ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF FINANCIAL PERFORMANCE OF SELECTED COMMERCIAL BANKS IN ETHIOPIA: THE ROLE OF ICT.

BY

ENDALKACHEW MEKONNEN ALI

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A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY SCHOOL OF GRADUATE STUDIES IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION IN ACCOUNTING AND FINANCE

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DECLARATION

I, the undersigned, declare that this thesis "Determinants of Financial Performance of Selected Commercial Banks in Ethiopia: The role of ICT" is my original work, prepared under the guidance of Zenegnaw Abiy (PhD). To the best of my knowledge, all sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

Signature: _____

Date: _____

Endalkachew Mekonnen Ali

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Signature: _____

Date: _____

Zenegnaw Abiy (PhD)

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Endalkachew Mekonnen Ali

Abbreviation

AIB: - Awash International Bank
AIS: - Accounting Information Systems
BOA: - Bank of Abyssinia
CB's: - Construction Bank's
CBE: - Commercial Bank of Ethiopia
CC: - Correlation Coefficients
CoBO: - Cooperative Bank of Oromiya
CI: - Condition Index
CSA: - Central Statistics Authority
DB: - Dashen Bank
EVA: - Economic Value Added
GDP: - Gross Domestic Product
GMM: - Generalized Method of Moments
HHI: - Herfindahl-Hirschman Index
IC: - Information Communication
ICT: - Information Communication Technology
IMF: - International Monetary Fund
NBE: - National Bank of Ethiopia
NI: - Net Income
NIM: - Net Interest Margin
OLS: - Ordinary List Square
POLS: - Pooled Ordinary Least Square
ROA: - Return On Asset
ROAA: - Return On Average Asset
ROAE: - Return On Average Equity
ROCE: - Return On Capital Employed
ROE: - Return On Equity
SCP: - Structure-Conduct-Performance
SSA: - Sub-Saharan Africa
TA: - Total Asset
UB: - United Bank
UK: - United Kingdom
VIF: - Variance Inflation Factor
WB: - Wegagen Bank

Acronyms

CLRM: - Classical Linear Regression Model

FEM: - Fixed Effect Model

MOFEC: - Ministry of Finance and Economic Cooperation

NIB: - Nib International Bank

REM: - Random Effect Model

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Abstract

This study sought to examines the determinants of financial performance of selected commercial banks in Ethiopia the role of ICT using eight Ethiopian commercial banks registered before 2004/05 at NBE, by using panel data of banks over the period 2005-2015. Since the data is secondary in nature, the quantitative approach to research was considered. The study used "descriptive research approach" and secondary financial data are analyzed by using multiple linear regressions (OLS) models for the bank profitability measure, return on asset (ROA) using E-views 9 econometric software. Besides, the random effect model was used. The random effect model is preferred to the fixed effect model based on the hausman specification test. Under this study, both internal and external factors were included. The internal factors used in this study include ICT, operating cost, income diversification, deposit to total assets, whereas the external factors are market concentration, real GDP growth and inflation rate. Moreover, ROA were used as the performance measure. Based on the regression result, internal factors like ICT, operating cost, income diversity are significant key internal drivers of profitability of commercials banks in Ethiopia. Indeed, focusing and reengineering the institutions alongside these indicators could enhance the profitability as well as the performance of the commercial banks in Ethiopia. Among the external factors included in this study market concentration has negative significant effect on profitability of Ethiopian commercial banks. Regarding GDP and inflation it has negative insignificant and positive insignificant effect on performance respectively. From the study result, it is also observed that commercial banks in Ethiopia has low experience of evaluating information technology investments before and after investment is made. In general, the research concluded that banks will have better future with more technological advancements, if they are able to make sound information technology related investments with good management and IT governance system. This is a clear signal to all commercial banks in Ethiopia that they can more concentrate on internal driver without ignoring the industry and macroeconomic indicators when strategizing to improve ROA.

Key word: ICT, ROA, profitability/performance, financial institutions, commercial banks.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

As a financial intermediary, banks play a pivotal role in the operation of an economy. They channel funds from surplus spending unit to deficit spending unit for saving and investment which is important for one's country economic growth. During the last decade the banking sector around the world has experienced major transformation in its environment due to improvement in the requirement of financial services and high tech facilities, resulting in significant impacts on its profitability (Mohana et al., 2012).

Short (1979) and Bourke (1989) indicate the determinants of commercial bank's profitability can be divided into two main categories namely the internal determinants which are management controllable and the external determinants which are beyond the control of the management of the institutions. Following early work of Short (1979) and Bourke (1989), a number of more recent studies have attempted to identify some of the major determinants of bank profitability. Researches on the determinants of bank profitability were focused on both the returns on assets, equity, and net interest rate margins as a profitability measures. It has traditionally explored the impact on bank performance of bank specific factors, such as risk, market power, and regulatory costs. More recently, research has focused on the impact of macroeconomic factors on bank performance (IMF, 2002).

According to Devinaga (2010) internal determinants of commercial banks' profitability can broadly be classified as financial statement variables and non-financial statements variables. The former includes factors related to the decisions which directly affect the items in a balance sheet and profit & loss accounts. On the other hand, the latter involve those factors which do not have a direct impact on the financial statements. The external determinants of commercial bank profitability are, those factors which are external to the commercial banks' and hence outside the control of management. Several specific factors suggested as impacting the profitability of commercial banks' which are financial regulation, competitive conditions, concentration, market share, market growth, ownership, economic growth, interest rate and inflation.

A sound and profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system (Athanasoglou *et al*, 2005). Many studies have inspected the determinants of banks' performance in many countries around the world. Yadollahzadeh et al. (2013) studied the performance of commercial banks' in Iran for nine banks' over the period of 2006-2010 by using panel regression method. The authors used ROA and ROE as dependent variables which are separately examined by explanatory variables including bank size, asset management, capital adequacy ratio, gearing ratio, nonperforming loans and operating efficiency. The research result reveals that the first three variables have a positive effect on the performance of commercial banks' while the latter three have a negative effect on the performance.

Ezra (2013) studied the determinants of commercial banks' profitability in Sub-Saharan African (SSA) countries by using unbalanced panel data of 216 commercial banks' taken from 42 countries in SSA for the time period of 1999-2006. The independent variables were growth in bank deposit, growth in bank asset, capital adequacy, operational efficiency and liquidity ratio including the external variables such as GDP growth and inflation. The result reveals that both the internal and external factors explain variation in commercial bank profitability over the study period. Furthermore, Okoth et al. (2013) showed that bank specific factors significantly affect the performance of commercial banks', except for liquidity variable.

In Ethiopia, numbers of studies are conducted on the determinants of the commercial bank performance but their result is not conclusive and has no consensus in the banking literature about the determinants of bank performance (Mohana *et al*, 2012). Additionally, those authors didn't include important variables like ICT and deposit to total asset as a determinant variable. Since ICT and deposit to total asset are important variables that affect the performance of Ethiopian commercial banks'. Eyob (2010), Wubshet (2011) made study on capital investment decision on IT and its impact on Ethiopian private commercial banks'. On the other hand, to the best knowledge of the researcher studies are not made on determinants of Ethiopian commercial banks profitability by incorporating ICT as one of determinant factor. This study examines the determinants of bank performance in Ethiopia by including these important variables over the period of 2005-2015. This helps the bank managers to give due emphasis on the management of identified variables and provides them with understanding of activities that enhance their bank performance.

1.2. History of Banking in Ethiopia

Modern banking in Ethiopia was introduced in 1905. At the time, an agreement was reached between Emperor Menelik II and a representative of the British owned National Bank of Egypt to open a new bank in Ethiopia (Habtamu, 2012). February 15, 1906 marked the beginning of banking in Ethiopia history when the first Bank of Abyssinia was inaugurated by Emperor Menelik II. It was a private bank whose shares were sold in Addis Ababa, New York, Paris, London, and Vienna. In 1931, Emperor Haile Selassie introduced reforms into the banking system and the Bank of Abyssinia was liquidated and became the Bank of Ethiopia, a fully government-owned bank providing central and commercial banking services until the Italian invasion of 1936 (NBE, 2012).

During the Italian invasion, Bank of Italy was formed a legal tender in Ethiopia. In 1943, after Ethiopia regains its independence from fascist Italy, the State Bank of Ethiopia was established, with two departments performing the separate functions of an issuing bank and a commercial bank. In 1963, these functions were formally separated and the National Bank of Ethiopia (the central and issuing bank) and the Commercial Bank of Ethiopia are formed (NBE, 2012).

In the period up to 1974, several other financial institutions emerged including the state owned as well as private financial institution. State owned financial institutions includes; The Agricultural and Industrial Development Bank (Finance state owned enterprises), The Savings and Mortgage Corporation of Ethiopia, The Imperial Savings and Home Ownership Public Association (Provided savings and loan services). In addition, private financial institutions of the time include; Addis Ababa Bank, Banco di Napoli, Banco di Roma (Habtamu, 2012)

After 1974, the banking business could not move further because of the nationalization of private investments by the socialist regime that came into power leaving only three government banks'; the National Bank of Ethiopia, the Commercial Bank of Ethiopia and agricultural and Industrial Development Bank (Mortgage Bank). This was reversed when the socialist regime was overthrown in 1991. Subsequently, the licensing and supervision of Banking Business Proclamation No. 84/1994 was issued in 1994 which led to the beginning of a new era for Ethiopia banking sector (Ebisa, 2012). Immediately after the enactment of

the proclamation private banking companies began to flourish, leading to 16 private banks' and one public owned commercial bank (excluding the two non-commercial public owned banks' which are Development Bank and Construction and Business Bank) operating in Ethiopia as of the current year 2015/16. Generally, the following five principal events have been occurred in Ethiopian banking history related to Ethiopia political instability since 1905. (NBE, 2015)

1st Establishment of the Bank of Abyssinia in 1906 marked the advent of banking in the country.

2nd Fascist Italian invasion in 1936, when, following liquidation of the Bank of Ethiopia, a broad colonial banking network, extended to encompass all Italian possessions in the Horn of Africa (Eritrea, Ethiopia and Somalia) and closely linked with the metropolitan financial system, was set up in the country.

3rd In 1943, establishment of the State Bank of Ethiopia, was marked the re-birth of the Ethiopian independent banking. This occurred during World War II after liberation from fascist Italy.

4th Revolution of 1974, which wiped out the monarchy, nationalized companies and shaped a "socialist banking" the whole credit system was being based on central bank and three state-owned financial institutions, each of them enjoying monopoly in its respective market.

5th Collapse of socialist regime followed by a financial sector reform and liberalization according to Monetary and Banking Proclamation number 84/1994

1.3. Statement of the Problem

Commercial banks play a significant role in the economic development of countries by allocating resources and channel funds from savers to investors continuously (Okoth et al. 2013). To do so, they can get necessary earnings to cover their operational cost they incur. For sustainable intermediation functions banks need to be gainful. Beyond that, the financial performance of banks has critical implications for economic growth. Good financial performance rewards the shareholders for their investment. This in turn, gives confidence for additional investment and brings about economic growth. Conversely, poor performance may lead to bank failure and crisis which have negative consequence on the economic growth (Okoth et al. 2013).

Today it becomes extremely essential to examine commercial banks' performance because their survival in the dynamic economic environment will be dependent upon their good performance. So, there wellbeing and successful operation captures the interest of different researchers and other professionals. Thus, studies have examined the determinants of banks'' performance in many countries around the world.

Even though a lot of literatures are developed to examine the determinants of banks' performance, those studies show different and even contradictory results. For instance, the impact of bank size on banks' performance is hotly debated among researchers. While Mohana and Tekeste (2012) for Ethiopian banks', Yadollahzadeh et al. (2013) for Iran banks', Nassreddine et al. (2013) for Tunisian banks', Masood et al. (2012) for Islamic banks', Alkhatib (2012) for Palestine banks' have found economies of scale for large banks', Dietrich et al. (2009) for Switzerland banks', Birhanu (2012) for Ethiopian banks', Ezra (2013) for sub Saharan African banks' have found diseconomies of scale for large banks'.

Today, a broad opening in technology has been experienced in the world for banks' and they are currently taking advantage of these innovations to provide same improved and accessible services to customer that will enhance bank performance (Akinuli, 1999; Ovia, 2005). Some posit a positive relationship between ICT investment and bank performance (Becchetti, et al., 2003; Hernando and Nieto, 2007; Indjikian and Siegel, 2005) some argue to the contrary (OECD, 2004; McKinsey, 2004).

In Ethiopian banking sector, the context for making ICT investment decisions has been altered in the recent years (Eyobe, 2010). Furthermore, while the previous studies made by Wubshet (2011) have focused on the relationship between capital investment on ICT product and bank profitability. They point out ICT and performance has negatively correlated. However, despite the fact that banking in Ethiopia is one of the industries being transforming by ICT, still there exist insufficient studies and lack of enough evidences of ICT investment and its impact on banks' profitability (Access capital, 2010). Belayneh (2011) and Amdemikael et al. (2012) studied the determinants of commercial banks' profitability in Ethiopia. Further studies were made by Birhanu (2012) and Habtamu (2012) but they didn't include ICT as important variables that affect profitability.

Thus, whether the level of investment in ICT actually brings real benefits to the banks' or not is still a matter of concern in academic circles. Hence, there is a need for further studies to contribute to the ongoing debate on the nature of the relationship between ICT investment and bank performance. Therefore, this study considers ICT, operating cost, income diversification, total deposit, market concentration, inflation and gross domestic product as a variable that determines banks' performance. In light of the above facts and research gaps, the aim of this study is to examine the effects of Bank performance determinant variables including ICT in commercial banks' performance in Ethiopia.

1.4. Objective of the Study
1.4.1 General Objectives

The general objective of this study is to evaluate determinants of financial performance of commercial banks in Ethiopia: the role of ICT.

1.4.2. Specific Objectives

In order to achieve the above general objective, the study has the following specific objectives:

- To examine the impact of ICT on commercial bank performance in Ethiopia.
- To evaluate the effect of operation cost on profitability of CB's.
- To evaluate the impact of income diversification on CB's performance in Ethiopia.
- To analyze the impact of total deposits and on CB's performance in Ethiopia.
- To evaluate the effect of Inflation rate on profitability of CB's.
- To examine the impact of GDP on Ethiopian CB's profitability.
- To evaluate the impact of market concentration on Ethiopian CB's profitability.

1.5. Research Hypotheses

In line with the broad purpose statement the following hypotheses were also formulated for investigation. Hypotheses of the study stands on the theories related to a bank's profitability that has been developed over the years by banking area researcher's and past empirical

studies related to a bank's profitability. The results from the literature review (to be established in the next chapter) were used to establish expectations for the relationship of the different determinants. Hence, based on the objective, the present study seeks to test the following nine hypotheses:

H_1. There is a significant positive relationship between ICT and performance of banks'.

H_2. There is a significant negative relationship between operating cost and bank performance.

H_3. There is a negative significant relationship between total deposit and bank performance.

H_4. There is a positive significant relationship between income diversification and bank performance.

H_5. There is a negative significant relationship between market concentration and bank performance.

H_6. There is a significant positive relationship between inflation and bank performance.

H_7. There is a significant positive relationship between gross domestic product and bank performance.

1.6. Significance of the Study

Well-organized and structured commercial banks are required for sustainable economic development of a country. Thus, this study is designed to investigate the significance of some major bank profitability determinants in Ethiopia commercial banking including ICT as one factor. As a result, identifying and understanding the bank profitability determinants in Ethiopia context could have a great importance to the researcher, Banks' managers and executives, NBE as a regulator of banks' and policy makers for bank policy adjustments.

This study initiates the commercial banks' managers and executives to give due emphasis on the management of identified variables and provides them with understanding of activities that enhance banks' performance from worldwide experience. On the other hand, the study has a great significance for external stakeholders such as investors those own shares on the banks', the community for which the financial service is provided, and NBE the governor, which regulate the sector for the sake of the safety of the public resource and sustainable economic development. Besides, the outcome of this study will improve the understanding of different stakeholders and policy makers towards the role of ICT in banking sectors as it

applied in Ethiopian commercial banks'. Additionally, the finding of the study is can minimize the literature gap in the area of the study especially in Ethiopia.

1.7. Scope and Limitations of the study

1.7.1. Scope of the study

The scope of this study is restricted to the relationship between Return on Asset with its determinants over the period 2005-2015. Even if there are so many factors such as capital adequacy, asset quality, management efficiency, earning quality, liquidity, bank size, technology, human capital, loan performance, GDP, bank concentration, inflation, regulation, income diversification, effective tax rate among others that affects commercial banks' performance, this study is limited to bank specific factors such as, ICT, operating cost, income diversification and deposit to total assets and external factors like GDP, inflation and market concentration that determine the financial performance of commercial banks' in Ethiopia.

Currently seventeen commercial banks are operating in Ethiopia, one is state owned and the others are privately owned. Thus, this study includes eight commercial banks' that are registered by NBE before 2004/05 namely, Commercial Bank of Ethiopia, Dashen bank, Awash International bank, Bank of Abyssinia, Wegagen bank, united bank, and Nib international bank, and Cooperative Bank of Oromiya. The data set will cover an 11-year period from 2005 to 2015 G.C.

1.7.2. Limitations of the study

During the study, the researcher also faced some uncontrollable (external) factors that affected the smooth implementation of the research. While conducting this research the following challenges or limitation constrain the researcher not to investigate exactly as it is proposed. This study was constrained by lack of consistent cost data's and slow response of some banks in giving out information associated with sophisticated IT equipment made by Ethiopian banks. Even though the researcher tried his best to design the research as properly as possible, these are some of the factors that hindered the outcome of the research. Future research is, therefore, recommended to address the above stated limitations.

1.8. Organization of the paper

This paper would be organized in five chapters. The first chapter presents the background of the study, background of the study area, statement of the problem, hypothesis, and objective of the study, significance of the study, and scope and limitation. The second chapter will present the review of related literature. The third chapter presents the methodology to be used to undertake the study. The fourth chapter will present discussion and analysis of the data gathered. The final chapter provides the summary, conclusion and recommendations**.**

CHAPTER TWO
2. REVIEW OF RELATED LITERATURE

This chapter presents the literature related with bank performance. Accordingly, the review of the literature is divided into two parts. The first part presented the theoretical foundation of performance determinants including ICT; the overview of the Ethiopian banking industry, economic significance of banks' and the factors affecting bank performance. The second part presents the review of previous studies done on the performance of commercial banks consists of both single country studies and panel country studies. Followed by the review of previous studies done on ICT and performance of CB's consists of both global and local studies.

2.1. Review of Theoretical Literature on banks' performance determinants
2.1.1. Review of Theoretical Literature on ICT
2.1.1.1. Technological Uprisings, Information and Growth

Although tremendous technological advances took place over the past 100 years in several sectors, such as transport, communications, electrification and medicine, recent ones are much more comprehensive and powerful. Their salient characteristics involve convergence and interaction of many strands of technological change, with social consequences far more profound and far more difficult to foresee. They fall into three basic categories or strings of technical changes: in materials, in biotechnology and in information (Hallberg and Bond, 2000). Research has discovered many new, innovative materials. Transport enjoys lighter materials for fuel efficiency; health care takes advantage of dynamic images and intelligent prosthetics; and the energy sector benefits from many new materials as well.

The banking business is becoming highly information technology based due to its inter-sectorial link; as it appears to be reaping from most of the benefits of revolution in technology, as it is seen by its application to almost all areas of its activities (Akinuli, 1999). Technology has broadened banking and as a result of this it has changed the nature of banking in competitive environment in which they operate or domiciled. A wide opening has therefore been experienced around the world for banks' and they are currently taking due advantage of these innovations to provide improved customer services in the face of competition and faster services that enhance productivity (Akinuli,1999; Ovia,2005).

Technological advancement facilitates payments and creates convenient alternatives to cash and cheque for making transactions. Such new practices have led to the development of a truly global, seamless and Internet enabled 24-hour business of banking. Technological advance in payments are important due to the fact that it will be feasible to outsource quite a number of the banks' role in the payments system. Also banks' regulation can be more technologically dependent and better focused rather than focusing on conceptual guidelines. ICT revolution both in terms of innovation rate, speedy operation, and cost per unit (portraying reduction in average total and marginal costs) has made a good number of banks' embrace the use of ICT infrastructure in their operations (Akinuli, 1999).

2.1.1.2. ICT Investment

Most of the initiatives regarding technology are aimed at providing better and more efficient customer service by offering multiple options to the customer. The death of distance, which is a by-product of technology, has become a reality in the banking sector. Technology is also playing a key role in banks'" strategies for gaining a competitive edge (Uppal, 2008). According to Alalade et. al. (2014), the application of information and communication technology concepts, techniques, policies and implementation strategies to banking service, has become a subject of fundamental importance and concern to all banks' and indeed a prerequisite for local and global competitiveness. ICT directly affects how managers decide, how they plan and what products and services are offered in the banking industry.

In recent years, the utilization of information technology has been magnificently increased in service industries, particularly, the banking industry, which by using information technology related products such as internet banking, electronic payments, security investments and information exchange, can deliver high quality services to clients with less effort (Kerim and Hamdam, 2010). Banking is vital to a healthy economy, but banks themselves are not" highlight the crucial nature of electronic forces that are affecting banks more than any other financial service provider group. This transaction of business operation by banks' have created new mode of operation called E-Banking (Mai *et. al*., 2007). Web based banking service or E-Banking, the latest generation of electronic banking transaction has opened up new opportunity to the existing banks' and financial institutions. It permits business process re-engineering, service borderless market, to achieve zero latency leading to improvements in

customer service levels and better risk management because of realtime settlement (Agrawall& Jain, 2013).

According to Uppal (2008), the relationship between IT and banking is fundamentally symbiotic. In the banking sector, IT can reduce costs, increase volumes, and facilitate customized products; similarly, IT requires banking and financial services to facilitate its growth. Alalade et. al. (2014) argued that the most significant shortcoming in the banking industry today is a wide spread failure on the part of senior member of management in banks to grasp the importance of technology and incorporate it into their strategic plans accordingly. He continued that banks should re-examine their service and delivery systems in order to properly position them within the framework of the dictates of the dynamism of information and communication technology. Many studies agreed that there is a positive relationship between ICT and performance of banking in terms of quality service delivery, customer satisfaction and attraction, employees" productivity, cost reduction, profitability, and effective decision making.

The advancement in technology has played an important role in improving service delivery standards in the banking industry. In its simplest form, Automated Teller machine and deposit machines now allow consumers to carry out banking transactions beyond banking hours. With online banking, individuals can check their account balances and make payments without having to go to the banking hall. There is also, mobile banking which allows individuals to check their account balance and make fund transfers using their mobile phones. This is gradually creating a cashless society where consumers no longer have to pay for all their purchase with hard cash (Wisdom, 2012). He finally conceded that the growth in the application and acceptance of internet-driven technology means that delivering an enhanced service is more achievable than ever before.

Michael (2001) defines information technology (abbreviation IT) as science and activity of storing and sending out information by using computers. It is related to all aspects of managing and processing information, especially within a large organization or company. On the other hand, Information technology, defined by Rodney L. Stump, (1996) includes computer hardware, software, and communications systems, as well as the personnel and resources dedicated to supporting these capabilities. Such investments are made to facilitate

information management, that is, the compilation, analysis, and dissemination of task-related information.

Investment made on information technology resources can be classified as: tangible resources that comprising the physical IT infrastructure components, human IT resources that comprising the technical and managerial IT skills, and intangible IT resources, such as knowledge assets, customer orientation and synergy (C.Zehir, B.Muceldili, B.Akyuz and Ali Celep 2010). IT investments may be deployed company-wide or more narrowly to support specific functions or projects (Rodney L. Stump 1996). IT is heterogeneous phenomenon comprises different kinds systems used to achieve varying managerial objectives. There has been a rising trend in IT expenditure over the last two decades (Benchmark Research, 1997), which corresponds to the mass of IT products now available in the market. Such new products pose in ever increasing problem to managers, as they constantly have to invest and justify their decisions to update software and hardware to keep abreast of their competitors.

ICT investment decision is the most important decision management faced on every organization to shape the future of the business and its ability to manage its future operations. They are generally difficult and expensive to reverse. So they need to be right first time. In making capital investment decisions, managers aim to maximize shareholder wealth by maximizing long term returns, taking account of risk and liquidity.

Organization investment decision on information technology is one of the most critical and enormous amount of fund requiring investment. Most organization currently depending on information technology to be competitive on ever increasing sophisticated world. Eyob (2010) defined IT capital investment as any acquisition of computer hardware, network facilities, or pre-developed software, or any "in-house" systems development project, that is expected to add to or enhance an organization's information systems capabilities and produce benefits beyond the short term. Various studies demonstrate that many firms are in fact becoming dependent on IT, however investing in IT can be an extremely expensive and time-consuming process and its justification is difficult to quantify because of ineffective Information Management Systems (IS). Investment on information technology is known as the most challenging investment decision for mangers; due to the difficulty of measuring its return. For some organizations IT investment requires basic structural change within the organization; which is most of the time becoming reason for failure of IT investment.

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Brynjolfsson (2003) and Karl Westerlind (2004) show that when investments of this sort are supplemented with restructuring in the organization, the return occur faster.

Decisions making on information technology investment is the process of three major interdepending phases staring from selecting the appropriate investment to its implementation, management and control. Select phase which is the first phase organizations identifies and analyzes each project's risks and returns before committing significant funds to any project and selects those IT projects that will best support its mission needs. This process should be repeated each time funds are allocated to projects, reselecting even ongoing investments has to pass on this phase. The second phase is control phase on which the organizations ensures that, as projects develop and investment expenditures continue, the project continues to meet mission needs at the expected levels of cost and risk. If the project is not meeting expectations or if problems have arisen, steps are quickly taken to address the deficiencies. If mission needs have changed, the organization is able to adjust its objectives for the project and appropriately modify expected project outcomes. The third phase is known as evaluate phase, actual versus expected results are compared after a project has been fully implemented. This is done to (1) assess the project's impact on mission performance, (2) identify any changes or modifications to the project that may be needed, and (3) revise the investment management process based on lessons learned.

The investment process does not end with the evaluation phase. A project can be active concurrently in more than one phase of the select/ control/ evaluate model. After a project has been designated for initial funding in the select phase, it becomes the subject of evaluation throughout the control phase for the purposes of reselection. Reselection is an ongoing process that continues for as long as a project is receiving funding. If a project is not meeting the goals and objectives that were originally established when it was selected, or if the goals have been modified to reflect changes in mission objectives and corrective actions are not succeeding a decision must be made on whether to continue to fund the project. Ultimately, "deselection" can be one of the most difficult steps to implement, but it is necessary if funds can be better utilized elsewhere. Once projects are operating and being maintained, they remain under constant review for reelection.

2.1.1.3. Evaluating ICT Investment Decisions

IT investment decisions in an organization are long term huge capital requiring investments decisions; which is assumed to benefit the organization in the long run. There is general agreement that investment decisions are the most important decisions made by corporations. Harris and Raviv (1996) extend the choice of projects and the levels of investment are critical not only for stakeholders of the firm but also for the economic well-being of society as a whole. Investments like information technology requires large amount of capital and so that critical evaluation both before and after investment should be made. Evaluating the value of information technology investments only from the financial perspectives likely to understate the value of investment made and there would also lay a risk in underestimating the cost versus the benefit of an IT investment (Karl, 2004).

Organizational change fueled by the expansion of information technology, may have contributed to the erosion of the previously established relationship between company size and the quantitative investment appraisal criteria selected (Alan Sangster, 1993). Eyob (2010) argue traditional investment appraisal techniques have been useful in the past, when the business environment was easily predictable and stable but with the today's business environment where things are more and more unpredictable and unstable the utility of the traditional investment appraisal techniques have been questioned greatly.

The payback period is the time it takes for the cash flows generated by a project to pay back the initial cash outflows (for capital investment, working capital and initial costs) at the start of the project (capital investment appraisal). Khakasa (2009) survey made on east Africa showed payback period method of investment appraisal is the most widely used technique. A given project with smaller amount of payback period is preferred from that has larger number of payback period. Karl Westerlind (2004) relate payback period to IT investment as a key measurement of risk calculations, the shorter the period, the better, this is because the technology has tendency of rapid change. One of the problems related to pay back period method is it fails to consider other factors rather than cash flows such as profits and non-cash measures like deprecation and other immeasurable factors.

Net present value method is the sum of the present values of all the cash flows associated with an investment project (capital investment appraisal). The project should be accepted if

NPV calculated is positive; the reasoning behind this is that when there is a positive NPV the project offers a return in excess of the cost of capital and acceptance of such a project will increase the wealth of the company. For a negative NPV project the cost of capital is not covered and acceptance of such a project will reduce the value of the firm. Using NPV method on information technology investment like that of payback period failed to consider technological benefits that are difficult to quantify. Internal Rate of Return (IRR) is often used in order to decide in which alternative to invest in. Using IRR involves calculating an investments expected return and can be used to compare different investment alternatives (Karl Westerlind, 2004). By using discounting factor evaluation can be made between alternative investment ideas while calculating their IRR. The outcome of the calculation should equal zero and therefore the better of the alternatives is then likely to be invested in.

Accounting rate of return (ARR) is another traditional method of evaluating capital investment projects which expresses the profit from an investment as a percentage of the investment. The profit is the accounting profit, calculated as in the profit and loss account, and may be calculated before or after tax. It is usually the average profit over the life of the project. The investment includes fixed assets and working capital specific to the project, valued in the same way as in the balance sheet, and is usually also averaged over the life of the project. The ARR for the project is usually compared with a company, group or divisional target.

The above discussed traditional investment appraisal techniques used to evaluate benefits and costs of a given investment before enormous amount of capital is toss. But for information technology investments the chance of using these techniques and be successful on deciding the best investment decision is difficult. Measuring the intangible benefits and costs of information technology investment is one of the major problems that traditional investment appraisal techniques such as payback period, NPV and IRR faced. Also Peter E.D, Zahir and David J, (2004) said these techniques ignore the impact that the system may have in human and organisational terms. Companies may, therefore, be left questioning how to compare a strategic investment in IT, which delivers a wide range of intangibles, with other corporate investments whose benefits are more tangible. In addition to these, the risk associated with future technological advancements that can affect the likely benefits of information technology adopted is also one of the problems that cannot be dealt using this technique. (Eyob 2010 and Karl 2004).

Organizations frequently face the IT project evaluation and selection problem. Numerous studies have shown that modern organizations are not able to function effectively and efficiently without appropriate development and implementation of IT projects for satisfying the increasing expectation of the stakeholders for organizational performance. As a result, making the right decision on IT projects to develop and implement is of critical importance in every modern organization for their profitability and even survivability in today's dynamic environment.

Choosing an evaluation approach that reaches beyond the traditional boundaries of financial evaluation (for example, direct cost analysis and cash flow projections) is increasingly important, and many factors associated with developing a robust IS requires a business, user and technology context (Peter E.D et al 2004 p - 457). Related researches further stressed the fact that financial transparency is paramount so as to ensure a suitable return on investment, other strategically softer, political and social factors need to be considered during the evaluation process. To select the most appropriate IS project for development; the decision maker usually needs to

(a) Evaluate the performance of all the available IS projects,
(b) Assess the relative importance of the selection criteria,
(c) Aggregate the assessments for producing an overall performance index value for each available IS project alternative across all criteria on which a final decision can be made.

2.1.1.4. Investment on ICT and Organization Performance

Productivity paradox refers to an investment on information technology in the 1980s, on which most studies point out the relation between information technology and organizational performance was negative that information technology has no significant effect on organizations, industries and economy as whole (Solow, 1987).

There are some reasons why the productivity paradox exists. The main reason is likely to be due to measurement errors of IT capital (Brynjolfsson, 1993). This can be due to rapid price and quality changes, and failure of economic statistics to measure qualitative improvements in the output of service industries. Since most studies were made in the United States and lots of technological advancements have been witnessed since then, the 1980s productivity

paradox face time and space gap in order to use them on current information technology investments.

Information technology (IT) can be accepted as a unique resource in a firm in the ends of the 20th century and 21th century (Cemal et al, 2010). Investment on information technology is most of the time assumed to add value to the organization even though measuring the ultimate benefit and return is difficult. But in general anticipated benefits from technology investments include reduced costs, improved quality, increased flexibility, improved customer satisfaction, higher productivity and ultimately, higher financial performance and coordination (Cemal et al 2010; Westerlind 2004 ; Eyob 2010; Lu & Huang 2009 and Shirley & Sushanta 2006).

According to much theoretical and empirical evidence, IT offers benefits for a wide range of business processes and improves information and knowledge management within the firm, leading to better performance. Firms can manage their processes more efficiently and, as a consequence, they increase their operational efficiency. Moreover, IT reduces the coordination costs of the firm because of lower procurement and inventory costs and closer coordination with suppliers (Tachiki, 2004 and OECD, 2004). In addition, communication based on IT and the internet can also improve external communication, reducing the inefficiencies resulting from lack of coordination between firms, and increasing the speed and reliability of information processing and transfer. In general, IT reduces transaction and coordination costs, maximizing the value of the transactions (OECD, 2004).

The relation between information technology and organizational performance is depend on many factors simply investing large amount of capital on information technology do not create value. IT investments alone cannot be taken as a sole factor for the profits of a firm. There appears to be no doubt as to the business value of IT (Eyob, 2010), but the dimension and extent of the business value of IT depends on a varied array of factors. Business value of information technology is depending on many external and internal factors. IT is an input in the production process and there is an interaction between IT and other inputs. Recently, the empirical literature has begun to reassess the association between IT and a wide variety of complementary factors (Arvanitis and Loukis, 2009; Giuri, 2008 and Aral & Weill 2007), with a consensus emerging that, in order for IT to be properly utilized, it must be used in conjunction with complementary resources such as organizational structure, human resources

or organizational resources (Ana and Walton, 1989; Bélanger and Collins, 1998; Bresnahan et al., 2002; Mata et al., 1995; Ramírez et al., 2001; Peppard and Ward, 2004; Aral et al., 2010).

2.1.1.5. ICT Investment in Commercial Banks

Recently, the world has witnessed a great development and a rapid change in the global banking environment as the circumstances obligated the banking industry to reconsider its structure, laying down strategies and the means used to achieve them in a world where the concepts became different and diversified and the competition turned out to be the foundation on both the domestic and international area. (Saeed and Bampton, 2013)

Information technology has become the heart of banking sector while banking industry is the heart of every economy (Alhaji and Rosmaini, 2012). The recent economic crisis in the world raised from banking industry can be seen as proof for the influence of the industry on the world. Technology is now a day's becoming key element to overcome challenges in modern banking business such as performance improvement, customer's satisfaction and quality of service delivered. Through the introduction of IT related products in internet banking, electronic payments, security investments, information exchanges (Berger, 2003) banks now can provide more diverse services to customers with less manpower. Seeing this pattern of growth, it seems obvious that IT can bring about equivalent contribution to profits.

In response to the demands for quick, efficient and reliable services, industry players are increasingly deploying technology as a means of generating insights into customers' behavioral patterns and preferences. Well-developed outsourcing support functions (technology and operations) are increasingly being used to provide services and manage costs (e.g. Automated Teller Machine networks, cards processing, bill presentment and payments, Software Development, Call center operations and Network management). (Oluwagbemi et al, 2011).

Technology investments in banks have two dimensions first one is technological investments which are directly related to customers. Using the techniques of electronic banking such as home banking services via the internet, which exceeds the dimensions of space and time, automated teller machines (ATMs) where customers can easily access their account from any geographic location, point of sale (POS) machines which avoids unnecessary cash on hand

while shopping in trade centers, mobile banking and etc. Such IT investments provide banking services that achieve advantages for both banks and customers in the provision of banking products and services (Saeed & Bampton, 2013) and the second information technology investments in banks is investment made on various software's and applications that banks use for internal work such software used in payroll processing, financial and other report preparation, stock management, purchasing and others. Both kinds of investments enable banks to improve their performances. It is believed that IT can improve bank's performance in two ways: according to Saeed and Bampton, (2013) IT can reduce operational cost (cost effect), and facilitate transactions among customers within the same network (network effect). In the prior decades IT capital investment is more intensive in financial sectors, specifically in banks.

According to Heike (2012), In America, Europe and Asia financial services firms spend more on IT than other industries do. This author specified the ratio of IT expense and costs to the revenue and operating income of banks and the banks' expenses for IT equal 7.3% of their revenues and IT costs at 4.7% to 9.4% of operating income. In the future growth on IT investment will continue. Shaukat and Zafarullah (2009) indicated IT spending by the banking sector will grow at a healthy rate of 3.8% during 2009 to reach $63.6 billion in 2013. Even though there are different reasons for the higher use of IT in banks this author identified the following main reasons (Girma, 2012)

1. As a financial service firms have to fulfill regulatory requirements which translate into IT costs that do not contribute to the firms' earnings.
2. Banks rely heavily on IT in their back offices as well as their distribution channels

2.1.1.6. Management of ICT Investment

Further, other studies have demonstrated that IT management capabilities, or the managerial skills associated with acquisition, management and use of information technologies, have significant impact on business performance (Bharadwaj 2000; Santhanam et al. 2003; Sunil, Narayan, M. S. Krishnan and V. Sambamurthy (2003). IT Management is managerial skills for the acquisition, management, and use of IT in key business processes and strategies and include IT infrastructure capability, IS-business partnering, solutions delivery, vendor partnering, and strategic planning as key IT capabilities (Sunil, Narayan, M. S. Krishnan and

V. Sambamurthy, 2003 p3-4). Because of large amount of capital investment, over all IT practice in an organization has to have strong management and IT governance structure so that the appropriate benefit from IT can be fully utilized. To strengthen this doubt, Senft and Gallegos (2009) argue that as high-speed information processing has become indispensable to organizations' activities, from a worldwide perspective, IT processes need to be controlled and from a historical standpoint, much has been published about the need to develop skills in the field of IT audit and control. This is because when information systems or technology fail, they often cause significant impacts on shareholder value (Parent and Reich, 2009).

Mullineux (2006) also claimed that banks are special because their managers have duty to (more risk averse) depositors as well as (more risk prone) shareholders and thus a solution to the "principal-agent problem" aimed at maximizing shareholder value is inappropriate. Gruttner (2010) claimed that more than a way to create competitive advantage, IT plays a fundamental role in the banking market and IT Governance provides tools to manage IT structures and processes in order to appropriately support the business strategy. Implementing new IT Governance in financial institutions may be very challenging, especially when technical literature has not many examples in developing markets. Hence, the overall governance of banks and their IT governance in particular would be of critical interest for academia as well as practitioners.

2.1.1.6.1. Business Models, Commerce and Market Structure

The major way in which information technology is affecting work in today's organization is by reducing the importance of distance. In industries, the geographic distribution of work duty is changing significantly. Therefore, for instance, some software firms have found out that they can actually overcome the tight local market for software engineers in sending projects to India or other nations of the world where the wages are reduced. Furthermore, this type of arrangements can take advantage of the time differences so that critical projects can be worked on. Firms today can outsource their manufacturing to other nations of the world and rely mostly on telecommunications to keep marketing and distribution teams in close contact with the manufacturing company.

Information technology can enable a finer division in terms of labor among countries, which in turn affects the demand for various skills in each nation. Technology enables various types

of work and employment to be decoupled with one another. Firms have more freedom to locate their economic activities, labor, capital, creating greater competition among regions in infrastructure, and other resource markets. It also opens opportunity for regulatory arbitrage: firms can increasingly choose which tax authority and other regulations they want or intend to adopt. An infrastructure of computing and communication technology, providing 24-hour access at low cost to almost any kind of price and product information desired by buyers, will reduce the informational barriers to efficient market operation.

Information is a critical and powerful. Timely availability of relevant information is vital for effective performance of the organization and managerial functions. In much organization information system is like the nervous system in the human body. Certainly, today's organizations run on information. An information system encompasses transaction processing systems, decision support systems, management information systems and strategic information systems (kabiru and Idandago, 2012).

Information Technology Association of America (ITAA) has defined ICT as "the study, design, development, application, implementation, support or management of computer based information systems." Khalifa (2000) define ICT is the automation of processes, controls, and information production using computers, telecommunications, software and ancillary equipment such as automated teller machine and debit cards. William & Sawyar (2005) define ICT as "a general term that describes any technology that help to produce, manipulate, process, store, communicate, and/or disseminate information". This definition is the comprehensive one; it covers all aspects discussed by different researchers.

Irechukwu (2000) lists some banking services that have been revolutionized through the use of ICT as including account opening, customer account mandate, and transaction processing and recording. ICT has provided self-service facilities it assists customers to validate their account numbers and receive instruction on when and how to receive their cheque books, credit and debit cards. Stand from the above author definition we can be said that ICT concept came from a merging of computer with communications technologies, when computer and communications technologies are combined, the result is ICT.

2.1.1.6.2. Factors affecting banks' performance

Different studies undertaken on the performance of banks' suggest that banks' performance is affected by both internal and external factors (Nassreddine *et al*. 2013; Okoth *et al*. 2013; Ezra, 2013) and these factors affect the performance of banks' positively or negatively. Nassreddine et al. (2013) stated that some of the factors that affect the performance of the bank could be under the control of banks' management and the others could be beyond management's control. Those factors which could be under the control of the management are called internal or bank specific factors.

According to Mohana *et al*. (2012) they are so called bank specific factors because depending on the likely impact they have on the profitability of the bank they can be reinforced (positive treatment) or weakened (negative treatment) by the management of the bank. The major internal factors that affect performance of banks include: capital structure, asset quality, management efficiency, earning quality, liquidity, bank size, technology, human capital, loan performance and income diversification among others. Moreover, those factors which are beyond the management's control are referred as external or macroeconomic factors and these factors are related to the industry and macroeconomic factors. These factors include: bank concentration, inflation, real GDP growth, effective tax rate, interest rate, among others.

2.1.2. Review of empirical literature on determinants of bank performance

This section gives a brief review of the previous studies made on the determinants of bank performance from both developed and developing nations. Thus, empirical works done on the determinants of bank performance have focused on either a panel of countries (Masood *et al*., 2012; Demirguc *et al*., 1999; Sufian *et al*., 2009; Ezra, 2013; Goddard *et al*. 2004*;* Bashir, 2003) or on an individual country (Athanasoglou *et al*., 2005; Kumbirai and Webb ,2010; Tan and Floros, 2012; Yadollahzadeh *et al.,* 2013; Dietrich *et al*., 2009; Gul *et al.*, 2011; Sufian *et al*., 2009; Okoth and Gemechu, 2013; Ghazouani et al., 2013; B.S. Badola et al., 2006); Dinh, 2013; Alkhatib, 2012). Moreover, most of the studies undertaken on bank performance consider both internal and external factors to examine performance of banks'. So, the determinants of bank performance studies conducted in a single country, panel country and studies made in Ethiopia are reviewed as follows.

2.1.2.1. Panel country studies

Demirguc-Kunt and Huizinga (1999) Using bank level data for 80 countries in the 1988-1995 period, they show that differences in interest margins and bank profitability reflect a variety of determinants: bank characteristics, macroeconomic conditions, explicit and implicit bank taxation, deposit insurance regulation, overall financial structure, and several underlying legal and institutional indicators. Controlling for differences in bank activity, leverage, and the macroeconomic environment, they found that a larger bank asset to GDP ratio and a lower market concentration ratio lead to lower margins and profits. Moreover, foreign banks' have higher margins and profits compared to domestic banks' in developing countries, while the opposite holds in developed countries. Also, there is evidence that the corporate tax burden is fully passed on to bank customers.

Bashir (2003) undertook study to analyze how bank characteristics and the overall financial environment affect the performance of Islamic banks'. Utilizing bank level data, the study examines the performance indicators of Islamic banks across eight Middle Eastern countries between 1993 and 1998. A variety of internal and external banking characteristics were used to predict profitability and efficiency. In general, his analysis of determinants of Islamic banks'' profitability confirms previous findings. Controlling for macroeconomic environment, financial market structure, and taxation, the results indicate that high capital-to-asset and loan- to-asset ratios lead to higher profitability. The results also indicate that foreign-owned banks are likely to be profitable. Everything remaining equal, the regression results show that implicit and explicit taxes affect the bank performance and profitability negatively while favorable macroeconomic conditions impact performance measures positively. His results also indicate that stock markets and banks' are complementary to each other.

The profitability of European banks' during the 1990s is investigated by Goddard *et al*. (2004) using cross-sectional, pooled cross-sectional time-series and dynamic panel models. They use cross-sectional and dynamic panel estimation to investigate selected determinants of profitability in six major European banking sectors: Denmark, France, Germany, Italy, Spain and the UK, for the period 1992-98. Models for the determinants of profitability incorporate size, diversification, risk and ownership type, as well as dynamic effects. Despite intensifying competition there is significant persistence of abnormal profit from

year to year. The evidence for any consistent or systematic size-profitability relationship is relatively weak. The relationship between the importance of off-balance-sheet business in a bank's portfolio and profitability is positive for the UK, but either neutral or negative elsewhere. The relationship between the capital–assets ratio and profitability is positive.

Sufian et al. (2009) uses a sample of 389 banks' in 41 SSA countries to study the determinants of bank profitability from 1998 through 2006. Their study is based on an unbalanced panel of SSA commercial banks'. They use the return on assets (ROA) as a measure of bank profitability. They use independent variables namely, credit risk, activity mix, capital, bank size, market power, GDP and inflation. They found that apart from credit risk, higher returns on assets are associated with larger bank size, activity diversification, and private ownership. Bank returns are affected by macroeconomic variables, suggesting that macroeconomic policies that promote low inflation and stable output growth do boost credit expansion. The results also indicate moderate persistence in profitability. Causation in the Granger sense from returns on assets to capital occurs with a considerable lag, implying that high returns are not immediately retained in the form of equity increases. Thus, the paper gives some support to a policy of imposing higher capital requirements in the region in order to strengthen financial stability.

Masood and Ashraf (2012) undertook study on the determinants of Islamic banks' profitability in case of different countries by taking 25 banks' out of 12 countries for the period of 2005-2010.The objective of their study was to inspect whether bank-specific and macro-economic determinants influence Islamic banks'' profitability in the selected countries of different regions by using the balanced panel data regression model. They used ROA and ROE as profitability measure and considered both micro and macro variables as determinants of profitability. The micro determinants include asset size, capital adequacy, asset quality, liquidity, deposits, Assets Management, Operating efficiency, Gearing Ratio, Financial Risk and macro factors included GDP growth and inflation rate. Their study results reveals that, banks' with larger assets size and with efficient management lead to greater return on assets and also their result shows that management efficiency regarding operating expenses positively and significantly affects the banks'' profitability.

Ezra (2013) undertake study on the determinants of commercial banks' profitability in sub-Sahara Africa using an unbalanced panel of 216 commercial banks' drawn from 42 countries in SSA for the period 1999 to 2006.He employed the random effect panel methods to estimate bank profitability. Growth in bank asset, growth in bank deposit, capital adequacy, operational efficiency, liquidity ratio, growth in GDP and inflation are an explanatory variable. The findings show that the bank level variables such as capital adequacy and growth in bank deposits have positive influence on bank profitability. According to the study, Positive growth of in these indicators could be results of banking sector liberalization that has been implemented in most of SSA countries since 1980s and 1990s.on the other hand, growth in bank assets, operational efficiency and bank liquidity indicators have negative effect on bank profitability. The negative effect of these indicators could be explained by disproportionate accumulation of assets through merger and acquisitions of foreign based banks at high costs that has occurred in SSA in the last two decades. On the other hand, negative effect of bank liquidity can be explained by low bank lending. For macro-economic variables, Francis M.E found that both growth in GDP and inflation had a negative effect on bank profitability.

2.1.2.2. Single country studies

The aim of the study made by Athanasoglou et al. (2005) is to examine the effect of bank-specific, industry specific and macroeconomic determinants of bank profitability, using an empirical framework that incorporates the traditional Structure-Conduct-Performance (SCP) hypothesis and they apply a GMM technique to a panel of Greek banks' that covers the period 1985-2001. They used independent variables like Capital, credit risk, productivity, expense management, size, ownership, concentration, inflation and business cycle. According to the empirical results, capital is important in explaining bank profitability and that increased exposure to credit risk lowers profits. Additionally, labor productivity growth has a positive and significant impact on profitability, while operating expenses are negatively and strongly linked to it. The estimated effect of size does not provide evidence of economies of scale in banking. Likewise, the ownership status of the banks' is insignificant in explaining profitability, denoting that private banks' do not in general make relatively higher profits, at least during the period under consideration. Also, the SCP hypothesis is not verified, as the effect of industry concentration on bank profitability was found insignificant.

Badola *et al*. (2006) made an attempt to identify the key determinants of profitability of public sector banks' in India. The analysis is based on step-wise multivariate regression model used on temporal data from 1991-92 to 2003-04. The study has brought out that the explanatory power of some variables is significantly high. Such variables include non-interest income (NII), operating expenses (OE), provision and contingencies (P&C) and Spread. However, some variables namely credit/deposit ratio, NPAs and business per employee (BPE) are found with low explanatory power. Hence, the variables non-interest income, operating expenses, provision and contingencies and spread have a significant relationship with net profit. Among them two variables P&C and OE are found having negative relationship. Based on the result they conclude that control over non-performing assets, operating expenses, provision and contingencies are major areas of concern for the management of public sector banks'.

Kosmidou et al. (2006) investigates the impact of bank-specific characteristics, macroeconomic conditions and financial market structure on UK owned commercial banks'' profits, measured by return on average assets (ROAA) and net interest margins (NIM). An unbalanced panel data set of 224 observations, covering the period 1995-2002, provided the basis for the econometric analysis. The results of the study show that capital strength, represented by the equity to assets ratio is the main determinant of UK banks'' profits. The other significant determinants are cost-to-income ratio and bank size, both of which impact negatively on bank profits. Besides, the macroeconomic factors namely GDP growth and inflation has a positive impact on bank performance.

The objective of the study made by Anna et al., (2008) was to examine the contribution of bank-specific as well as macroeconomic and financial structure factors to the variation in profitability across banks' and over time in Macao by Utilizing bank level data for the period 1993-2007. They adopt the panel data regression to determine the important factors in achieving high profitability by using internal variables such as capital ratio, asset composition, fund source, asset quality, expense management, fee based services, tax and market share including external variables like GDP growth rate, real interest rate and inflation. They use ROA as a profitability measure. Their results reveal that capital strength of a bank positively affects profitability. On the other hand, the asset quality, as measured by the loan- loss provisions, affects the performance of banks' adversely. In addition,

banks' with a large retail deposit-taking network do not achieve a level of profitability higher than those with a smaller network. Finally, with regard to macroeconomic variables, only the rate of inflation reveals a significant relationship with banks'' performance.

Dietrich *et al.* (2009) examined how bank-specific characteristics, macroeconomic variables and Industry-specific factors affect the profitability of 453 commercial banks' in Switzerland over the time period from 1999 to 2006.According to Dietrich *et al.* (2009), this is the first econometric study that has examined the important issue of the determinants of the banking profitability for the Swiss banking market. Besides, this study incorporates the influence of previously ignored factors such as, the growth of a bank's loans relative to the growth rate of the market, the share of interest income relative to total income, the effective tax rate, bank age or the yearly change of regional population in the regression model. They found that better capitalized bank seem to be more profitable. Also, in case that a bank's loan volume is growing faster than the market, the impact on bank profitability is positive. Looking at the effect of the share of interest income at total income, they found that banks' with a higher interest income share are less profitable. Bank age does not have an impact on bank profitability. As to the geographic distribution, banks' in the Lake Geneva region, which is the second most important banking area in Switzerland, are slightly more profitable than banks' in the Zurich region. Looking at the ownership variables, foreign banks' are clearly less profitable than Swiss owned banks'. Similarly, privately owned institutions have a slightly higher profitability compared to state-owned banks'. GDP growth affects the bank profitability positively, and the effective tax rate and the market concentration rate, which both have a significantly negative impact on bank profitability.

The objective of the study made by Alexiou *et al.* (2009) was to identify the crucial factors that affected the profitability of the six major Greek commercial banks' by using Panel data analysis over the period 2000-2007. In this case, ROA and ROE were the dependent variables while bank capital, credit risk, bank size, liquidity risk, operating cost, inflation rate, interest rate, GDP, private consumption and investment were the independent variables. Macroeconomic factors such as inflation and private Consumption appear to play a significant role in shaping the performance of banking institutions. Additionally, bank specific variables, such as capital or measures of cost-efficiency, also play a critical role in determining bank profitability.

Sufian *et al*. (2009) made study to examine the performance of 37 Bangladeshi commercial banks between 1997 and 2004 by using an unbalanced bank level panel data. They found that bank specific characteristics, in particular loans intensity, credit risk, and cost have positive and significant impacts on bank performance, while non-interest income shows negative relationship with bank profitability. Regarding bank size results suggest that it is not uniform across the various measures employed. The empirical findings suggest that size has a negative impact on return on average equity (ROAE), while the opposite is true for return on average assets (ROAA) and net interest margins (NIM). Regarding the impact of macroeconomic indicators, they conclude that the variables have no significant impact on bank profitability, except for inflation which has a negative relationship.

Kumbirai and Webb (2010) made study on the performance of South Africa's commercial banking sector for the period 2005- 2009. They employed financial ratios to measure the profitability, liquidity and credit quality performance of five large South African commercial banks'. They found that overall bank performance increased considerably in the first two years of the analysis. A significant change in trend is noticed at the beginning of the global financial crisis in 2007, reaching its peak during 2008-2009. This resulted in falling profitability, low liquidity and deteriorating credit quality in the South African Banking sector.

The study made by Gul *et al*. (2011) examined the relationship between bank specific and macro-economic characteristics of bank profitability by using data of top fifteen Pakistani commercial banks' over the period 2005-2009. They used the Pooled Ordinary Least Square (POLS) method to investigate the impact of assets, loans, equity, deposits, economic growth, inflation and market capitalization on major profitability indicators i.e., ROA, ROE, ROCE) and NIM separately. The empirical results have found strong evidence that both internal and external factors have a strong influence on the profitability.

Sufian (2011) studied bank specific and macroeconomic determinants of profitability by using an unbalanced bank level panel data set of Korean banks for the time period 1992-2003. He found that Korean banks with lower liquidity levels tend to show higher profitability. Furthermore, higher diversification regarding banks' income sources towards derivative instruments and other fee based activities shows a positive effect. On the other hand, the impacts of credit risk and overhead costs are negative.

Alkhatib (2012) empirically examine the financial performance of five Palestinian commercial banks' listed on Palestine securities exchange (PEX). to assess the financial performance of Palestinian commercial banks', Alkhatib (2012) developed 3 models; each consists of one dependent variable and 4 identical independent variables. He used ROA as an internal financial performance indicator the Tobin's Q model (price/book) as a market financial performance indicator and finally the economic value added as an economic financial performance indicator. Bank size, credit risk, operational efficiency and asset management were used as independent variables. The study employed the correlation and multiple regression analysis of annual time series data from 2005-2010. Under the first model the result of the research reveal that, bank size and asset management were positively related with ROA but credit risk and operational efficiency were negatively correlated with ROA. In the second model both bank size and asset management were positively correlated whereas credit risk and operational efficiency is negatively correlated with the market performance of banks' measured by Tobin's Q. In the third model that is the model which uses economic performance of banks' measured by EVA, except operational efficiency, bank size, credit risk and asset management ratios were positively correlated with EVA.

Lamarana (2012) examines the performance of the Malaysians local banks' and foreign banks' and compares their profitability in the financial sector. This comparative study aims to investigate the factors influencing bank profitability in Malaysia for the period 2005-2011 covering 16 major commercial banks' (8 locally owned and 8 foreign owned). He uses ROA and ROE as a dependent variable. Conversely, capital adequacy, asset quality, management efficiency, liquidity and bank size are the independent variables. The researcher use regression analysis to the panel data. The comparison between the two categories of ownership indicates that foreign banks' are more profitable than domestic banks'.

Tan and Floros (2012) took a sample of 101 banks' (five state owned banks',12 joint-stock commercial banks' and 84 city commercial banks') to examine the determinants of bank profitability in China for the period of 2003-2009 by using unbalanced bank level panel data. They examine the effects of inflation on bank profitability, while controlling for comprehensive bank-specific and industry-specific variables. They use ROA and NIM as a dependent variable. The study indicated that there is a positive relationship between bank profitability, cost efficiency, banking sector development, stock market development and inflation in China. The authors report that low profitability can be explained by higher

volume of non-traditional activity and higher taxation.

The goal of the study conducted by Yadollahzadeh *et al.* (2013) was to examine the effective factors on the performance of commercial banks' in Iran for nine commercial banks' during 2006-2010 using panel data regression method. They considered ROA and ROE as dependent variables which are separately examined by explanatory variables including bank's size, gearing ratio, nonperforming loans, asset management, operating efficiency and capital adequacy ratio. Their research results show that the variables of bank's size, management efficiency and capital adequacy ratio have a positive effect on the performance of commercial banks' while the variables of operating efficiency, gearing ratio and non-performing loans have a negative effect on the performance.

Weersainghe and Ravinda (2013) examined the impact of bank specific such as Bank Size, Liquidity Risk, and Operating Cost, Capital adequacy, Credit Risk and macroeconomic determinants like GDP growth rate and Interest Rate on the profitability of commercial banks' in Sri Lanka by using quarterly data relating to the bank specific and macroeconomic indicators during the period 2001-2011 and carrying out a multiple panel regression. Moreover, they used ROA and ROE as profitability indicator. Empirical results shows, it was observed that the large banks' are recorded more profits due to economic of scale than the banks' which are well sound with a higher regulatory capital ratio. Further, the results from the panel regression suggest that the liquidity and operating cost efficiency banks' were negatively related to the commercial banks' profitability in Sri Lankan. In addition, interest rate found to be having a significant impact on the bank profitability with a negative relationship between the Return on Assets of a bank.

By using linear multiple regression model and Generalized Least Square on panel data, Okoth and Gemechu (2013) studied the determinants of financial performance of commercial banks' in Kenya for ten years from 2001 to 2010. They used independent variables like capital adequacy, asset quality, Management Efficiency, Liquidity Management, GDP Growth Rate, and Inflation Rate and ROA, ROE, and NIM, as a dependent variable. They found that bank specific factors significantly affect the performance of commercial banks' in Kenya, except for liquidity variable. But the overall effect of macroeconomic variables was inconclusive at 5% significance level. The moderating role of ownership on the financial performance of CB's was insignificant.

The purpose of the study made by Ghazouani et al. (2013) is to empirically assess the main explanatory factors that might affect the banks' performance in Tunisia. They use internal factors namely; size, capital ratio, credit quality, operational efficiency, bank deposit growth and ownership and the External factors include both industry-specific variables such as Concentration and size bank system and macroeconomic variables like GDP Growth and inflation. They use data from the 10 conventional commercial banks' on the longest relevant period from1998 to 2011. They apply a dynamic panel data estimation approach, by employing the generalized method of moments (GMM). The empirical result suggests that the bank capitalization, as well as the best managerial efficiency, have a positive and significant effect on the bank performance. Private owned banks' seem to be more profitable than state owned ones. Industry-specific factors, as the concentration and that of the system bank size have a negative and a significant effect on performance. As for the impact of the macroeconomic indicators, they conclude that the overall variables do not have a significant effect on bank performance. However Inflation seems to affect negatively bank's net interest margin.

The study made by Dinh (2013) examines the determinants of foreign bank profitability and makes a comparison on performance of foreign banks' and domestic banks' using the fixed effects method. The sample is an unbalanced panel data set of 51 commercial banks' operating in Vietnam from 2000 to 2012. He use ROA and NIM as a dependent variable and ratio of overhead costs, short term customer funding, equity, loans, loan loss provision and other income, to total assets; and total assets to the whole banking total assets, GDP growth rate, the inflation rate, the depth of the financial sector and institutional quality as explanatory variable. He argues that foreign bank profitability is influenced significantly by all bank specific factors, macro-economic factors and multinational bank indicators. He found that total assets and other income have positive impact on profitability. Moreover, parent bank profitability indicates significant and negative influence on foreign bank profitability. Besides, foreign banks' perform better than domestic banks' due to their ownership advantage.

Study on the financial performance of the Naara rural bank in the upper east region of Ghana conducted by Hadad (2013) used the annual financial statements covering a period of eleven years (2000 to 2010). Multiple regressions were the major statistical tool used to

analyze the data collected from the Naara rural bank. The research is aimed at establishing empirically the relationship that exists between Naara rural banks' financial performance on one hand and its credit portfolio, non-performing loan, liquidity and size (total asset) on the other hand. The result of the research reveals that liquidity and size were positively and significantly related to the performance of the bank. Although the effect of its loans portfolio is positive, its influence on performance is statistically insignificant. In addition, non-performing loans were also negative and significantly related to the performance of the bank.

2.1.2.3. Review of previous studies on Ethiopia

Belayneh (2011) examine the impact of bank specific, industry specific and macroeconomic determinants of Ethiopian commercial banks' profitability that covers the period 2001-2010 by applying the balanced panel data of seven Ethiopian commercial banks'. He used the ROA as a dependent variable and capital, size, loan, deposits, noninterest income, noninterest expense, credit risk, market concentration, economic growth, inflation and saving interest rate as independent variables. The estimation results show that all bank-specific determinants, with the exception of saving deposit, significantly affect commercial banks' profitability in Ethiopia. Market concentration is also a significant determining factor of profitability. Finally, with regard to macroeconomic variables, only economic growth exhibits a significant relationship with banks'' profitability.

The study carried out by Mohana *et al.* (2012) was to explore the key determinants of profitability of commercial banks' operating in Ethiopia by using unbalanced panel data set of banks' over the period 1999/00-2008/09. They used internal factors like capital adequacy, liquidity, credit risk, loan portfolio, asset quality, and expense management and external factors related to the industry and the macroeconomic factors within which the banks' operate. Moreover ROAA was used as dependent variable. In their analysis the fixed effects model is used to control the unobservable bank specific characteristics. The result of the study reveals that Capital adequacy (equity to asset ratio), diversification (non-interest income to total income) and bank size (log of total assets) are among the internal factors that have positive and significant impact on the profitability of Ethiopian commercial banks'. Moreover, the loan loss reserve to total loans is also found to have negative impact on profitability though it is statistically insignificant. In addition to this,

liquidity and operational efficiency are among the internal factors that negatively affect the profitability of the banks'. Finally, the macroeconomic factors have insignificant impact on the commercial banks' profitability in Ethiopia.

The purpose of the study made by Habtamu (2012) is to investigate determinants of private commercial banks' profitability in Ethiopia by using panel data of seven private commercial banks' from year 2002 to 2011. He used quantitative research approach and secondary financial data are analyzed by using multiple linear regressions models for the three bank profitability measures; Return on Asset (ROA), Return on Equity (ROE), and Net Interest Margin (NIM). He applied fixed effect regression model to investigate the impact of capital adequacy, asset quality, managerial efficiency, liquidly, bank size, and real GDP growth rate on major bank profitability measures separately. Beside this, he used primary data analysis to solicit mangers perception towards the determinants of private commercial banks' profitability. The empirical results shows that bank specific factors; capital adequacy, managerial efficiency, bank size and macro-economic factors; level of GDP, and regulation have a strong influence on the profitability of private commercial banks' in Ethiopia.

The main objective of the study made by Birhanu (2012) is to examine the effect of bank-specific, industry-specific and macroeconomic determinants of Ethiopian commercial banking industry profitability from the period 2000-2011 by using OLS estimation method to measure the effects of internal and external determinants on profitability in terms of average return on asset and net interest margin. The result reveals that, all bank-specific determinants, with the exception of bank size, expense management and credit risk, affect bank profitability significantly and positively in the anticipated way. However, bank size, expense management and credit risk affect the commercial banks' profitability significantly and negatively. In addition to this, no evidence is found in support of the presence of market concentration. Finally, from macroeconomic determinants GDP has positive and significant effect on both asset return and interest margin of the bank. But interest rate policy has significant and positive effect only on interest margin.

Amdemikael (2012) carried out study to examine the bank-specific, industry-specific and macro-economic factors affecting bank profitability for eight commercial banks' operating in Ethiopia, covering the period of 2000-2011. He adopts a mixed research approach by combining documentary analysis and in-depth interviews. He used ROA as

a dependent variable and capital strength, operational efficiency, income diversification, liquidity risk, bank size, asset quality, industry concentration level, real GDP growth and inflation as independent variables. The findings of the study show that capital strength, income diversification, bank size and gross domestic product have statistically significant and positive relationship with banks'' profitability. On the other hand, variables like operational efficiency and asset quality have a negative and statistically significant relationship with banks'' profitability. However, the relationship for liquidity risk, concentration and inflation is found to be statistically insignificant.

2.1.3. Empirical findings of previous literature on ICT

2.1.3.1. Literature in global context about IT investments, productivity and profitability

Several studies over the years have been conducted at both the industry and firm level to examine the impact of IT on productivity. The previous studies also have employed methods based on the theory of production to evaluate IT productivity for firm and industry level data. Brynjolfsson and Hitt (1996) provide reviews of this literature on the business value of IT. Some studies have drawn on statistical correlation between IT spending and performance measures such as profitability or stock value for their analyses (Dos Santos et al. 1993, Strassman 1990), and have concluded that there is insignificant correlation between IT spending and profitability measures, implying there by that IT spending is unproductive. Firm-level studies, however, paint a more positive picture of IT contributions to productivity. These findings raise several questions about miss measurement of output by not accounting for improved variety and quality, and about whether IT benefits are seen at the firm-level or at the industry-level. Such issues have been discussed in Brynjolfsson (2000), Brynjolfsson and Hitt (1996). Among several study the following illustrate the industry level studies: Morrison and Berndt (1990), which found that in the manufacturing industry, "estimated marginal benefits of investment in IT are less than marginal costs, implying over investment". More specifically, they determined that for each additional dollar spent on IT, the marginal increase in measured output was only 80 cents. On the other hand, different firm-level data has led to several other studies which report results different from those found in industry-level studies.

Loveman (1994), using data from the Management Productivity and Information Technology (MPIT) Database in a Cobb-Douglas production function framework, concludes that for the manufacturing firms included in his study, there is no significant contribution to output from IT expenditure. Lichtenberg (1995), on the other hand, concludes that there is significant benefit from investment in IT. For his analysis, he draws data from annual surveys conducted between 1988 and 1991 by Information Week and Computer World magazines. Using a Cobb- Douglas production function, he estimates that there are "substantial excess returns to 21 investment in computer capital" and further, that one Information Systems (IS) employee is equivalent to six non-IS employees in terms of marginal productivity.

Brynjolfsson and Hitt (1996) use data from two sources: the dataset compiled by the International Data Group (IDG), and Standard and Poor's Compustat II database. The IDG data includes self-reported firm level details of IT expenditure collected annually, while the Compustat database provides various measures of output and non-IT expenses. Using this data in a Cobb-Douglas production function, researchers conclude that "computers contribute significantly to firm-level output." In reality they find that computer capital contributes an 81% marginal increase in output, whereas non-IT capital contributes 6%. Similarly, they show that IS-labor is more than twice as productive as non-IS labor.

Regarding IT profitability much of the previous research has examined correlations between measures of IT spending and measures of profitability (Ahituv and Giladi 1993, Markus and Soh 1993, Dos Santos et al. 1993, Strassmann 1985). A number of studies have attempted to examine direct correlations between IT spending and profitability ratios (Ahituv and Giladi 1993) while others examine how IT influences intermediate variables which in turn drive profits (Barua, Kriebel and Mukhopadhyay 1995; Neumann, Ragowsky, and Ahituv 1994). Generally, these studies find little direct correlation between IT spending and business profitability. Barua et al (1995) who found that IT investment affects intermediate measures (such as inventory turnover) but found no evidence on the benefits extended to firm performance as measured by return on assets (ROA).

2.1.3.2. Literature in global context on impact of ICT on the banking industry, theory and empirics

Banking has always been a highly information intensive activity that relies heavily on information technology to acquire, process, and deliver the information to all relevant users. Information technology is not only critical in the processing of information; also it provides a way for the banks' to differentiate their products and services. In this regard Banks' find that they have to constantly innovate and update to retain their demanding and discerning customers and to provide convenient, trustworthy, and useful services obsessed by the challenge to expand and capture a larger share of the banking market, a number of banks' invest in more bricks and mortar to enlarge their geographical and market coverage. (Journal of the association of Information system, volume 1, Article 5 June 2000) Additionally, different IT literatures states that ''the interest in IT investments in the banking industry comes from the intrinsic nature of banking activities: process, manage, and strategically use information''. Several consequences arise. First, IT has facilitated the development of new, sophisticated financial products as well as the introduction of alternative delivery channels to the traditional branch network (White, 1998). Second, IT shapes the ways in which banks' carry out their business, through the application of new and improved technologies expected to reduce bank costs over time. Third, in the EU, the development of cost saving technology, jointly with deregulation has strengthened financial sector competition. Because of that, rationalization and cost management are relevant bank strategic objectives (De Bandt and Davis, 2000), and IT investments are perceived as a necessity" to pursue this strategy. Fourth, banks' are increasingly recognizing the need to focus strategically on the improvement of quality (through customer information management, multiple-products and multiple-channels approaches), and again IT investment is viewed as a necessity/opportunity" to pursue this strategy. Finally, technological progress has been cited widely as one of the major sources of change in the financial services industry (European Commission, 1997; European Central Bank, 1999; Bank for International Settlements, 1999).

Regarding the contribution of IT on Productivity and profitability several studies have been conducted at both the industry and firm-level to examine the impact of IT on productivity and profitability. Surprisingly most of the previous studies relating to the contribution of IT toward firm-level productivity have been restricted to the manufacturing industry. As quoted by Baba and Patrik (1997), possibly owing both to a lack of data at the firm-level in the

service industry and perhaps, more significantly, the difficulty of unambiguously identifying the "output" of a service industry. The latter problem is particularly persistent in the banking industry, which is the focus of this study. As regard to banks': Markus and Soh (1993) find that not all banks' achieved clear financial benefits from IT spending: small banks' did not show a significant association between IT spending and profitability; while large banks' had negative returns from their contemporaneous IT spending.

Baba and Patric (2000) examines the effect of IT investment on both productivity and profitability in the retail banking sector using data collected through a major study of retail banking institutions in the United States, and they concludes that additional investment in IT capital may have no real benefits and may be more of a strategic necessity to stay even with the competition. Conversely, the results indicate that there are substantially high returns to increase in investment in IT labour, and that retail banks' need to shift their emphasis in IT investment from capital to labour. Regarding bank profitability as measured by ROA their finding shows insignificant relation between IT and ROA.

Madueme (2010) tried to assess the impact of Information Communication Technology (ICT) on the productivity of the Nigerian banking sector by conducting empirical study. In his study IT impact on Productivity was conceptualized as ability to make positive contributions to output after deductions for depreciation and labor expenses has been made. The Transcendental Logarithmic Production function and the CAMEL rating were used for the study. Finally results showed that bank output such as loans and other assets increased significantly to changes in expenditure on information communication technology the results reveal that generally a one percent increase in ICT expenses impacted on the productivity of Nigerian banks' to the tune of 26.8 percent. The figure shows that banks' output are quite responsive to changes in ICT expenditure. It was also discovered that ICT labor expenses impacted more on banks' output than capital expenses on information technology. Beccalli (2007) investigated whether or not investment in information technology influenced bank performance, but found little relationship between IT investment and bank profitability or efficiency.

2.1.3.3. Literature in local context on impact of ICT on the banking industry

Eyob (2010) conduct study on capital investment decisions on IT and its impact on corporate value maximization the case of Ethiopian Financial Institutions by using five consecutive year data starting from 2005. In his research he also tried to assess the influence of information technology investment on six private commercial banks' by using matched sample comparison group methodology. the result of his study and the hypothesis testing have shown that high IT capital did not result in a significantly better profit and cost performance compared to the relatively low IT resources banks'.

Wubshet (2011) is another academician who conducts empirical study to assess the impact of Information Communication Technology (ICT) on the performance of Ethiopian banks' by using two year paneled data of ten private commercial banks'. He assess the impact of IT on performance by conceptualized the ability to make positive contributions to banks' profitability as measured by ROA. To investigate the relationship between IT investment and profitability the researcher used multiple linear regressions by including other bank specific (internal) determinants of Profitability. The result reveals that IT investment made by Ethiopian banks' is not associated with superior performance.

Concerning the role of IT on profitability, the previous studies that are stated on the theories of competitive strategy have so far failed to show a clear link from IT investment to profitability and failed to find evidence of clear positive effects of IT on financial profitability: this seems to suggest the existence of an IT profitability paradox. Although Hitt and Brynjolfsson (1996) document the positive impact of IT on output and consumer surplus they do not find significant positive correlation between IT spending and financial/operating performance. Similarly, Barua *et al.* (1995) found that IT investment affects intermediate measures (such as inventory turnover) but found no evidence on the benefits extended to firm performance as measured by return on assets (ROA).

For the banking industry, previous researches have failed to show a clear link from IT investment to profitability and failed to find evidence of clear positive effects of IT on financial performance measures and fails to associate the role of IT spending with competitive strategy. Although compared to the IT productivity paradox, the question of whether IT contributes to profitability has not yet been clearly answered by the previous

researches. Therefore, referring to the existing literatures, the banking sector is one of the industries where the IT profitability paradox remains unconfirmed.

2.2. Conclusion and knowledge gap

From the review of the relevant literature relating to the determinants of bank performance, it is possible to see the existence of knowledge gap. Even though studies were undertaken by Belayneh (2011), Amdemikael (2012), Birhanu (2012), Habtamu (2012) and Mohana et al. (2012), on the determinants of Ethiopian banking performance, they all fails to include the important variables like ICT and capital structure. Because these variables are very important variables which can significantly affects the performance of Ethiopian banking industry.

Besides, the growth and development of the Ethiopian banking industry in terms of number of commercial banks', total assets and capital, branch network, increasing their outreach to remote areas and continuously reporting profits of different magnitude. In addition, in much organization information system is like the nervous system in the human body. Certainly, an information system encompasses transaction processing systems, decision support systems, management information systems and strategic information systems.

Thus, these necessitate the examination of the determinants of bank performance in Ethiopian banking industry by including new variables like ICT and capital structure. Finally, a lot of literatures are developed to examine the determinants of banks' performance but those studies show different and even contradictory results. This shows that there is no consensus in the banking literature on the determinants of bank performance. Therefore, due to this and other factors these study undertaken to solve the above mentioned problem.

2.3. Conceptual framework

To fulfill the objective of this study both bank specific and macroeconomic factors were considered. As for the determining factors of bank performance, the independent variables of the study will be classified as ICT, major Internal, and external profitability determinant variable (bank specific, industry specific and macroeconomic variables) and the description of them is provided in the following section. To make clear dependent variable and independent variable, the researcher uses the following conceptual framework: Thus, the relationship between bank performance and its determinants are as follows:
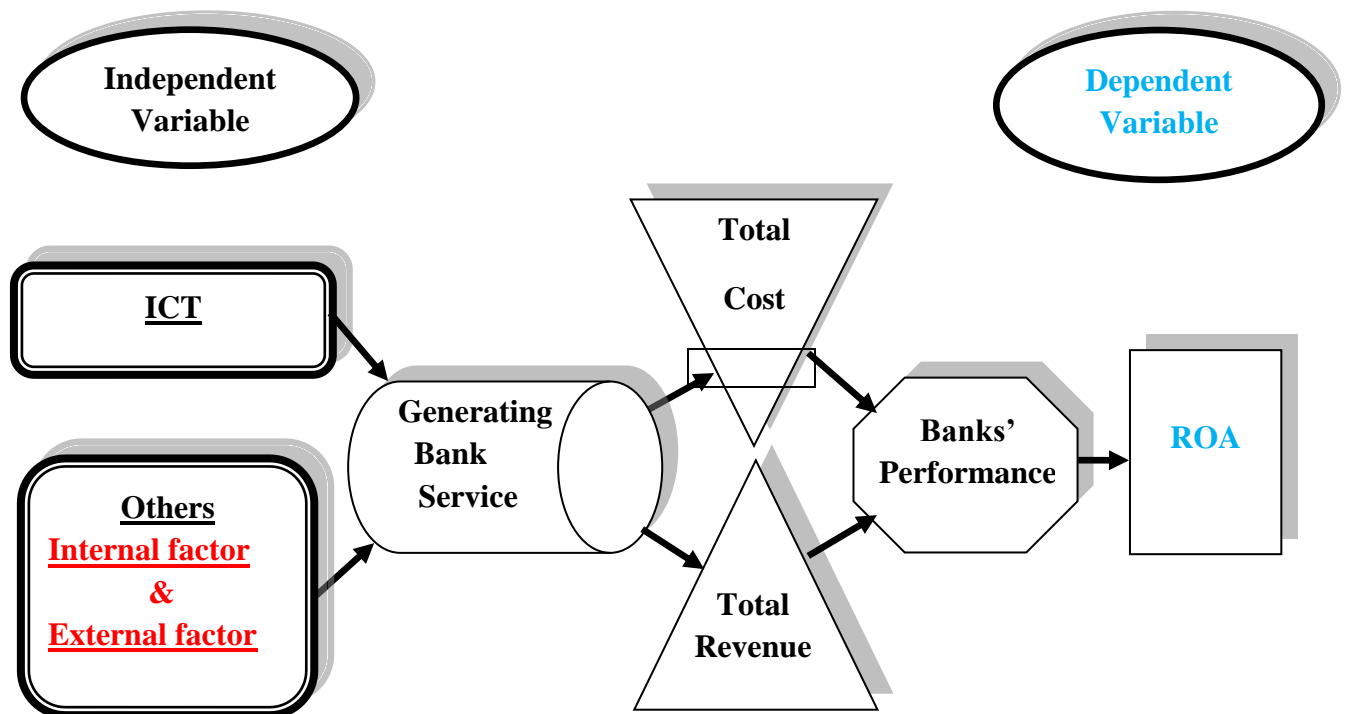
Figure 1.Conceptual Framework

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

The purpose of this section is to present the research methodology that is used by the researcher. It contains the research design which the researcher used in achieving the research objectives stated at the beginning.

3.2. Research Design

A research design refers to a grand plan of approach to how the researcher will go about answering the research questions. To achieve the objective of this study, Explanatory research design was adopted. The researcher of study prefers to use explanatory research design to explain the relationships of variables that used in the study. Explanatory research is proposed to be applied because the research tries to establish a cause and effect relationship between performance and ICT with other determinant factors that determine bank performance.

In order to have understandable picture of the evident determinants of profitability it would be also employ selected inferential statistics, because quantitative research is the systematic and scientific investigation of quantitative properties and phenomena and their relationships (Birihanu, 2012) cited in (Abiy et. al, 2009). The quantitative approach will focus on the secondary data of the selected private commercial banks'. Under this study, panel data from the year 2005-2015 were used. This is because panel data has the advantage of giving more informative data as it consists of both the cross sectional information, which captures individual variability, and the time series information, that captures dynamic adjustment.

3.3. Population, Sample Design and Sample Size

3.3.1 Population

In this study the target population is defined as financial service firms in Ethiopia; specifically, the banking industry that have invested on software, hardware and networking equipment's and that has been in operation at least for ten years. The study population is seventeen commercial banks. The total study population is summarized on the following table that lists banks based on their state of ownership and year of establishment year in G.C.

S.No	Bank Name	Web Site	Year Est.
1	Abay Bank S.C.	http://www.abaybank.com.et/	2010
2	Addis International Bank	http://www.addisbanksc.com/	2011
3	Awash International Bank	http://www.awashbank.com/	1994
4	Bank of Abyssinia	http://www.bankofabyssinia.com/	1996
5	Berhan International Bank	http://berhanbanksc.com/	2010
6	Bunna International Bank	http://www.bunnabanksc.com/	2009
7	Commercial Bank of Ethiopia	http://www.combanketh.et/	1963
8	Cooperative Bank of Oromia	http://www.coopbankoromia.com.et/	2005
9	Dashen Bank	http://www.dashenbanksc.com	1996
10	Debub Global Bank	http://www.debubglobalbank.com/	2012
11	Enat Bank	http://www.enatbanksc.com/	2013
12	Lion International Bank	http://www.anbesabank.com/	2006
13	Nib International Bank	http://www.nibbank-et.com/index.php	1999
14	Oromia International Bank	http://www.orointbank.com/	2008
15	United Bank	http://www.unitedbank.com.et/	1998
16	Wegagaen Bank	http://www.wegagenbanksc.com/	1997
17	Zemen Bank	http://www.zemenbank.com/	2009

Source: www.nbe.org.et.

3.3.2. Sample Design and Sample Size

Currently seventeen commercial banks are operating in Ethiopia; this study includes banks that are registered by NBE before 2004/05. Thus, out of 17 commercial banks' operating in the country solely 8 are selected and the data sets were cover an 11-year period from 2005 to 2015 G.C. The target populations of the study are 8 CB's named, (Commercial Bank of Ethiopia, Dashen Bank, Awash International Bank, Bank of Abyssinia, Wegagen Bank, United Bank, Nib International Bank, and Cooperative Bank of Oromiya).

After the year 2005 the entrance of new banks in the banking industry increases the competition among banks'. Then, banks shift their face from traditional banking service to modern one. To make this, investment on ICT and implementation of IT become best alternative to differentiate their service from others. On other hand, the selection of the sample bank was determined by census method, because all the 8 banks' that were registered by NBE before 2004/2005 are included in this study. Among these eight banks' one bank namely, CBE were state owned banks'. Thus, the total target populations were included in this study. Even the total sample size was becoming 47% of the total population. Thus, it is possible to make generalization.

3.4. Source and Types of Data

All the necessary data that associate with this study would be collected by using secondary data. Stewart and Kamins (1993) cited in Li (2007), secondary data have its own advantages compared to primary data, the former gives higher quality data, the feasibility to conduct longitudinal studies and the permanence of data which means secondary data generally provide a source of data that is both permanent and available in a form that may be checked relatively easily by others. Therefore, it increases the dependability of the data.

The cost data associate with ICT investments would be collected from the annual reports of each bank and the profitability data and the financial ratios of other bank specific profit determinants would be collected from audited financial statements, i.e. from both balance sheet and income statement of the respective banks'. On the other hand, the industry specific and macroeconomic determinants of profitability of commercial bank data are obtained from National Bank of Ethiopia (NBE), which regulates the banking sector of the country, from Ministry of Finance and Economic Cooperation (MoFEC) and Central Statistics Authority (CSA). The data set will cover an 11-year period from 2005 to 2015, with a total of 8 commercial banks' currently operated in the country. All the accounting information is consolidated on June 30 of each year. Therefore, the study included eight commercial banks' of which one is state owned and the rest are private banks'. Consequently, this study used panel data of eight commercial banks for eleven years (88 observations).

3.5. Data Analysis Techniques and Methodology

To achieve the research objective, the study used panel data of eight banks for eleven years. Panel data were used, because by combining time series of cross section observations, panel data give more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency (Gujarati, 2004). The wide spread agreement from the literature on bank profitability is that the appropriate functional form of analysis is the linear one. (Short, 1979; Bourke, 1989) consider several functional forms and conclude that the linear model produces result as good as any other functional forms. When more than one independent or explanatory variable are needed in the regression model in order to best predict an important response and to obtain improved fit, a multiple regression model is needed Kothare (2004).

In this study the dependent variable, ROA, will not be affected by IT investment only; also be impacted by various variables independent of IT in meaningful way. Therefore, multiple linear regressions will be used as the approach to investigate the contribution of ICT investment along with the most internal predictive explanatory variables to the bank performance. A multiple linear regression model will use to determine the relative importance of each independent variable in influencing performance. Yaffee (2005) the Ordinary Least Squares (OLS), constant coefficients, fixed effects and random effects models are among the commonly used models in analyzing panel data.

Thus, the collected panel data was analyzed b y using E-views 9 econometric software package. In case of the descriptive statistics, the mean, standard deviation, maximum and minimum values were used to analyze the trends of the data while the correlation matrix was used to show the relationship exist between the variables used in the study. Moreover, the diagnostic tests were undertaken in order to check the validity of the model and fulfill the assumption of the Classical Linear Regression Model (CLRM). To this end, the study used the random or fixed effects models and the Hausman specification test was used to choose the appropriate model for this study.

Finally, the performance of a bank will be measured by its ROA. The ROA, defined as net income divided by total assets, reflects how well a bank's management is using the bank's real investment resources to generate profits. The reason to use ROA as the key proxy for bank performance instead of the alternative ROE is, because an analysis of ROE disregards financial leverage and the risks associated with it (Lindblom et al., 2002; Avkiran, 1997).

3.6. Model Specification

This study used explanatory variable like ICT, operating cost, income diversification, Deposit to total assets, market concentration, Inflation and real GDP growth while the dependent variables are ROA. In this study, panel data were used from the year 2005-2015. As noted in Brooks (2008), a panel keeps the same individuals or objects and measures some quantity about them overtime. The regression model for the panel data is described in the following general econometric equation:

$$Yit = \alpha + \beta X_{it} + \varepsilon_{it}$$

Where:

Yit = is the dependent variable

α = is the intercept term

β = is a Kx1 vector of parameters to be estimated on the explanatory variables

Xit = is a 1xK vector of observations on the explanatory variables,

t = 1...T;

i = 1...N,

εit = the normal error term.

In this study, the performance of the bank is measured using the ROA. The bank specific variables of the study include ICT, capital structure, operating cost, income diversification, loan to total assets and non-interest expense while the macroeconomic factors were real GDP growth and the industry factor includes market concentration. The comprehensive regression equation of the study is as follows:

$$ROA_{it} = \alpha + \beta_1(ICT)_{it} + \beta_2(OpCost)_{it} + \beta_3(IncDiv)_{it} + \beta_4(DtTA)_{it} + \beta_5(MktC)_t + \beta_6(INF)_t + \beta_7(GDP)_t + \varepsilon_{it}$$

Where: -

ROA $_{it}$ = Return on Asset for bank i in year t

ICT $_{it}$ = ICT Investment for bank i in year t

OpCost $_{it}$ = operating cost for bank i in year t

IncDiv $_{it}$ = Income diversification for bank i in year t

DtTA $_{it}$ = total deposits of bank i divided by total asset of bank i at period t

MktC $_t$ = market concentration of banks at period t

INF $_t$ = inflation rate of the county at period t

GDP $_t$ = real growth domestic product of the country at time t

$\beta_1 - \beta_7$ = the coefficient of the explanatory variables

ε_{it} = the error term

3.7. Study Variables

3.7.1. Dependent variable

Bank performance is usually measured by ROA, ROE or NIM. Studies conducted on the determinants of banks' performance use one or a combination of these ratios as a measure of performance in their analysis. According to Mohana et al. (2012), the choice of the financial performance ratios (ROA, ROE and NIM) depends on the objective of the performance measure since the output of each of the performance measure differs. Thus, to mitigate the objectives of this study the researchers is willing to posit on ROA to measure banks' performance.

3.7.1.1. Return on Asset (ROA)

The ROA reflects the ability of a bank's management to generate profits from the bank's assets. It shows the profits earned per birr of assets and indicates how effectively the bank's assets are managed to generate revenues, although it might be biased due to off-balance-sheet activities. This is probably the most important single ratio in comparing the efficiency and operating performance of banks' as it indicates the returns generated from the assets that bank owns (Tan et al. 2012). ROA is the most comprehensive accounting measure of a bank's overall performance.

$$\text{ROA} = \frac{\text{Net income}}{\text{Total asset}}$$

3.7.2. Independent Variables

Banks' performance is affected by both internal and external factors. Internal factors are factors over which banks' management has control whereas external factors are factors over which the management of the bank lacks control. For the purpose of this study nine independent variables are included. From these nine variables seven variables are internal and the remaining two are external factors assuming that they best explain the determinants of bank performance.

3.7.2.1. Internal factors

An internal factor that is called the bank specific factors is determinants that are mainly influenced by a bank's management and policy objectives. That is, according to Mohana et al., (2012), the bank specific factors reflect the difference related to policies and decisions of a bank's management. Such performance determinants are ICT, Deposit to total assets, income diversification and operating costs, derived from balance sheet and income statement.

3.7.2.1.1. Investment on ICT

ICT which is proxies by ICT investment minus accumulated depreciation provides a measure of performance. In recent years, the utilization of information technology has been magnificently increased in service industries, particularly, the banking industry, which by using Information Technology related products such as internet banking, electronic payments, security investments and information exchanges can deliver high quality services to clients with less effort, thereby enhancing their financial performance (Berger, 2003). Ahituv and Neumann (1993) stated that an information system is a set of components (people, hardware, software, data, and procedures) that operate together to produce information that supports the operation and management functions of an organization.

Results show on investment in ICT and banks' performance has received immense attention from researchers in various countries over the years. The results from these studies have been markedly conflicting. Thus, whether the level of investment in ICT actually brings real benefits to the banks' or not is still a matter of concern in academic circles. Hence, there is a need for further studies to contribute to the ongoing debate on the nature of the relationship between ICT investment and bank performance. (Eyob, 2010; wubeshet, 2011) found a negative relationship between them but the researcher expect positive and significant impact.

H₁. There is a Positive relationship between ICT and performance of banks'.

> **Cost – Accumulated Depreciation**

3.7.2.1.2. Operating cost

Operating cost is defined as the cost to income ratio such as the administrative costs, staff salaries and property costs, excluding losses due to bad and non-performing loans over total generated revenues. It is used to measure the impact of efficiency on bank performance. According to Athanasoglou et al. (2008), Dietrich (2009) and Sufian (2011) efficient cost management is a prerequisite for the improved performance of banking sector i.e., the high elasticity of performance of this variable indicates that banks' have much to gain if they improve their managerial practices. Most authors such as Athanasoglou et al. (2005), Kosmidou et al. (2006), Yadollahzadeh et al. (2013), Weersainghe et al. (2013) and Alkhatib (2012) found negative relationship between operating cost and bank performance. It can be calculated as below and the researcher hypothesizes as follows;

H₂. There is a negative relationship between operating cost and bank performance

$$\text{Operating cost} = \frac{\textbf{Total expenses}}{\textbf{Revenue}}$$

3.7.2.1.3. Deposit to total asset (DtTA)

Commercial banks mainly depend on the funds deposited by their clients (the public) in order to lend it out and earn interest income. It is also the number one expense item for a banking sector because there is interest payment for different types of deposits. Deposits received by all commercial banks includes current or demand deposits, fixed or time deposits (term deposits), and saving deposit. On current or demand deposits, the banks do not pay interest in most countries; rather, it can be withdrawn in part or in full at any time by depositors through issuing cheques. Fixed / Time / Term deposits are interest bearing deposit which left with the bank for a certain (fixed) period of time and it incur a higher interest expense on banks. On the other hand, saving deposits is a deposit made by individuals and it can be withdrawn at any time. It is subject to certain limitations regarding the amount and the frequency of withdrawals. Since withdrawal can take place at any time, the commercial banks have to keep a certain proportion of their assets in liquid form. When we see the impact of deposit on commercial banks profitability, empirical evidence from Naceur and Goaied (2001) quoted by Aburime (2008) indicates the best performing banks are those who have maintained a high

level of deposit accounts relative to their assets. Increasing the ratio of total deposits to total assets means increasing the funds available to use by the bank in different profitable ways such as investments and lending activities. In turn, this should increase the bank's returns on assets *ceteris paribus.* In addition, since deposit is the major and perhaps the cheapest source of funding for banks, it impacts banking performance positively as long as there is a sufficient demand for loans in the market (Anna and Chan 2008). However, if there is insufficient loan demand, more deposits in fact may depress earnings, since this type of funding has its own cost. Although different studies said the relationship between deposit and profitability is ambiguous, Anna and Chan (2008), Aburime (2008) and Saira *et al*., (2011) indicate a positive relationship.

H₃. There is a positive relationship between deposit and bank performance

Deposit to Total Asset = Total Deposit
                                Total Assets

3.7.2.1.4. Income diversification

Income diversification is other alternative means of income other than earning from loans. It includes fees earned from offering unit trust services, service charge on deposit account, standard fees, and charges for other bank services (Birhanu, 2012). Income diversification is calculated as the percentage of the bank's income other than interest income to its total income. This ratio reflects how well the bank has diversified its source of income. A high ratio of this would mean that the bank is performing better in terms of diversifying its activities to increase its income and thereby affect the profitability of the bank favorably (Mohana et al., 2012). Thus, the researcher expects a positive impact on performance.

H₄. There is a Positive relationship between Income diversification and bank performance

Income diversification = Non interest income
                              Total income

3.7.2.2. External factors

External factors are variables that reflect the economic and legal environments where the financial institutions operate. They represent events outside the influence of the bank. The management can anticipate changes in the external environment and try to position the institution to take advantage of anticipated developments (Anna, 2008).

3.7.2.2.1. Market Concentration (MC)

It is the number, size and distribution of banks' in a particular market or country. Two theories are proposed to explain how the degree of sector concentration affects bank profitability. The Structure-Conduct-Performance (SCP) hypothesis states that a more concentrated sector favors' bank profitability motivated by the benefits of greater market power. On the other hand, the efficiency theory explains the positive relationship between concentration and profitability as an indirect consequence of efficiency. This theory argues that the better managed banks' or those with more efficient (and thus more profitable) cost structures could see their market shares increase, resulting in a higher degree of concentration. As indicated in other empirical studies this study also measure market concentration by Herfindahl-Hirschman (H-H) index which is the sum of the square of market share of the sample banks' included in this particular study similar to (Sastrosuwito & Suzuki, 2011 and Ponce, 2012).

Market share of each bank is measured by the ratio of a bank's total asset to total asset of all banks'. The empirical evidence on the relationship between concentration and profitability is not conclusive. (Goddard et al., 2004 and Ponce, 2012) report a positive relationship between market concentration and profitability; other studies do not find such a relationship. However, (Berger and Humphrey, 1997) find that the cost efficiency hypothesis seems to be more important than the market-power theory in explaining bank profitability when frontier efficiency analysis is applied. In this study in support of the two theories, the researcher hypothesizes a direct association between industry concentration and bank profitability in Ethiopia.

H₅. There is a Positive relationship between Market Concentration and bank performance

3.6.2.2.2. Real GDP Growth

GDP is one of the measures of economic growth for a countries economy which is measured in terms of the monetary value of all goods and services produced within the borders of a country during a year. Similarly, if GDP is growing faster than the population growth rate, average household incomes should be rising and the rate of poverty is declining and the society should gradually have more resources to invest in vital social services and infrastructure. The output of many research shows GDP has positive and significant effect on performance of banks'. Thus, the researcher expects same result as previous studies and hypothesizes as GDP has a positive impact on the performance of banks'.

H₆. There is a positive relationship between gross domestic product and bank performance

3.6.2.2.3. Inflation Rate

The effect of inflation is also another important determinant of banking performance. In general, high inflation rates are associated with high loan interest rates and thus high income. Perry (1992), however, asserts that the effect of inflation on banking performance depends on whether inflation is anticipated or unanticipated. If inflation is fully anticipated and interest rates are adjusted accordingly, a positive impact on profitability will result. Alternatively, unexpected rises in inflation cause cash flow difficulties for borrowers, which can lead to premature termination of loan arrangements and precipitate loan losses. Indeed, if the banks are sluggish in adjusting their interest rates, there is a possibility that bank costs may increase faster than bank revenues. Hoggarth *et al.* (1998) even conclude that high and variable inflation may cause difficulties in planning and in negotiation of loans.

The findings of the relationship between inflation and profitability are mixed. Although the studies of Guru *et al.* (2002) in Malaysia and Jiang *et al.* (2003) in Hong Kong show that higher inflation rate leads to higher bank profitability, the study of Abreu and Mendes (2000), nevertheless, reports a negative coefficient for the inflation variable in European countries. In addition, Demirguc and Huizinga (1999) notice that banks in developing countries tend to be less profitable in inflationary environments, particularly when they have a high capital ratio. In these countries, bank costs actually increase faster than bank revenues. Thus, the expected

sign of the inflation is unpredictable based on prior research but the researcher expects positive relation.

H₇. There is a positive relationship between inflation and bank performance

3.7.3. Operationalization of the Study Variables

This section presents the measurements that were used to operationalize the study variables.

Table 1: Operationalization of the Study Variables

		Variables	**Notation**	**Measurement**	**Expected sign**
Dependent variable		Performance	ROA	Net Income / Total Assets	**NA****
Independent variable	Internal Factor	Investment on ICT	ICT	log Cost - Accumulated Depreciation *	+
		Income Diversification	IncDiv	Non-interest income/ Total Income	+
		Operating Cost	OpCost	Total expenses/ Revenue	**-**
		Deposit to Total Assets	DtTA	Deposit / Total Assets	+
	External Factor	Economic growth	GDP	Real GDP growth	+
		Inflation Rate	INF	Yearly change in the consumer price index.	+
		Market Concentration	MktC	H-H Index	+

* Natural Logarizm of BV of assets is used in order to reduce the scale effect

** The symbol mark (**) indicates the possibility of both signs on that specific determinant

CHAPTER FOUR
4. DATA ANALYSIS AND PRESENTATION

4.1. Introduction

This chapter presents the result of study which includes descriptive statistics of variables, correlation results for dependent and explanatory variables, diagnosis test for the regression models, and regression analysis and discussions of profitability measures of return on asset (ROA). Secondary data analysis was done by using E-views 9 econometric-software. This chapter analyzes the determinants of commercial banks' profitability, using the annual balanced panel data, where all the variables are observed for each cross-section and each time period. The study has a time series segment spanning from the period 2005 up to 2015 and a cross section segment which considered eight Ethiopian commercial banks, such as: CBE, DB, AIB, WB, BoA, CBoO, UB and NIB. The current chapter has five sections. Section 4.2 presents the descriptive statistics of the dependent and independent variables followed by the test for the classical linear regression model/ CLRM were presented followed by under section 4.3. Section 4.4 presents model selection and section 4.5 regression result analysis. Finally, the analysis and discussion were presented under section 4.6.

4.2. Descriptive analysis

This section presents the descriptive statistics of both dependent and independent variables used in the study for the sample banks'. The dependent variables used in the study were ROA while the independent variables were ICT, operating cost, market concentration, deposit to total Assets, income diversification, real GDP, and inflation. Thus, the total observation for each dependent and independent variable were 88 (panel data of 8 commercial banks for 11 years).

The following table 2 demonstrates the mean, standard deviation, minimum and maximum values for the dependent and independent variables for sample banks' over the year 2005 to 2015.

Table 2: Summaries of Descriptive Statistics

	ROA	OPCOST	MKTC	INF	INCDIV	ICT	GDP	DTTA
Mean	0.03007912	1.161474	0.053166	0.159636	45.23447	18.0080977	0.108909	0.750685
Median	0.03185361	1.055786	0.002100	0.109000	45.61897	17.4504839	0.106000	0.763879
Maximum	0.04005468	3.375069	0.492700	0.364000	69.41955	20.6054877	0.133000	0.871518
Minimum	0.01277000	0.383239	0.000000	0.028000	4.030710	14.2221076	0.086000	0.116279
Std. Dev.	0.00623879	0.505218	0.136240	0.108602	13.75962	18.1722193	0.013074	0.091463
Observations	88	88	88	88	88	88	88	88

Source: E-views 9 Output (2016)

The ROA measured by the net income divided by total assets has a mean value of 3.00 percent. This indicates that the sample banks on average earned a NI of 3.00 percent of the total asset. Since ROA indicates the efficiency of the management of a company in generating NI from all the resources of the institutions, the higher ROA shows that the company is more efficient in using its resources. The maximum value of ROA was 4.00 and minimum value of 1.28 percent. This means the most profitable bank among the sampled banks' earned 4.00 cents of net income for a single birr invested in the assets of the firm. On the other hand, the least profitable bank of the sampled banks earns 1.28 cents of income for each birr investment in the assets of the firm and this may be due to lack of efficiency in expense management or high operating costs. Thus, this causes poor performance since the higher costs of operation negatively affect bank performance.

While looking at the study variable ICT, which was measured by natural log of cost minus accumulated depreciation mean, maximum and minimum cost the bank incur in the previous eleven years. The average amount of birr spent on information technology in the selected banks is 18.00 million. The maximum amount of birr spent on information technology is 20.61 million in the last eleven years on other hand the minimum amount is 14.22 million. The standard deviation shows low variation of 18.17 million between selected banks' investment on information technology. This means the bank with good information technology facility invest 18.17 million higher than the bank with small information technology facility.

Regarding the other independent variables, the operating cost which was measured by dividing total expense by revenue has a mean value of 1.16 with a maximum and minimum

value of 3.38 and 0.38 percent respectively. In addition, the standard deviation of the operating cost was 0.50 percent. This result shows that on average the sample commercial banks incurred a cost of 1.16 percent of the total revenue. This implies that in the study period the sample commercial banks' have a small variation in their operating cost.

The other independent variable used in the study was the income diversification which is measured by non-interest income divided by total income has a mean value of 45.24 percent with a standard deviation of 13.76 percent including the maximum and minimum value of 69.42 and 4.03 respectively. This shows that in the study period the sample commercial banks' have higher variation in diversification of their source of income.

Concerning deposit asset ratio there is large variation indicated by the range between 11.63 percent and 87.15 percent. The mean of deposit to asset ratio is 75.07 percent. This indicates the large portion of the asset of most commercial banks composed from customer deposit. This has a negative implication when large numbers of financial institution liability holders seek to withdraw their financial institution at the same time (bank run).

Also table 2 shows descriptive statistics for Independent variable of external factors real GDP growth for the last eleven years have a mean value of 10.89%, with a maximum of 13.3% and a minimum of 8.6 %. The table also presents for GDP a small standard deviation of 0.013; which implies that economic growth in Ethiopia during the period of 2005 to 2015 remains reasonable stable and the result was more or less in agreement with the government's report regarding economic growth. Regarding the other macro-economic variable employed in this study inflation (INF), empirical studies suggest that if a bank's income rises more rapidly than its costs, inflation is expected to exert a positive effect on profitability. The study also shows a positive relationship between inflation and banks profitability but the result is insignificant.

Finally, the mean of market concentration which is defined by Herfindahl-Hirschman Index (HHI) is 49.27. HHI is a commonly accepted measure of market concentration and it takes into account the relative size and distribution of firms in a market and it approaches to zero when a market consists a large number of firms of relatively equal size. The descriptive statistics of the HHI indicate that there is significant variation in concentration of banks' in the banking sector. The most concentrated bank in the sector has the maximum value of

49.27 percent share and the least concentrated bank in the sector has the minimum value of 0.00 percent share. This indicates the market share difference in the selected private commercial bank sector is very high.

4.3. Classical linear regression model (CLRM) Assumption and Diagnostic Test

Before going further into panel data econometric procedures, the second issue is test the assumption of classical linear regression model (CLRM). Most prior academic literature, as mentioned in the literature review, examines determinants of banks'' profitability using different panel data modeling techniques. Among others, Pasiouras and Kosmidou (2007) and Ommeren (2011) use ordinary least squares (OLS) technique in which differences between the observations and estimations are minimized in terms of sum of squares. The characteristics of the model and proposed variables in equation of this research are not violating the classical assumptions underlying the OLS model. These are checked by testing each assumption. Among them the major ones are: test for heteroscedasticity, multicollinearity, autocorrelation and normality. Accordingly, the following subsection presents the tests made by the researcher.

4.3.1. Heteroscedasticity Test (Variance of the errors is constant) (Var (u_t) = $+\sigma^2 < \infty$)

The homoskedasticity is one of the assumptions of the CLRM which states that the variance of the errors must be constant. This theoretically expressed as by Brooks (2008, p.133) ''var (u_t) = $\sigma^2 < \infty$; it has been assumed so far that the variance of the errors is constant, σ^2 - this is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroskedastic (Brooks, 2008). As noted in Woolridge (1999) homoskedasticity fails whenever the variance of the unobservable changes across different segments of the population, which are determined by the different values of the explanatory variables. The White test for heteroskedasticity was the most popular test used to test the presence of the heteroskedasticity.

To test this assumption, the White test was used having the null hypothesis of heteroskedasticity. Both F-statistic and chi-square (χ) 2 tests statistic were used. In this study as shown below in table 3, both the F-statistic and Chi-Square versions of the test statistic gave the same conclusion that there is no evidence for the presence of heteroskedasticity,

since the p-values were in excess of 0.05. The third version of the test statistic, "Scaled explained SS", which as the name suggests is based on a normalized version of the explained sum of squares from the auxiliary regression, also gave the same conclusion that there is no evidence for the presence of heteroskedasticity problem, since the p-value was considerably greater than 0.05.

Table 3: Heteroscedasticity Test: White

Heteroskedasticity Test: White

F-statistic	1.652019	Prob. F(7,80)	0.1330
Obs*R-squared	11.11400	Prob. Chi-Square(7)	0.1337
Scaled explained SS	9.258471	Prob. Chi-Square(7)	0.2346

Source: E-views 9 Output (2016)

4.3.2. Multicollinearity test

Multicollinearity means the existence of a "perfect" or exact, linear relationship among some or all explanatory variables (Gujarati, 2004). As noted in Gujarati (2004) if multicollinearity is perfect, the regression coefficients of the explanatory variables are indeterminate and their standard errors are infinite. If multicollinearity is less than perfect, the regression coefficients, although determinate, possess large standard errors (in relation to the coefficients themselves), which means the coefficients cannot be estimated with great precision or accuracy.

Table 4: Multicollinearity matrix between explanatory variables

	OPCOST	MKTC	INF	INCDIV	ICT	GDP	DTTA
OPCOST	1.000000						
MKTC	-0.412093	1.000000					
INF	-0.050588	-0.011955	1.000000				
INCDIV	-0.247506	-0.086010	-0.017256	1.000000			
ICT	-0.067502	0.383855	-0.172525	-0.100824	1.000000		
GDP	-0.177803	0.009322	-0.324479	0.081083	-0.347046	1.000000	
DTTA	0.039160	0.049884	0.029227	0.347062	0.147265	-0.037489	1.000000

Source: E-views 9 Output (2016)

Multicollinearity condition exists where there is high, but not perfect, correlation between two or more explanatory variables (Cameron and Trivedi 2009; Wooldridge 2006). According to Churchill and Iacobucci (2005), when there is multicollinearity, the amount of information about the effect of explanatory variables on dependent variables decreases. As a result, many of the explanatory variables could be judged as not related to the dependent variables when in fact they are. This assumption does allow the independent variables to be correlated; they just cannot be perfectly correlated. If we did not allow for any correlation among the independent variables, then multiple regressions would not be very useful for econometric analysis. How much correlation causes multicollinearity however, is not clearly defined.

While Hair et al (2006) argue that correlation coefficient below 0.9 may not cause serious multicollinearity problem. Malhotra (2007) stated that multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75. Kennedy (2008) suggests that any correlation coefficient above 0.7 could cause a serious multicollinearity problem leading to inefficient estimation and less reliable results. This indicates that there is no consistent argument on the level of correlation that causes multicollinearity.

According to Gujarati (2004), the standard statistical method for testing data for multicollinearity is analyzing the explanatory variables correlation coefficients (CC); condition index (CI) and variance inflation factor (VIF). Therefore, in this study correlation matrix for seven of the independent variables shown above in the table had been estimated. The results in the correlation matrix show that the highest correlation of 0.3839 which is between ICT and market concentration. Since there is no correlation above 0.7 according to Kennedy (2008) we can conclude in this study that there is no problem of multicollinearity.

When the relation of ICT with other determinant of profitability is seen it has negative relation with operating cost (Opcost), income diversification (IncDiv), Inflation (INF) and GDP. On the other hand, the researcher observed other facts from the above table 4 is negative colinearity between information technology and income diversification (IncDiv), operating cost (Opcost), real growth domestic product (GDP) and Inflation (INF) this implies information technology has not power to explain the same feature explained by the over mentioned variables.

4.3.3. Autocorrelation test

According to Brooks (2008), the autocorrelation tests covariance between the error terms over time (or cross-sectional, for that type of data) is zero (cov $(u_i,u_j) = 0$) This means it is an assumption that the errors are linearly independent of one another (uncorrelated with one another). If the errors are not uncorrelated with one another, it would be stated that they are auto correlated or they are serially correlated between an error and its immediately previous value. To test the presence of autocorrelation, the Durbin-Watson test was used.

Durbin-Watson test (DW) is approximately equals to 2 $(1 - \hat{\rho})$, where $\hat{\rho}$ is the estimated correlation coefficient between the error term and its first order lag (Brooks 2008). The null hypothesis for the DW test is no autocorrelation between the error term and its lag. According to Brooks (2008), DW has 2 critical values: an upper critical value (dU) and a lower critical value (dL), and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected. The rejection, non-rejection, and inconclusive regions are shown on the number line in figure.

Figure 2: Rejection and Non-Rejection Regions for DW Test

Reject H$_0$: Positive autocorrelation	Inconclusive	Do not reject Ho: no evidence of autocorrelation	Inconclusive	Reject H$_0$: negative autocorrelation
		2		
0	d$_L$ d$_U$		4-d$_U$ 4-d$_L$	4
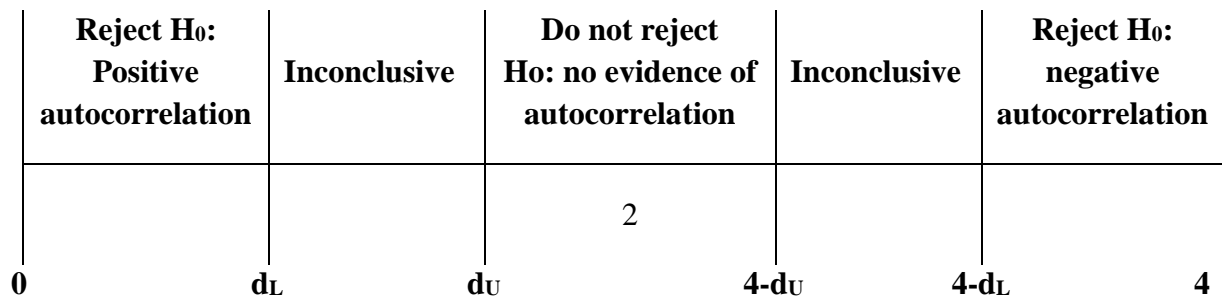
Source: Brooks, 2008

As noted in Gujarati (2004), Durbin Watson (DW) is a test for first order autocorrelation (it is a test for a relationship between an error and its immediate previous value). The study used the d$_L$ and d$_U$ values for 90 observations as approximation of 88 (11*8) observations. The DW table for 90 observations with 7 explanatory variables at 1% level of significance, the d$_L$ and d$_U$ values are 1.360 and 1.687 respectively. The DW test statistic values of this study for 88 observations as shown table 5 were 1.653 which is found between d$_L$ and d$_U$ values. The DW value of ROA lies in the inconclusive region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected. Thus, the simplest way to judge the

absence of autocorrelation is by looking at the DW measure's value in the regression result, and then it's an indicator of the absence of autocorrelation.

Table 5: Autocorrelation test

| Variables	DW test result
All bank Specific, industry & Macroeconomic	1.65

Source: E-views 9 Output (2016)

4.3.4. Test of Normality (errors are normally distributed (ut ~ N (0, σ^2))

Normality assumption is required in order to conduct single or joint hypothesis tests about the model parameters. In this study to check whether the normality test was adequately meet, the histogram was used. If the residuals are normally distributed, the histogram should be bell-shaped (Brooks, 2008).

As shown in the histogram figure 6 below, a normal distribution is not skewed and is defined to have a coefficient of kurtosis ≈ 3. Jarque-Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skeweness and kurtosis are ≈ 0 and ≈ 3 respectively. Normality assumption of the regression model can be tested with the Bera-Jarque measure. If the BJ value is greater than 0.05, it's an indicator for the presence of normality on ROA (Brook, 2008). As shown in Figure 3 since, the histogram is bell-shaped and the Bera-Jarque statistic is not significant. This means that the p-value given at the bottom of the normality test screen should be bigger than 0.05 to not reject the null of normality at the 5% level so, the residuals are normally distributed in this study, concluded that there is no the problem of normality on ROA model.

Figure 6: Normality Test result
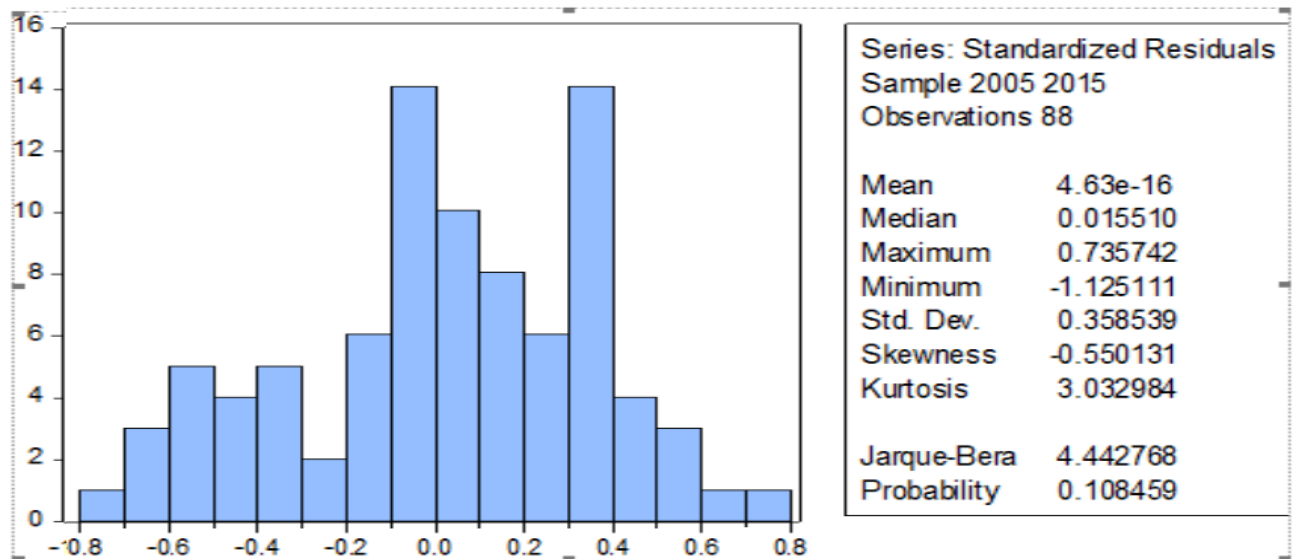
Source: E-views Output (2016)

4.4. Model selection: fixed effect versus random effect models

The model used to examine the determinants of performance of commercial banks' in Ethiopia is panel data model. As noted in Brooks (2008), there are two panel data estimator approaches that can be employed in financial research: fixed effects models (FEM) and random effects models (REF). The fixed effect regression is the model to use when researcher wants to control for omitted variables that differ between cases but are constant over time. It allows using the changes in the variables over time to estimate the effects of the independent variables on dependent variables (Li Yuqi, 2006). Similarly, according to (Li Yuqi, 2006), between effects regression with between effects is the models to use when want to control for omitted variables that change over time but are constant between cases. It allows using the variation between cases to estimate the effect of the omitted independent variables on dependent variable. In contrast, if we have reasons to believe that some omitted variables may be constant over time but vary between cases and others may be fixed between cases but overtime, then we can include both types by using random effects (Li Yuqi, 2007).

The best way of choosing between the fixed effect model and the random effect models is running the hausman test. The hausman test checks a more efficient model against a less efficient but consistent model to make sure that the more efficient model also gives consistent results (Li Yuqi, 2007). According to Brooks (2008), if the p-value for the hausman test is

less than 1%, this shows that the random effects model is not appropriate and that the fixed effects model is to be preferred. Accordingly, the hausman specification tests for this model shows that a p-value of 1.0000 (which is greater than 0.05) for the regression model of ROA, ICT, DtTA, GDP, MktC, IncDiv, INF and OpCost. Hence, the random method was preferable. Accordingly, REM was employed to estimate the relationship between the dependent and independent variables.

Table 6: Correlated Random Effects - Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	7	1.0000

Source: E-views 9 Output (2016)

The null hypothesis of the Hausman test of Table 6 showed that, the p-value for the test is > 0.05, which indicates that the null hypothesis was not rejected. Thus, in this study the relationship between bank performance and the explanatory variables was examined by the random effects model. According to the following table of result, The R-squared value measures how well the regression model explains the actual variations in the dependent variable (Brook, 2008). Thus, the adjusted R-squared value in Table 4.4 below indicates that 0.6431 percent variation in performance (ROA) of the selected private commercial banks' in Ethiopia.

This section presents over all empirical results of the regressions. Table 6 shows that, the results of the regressions. The study tried to evaluate the impact of ICT on the profitability of Ethiopian banking. Based on the model of multiple linear regressions, the researcher estimates the contribution of firm-level computers and related ICT infrastructure investment in information & communication technology to the financial performance of banks'. The panel least square nature of the available data (8 Ethiopian commercial banks' for a time period of 11 years) with total panel (balanced) observations 88 used. Thus, all the variables are observed for each cross-section for each time period, the estimations are performed by panel least square method.

Table 7: Regression result- Random Effect Model

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 12/24/16   Time: 10:53
Sample: 2005 2015
Periods included: 11
Cross-sections included: 8
Total panel (balanced) observations: 88
Wallace and Hussain estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.255317	0.625101	6.807412	0.0000
OPCOST	**-0.986942**	0.096320	-10.24654	**0.0000*****
MKTC	**-2.039723**	0.356187	-5.726554	**0.0000*****
INF	0.283994	0.479423	0.592365	0.5553
INCDIV	**0.009269**	0.003348	2.768600	**0.0070*****
ICT	**1.79E-09**	6.86E-10	2.601986	**0.0110****
GDP	-5.057263	4.232069	-1.194986	0.2356
DTTA	-0.032917	0.481231	-0.068402	0.9456

Effects Specification

			S.D.	Rho
Cross-section random			0.078195	0.0433
Idiosyncratic random			0.367536	0.9567

Weighted Statistics

R-squared	0.671869	Mean dependent var	2.577260
Adjusted R-squared	0.643158	S.D. dependent var	0.614953
S.E. of regression	0.367350	Sum squared resid	10.79569
F-statistic	23.40077	Durbin-Watson stat	1.653981
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.669729	Mean dependent var	3.007912
Sum squared resid	11.18384	Durbin-Watson stat	1.687846

Source: E-views 9 Output (2016)

*** and **, indicates significant at 1%, and 5% significance level respectively

4.5. Regression result analysis

This section presents the overall results of the regression analysis on the determinants of bank performance. In this study ROA was used as a main performance measure. The reason for using ROA as the measurement of bank performance was because the ROA reflects the ability of a bank's management to generate profits from the bank's assets and also indicates how effectively the bank's assets are managed to generate revenues. Moreover, performance is best measured by ROA (Tan et al., 2012). Table 7 shows the regression analysis for ROA. In this regression analysis the dependent variable is ROA while the independent variable is ICT, DtTA, GDP, MktC, IncDiv, INF and OpCost.

Under the following regression outputs, the beta coefficient may be negative or positive; beta indicates that each variable's level of influence on the dependent variable. P-value indicates at what percentage or precession level of each variable is significant. R^2 values indicate the explanatory power of the model and in this study adjusted R^2 value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models.

Empirical model: As presented in the third chapter the empirical model used in the study in order to identify the factors that can affect Ethiopian banks' profitability was provided as follows:

$$ROA_{it} = \alpha + \beta_1(ICT)_{it} + \beta_2(OpCost)_{it} + \beta_3(IncDiv)_{it} + \beta_4(DtTA)_{it} + \beta_5(MktC)_t + \beta_6(INF)_t + \beta_7(GDP)_t + \varepsilon_{it}$$

The overall performance of the estimates is satisfactory. In the model the relationships between the dependent variable and the independent variables are strong, with the p-values significant at a 1% level for operating cost, market concentration, income diversity and ICT has significant at 5%. The value obtained for adjusted R^2 is satisfactory, as it is fairly high i.e. adjusted $R^2 = 64.31\%$ shows the higher explanatory power of the included independent variables. Adjusted R-squared is measured the goodness of fit of the explanatory variables in explaining the variations in banks' profitability measure ROA.

As clearly described in the above adjusted R-squared value for the regression model was 0.6431 this indicates the explanatory variables in this study jointly explain about 64.31% of the variation in the profitability measure, return on asset (ROA). That is ICT, DtTA, GDP, MktC, IncDiv, INF and OpCost collectively explain 64.31% of the change in ROA. This means that the remaining 35.69% of the variation in the profitability of banks' explained by other variables, which are not included in the model. Therefore, these explanatory variables together, are good explanatory variables of the profitability of commercial banks' in Ethiopia. The null hypothesis of F-statistic (the overall test of significance) that the R^2 is equal to zero was rejected at 1% as the p-value was sufficiently low. F value of 0.0000 indicates strong statistical significance, which enhanced the reliability and validity of the model.

To investigate the relationship between IT investment and profitability the researcher estimates previously outlined regression. The results derived from the estimated model are reported in Table 1. According to the result, the coefficient of ICT shows positive relation with ROA and also statically significant at 5% significant level. The magnitude of the IT coefficient suggests that, holding other factors constant, the 1% changes (increase) in ICT investment increase (enhance) the profitability of banks' (ROA) by 1.79E-09 units. From this result it can be understood that, commercial banks generate positive return from capital investments on technological products since the benefit they are getting is significant. This finding confirms that the relationship between IT investments and accounting profitability measure (ROA) are positive, higher IT investments are associated with higher profitability.

The following sections discussed about regression results of bank specific variables, industry specific variables and macroeconomic variables among the bank specific variables income diversity (IncDiv) and ICT have positive significant effect on profitability. However, operating cost (OpCost) has negative and significant impact on the profitability while deposit to total assets (DtTA) has negative insignificant effect on selected commercial banking industry in Ethiopia. On the other hand, the only industry specific variable which is market concentration (MktC) has negative relation on profitability of the sector but it significant effect since the (p-value = 0.0000). Regarding to macroeconomic variables real gross domestic product (GDP) growth of the country has negative effect on profitability of commercial banks' and is not significant even at 10% significance level (p-value = 0.2356). Inflation rate (INF) of the country has positive effect on profitability of commercial banks' and is not significant even at 10% significance level (p-value = 0.5553).

Besides, table 7 also shows that the coefficient of operating cost, market concentration, GDP, capital structure and deposit to total asset against ROA were negative as far as the coefficients for those variables are negative (-0.986942), (-2.039723), (-5.057263) and (-4.032917) respectively. This indicates that four was an inverse relationship between the aforementioned three independent variables and ROA. Thus the increase of those variables will lead to a decrease in ROA.

To sum up, variables like, inflation (INF), income diversity and (IncDiv) and ICT had a positive relationship with profitability as far as their respective coefficients were (0.283994), (0.009269), and (1.79E-09). This revealed that there was a direct relationship between the above six independent variables and ROA. In general as per the regression results provided in table 7 among the 7 repressors used in this study 4 of them was significant.

In general, so far, the results of the documentary analysis which includes tests for the classical linear regression model, descriptive statistics, correlation matrix and regression analysis have been presented. The results of the tests for the classical linear regression model showed as the data fit the basic assumptions of CLRMs. On the other hand, the remaining results of the documentary analysis were used to assess the link that exists between bank specific, industry-specific and macro-economic determinants of bank profitability (ROA).

4.6. Analysis and discussions

Research hypotheses

H_1. *There is a significant positive relationship between ICT and performance of banks'.*

H_2. *There is a significant negative relationship between operating cost and bank performance.*

H_3. *There is a negative significant relationship between total deposit and bank performance.*

H_4. *There is a positive significant relationship between income diversification and bank performance.*

H_5. *There is a negative significant relationship between market concentration and bank performance.*

H_6. *There is a significant positive relationship between inflation and bank performance.*

H_7. *There is a significant positive relationship between gross domestic product and bank performance.*

4.6.1. Analysis of results

This section of the chapter discusses the analysis of the results. The analysis is based on the theoretical framework and the data collected through the data collection instruments. The data are analyzed in light of the specific research questions and hypotheses stated. Hence, the analysis focuses on the results of the regression analysis from document review for the selected bank-specific, industry-specific and macro-economic (internal and external) factors that have an impact on bank performance. These selected factors are ICT, DtTA, GDP, MktC, IncDiv, INF and OpCost.

Information Communication Technology (ICT)

The results of the random effect model in Table 7 shows ICT which was measured by natural log of cost minus accumulated depreciation has the beta value of 1.79E-09 for ROA with p-value of 0.0110. This shows that ICT has significantly affects the performance of the Ethiopian commercial banks at 5% significance level for ROA. The beta coefficient value of ICT 1.79E-09 shows a percentage change in the level of investment on ICT result positive change in ROA of the selected commercial banks' in Ethiopia to the extent of 1.79E-09. Even though this finding inconsistent with studies made by (N, 2001); (Rai, 1997); (Hitt, 1996), implies that banks with higher ICT investments are not able to apply a premium to the price given the higher quality of their outputs. The regression shows that; higher ICT investments are associated with higher profit in Ethiopian commercial banks'. Thus, the hypothesis which states there is a positive relationship between ICT and performance is accepted by the study.

Operating cost (OpCost)

The coefficient of the ratio of cost to income, which provides information on the efficiency of management regarding expenses relative to income, the beta coefficient for this variable was negative and statistically significant at 1% significance level with p-value of 0.0000. The beta coefficient for this variable is -0.986942 for ROA. This result reveals that, a decrease in expense increase the profit of commercial banking industry in Ethiopia. This indicates that the commercial banks' in Ethiopia have much to profit if they are able exercise efficient cost management practices. The result is consistent with the studies of Ghazouani et al. (2013), Ezra (2013), Sufian & Chong (2008), Dietrich et al. (2009), Sufian (2011), Birhanu (2012)

and Amdemikael (2012). For instance, Sufian & Chong (2008) in their work on the Philippines banks' realized as cost to income ratio exhibits a negative and significant impact on Philippines banks' profitability. The results imply that an increase/decrease in these expenses reduces/increases the profits of financial institutions operated in Philippines. Coming back to this particular study, the result revealed that in the context of the Ethiopian banking industry like that of Sufian & Chong (2008) result, the ratio of cost to income exhibits a negative and significant impact on the ROA. Thus, the ratio of cost to income was statistically significant in explaining the variability in ROA of commercial banks' in Ethiopia. Therefore, operating cost is exists as one of the major determinant factor that can influence Ethiopian banks' profitability in unfavorable way. Therefore, the hypothesis which states operating cost negatively affect bank performance is accepted by the study.

Deposit to total asset (DtTA)

Regarding the impact of deposits on profitability, even though it is the main source of funds for banks, the number one expense item for a banking sector is interest payment on saving and fixed deposits. Deposit to total asset ratio is one of bank specific determinant, result that researcher get on regression table is negative and insignificant relation with return on asset (ROA). The coefficient value on table for deposit to total asset shows -0.032917. This value indicates that unit additional deposit will reduce the profitability of Ethiopian banks by 0.032917. This may be because it incurs a higher interest expense on banks than other deposits. Thus, banks could transfer deposit in to loans and get higher income than what they paid on interest expenses. The above finding has consistence with (Belayeneh, 2011) and (Webeshet, 2011). Deposit being the major and perhaps the cheapest source of funding for banks, it is generally believed that customer deposits impact banking performance positively as long as there is a sufficient demand for loans in the market. However, if there is insufficient loan demand, more deposits in fact may depress earnings the fact that the researcher also get negative relation with profitability is created by insufficient demand of loan from commercial banks of Ethiopia.

Income diversification (IncDiv)

The ratio of non-interest income to total assets which is a measure of diversification and business mix have a positive effect on profitability, which is in agreement with a prior

expectation. In addition, this variable was also statistically significant with the beta value for income diversification is 0.009269 with p-value = 0.0070) in explaining the variability in ROA of commercial banks' in Ethiopia. Thus, IncDiv was considered as a vital driver of the performance of commercial banks' in Ethiopia. That means in the Ethiopian banking industry for the last eleven years revenue generated from non-traditional activities were one of the relevant drivers of their performance in general and profitability in particular. Furthermore, the positive coefficient that existed between income diversification and profitability clearly indicates as the Ethiopian banks' profitability is highly determined by earnings. This result was also consistent with the previous findings of Olweny & Shipo (2011) and Trujillo-Ponce (2012), Jiang et al.(2003), Sufian et al.(2012), Kosmidou et al.(2006) suggesting that revenues generated from new business have significant contribution to improve performance of the bank. Besides, the result of this study was also in agreement with what is existed in reality in the Ethiopian context which shows the shifting of banks' from interest based income to non-interest one as a result of relatively growing competition this days. This is because of the Ethiopian banks' move towards non-traditional activities as a main source of revenue. As a result, in the periods under study the determination ability of this factor increases at an increasing rate and it had clearly a positive effect on profitability of Ethiopian banks'.

Market Concentration (MktC)

It is the only industry-specific variable of the study. The coefficient of the only industry specific variable used in this study concentration is positive as hypothesized, and its effect is statistically significant. Hence, this study finds no evidence to support the SCP hypothesis. The structure-conduct-performance hypothesis (also referred to as the market-power hypothesis) states that a more concentrated sector favors bank profitability motivated by the benefits of greater market power. In case of Ethiopian banking industry, the level of concentration influences Ethiopian banks' profitability positively and its effect is significant. Thus, industry concentration is a major factor that determines Ethiopian banks' profitability as indicated by the significant coefficient in the combined regression analysis output. The finding is consistent with the findings of Athanasoglou et al. (2008) but inconsistence with (Belayneh 2011, Damena 2011, Berger et al., 1989; Short, 1979 and Goddard et al., 2004).

Theories on market concentration argue that if the size and firm distribution of a specific sector is concentrated, the profitability of firms becomes high because they could get monopoly power to set the price of their products / service and determine their desired level of profit. During the sample period (2005-2015), the concentration of Ethiopian commercial banks' that is measured by Herfindahl-Hirschman Index (HHI) has been declined. Hence, this decline on market concentration makes Ethiopian banks' to lose their absolute monopoly power on pricing of their services and enjoy the new era of competition. The possible reason for this may include the sector is highly regulated industry and the existence of high price sensitive customers in Ethiopia. In conclusion, from the findings of the regression analysis one can conclude that as Ethiopian banks profitability is determined by the level of market.

Gross Domestic Product (GDP)

As in the previous studies, the results concerning the real GDP are mixed. The p-value was 0.2356 towards ROA. This shows that GDP is not significant even at 10% significance level. Besides, the beta value -5.057263 for ROA model shows the negative impact of GDP on bank performance. While Weersaingh et al. (2013), Ben (2003), Sufian (2011), Sufian et al.(2009) found positive relationship of real GDP with ROA, Ezra (2013), Ghazouani et al.(2013) obtain a negative impact. The finding reveals that the effect of GDP growth on Ethiopian banking industry is insignificant and also it varies with the measure of performance used. Based on the regression result, this study fails to reject the hypothesis which says there is a positive relationship between real GDP and bank performance.

Inflation Rate (INF)

Regarding inflation empirical studies suggest that if a bank's income rises more rapidly than its costs, inflation is expected to exert a positive effect on profitability. The study also shows a positive insignificant relationship between inflation and banks profitability having p-value of 0.283994 for ROA. It is expected that increase on inflation rate has negative relation with performance of banks. Some studies disprove this argument by showing positive relation with inflation and banks profitability. Holding other factors constant, banks used 1% increase on inflation to increase ROA by 0.283994 units which is statistically insignificant.

Prior studies explained the rationale behind positive relation between inflation and banks profitability as once banks are able to anticipate inflation, it will give them chance to adjust interest rates accordingly as a result they will be able to increase revenues faster than increase in costs which will result in increase in profitability. This may suggest that due to the ability of banks to accurately predict the levels of inflation, the banks use the opportunity to benefit from inflationary environment to increase profits. Thus, the hypothesis which explains there is a positive relationship between inflation and bank performance is accepted by this study.

4.6.3. ICT Investment and ROA Hypothesis Testing

The objective of the study is to evaluate the relationship between banks investment on information technology and its impact on the performance of commercial banks with related to other bank profitability determinant variable. In order to achieve this objective the researcher implemented quantitative research approaches. The following section presented brief analysis of ICT variable result on regression analysis and its impact on the performance of commercial banks by supporting it with empirical evidence from former studies. The coefficient of ICT capital is 1.79E-09 with p value 0.0110, implying positive relation between technological advancements and performance of banks and the impact of ICT investment is significant even at 5%.

Hitt and Brynjolfsson (1995) studied the relation between technological advancement and performance measurements and concluded that positive relation is observed on the study but they point out that even though IT has positive impact on the performance of commercial banks its contribution to profitability is insignificant.

Baba and Patrick (1997) by using data collected through a major study of retail banking institutions in the United States, concludes that additional investment in IT capital may have no real benefits and may be more of a strategic necessity to stay even with the competition. Study result from Eyob (2010) on capital investment decision on information technology and its impact on the performance of organization also point out that there exists insignificant difference on the performance of high IT capital investing banks and low IT capital investing banks. The study also point out that information technology investment decisions are not evaluated before and after capital investment decisions is made and banks experience on this area is slight.

Latest study made by Tadesse (2015) on the impact of accounting information system (AIS) and commercial banks performance reviled that performance of AIS infrastructure was not productive as expected and should have to consistent with the quality of AIS's service and appropriate implementation of AIS's software. But over all banks are benefiting from investment made on accounting information systems.

Rahel (2015) studied the relation between Capital investment on information technology and performance measurements and concluded that positive relation is observed. Her study point out IT capital has positive impact on the performance of commercial banks and its contribution to profitability is insignificant.

Test of Hypothesis

H$_1$: ICT investment makes Positive contribution to profit of Ethiopian private commercial banks

The coefficient of ICT variable in regression result shows ICT investments make positive contribution to the performance of Ethiopian commercial banks.

The following table 8 presents the summary of hypothesized expected sign and actual sign for the relationship between the explanatory variables (independent variables) and banks' profitability (dependent variables).

Table 8: Summary of actual and expected signs of explanatory variables on the dependent variables

Explanatory variables	Expected impact on performance	Actual impacts
		Profitability (ROA)
ICT	Positive & significant	Positive & Significant
OpCost	Negative & Significant	Negative & Significant
DtTA	Negative & Significant	Negative & Insignificant
IncDiv	Positive & Significant	Positive & Significant
MktC	Negative & Significant	Negative & Significant
GDP	Positive & Significant	Negative & Insignificant
INF	Positive & Significant	Positive & Insignificant

Generally, this chapter discussed the analysis of the results of multiple linear regressions model. To summarize the above data analysis Ethiopian banks profitability are highly affected by bank-specific (internal) factors than that of external one. That means, all the bank-specific factors included in this study are proved as they were the major determinants of Ethiopian banks profitability. On the other hand, among the external variables included in this study the only factor that can affect Ethiopian banks profitability was market concentration. Thus, next chapter will discuss the conclusions and recommendations of the study.

CHAPTER FIVE

5. SUMMARY OF MAJOR FINDING, CONCLUSION AND RECOMMENDATION

This chapter deals with the conclusions and recommendations provided based on the findings of the study. The following sections discussed about the final conclusion remarks of the study and applicable recommendations. Accordingly, this chapter is organized into four sections. The first section, section 5.1 presents the summary of major finding whereas the second section, section 5.2 presents conclusion and lastly section 5.3 presents recommendation of the study and finally section 5.4 presents future research direction.

5.1. Summary of Finding

The main objective of this study was to examine the determinants of financial performance of commercial banks' in Ethiopia by imparting ICT as one of profitability determinant factor. According to previous studies made on the determinants of financial performance, performance is affected by both internal and external factors. The internal determinants refers to the factors originate from bank accounts (balance sheets and/or profit and loss accounts) and therefore could be termed micro or bank-specific determinants of profitability. The external determinants are variables that are not related to bank management but reflect the economic and legal environment that affects the operation and performance of financial institutions. Empirical results from previous studies conclude that internal factors explain a large proportion of banks' profitability; nevertheless external factors have also an impact on their performance.

A number of explanatory variables have been proposed for both categories, according to the nature and purpose of each study. Studies dealing with internal determinants employ variables such as size, capital, asset quality, income diversification or costs etc. While for external determinants, several factors have been suggested as impacting on profitability and these factors can further distinguish between control variables that describe the macroeconomic environment, such as inflation, interest rates and economic growth, and variables that represent market characteristics. The latter refer to market concentration, industry size and ownership status.

Based on the review on previous studies and banking area theories, the present study investigated the role of ICT with some selected Internal and external performance

determinant factors on the Ethiopian banking industry over the period of 2005 to 2015. The bank-specific factors that were used in this study include variables such as ICT, operating cost, deposit to total assets and income diversification. On the other hand in this study only one industry-specific variable and one macroeconomic conditions indicator variables were employed (market concentration, inflation and GDP) respectively.

Toc comply the objective of this research, the paper is primarily based on quantitative research method. The quantitative data were mainly obtained from NBE and MoFED for bank specific and external factors respectively through documentary analysis in order to identify and measure the determinants of banks' profitability. For testing the research hypotheses, a balanced panel data for eight Ethiopian commercial banks' for eleven years were selected and the necessary financial data were collected for the time period of 2005 to 2015. In specific, the study carried out by constructing a multiple regression analysis model based on OLS and random effects estimates is adopted to measure the effect of determinants on banks' profitability quantitatively. Before making regression analysis, diagnostic tests were made for the classical linear regression model (CLRM) by using E-views 9 version software.

As was indicated in the methodology section, the researcher used a census sampling method. The overall result obtained from the regression model indicates that investment on ICT has positive and significance impact on performance of Ethiopia commercial Banks'. The independent variables (investment on ICT) used in order to achieve the objectives stated were; Infrastructure (hardware), software and related service. The empirical findings on the impact of bank profitability in Ethiopia for the sample suggest the following conclusions.

5.2. Conclusion

In general from the study result, the researcher concluded that as banks are the intensive users of ICT, the objective of this paper was to investigate whether investment in ICT (as captured by computer and peripherals and IT soft wares) affects bank profitability in selected Ethiopian commercial banks during the period of 2005-20115. Despite banks' being major investors in IT the study find positive relationship between ICT investment and bank profitability (ROA). The results reveal that generally a one unit increase in ICT spending (computers and IT soft ware's) impacted on the performance (ROA) of Ethiopian banks' to the increase of 1.79E-09 units. This finding is inconsistent with Hitt and Brynjolfsson (1996), eyob (2011) and webshet (2011) i.e. the easy availability of IT (computers and IT software) to all banks implies that IT investments do not provide any competitive advantage through product differentiation. In other words, a bank investing in IT does not stand to gain additional market share as a result of its IT investment.

The regression result reveals that, the selected banks enhance their financial performance by enhancing their ICT investment. Therefore, the main conclusion is that, selected Ethiopian banks are able to enrich their financial performance due to their spending on IT. Thus, their investment in ICT should be associated with normal profits. After all, even though this study shows positive relationship between ICT and performance in selected Ethiopian bank, the researcher wants to enlighten that capital expenditure like expenditure on ICT may have not an impact in short run. In general, from the hypothesis tested, it can be concluded that adoption of information and communication technology has a significant impact on performance. Furthermore, it can be deduced from the regression result that there is a strong positive relationship between adoption of Information and Communication technology and ROA.

Based on correlation analysis, Income diversity, ICT and inflation, were positively correlated with ROA. These correlations clearly show that, the above positively correlated variables increases, ROA also moves on the same direction. On the other hand, operating cost, market concentration, GDP and deposit to total asset were negatively correlated with ROA. This clearly shows that, the above variables and ROA moves in opposite direction.

Besides the relationship between ICT and profitability, this paper considers (explores) the bank specific determinants, industry specific determinant and macroeconomic determinant (internal and external factors) that mostly influence the overall performance of banks'.

Regarding the internal determinants of profitability, all included individual bank characteristics are able to explain substantial part of bank profitability in Ethiopian banks'. Banks' with more deposit (high ratio of DtTA) are perceived to have more ability of acquiring funds (deposits) at lower cost and transforming into loans such an advantage can be translated into higher profitability.

The negative and significant impact of operating cost on performance measures (ROA) shows that increase/ decrease in expenses decrease / increases the performance of the commercial banking industry in Ethiopia. This indicates that the commercial banks' in Ethiopia have much to profit if they are able to exercise efficient cost management practices operating. The negative coefficient of the operating cost implies that there is a negative correlation with ROA. This means that, the higher costs of operation negatively affect bank performance significantly. On the other hand, if the commercial banking industry in Ethiopia invests in operating area they are able to enhance the customer needs which leads to profitability. Thus, the negative and significant coefficient of operating cost causes to some extent good performance in Ethiopian commercial banks'.

Next to operating cost, the result showed a positive and insignificant relationship between income diversification and profitability. The coefficient of the ratio IncDiv is relatively the highest compared with other variables, showing that an increase in noninterest income will result in increased profitability. Concerning to none interest expense (NII) the results indicate that there is negative and significant relation between profitability determinants of selected commercial banks' profitability in term of return on asset (ROA). We can conclude the selected bank non-interest expense reduce their profitability

Concerning industry-specific variable, the empirical results show that concentration affects bank profitability positively, but this effect is statistically insignificant. Hence, this study finds little evidence to support the SCP hypothesis. From this researcher conclude that, the industry was moving to a more competitive structure at the current time but it is not enough.

To sum up, the macroeconomic factor used in this study was GDP; it is statistically insignificant and has negative impact on ROA on selected commercial banking industry. These results about GDP not support the argument of the positive association between economic growth and the financial sector performance revealed by the empirical financial literature .The finding of the this research indicate that, the current Ethiopian economy growth could not create a new and potential demand for financial services and it might increase the probability of default loan.

5.3. Recommendation

This study raised a basic research questions and developed hypotheses related to the study variables. The main objective of this study was to investigate the contribution of ICT and other bank determinant towards the performance of Ethiopian banks' during the period of 2005-2015. The study applied descriptive study on eight selected commercial banks' and tried to infer the findings to Ethiopian commercial banks' in general through testing the hypotheses. Based on the finding of the regression analysis, the researcher forwarded the following possible recommendations. In this paper, few suggestions have been made on how Ethiopian banks' can maximize their return from ICT investment

 It is found that positive relationship between ICT and improved bank profitability (ROA). This implies that the bank managers and shareholders needs to be up and this empirical fact take some reasonable steps to insure improvements on their profitability associated with their ICT investment.

 The initial important factor that must be recommended to bank managers and shareholders is the cost-benefit consideration of ICT investment. The success of banks' that has spent huge sums on ICT doesn't reap benefits. It serves as a reminder of the cost-benefits considerations that serve as a cornerstone of successful strategic planning. In other words, whenever banks' are addressing the growing demand for ICT related products (for example, ATM services) by providing for expenses related to ICT based banking in their budgets; an important consideration is whether the resulting benefits exceed this expenditure. Therefore, maximizing the benefits of ICT based expenditure is desirable for Ethiopian commercial banks' with the consideration of cost and benefit of their IT investment.

 ICT, Income diversity, operating cost are significant key internal drivers of profitability of commercials banks' in Ethiopia. Indeed, focusing and reengineering the institutions alongside these indicators could enhance the profitability as well as the performance of the commercial banks' in Ethiopia.

In general, the explanatory powers of bank-specific variables are far more important in explaining the variability in ROA for commercial banks' in Ethiopia than external variables. But among the external factors included in this study market concentration exists as significant key drivers of profitability of Ethiopian banks'. This is a clear signal to all commercial banks' in Ethiopia that they cannot ignore the industry structure and macroeconomic indicators when strategizing to improve profitability. Thus, banks' in Ethiopia should not merely be concerned about internal factors, but they must consider both the internal and the external factors together in fashioning out strategies to improve their performance in general and profitability in particular.

 Finally, as many literatures supports financial intermediation in Ethiopia is still in its infant stages even by the standards of other low-income countries: more than 90 percent of the population is unbanked (versus an average of 60-70 percent elsewhere in Africa); and many other metrics such as the total number of banks', banks' contribution to GDP, bank accounts per-person, branches per person, and bank credit per person are lower in Ethiopia compared to other African countries. Thus, Ethiopian commercial banks' should focus to reach this unmet demand of finance by adjusting their strategy with the government regulation.

5.4. Future research direction

Finally, the study sought to investigate the determinants of financial performance in selected commercial banks' in Ethiopian: the role of ICT. However, the variables used in the statistical analysis did not include all factors that can affect Ethiopian banks' profitability. Thus, this study suggests for future studies to introduce additional internal and external factors in order to expand the finding of these result. Additionally, the researcher would like to recommend future researchers to include and measure the impact of non-financial determinants like management quality, efficiency and productivity, bank age, and number of bank branches. Moreover, it's better to conduct comparative studies on the performance of the bank among the private commercial banks' in Ethiopia. Furthermore, most of the studies conducted in Ethiopia have taken top ten experienced banks'. This reveals that the newly established banks' left unstudied. Thus, in the future it's better to include the newly established commercial banks' in Ethiopia.

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