ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

SCHOOL OF INFORMATION SCIENCE

Evaluating the Impact of Information Systems in Ethiopian Commercial Banks

ELSHALOM ENDRIAS ESSAY

June 2016

ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL SCIENCES

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Evaluating the Impact of Information Systems in Ethiopian Commercial Banks

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

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Name and signature of Members of the Examining Board

	Name	**Signature**	**Date**
Examiner	_____	_____	_____
Examiner	_____	_____	_____
Advisor	Ato Getachew Jemaneh	_____	_____

DEDICATION

Dedicated to my Beloved Parents Endrias Essay and Almaz Haile

ACKNOWLEDGMENT

After an intensive period of three years of study, today is the day: writing this note of thanks is the final touch on my thesis. Those three years have been a period of intense learning for me, not only in the academic pitch, but also on a personal level. I would like to take this moment and thank everyone who helped me on my academic endeavor.

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Abstract

Information system is revolutionizing how business organizations operate; and it is giving a vital opportunity by enabling to work more efficiently and maximize productivity. This research is conducted to evaluate the impact of information systems (IS) in Ethiopian commercial banks. In Ethiopia, there are no foreign banks yet. IS is becoming the main determinant for all activities of the organization. The availability of permeating and continuous information is becoming a determining factor of World's economy.

Quantitative research approaches were followed and this research is more of behavioral science research. Stratified sampling is used in order to divide the total population into two strata, so as to select one public bank and four private banks, from public bank strata, solely Commercial Bank of Ethiopia, and from private bank strata, Awash International, Birhan International, Debub Global and United Bank were selected. A confidence level of 95% and confidence interval of 8% was taken to calculate sample size using Cochran formula; SPSS Version 20.0 is used for analyzing quantitative data.

Information system is composed of people, hardware, network, software, database and procedure and above, it has deliverable. This study evaluates the overall information system impact in Ethiopian commercial banks and the impact IS component has. The study used strategic management grid model to evaluate the impact of IS. Also, the impact of People, Hardware and Network, Software and Database component was evaluated and in addition to that, Service Delivery and IT Governance were also evaluated in order to identify the overall IS impact in Ethiopian banks.

The overall information system has high present and high future impact. The people component has turnaround impact; hardware and network has strategic impact; service delivery has factory impact and the last IT governance has turnaround impact. The last not the least, IS has strategic impact. However, software and database needs further research to see their impact on information system.

Keywords: Information System; Commercial Banks; strategic management grid model

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List of Acronyms

AIB	Awash International Bank
ATM	Automated Teller Machine
BIB	Birhan Bank
CBB	Construction and Business Bank
CBE	Commercial Bank of Ethiopia
CORE	Centralized Online Real Time Exchange
CSM	Customer Service Manager
CSO	Customer Service Officer
DB	Dashen Bank
DBE	Development Bank of Ethiopia
DGB	Debub Global Bank
ERP	Enterprise Resource Planning
ICT	Information Communication Technology
IMF	International Monetary Fund
IS	Information System
ISACA	Information System Audit and Control Association
IT	Information Technology
ITG	Information Technology Governance
NBE	National Bank of Ethiopia
POS	Point of Sale
SPSS	Statistical Package for the Social Sciences
UB	United Bank

Glossary

People: - People are users of Information System and employee in the organization

People Present Impact: - Unforeseen impact of users of IS in the banking industry.

People Future Impact: - Strategic impact of users of IS in the banking industry which enables the company to achieve its vision and goal.

Hardware and Network: - are individual components of IS and they are treated together for this study purpose. Hardware and Network for this study incorporates devices (like computer, server, printer and etc…) and network infrastructure.

Hardware and Network Present Impact: - Unforeseen impact of hardware and network.

Hardware and Network Future Impact: - Strategic impact of hardware and network

Software and Database: - are individual components of IS and they are treated together for this study purpose. Software and Database for this study incorporates software (like CORE banking, ERP, in house developed software and etc…) and database.

Software and Database Present Impact: - Unforeseen impact of software and database.

Software and Database Future Impact: - Strategic impact of software and database.

IT Governance: - is IS policy and procedure for implementing IS policy. It is the governing part of information system.

Service Delivery: - It is service given to customers. It also considers service efficiency and effectiveness.

Chapter One

Introduction

1.1 Background

1.1.1 Information System

Information System (IS) is progressively becoming a precious and powerful tool driving development, supporting growth, promoting innovation, and enhancing competitiveness. “Emerging information system offers opportunities for developing nations to leapfrog earlier stages of development” (Kamel, 2005). It is also important to note that with an increasingly global environment less limited by time or distance, nations around the world need to get connected and join the global networked community. Otherwise, they may fall further behind and the gap they have with the developed world could get wider.

Additionally, there is growing evidence that information system is becoming an increasingly powerful tool when used as part of an overall development strategy coupled with partnerships between governments, business, and civil society. The banking sector is an example in which information system have had. It is important to note that the banking industry was one of the very first to utilize information technology back in the 1960s in the world, and has thus a record of influencing the development process through the technology. There are many examples of information technology applications in the banking sector that have helped build new markets and fuel the economy. For example, Automated Teller Machine (ATM) technology adoption has increased community efficiency, which led to a reduction in costs, improvement of quality, and increase in the added value to customers. Variety of cards, web-based banking, and mobile banking are the names of few outcomes of the process of automation and computerization in banking sector. This has further led to the move from brick banking to concept of 'click banking' (Oppong, et al., 2014). However, some of the implementations of information technology in the banking sector in the context of developing nations are often hindered by a number of challenges, including lack of stability of the legislation, weak financial sector, poor technological

infrastructure, and relatively small Internet and computer penetration. In recent years, developing nations are increasingly investing in building up and improving their technology infrastructure.

The banking industry of Ethiopia is in the midst of an Information system revolution. A combination of regulatory and competitive reasons has led to increasing importance of total banking automation in this industry. Information system enables sophisticated product development, better market infrastructure, implementation of reliable techniques for control of risks and helps the financial intermediaries to reach geographically distant and diversified markets.

IS planning is the cause of the revolution of banking industries in the whole world. IS were supporting and helping the organizations in the past year. But, nowadays organizations have realized that IS is part of the business. Information system is an integrated system for people and processes intended to efficiently use information.

> There are many kinds of information systems in the real world. All of them use hardware, software, and people resources to transform data resources into information products. Some are simple manual information systems, where people use simple tools such as pencils (Abdelhak & Dalel, 2009).

Information system bridges business and technology. People faces difficulties in distinguishing IS and IT. The reason they many not distinguish is, they think all information systems are computer based systems. IS is concerned with the information that computer systems can provide to aid a company in defining and achieving its goals It is also concerned with the "processes that an enterprise can implement and improve using information technology" (Olanrewaju, 2009).

1.1.2 Banks and Information System

There is growing evidence that shows information system is becoming an increasingly powerful tool for the overall development strategy (Kamel, 2005). Information system holds many advantages. The impact information system is felt across many industries and sectors. The banking sector is an example in which information system have had vital implications. As Krishna (2015) stated, ICT developments are becoming a mandatory to meet challenges of growth and in diversification of service.

> Technological sophistication in the banks is aimed at not only providing better services to customers but also to attain competitive advantages among them. Development of a sound and adequate ICT has become a necessity to meet the challenges of growth and diversification of banking industry (Krishna, 2015).

Today, the banking industries are growing intensely towards customer needs and wants especially in availability and diversification of services. Customer services and customer satisfaction are the prime work of any system. Information system has been the reason for many new innovations including product designing and service delivery in the banking and finance industries (Vijayaragavan, 2014). "Technology has opened new product and services, new market and efficient delivery channels for banking industry" (Shah, 2014) and "Information technology is technology used to store, manipulate, distribute or create information for communication, data management and management information systems" (Tawar & Keshari, 2013).

1.2 Statement of the Problem

Nowadays, the use of Information Systems (IS) has revolutionized how companies and organizations behave in the environment. The use of IS had led to effective use of resources and infrastructure; a systematic and easy way of doing things. Maintaining efficiency and effectiveness of the business process is now fundamental responsibility of the company. It has been a while since information system had become an essential tool to maintain the efficiency and effectiveness of the business and it is now recognized as fundamental resource for the organizations.

Banking industry is one of the biggest users of IS. IS have given banks a potential they could only dream, and also given customers high expectations which may result in dissatisfaction of users. The changes that IS has brought to banking is massive in its impact on stakeholders of the bank. IS helped the delivery of service given by the bank and also allowed to diversify its products and services more conveniently and effectively. The introduction of IS service by the bank has positively impacted the rate at which customers visits banking halls and service provided (Obiri-Yeboah, et al., 2013). As Misrak (2015) stated "Information technology has a big role almost in all business sectors." The role at which IS is playing should be measurable and identified.

In the banking industry, there are many responsibilities and activities to keep the operation of the sector. Almost all processes and activity are supported by IS. The influence of IS in the industry and the role which IS is playing in the industry are nowadays essential and interesting area to study. Some literatures and people were unable to identify the difference of IS and IT; IT transmits, processes, or stores information and yet IS is "an integrated and cooperating set of software directed information technologies supporting individual, group, organizational, or societal goals" (Watson, 2007) . The governance of IS, delivery of IS and user or people are major concern of IS and nor for IT.

According to Galliers and Leidner (2003), Information Communication Technology (ICT) is not considered by management in the strategy plan of the business. Instead, it is perceived as a tool for operation and automation in the organization. Many organizations use ICT to reengineer or reinvent the process or operations of the company. Even though, "IT investments reduce average production costs, and increase average overhead costs in firms" (Mitra & Chaya, 1996). Traditionally, information system has viewed as playing only supportive role by its practitioners.

> Recently, however, due to a significant decline in the cost of information technology and greatly improved speed and power of computers, IS moved from its traditional role as an application of back office support to one offering opportunities for gaining significant competitive advantage (Rawani & Gupta, 2002).

IS has been playing operational or supportive role and many companies forgot the other role of IS (Galliers & Leidner, 2003). It is being increasingly viewed as having the power and ability to change main organizational directions, strategy, and redefine industry. "The level of dependence on IS and, the potential for using IS for strategic purposes varies among organizations" (Me Farlan, et al., 1983) as cited in (Rawani & Gupta, 2002). Now, the question is who is a player and who is spectator? What is the responsibility of IS? What is the boundaries of IS and operational activities or organizational strategy and IS strategy? What is the affiliation between vision of the organization and the role of IS? Is IS allowed to impact the organizations strategic plan?

Yalew (2015) studied the impact of ICT on employees' performance in to private commercial banks and Misrak (2015 studied IT investment in Ethiopian financial sector towards qualitative measurements of an IT ROI conceptual model; while this study studies the impact of information

system in all commercial banking services. “When we come to specific to the Financial Industry of Ethiopia, the Industry is aggressively investing on hardware, network infrastructure, and software” (Misrak, 2015). The IS state of the art technologies are now being acquired by spending huge amount of money. Though, instead of investing on hardware, software and IS state of the art technologies without studying the impact, it is difficult for developing country to utilize the acquired information and human resources. There is a gap between what managers understand about IS and its impact on the banks overall objective and its potential benefits and impacts. This research fills the gap by evaluating the impact of IS on banks and recommend if they are any; to fully practice IS returns and realize IS potential benefits. Therefore, it is important to study the impact of IS in order to achieve the banks vision. Evaluation of information system impact is an important issue in organizations which is often overlooked. No study so far evaluated IS impact in commercial banks of Ethiopia.

The issue of IS and its organizational responsibilities is becoming a major research problem these days. The following are major research questions of the study: -

- What is the impact of information system in Ethiopian commercial banks?
- What are the problems observed in implementing information system?

1.3 Objective of the Study

1.3.1 General Objective

The main objective of this study is to determine and measure the impact of information systems in Ethiopian commercial banks.

1.3.2 Specific Objectives

In order to determine and measure the role played by information systems in Ethiopian public and private commercial banks, the study has the following specific objectives.

- To review literature by identifying different papers related to this area of study
- To evaluate IS impact in commercial bank of Ethiopia.
- To identify problems observed in implementing information system.

1.4 Scope and Limitation of the Study

The scope of this research is limited to the identification and evaluation of IS impact on Ethiopian commercial banks. The impact of IS is evaluated in overall commercial banking service and their activities undertakings to achieve their goal. The issues covered in this study to evaluate IS impact on the banks are, the impact of People competency in the banks, the impact of hardware and network, the impact of software and database, the impact of service delivery and lastly the impact of IT governance in all commercial banking services. From the entire financial sector operating in Ethiopia, the research covers particularly the activities of privately owned commercial banks and state owned commercial bank that are registered by National Bank of Ethiopia (NBE).

Due to time and financial constraint this research focus on the impact of IS in all commercial banks of Ethiopia. Another limitation is that all banks are not on same level of maturity in using information system and does not have same experience. This makes the data collection a bit though. This study does not cover evaluating the impact of IS on specific banking service such as credit service, import & export service, customer service, trade service, retail service or other, in fact it studies the impact of IS on all banking service as a bank.

1.5 Significance of the Study

Banking industry is an international business industry which needs international competence and ability to endure in business. The influence of internet banking and online banking are treats for emerging and developing local banks; internationally experienced banks of Europe and America are migrating and diversifying its products and services to developing countries. Therefore, in order to stay competitive, local banks should maximize the benefit gain from IS. Ethiopia is one of the developing countries located in the east of Africa bordered by Eretria to the North, Djibouti to the Northeast, Somalia to Southeast, Kenya to the South and Sudan to the West. The International Monetary Fund (IMF) ranks Ethiopia among five fastest growing economies in the world over the 12 months from July 2013 to July 2014. The country's fiscal year runs from July-June, all of the economy's main sectors performed well. Agriculture (which represents 40.2% of GDP) grew by 5.4%, industry (14% of GDP) expanded by 21.2% and services (46.2% of GDP)

rose by 11.9%. To manage such kind of economic growth and to satisfy foreign investors, Ethiopian banks should build their capacity and be prepared for the economic boom. Plus, today's customer satisfaction is a deal of sustainability and existence in every aspect of business. So, present banking sector has to come up with a lot of initiatives in the form of providing a better customer services with the help of new technologies (Vijayaragavan, 2014). Hence, in order to effectively use IS products and also to compute international banking, IS role should be evaluated and understood to set objectives and strategic plan so that the banks could utilize the resource effectively.

The result of this study will evaluate the impact and role played by IS and allow to reconsider the role of IS in banks managers perspective while making strategies to achieve their vision for Ethiopian banks. The main beneficiaries of this study results are public and private banks of Ethiopia, National Bank of Ethiopia, Foreign Banks, Government Financial Agency Institution, Ethiopian Investment Commission, Ministry of Finance and Economic Development, Ministry of Communication and Information Technology, Public Financial Enterprise Agency, Ministry of Trade and Ministry of Industry.

1.6 Organization of the Study

This paper is organized into five chapters. The first chapter is about the background of the study, statement of the problem, objective of the study and scope and limitation of the study. The second chapter presents review of related literatures on role and impact of IS and discus related works in that area from local and foreign literatures. The third chapter discusses the methodologies and procedures followed for the data collection, analysis and interpretations. The fourth chapter deals with analysis and presentation of data, discussion; summery of findings and the impact or role played by IS in Ethiopian Banks. The fifth and the last chapter bring conclusion and recommendations.

Chapter Two

Literature Review

This chapter reviews literatures relevant to IS roles and impacts towards Ethiopian Banks in the dimension of non-qualitative and qualitative measurements. Both empirical and theoretical literatures were reviewed.

2.1 Overview of Banking

The term banking is vague and it can be applied to a large financial institutions and also small savings and loans organization. A bank is a financial institution which is licensed as a receiver of deposits and lender by another central bank after fulfilling the requirement needed. There are many types of banks; the following two are the most communal and main banks which are commercial or retail bank and investment banks. In most countries, banks are regulated by the national government or central bank (Heffernan, 2005). In Ethiopia; banks are regulated by National Bank of Ethiopia. Banks provide an essential financial function to investors and government by linking depositors and borrowers. Bank is a lawful organization, it has law to save and withdraw also to lends and pay back the credit.

2.1.1 Benefits of Bank

Financial systems support the exchange of goods and services by providing payment facilities foster specialization by enabling more transactions (Beck, 2011). The other benefit is they pool savings from individual savers, organizations, financial institutions. The other benefit is economizing on screening and monitoring costs and thus allowing more investment projects to be financed and also by creating employment opportunity to numerous people. The other, banks can also help reduce liquidity risk and thus enable long-term investment (Beck, 2011).

2.1.2 Types of Banks

The banking industry can be divided into Retail Banks, Commercial banks, Cooperative banks, Investment Banks, Specialized banks and Central banks. According to Buckle and Becalli (2012), Heffernan (2005) and Fama (1980) Retail banks are banks which provide savings and loan, fixed deposits and other banking services to individual consumers. Commercial Banks,

receive money and grant loans to their customers and business enterprise. Cooperative Banks provides cheap credit to their members. Investment banks help businesses work in financial markets. Specialized banks are exchange banks for foreign, industrial and development banks. Central Banks manage the monetary system for a government (Buckle & Beccalli, 2012) (Fama, 1980) (Heffernan, 2005).

2.1.3 The History of Banking

The history of banking industries goes back to the epoch of Babylonians and Assyrians around 2000 BC and later on Greek and then Roman Empire (Idiab, et al., 2011). The history begins with the first prototype banks of merchants, which provides grain loans to farmers and traders who carried goods between cities. Written standards of practice in the ancient world were considered necessary and also were part of the Code of Hammurabi the earliest known formal laws (Nagarajan, 2011). Deposits were not of money but of cattle, grain or other crops and eventually precious metals. "A wide range of deposits was accepted, loans were made, and borrowers paid interest to lenders" (Davies, 1994).

> Credit in its earliest form was primitive, credit need only have consisted of a loan of seed to a son or brother or neighbor until harvest time or a loan of an animal or of a tool or of a food. Such transfers is called gifts if no repayment is expected, loans if repayment is expected and loans at interest if the repayment of a certain amount, more than was loaned, is expected (Homer, 1963).

> Hildreth mentioned, the first regular institution resembling what we call a Bank, was established at Venice, nearly seven hundred years ago. In its origin it had nothing to do with the business of banking. It began in this way. The Republic being engaged in war, and falling short of funds, had recourse to a forced loan. The contributors to that loan were allowed an annual interest of four per cent on the sums they had been obliged to lend (Hildreth, 2001).

The first bank to take the name of bank was the "Bank of Barcelona" in 1401G.C. Bank of Barcelona accepts deposits and discounted bills of exchange. However, the first state bank was established in the city of Venice on 1587. And Bank of Amsterdam established on 1609 for the purpose of filing excessive and providing content to the public (Idiab, et al., 2011).

Gradual emergence of banks took time to build the modern banking industries. Many of the institutions were owned by individuals, families and were protected by law to protect the depositors in case of bankruptcy for return of private capital to owners of these banks. In

meantime, those laws and modifications let to establishment of banks with joint stock companies. Also, Industrial Revolution in Europe led to growth of companies with their activities. The need for large banks helped them to set up branches all over the world (Idiab, et al., 2011).

2.1.4 History of Banking in Ethiopia

Banks in Africa has undergone magnificent change during the past 20 years. Which were dominated by government owned banks in 1980s. (Beck & Cull, 2013). In Ethiopia, the evolution of modern institutionalized Financial System goes back to 1900 when an agreement was reached on 1905. The agreement was reached between Emperor Minilik II and British owned National Bank of Egypt, represented by Mr. MaGillivray. This agreement introduces modern banking in Ethiopia on 1906 (Tewdros & Vijay, 2011) (Shaikh, 2014) (Misrak, 2015). After the agreement the first bank named "Bank of Abysinia was inaugurated in Feb.16, 1906 by the Emperor. The Bank was totally managed by the Egyptian National." (Misrak, 2015)

> During the Italian occupation, Bank of Italy banknotes formed the legal tender. Under the subsequent British occupation, Ethiopia was briefly a part of the East Africa Currency Board. In 1943, 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 were formed. In the period to 1974, several other financial institutions emerged (Tewdros & Vijay, 2011).

Arnaldo Mauri used five events to describe history of banking in Ethiopia. In which the first event was, the establishment on 1905, the second was Italian occupation in 1936, when, following liquidation of the Bank of Ethiopia, "broad colonial banking communication extended to encompass all Italian possessions in the Horn of Africa" (Mauri, 1967). The third event was, in 1943, which is the establishment of the State Bank of Ethiopia, by giving rebirth to the Ethiopian independent banking. The fourth event was the revolution of 1974, which wiped out the monarchy era and starting of socialism era and it nationalized companies and shaped a "socialist banking" two tier models "suited" to Ethiopia, the whole credit system was based on the central bank and other three state owned financial institutions enjoying monopoly market. The fifth and the last event was the collapse of socialist regime. (Mauri, 2003).

Presently, there are 16 private commercial banks and two public banks in the Ethiopian banking industry. There are no foreign banks in the country, and the system remains isolated from the

effects of globalization. It seems that policy-makers fear that inviting foreign banks to invest will lead to loss of control over the economy (Tewdros & Vijay, 2011)

2.2 Fundamental Components of IS

Information system in business is expected to process data and transform into information and adds knowledge to the business. IS has the following component which are software, people, hardware, network and procedure (Bourgeois, 2014). Procedure component of IS is discussed in category of IT governance. Like any systems, information systems also has an output or deliverable. This deliverable in banking sector is service. Hence, IS deliverable or output is presented as service delivery. Hardware and network components are considered together in order to eliminate repetitiveness and also Software and database are also considered together.

The People Component

In the organization, among all types of resource human resource is a major resource. Good managers are not only effective in managing the economic and technical resource. They also effectively manage employees in the organization. The people are an essential component of information system.

Hardware and Network Component

Hardware is a tangible product that can be touched. This hardware includes storage devices, servers, desktop computers, laptops mobile phones, input device and output devices and so on. Network is the ability for computers to communicate one another. And also to facilitate communication between individuals (Bourgeois, 2014)

Software and Database Component

The other component of an information system is software. Software is the set of instructions that tell the computer or hardware what to do. Software is an application which people or information system users use to do their daily job. Software can be simple as calculator and complex and huge as banking software and ERP software (Heineman & Councill, 2001) while database is storing of data for easy retrieval and for further analysis.

Service Delivery

Information systems deliver an output which can be sub system, product, service, information, knowledge or other thing. To deliver service, information should be processed and this process is "a series of steps undertaken to achieve a desired outcome or goal. Information systems are becoming more and more integrated with organizational processes" (Bourgeois, 2014).

IT Governance

IT governance ensures the organizations IT infrastructure enables the organization to achieve its corporate strategy. It is concerned with "strategic alignment between the goals and objectives of the business and the utilization of its IT resources to effectively achieve the desired results." (Magee, et al., 2008). It is also "a part of the overall governance of an entity, with a specific focus on improving the management and control of Information Technology" (Barclays, et al., 2005).

2.3 Importance of IS in Banking Industry

Information Systems (IS) is increasingly becoming an invaluable and powerful tool driving development, supporting growth, promoting innovation, and enhancing competitiveness. It offers opportunities for developing country like Ethiopia to skip earlier stages of economic development. It is also important to remind that within increasing global domain, the world need to get connected with the global community.

IS is benefiting the bank in many ways reducing error and cost by automating and making real time transaction process for its customers. Centralized online real time exchange (CORE) banking system interconnects branches of the bank where customers can perform basic transactions from any of the bank's branch. CORE banking system is the mechanism and the way that the bank is getting closer to its customers. In addition to that, modern bank do not rely on its branch network alone (Rajesh & Rakesh, 2012). Many believed that IS has a magnificent role in providing service for the emerging e-commerce market. "Evidence suggests that many banks are beginning to deliver credit and deposit products electronically. In addition, some large banks are developing products designed exclusively for e-commerce" (Wenninger, 2000). Many banks have established internet banking and mobile banking in which web sites and mobiles where used by individuals and businesses to perform many basic banking functions such as

checking balances, transferring funds, or applying for credit cards. Businesses can apply for loans, initiate wire transfers, and take advantage of cash management and payroll services (Wenninger, 2000).

2.4 Information Systems Groundwork

In banking sectors technologies are used for the automation of the operation, to enhance customer relation, to create easy accessibility and availability, to improve real-time operation, to enhance security and build public trust and many more. Technological facilities have been identified to be the distribution channels of Banks. Hardware and Network on banking is really not one technology, but an attempt to merge several different technologies (Obiri-Yeboah, et al., 2013). Systems like business intelligence, management information system, executive system, knowledge management system, retail system, CORE banking system, Enterprise Resource Planning (ERP) System, Customer Management System which sustain the operation in most effective and efficient way. CORE banking system enable customers to access their account from anywhere and anytime without the physical interaction with branches. They also can use Automated Teller Machine (ATM), mobile banking, Point of Sale (POS), internet banking and other with no need of going to branch physically (Oppong, et al., 2014). CORE banking system is a networking of branches, which enables customers to operate their accounts, and avail banking services from any branch on CORE banking network, regardless of where they maintain their account.

2.5 Challenges in Using IS Facilities in Ethiopia

Banking sector in Ethiopia faces numerous challenges to adopt advanced technologies as well as E-banking applications and seize the opportunities presented by ICT applications in general. Key challenges in IS. There are the following challenges in Ethiopia; lack of proper trained persons, lack of nearby infrastructure like internet, online payment and telecommunication and new technologies. Banking sector in Ethiopia it is still developing. The banks try to use advanced technologies and attract customers. The new software's requires high configured hardware devices (computers) to maintain centralized servers and individual PC's and also to use these

software's employee's needs more skills. Ethiopia is lagging with proper trained persons. Software is failed or error should be occurred, they are unable to rectify it the other is Lack of awareness on the benefits of new technologies, Lack of trained personnel in the key organizations, Tendency to continue with existing infrastructure. This are some challenges in using IS facilities (Tewdros & Vijay, 2011).

2.6 Theoretical Frame Work

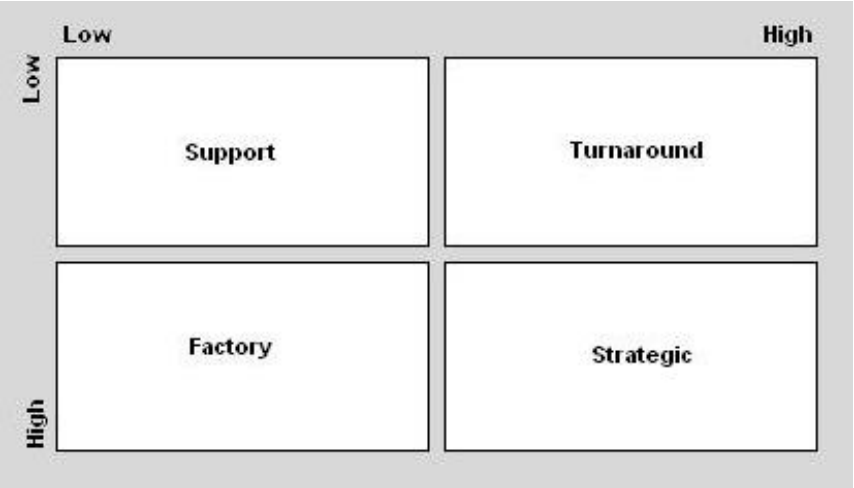
The banking industries are flourishing and playing a major role in economic growth of Ethiopia. These days, banks are buying and acquiring IT infrastructure. But, availability of infrastructure does not guarantee effective use of IS. A method for measuring and evaluating the use of information systems is necessary to identify the role and impact of IS. McFarlan and McKenney, in 1983, devised a very useful grid for assessing a company's use of IT a model called the 'Strategic Grid Method' (Corboy, 2007). By addressing four 'quadrants': support; factory; transition/turnaround; and strategy, each of which represents a situation for the company, McFarlan's model and explanation on how IS or IT is related to strategy and business operations in a company (McFarlan & McKenney, 1983). Though, it is observed that the method does not provide us with valid operational measures which could potentially have great use in empirical research studies (Al-Hatmi, 2012).

According to Abdullah Al-Hatmi (2012), this method represents the present and future impact of IT application on the business. To evaluate the strategic impact of IT on business, McFarlan (1984) addressed five questions based on Porter's Five Forces model of strategy:

- Can IT establish entry barriers for market competitors?
- Can IT influence the change of suppliers as well as alter bargaining power?
- Can IT change the basis of competition (based on cost, differentiation or focus)?
- Can IT alter bargaining power in relationships with buyers?
- Can IT generate new products?

These questions serve as a guide for the new direction of competition either within the organization or with other companies (Al-Hatmi, 2012).

Future



Present

Figure 2.1: McFarlan and McKenney model

According to Martin Corboy (2007) there are two straightforward questions

1. How important does management feel the present IT systems are to the company?
2. How important does the company think future developments in IT will be for the company, i.e. the impact of future IT developments on its way of doing business?

Depending on the responses to these questions, a company can be placed in the four quadrants as follows (Corboy, 2007).

1. **Low Present: Low Future Impact: -** IT has little relevance and simply supports existing processes.
2. **Low Present: High Future Impact: -** IT will feature more on the business agenda in the future. The company believes that IT will have a major impact on their business model in the future and IT is in a turnaround role i.e. IT will be a key feature of future strategic planning. It may not have played such a role in the past.
3. **High Present: Low Future Impact: -** Here IT is said to have a Factory Role. It is important in terms of day-to-day operations but it is not felt that there are any major IT developments on the horizon that will fundamentally alter the nature of the business. Here, the key issue is the maintenance of existing systems.

4. **High Present: High Future Impact: -** In this quadrant, IT plays a crucial role both in terms of its present impact and in terms of how future IT developments are viewed as impacting on the organization. IT is said to have a strategic significance. It is mission critical (this mean, the company is not going to be in business at all without using IT effectively to deliver its products and services both now and in the future). The role IT strategy plays in the formulation of the overall business strategy is critical.

"An alternative version to the Strategic Grid is called Low Future: High Present Impact 'Key Operational' and the Low Present: High Future Impact – 'High Potential'" (Corboy, 2007). The concept of Strategic Grid is used here to determine the role played by IS in banks. This helps to categorize organizations in one of the following four categories which are Strategic, Turnaround, Factory and Support.

2.7 Related Works

Research has been done by scholars, researchers, students and workers to enhance the way of life, to increase efficiency and effectiveness, to find out the real problem and its cause and also to get answers for many questions. Research on the field of IS focuses on research process of IS as well as research findings, their applicability and significance. In undertaking research on "Evaluating Impact of Information Systems in Ethiopian Commercial Banks", other literatures were reviewed. There are some related studies conducted by different researchers in different parts of the world. But in our country context, the researcher can't find studies which are directly related to these research themes which are done on Evaluation of Information Systems in Ethiopian Commercial Banks so far. There are limited numbers of studies conducted in Ethiopia which are partially related with these research themes and few international studies which are more related with this study.

The study on "Role of Information Systems in Banks: An Empirical Study in the Indian Context" Rawani and Gupta (2002) is one of the related studies with this research of Evaluating the Impact of Information Systems in Ethiopian Banks. The research is done on few Indian banks. The researchers used the concept of Strategic Grid to determine the role played by IS in banks. This helps to categorize organizations in one of the following four categories which are Strategic,

Turnaround, Factory and Support. The role of IS was assessed using two dimensions, which are present impact and future impact. Multi item construct was used to measure the present and future impact of IS in banks. The study used both qualitative and quantitative approach. All banks including Public Banks, Private Banks and Foreign Banks were included in the research.

Rawani and Gupta (2002) corrected the questionnaire based on feedback obtained and, finally, nine items were selected to measure the two dimensions. They dropped two items due to problems in convergent validity. Later, seven items were used for measuring the two dimensions which are present and future impact of IS in banks. They studied the current impact by assessing the impact of one hour shutdown of computer and by assessing feasibility of manual processing of data related to deposit and withdrawal of cash, and bank's critical dependency on the present IS. For determining the future impact of IS, items such as whether banks were developing new systems for efficiency improvement, whether systems were developed to create new service delivery channels/products (e.g., ATM, net banking, etc.), whether IS were providing new ways to compete by offering Hardware and Network based efficient payment systems or reaching more customers at lower cost, whether IS applications under development were vital for bank's strategic objectives, etc. were used. All items were measured using a five-point Likert-type scale (Rawani & Gupta, 2002).

Analyzing the present and future impact of IS for each bank was determined by locating it on the Strategic Grid depending on whether the mean score of the present and future impact of IS for the bank was above or below the sample mean value.. A comparison of the role of IS among three sectors of the banks.

The paper focuses on evaluating and locating the role played by IS in Indian Banks (Rawani & Gupta, 2002). The aim of the paper is to investigate the role of IS in public sector, private sector and foreign sector banks by locating their position on Strategic Grid.

The role of IS which reflects the present and future impact of IS on the organization has been found significantly different among three groups. There are more public sector banks 52.63% in support category whereas higher 52.63% and 71.43% of foreign banks are in strategic category. This paper has tried to locate the banks on the Strategic Grid. However, the level of computerization of various branches of a bank may be different and hence their dependency on

IT may be different (Rawani & Gupta, 2002). Therefore, the paper recommended Future research may involve locating the various branches and departments of a bank on the Strategic Grid and suggesting a suitable strategy for the branch. This study has the limitation that data are collected only from key IT executives. Perceptions of the bank's business executives may be different from that of the IT executives. Hence, future research could also attempt obtaining and analyzing the opinion of bank's business executives and looking for perceptual differences, if any (Rawani & Gupta, 2002). The study they made only studied the Software and hardware component of IS. The role of people or IS users in the bank, the delivery IS had on the banks and IT governance was not assed in their research.

Another study entitled "The Role of Information Technology on Banking Service Delivery: A Perspective from Customers in Ghana" by Obiri-Yeboah, et al (2013) studies the impact of IT on banking service delivery. The study evaluates the types of technological facilities used by bank customers, the benefit of technology and its challenges to customers. This research followed combination of qualitative and quantitative approach to ensure effectiveness of the research process as one can enhance the findings of the other and it adopted a case study strategy. The objective of the study is to answer the question "what is the role of technology on banking services quality in Ghana" by examining the technology facilities offered by banks in Ghana, benefit of technology on banking in Ghana and the challenges banks encounter in providing technology facilities to their customers. Samples of 153 participants were selected for the study; this consisted of 50 customers from each bank and 3 IT officers in all the banks were also interviewed using purposive sampling technique. IT officers in the 3 selected banks were purposely selected.

The study focused on the role of IT on service delivery from the perspective of Ghanaian customers. The research found that 24.4% of the respondents preferred using IT services in the bank, 3.3% preferred traditional services, 43.3% want both services, while 28.9% said they had not decided. The other findings on frequency of usage found that, 5.6% of respondents used IT services once a month, 36.7% twice a month, 23.3% used it three times, while 34.4% used IT services more than three times per month. On service delivery preference, It shows that all the respondents (100%) used ATM, 52.8% use internet banking, 52.8% use branch networking, 44% use direct deposit and withdrawal, 34.1% point of sale transfer terminal, 19.8% used pay by

phone system, 16.5% use electronic cheque conversion, 5.5% use personal computer banking services, and 3.3% use electronic fund transfer at point of sale (EFTPOS) in ascending order of usage (Obiri-Yeboah, et al., 2013).

The study discovered that customers use Internet Banking, Branch Networking, Direct Deposit and Withdrawal, Point of Sale Transfer Terminal, Electronic Cheque Conversion, Personal Computer Banking Services, and Electronic Fund Transfer at Point of Sale (EFTPOS). ATM, Direct deposit and Withdrawal Services and Branch Networking were the facilities that are offered by all the banks. ATM is used by all the respondents. The study shows that the introduction of technology facilities by the banks impacted positively on banking services delivery (Obiri-Yeboah, et al., 2013).

Another study on "An Empirical Study on Role of ICT in Banking Sector" by Saranya., et al (2014) studied . The objective of this study is to examine the awareness of ICT banking among customers; to analyze the usage of ICT in banking; to identify the benefits of ICT in banking and to suggest measures for effective utilization of ICT banking. The study used Descriptive research design. 200 samples are chosen from the total population of Chennai city, India using purposive quota sampling from non- probability sampling method to select people who have bank accounts and data was collected through a Structured Questionnaire.

The research found that the usage of ICT banking for fund transfer depends on age of the customers; the usage of ICT banking for bill payments does not depend on the income of the customers; and considering ICT banking as safe & secure does not depend on the occupation of customers (Saranya, et al., 2014).

A study entitled "The Impact of Information & Communication Technology on Ethiopian Private Banks' Performance: The Case of Two Selected Ethiopian Private Banks" by Yalew Nigussie (2015) was conducted in selected banks. The research aims to examine the impact of Information and communication technology on performance of the Ethiopian private banking industry. The research used both qualitative and quantitative data to ensure effectiveness of the research process as the findings of the qualitative data which enhance the findings of quantitative one and the vice versa plus it used a case study approach. This study tried to examine the relationship between adoption and application of ICT in Ethiopian private banks' services/products and their

performance improvement in terms of their customers' satisfaction and employees' performance (Yalew, 2015). The research recommendation may not directly apply to all private banks than Dashen Bank and United Bank. A total of 200 customers and 60 employees of Dashen Bank (DB) and United Bank (UB) were randomly selected to participate in the study. This research did not show the size of total population and also how the sampling size become 200 for customers and 60 for employees sample size, it uses purposive sampling which may lead the research paper to biased results, misrepresentation of data and incomplete conclusions.

The data analysis part has been done in Statistical Package for Social Sciences (SPSS). In generating the actual results, frequency tables were generated to determine the number of respondents who expressed their opinion on a particular item. Based on the frequency tables generated from SPSS, descriptive statistic was used to analyze and describe the findings. In order to further test the research hypothesis, the research used One sample test (T-statistic) and linear Regression model. The T-statistic test applied to examine the relationship between the studies' dependent and independent variable whereas linear regression model was applied to evaluate the level of significance of the independent variables on the dependent variable (Yalew, 2015)

The research's' p-value is .000 which is less than the tabulated value α (.05). At last, the paper concluded that adoption of information technology has a significant impact on customers' satisfaction.

Summary of the main related works with the current study is presented hereunder in table 2.1.

Table 2.1 Summery of Related Works

Author	Area	Objective	Methodology	Finding	Remark
(Rawani & Gupta, 2002)	Role of Information Systems in Banks: An Empirical Study in the Indian Context	Investigating role of IS in public, private and foreign sector banks by locating their position on the strategic grid.	Qualitative and Quantitative approach	It has been empirically proved that while the present impact of IS varies significantly ($p<0.005$) with the banking groups, the future impact of IS does not.	Because of the Data collected from IT personals, study can't show values ICT in the organization. perceive
(Obiri-Yeboah, et al., 2013)	The Role of Information Technology on Banking Service Delivery: A Perspective from Customers in Ghana	To answer the question "what is the role of technology on banking services quality in Ghana"	Qualitative and Quantitative approach	The study clearly shows that the introduction of technology facilities by the banks impacted positively on banking services delivery	The study focuses on the impact of IT on service delivery only.
(Saranya, et al., 2014)	An Empirical Study on Role of ICT in Banking Sector	To study usage of ICT in banking sector and how the people make use of its products and services.	Descriptive research design.	The usage of ICT banking for fund transfer depends on age of the customers.	The study focuses on examining awareness of ICT banking among customers. And analyze the usage of ICT in banking.
(Yalew, 2015)	The Impact of IT On Ethiopian Private Banks' Performance: The Case Of Two Selected Ethiopian Private Banks	To examine the impact of IT on performance of the Ethiopian private banking industry.	Qualitative and Quantitative approach	Application of ICT has affected employees' performance in Ethiopian Private Banks industry.	Small sampling

Chapter Three

Research Methodology

Research methodology as a method used to collect information and data for the intention of making business decisions which may consist of surveys, interviews and other research methods. For business organizations, research is an art of scientific investigation. It is also a systematic design, collection, analysis and reporting the findings & solutions for the marketing problem of a company (Bhojanna, 2007). In other words, this is where the researcher tries to defend or search the given questions thoroughly his or her own way until answers and conclusions are developed. It is also explained as answering unanswered questions or exploring which presently not exist is a research (Goddard & Melville, 2004).

This chapter presents details of the research design and methodology. This includes the research design, sample size and sampling technique, data source and collection method, procedure of data collection, questionnaire and reliability test. At the end the method data analysis was presented.

3.1 Research Design

The research design is the first part of research methodology. Every research adopts methodology to be used in undertaking the research. The methodology which is going to be used should be justifiable whether it is related to the research's theoretical theme and philosophy. The research design refers to the overall strategy that the researcher selects to integrate the components of the study in a coherent and logical way (Trochim, 2002). Thereby ensuring that the researcher will address the research problem effectively; it also constitutes the blueprint for the collection, measurement and analysis of data (Vaus, 2001).

Two paradigms describe much of the research in the Information Systems discipline which is behavioral science and design science (Purao, et al., 2008). Traditionally, research in Information System (IS) has primarily relied on behavioral research methods. "In recent years, an increasing interest in the design research method can be observed" (Purao, et al., 2008). The behavioral

science paradigm seeks to develop and verify theories that explain or predict human or organizational behavior. Researchers offer design science research to support behavioral science research (Carlsson, 2006). "The design research method has recently been introduced in information systems research as an alternative to behavioral (i.e., qualitative and quantitative) research methods" (Huysmans & De Bruyn, 2013).

This research is more of behavioral science and adds elements from design science (Hevner, et al., 2004). Because, some of our objectives like identifying metrics to measure use of IS, identifying the impact of IS, role of IS in Ethiopian banks can be achieved through behavioral science approach.

There are three approaches to conduct behavioral science research: Qualitative, Quantitative and Mixed approaches. Mixed method approach is the general term for when both qualitative and quantitative data collection techniques are used in research design (Kaufman & L.Kaufman, 2005). It is thought that the "combination of quantitative and qualitative methods presents a more enhanced insight into the research problem(s) and question(s) than using one of the methods independently"; (Creswell, 2012). Qualitative approach is the research paradigm that relies on collection of qualitative data. (Caruth, 2013).

> A qualitative approach is one in which the inquirer often makes knowledge claims based primarily on constructivist perspectives (i.e., the multiple meanings of individual experiences, meanings socially and historically constructed. with an intent of developing a theory or pattern) or advocacy/participatory perspectives (i.e., political, issue-oriented, collaborative. or change oriented) or both (Creswell, 2003).

Quantitative approach is mainly a survey study that measure quantitative or numeric description of trends and attitudes or opinions of a population by studying the sample population and generalizes or infer on total population (Creswell, 2014). In this study quantitative method were employed; to ensure effectiveness of the research process and enhance the findings, qualitative data were used to support quantitative data.

3.2 Data Collection

Data collection is the process of gathering information on targeted variables in a systematic way, and evaluates outcomes (Joop & Hennie, 2005). The main data gathering instruments used in this study is questionnaire and interview. The quality of the research tool will inevitably determine the quality of information collected. The questions are carefully designed in addressing the basic research objectives and most of the question will help identify impact of IS. Prior to final questioner distribution pilot test has been conducted on 20 respondents to check the questions, whether they are good enough to meet the research objective or not. The reliability of the pilot test is ensured through reliability analysis with the help of Cronbach's Alpha, with the score 0.942. Normally Cronbach Alpha test are considered reliable if the test result is greater than 0.7 as SPSS statistics manual (IBM, 2013). In this regard, the Cronbach‘s alpha for this study shows the items are reliable and the entire test or questions are internally consistent.

Table 3.1 Pilot Test Cronbach's Alpha Result

Case Processing Summary -Reliability Statistics

		N	%	Cronbach's Alpha	N of Items
Cases	Valid	20	100.0	0.942	65
	Excluded[a]	0	0.0		
	Total	20	100.0		

a. List wise deletion based on all variables in the procedure.

Cochran formula is used to calculate sample size. For population size greater than 100,000 or for infinite population using 95% confidence level and confidence interval of 8, the sample size will be 150 (see formula on Annex IV) (Cochran, 1977). Confidence level is the overall capture rate if the method is used many times. Confidence interval also called margin of error, is used to get an interval based on each sample, these intervals capture the unknown population mean. In other words, the actual mean will be located within the interval (Moore, et al., 2013).

Finally, while distributing the questionnaire to the respondents, the researcher distributed 150 questionnaires and obtained 108 responses. To increase 108 responses to 150 responses, redistribution of questionnaire were undertaken. The researcher finally administered 200

questionnaires to respondents and collected 150 of the response. Among 150 questionnaires, 50 were collected from CBE and 25 from Awash International Bank (AIB), Birhan Bank (BIB), Debub Global Bank (DGB) and United Bank (UB) each as planned. Regarding the Interview, eighteen open ended questions (See Annex V). In order to triangulate facts, and enrich the data, interview is conducted with IS process directors at the selected public and private banks.

3.1.1 Questionnaire

Data were acquired through personally administered questionnaires instrument to evaluate the role of IS in Ethiopian banks. The questionnaire is also designed to evaluate the impact of IS. It has two groups which are group one demographic information of the respondents and group two has five point Likert scale questions which measures the role of information system in Ethiopian banks. The respondents are requested to express their level of agreement or disagreement with the statement. In this group, there are themes of IS features which are People, Hardware and Network, Service Delivery and IT Governance. For survey questionnaire, sixty five factors have been used. From sixty five factors in the survey twenty five were taken directly from (ISACA, 2003), and other twenty two were taken from (Girmanesh, 2015) with little manipulation. They are selected because, they are important to evaluate and identify the IT governance of IS, impact role of IS playing in the banks which is important for the thesis to identify the role played or the impact IS had on the banks and the attention IS had on the banks executive managers. And the rest eighteen questions were formulated from literature review.

3.1.2 Documents

In addition to the questionnaire and interviews, documents were reviewed. Different documents are revised and assessed for this specific study. Printed materials; books, journal articles, National Bank of Ethiopia (NBE) annual reports, banks annual reports, published and unpublished documents were reviewed in depth, and assess other countries experiences in identifying impact IS in Ethiopian banks and its role.

3.1.3 Interview

In regard to interview, interview guides were prepared and interviews were conducted with IS process directors of the banks only. The directors were selected because of their work experience, position, skills and responsibility they held in their respective bank. The interview is structured interview which has 18 structured questions.

3.3 Source of Data

There are two types of data which is usually used in research, primary and secondary data. Primary data does not actually exist unless the researcher generate it through the research process as part of the consultancy or dissertation or project (Joop & Hennie, 2005). Primary data is original data collected by the researcher. It will often be collected through techniques such as experimentation, interviewing, observation and surveys. On the other hand, secondary data is information which already exists in some form or other but which was not primarily collected, at least initially, for the purpose of the consultancy exercise at hand. In fact, secondary data is often the start point for data collection in as much as it is the first type of data to be collected (Joop & Hennie, 2005).

This study used both primary and secondary data. Regarding the primary data the researcher distributed structured questionnaire to relevant participants and structured interview for selected participants. In order to strengthen the result and findings of the study the researcher examined different documents.

3.4 Population of the Study

There are 17 Commercial banks, one Development bank and one Central bank in Ethiopia. The general population of this study is all Commercial Bank employees working in Ethiopia, both from private and public banks. Numerically, there were 2 public commercial banks on the beginning of 2016, Commercial bank of Ethiopia (CBE) and Construction and Business Bank (CBB). But now, because of the decision imposed by government to merge CBB with CBE, CBB merged with the other public bank CBE. As result, there is only one public commercial bank in Ethiopia. Besides private banks, there are 16 private commercial banks in Ethiopia. In Ethiopia, there are no foreign banks as this research is taken. The total number of commercial banks is 17 and the total population of this paper is all IT professionals, business professionals, IT managers, business managers and executive managers working in these 17 commercial banks.

3.5 Sample Design

The aim of the sampling is to make conclusion about the general population by systematically taking representative samples from the total population. Sampling methods are classified as either probability or nonprobability. In probability samples, each member of the population has the same chance of being chosen, it is non-zero probability of selection (Barreiro & Albandoz, 2001). Probability methods include random sampling, systematic sampling, and stratified sampling. In this research, the researcher uses stratified sampling.

Stratified sampling is done by dividing the total population into sub population called strata and that probability sampling be conducted independently with in each strata (Ross, 2005). It is possible to have sub-strata into strata. For the sake of this study, the total population of banks was classified into two strata which are private banks and public banks. Again private bank's stratum is sub-divided into four strata according to their year of experience because it suit to attain the study objective by giving equal representing bank from different age of experience. All banks are given equal chance and the sampling is unbiased and fair. Stratified sampling is chosen because it does not only present the overall population, it also represent sub groups of the population so that each strata has proportional samples (Teddlie & Yu, 2007).

Among the total number of commercial banks in Ethiopia, which excludes the central bank known as National Bank of Ethiopia, and development banks also known as Development Bank of Ethiopia, there are 17 commercial banks in Ethiopia, excluding Construction and Business Bank, which was merged with the Commercial Bank of Ethiopia. Total population on this paper is IS and business professionals, IS and business managers and executive managers working in all commercial banks. As discussed above, the population is classified into two strata which are public commercial bank and private commercial bank. There is only one public commercial bank and 16 private commercial banks. In the public commercial bank there is only the Commercial Bank of Ethiopia. So, there is obviously no need of sampling to select the only public bank. In case of private banks, there are 16 private banks. These 16 private commercial banks are divided into sub-strata according to their year of experience in the business. Among each sub-stratum, one randomly selected bank from each sub-stratum will represent each sub-stratum. Table 3.2 shows sub strata of private banks and representing bank for each sub strata. Among all the 17

commercial banks, 5 commercial banks are selected. The total number of selected commercial banks are 5 and total sample size includes IS professionals, business professionals, IS managers, business managers and executives managers from these selected five banks.

Table 3.2 Sub-strata for private banks strata and representing bank

No.	Name of Bank	Establishment Year	Sub-Strata	Representing Bank
1	Awash International Bank	1994	Sub-Stratum 1	Awash International Bank
2	Dashen Bank	1995		
3	Bank of Abyssinia	1996		
4	Wegagen Bank	1997		
5	United Bank	1998	Sub- Stratum 2	United Bank
6	Nib International Bank	1999		
7	Cooperative Bank of Oromia	2004		
8	Lion International Bank	2006		
9	Oromia International Bank	2008	Sub- Stratum 3	Birhan Bank
10	Zemen Bank	2008		
11	Buna International Bank	2009		
12	Birhan Bank	2009		
13	Abay Bank	2010	Sub- Stratum 4	Debub Global Bank
14	Addis International Bank	2011		
15	Debub Global Bank	2012		
16	Enat Bank	2012		

The following banks are selected from all commercial banks, Commercial Bank of Ethiopia from first strata which is public commercial bank is chosen and Awash International Bank, United Bank, Birhan Bank and Debub Global Bank are chosen from the second strata which is private commercial banks

Five banks are selected, and this results in 150 responses to be expected in the sample. This sample size will be quite representative to conclude about role of information systems in Ethiopian banks, 50 respondents from strata one and 100 respondents from strata two. As listed above, Cochran formula is used to calculate sample size. For infinite population or population

greater than 100,000 using 95% confidence level and confidence interval of 8, the sample size will be 150 (See formula on Annex VI) (Cochran, 1977).

3.6 Data Analysis Technique

The entire instruments and collected data are categorized into major and sub objectives. Different types of methods of analyzing data are used. Each major and sub groups are represented in different way. In order to simplify the interpretation the finding of the study both descriptive and inferential statistic were employed in analyzing this study and were done using SPSS. Some quantitative data analysis is included in different statistical techniques. Data were collected through questionnaire and interview. Documents were reviewed; Independence test and descriptive statics were specifically used in the study. Quantitative data were analyzed using SPSS v 20 and qualitative data were analyzed. The interviews were recorded and transcribed. The researcher then categorized and sorted those data into different themes. There are two approaches of analyzing quantitative data which are deductive and inductive.

> Deductive approaches involve using a structure or predetermined framework to analyze data whereas the inductive approach involves analyzing data with little or no predetermined theory, structure or framework and use the actual data itself to derive the structure of analysis (Burnard, et al., 2008).

The researcher used both inductive and deductive approaches to analyze qualitative data collected through interview.

Quantitative data were dichotomized into high and low using descriptive statics. "Dichotomization of quantitative measure where in relationship among variable are examined after one or more variable have been converted to dichotomous variables by splitting the sample at some point on scale(s) of measurement. " (MacCallum, et al., 2002). This study used the median split, where the independent variable is split at the median to form high and low groups, which are then compared with respect to their means on the dependent variable. This method was adopted from MacCallum, et al., (2002).

3.7 Quality of Research

Reliability and validity are mostly raised in conducting quantitative research. In preparing the research to ensure that respondents would read and answer the question consistently on different occasions in the same context; easy, clear and well defined language is used. Reliability and

validity can be acquired through analyzing data in different statistical methods and the data can be found from different source (Golafshani, 2003).

3.7.1 Reliability of the Research

Reliability is the reparability of the research. This attribute of the instrument is actually referred to as stability. If the research is dealing with a stable measure, then the results should be similar. It is concerned with the uniformity of measurement which the survey questions used in research bear same type of information each time they are used in same condition (Golafshani, 2003). In order to determine whether the questionnaire that used to collect the data is reliable or not, internal consistency of each section of the questionnaire were tested using Cronbach alpha. On the pilot survey, Cronbach Alpha test resulted 0.942 which means the questionnaire is reliable. See Table 3.1

3.7.2 Validity of the Research

For this study among sixty five factors in the survey twenty five were taken directly from (ISACA, 2003), and other twenty two were taken from (Girmanesh, 2015) with little manipulation and eighteen questions were formulated from literature review and approved to collect the valid data which are used to meet our research objective. The data collected from interview have been validated in triangulation and the data from questionnaires have been validated with SPSS based on each sample organization. This makes the findings of the research are truly valid and measure the role of information systems in Ethiopian banks.

Chapter Four

Data Presentation, Analysis and Interpretation

This chapter discuss about data presentation, analysis and interpretation of data collected from primary source. This chapter has reliability test result of the questionnaire, detail analysis discussion section each on each sample stratum which is public and private bank. The responses obtained from questionnaire were supported by interview. The data collected are presented by frequency tables and charts wherever necessary and to analyze the results Statistical Package for the Social Science (SPSS) is used. Accordingly, for data summarization mean, median, mode, frequency, percentage and standard deviation values were used separately for private and public banks. The analysis and summarization is done separately for public and private banks.

Data Analysis, Preparation and Interpretation is categorized and analyzed in six different themes which are Demographic Information, The People Role, The Hardware and Network's Role, The System's Role, Service Delivery and IT Governance. The first category or theme shows the demographic information of the respondents. The assessment of role of information systems is done in five major themes for both public and private bank; each theme has different number of factors which have direct or indirect impact on them. The themes are; People Component, Hardware and Network Component, Software and database Component, Service Delivery, and IT Governance. Each them affects the overall information systems process. This study studies the impact of those themes on information systems and its role, overall impact on both private and public bank and role of information system in both public and private bank by categorizing the impact into two which are present impact and future impact. Then the impact divide in to five which are negative impact, approximately zero negative impact, no impact, low impact and high impact. Five point Likert scale ranging from -2 to 2 including zero is used in the questionnaire to express their level of disagreement and agreement. If the total result of questionnaire is between -2.00 and -1.01, it has negative impact, -1.00 and -0.01 it has approximately zero negative impact, 0 has no impact, between 0.01 and 1.00 means low impact and between 1.01 and 2.00 means high impact. High present and High future impact locates the role in Strategic role; Low present impact and high future impact locates the role in Turnaround role; High present and low future

impact locates the role in Factory role and low present impact and low future impact locates the role in Support role on strategic management.

4.1 Demographic Distributions of Respondents

Demographic information needs background of the respondents to understand the employees or respondents who participated in filling the questionnaire for this research. The following demographic variables are used Gender, Age, Education, Life Time Work Experience, Job Position and Present Position Experience of Respondents. Based on the demographics information obtained which is resented on Table 4.3.1, the majorities (76%) of the respondents are male and the rest (24%) are female. When we see the respondent by age range 54.67% of the respondents are categorized in age range between 21 - 30 years, 39.33% in the age range 31 – 40 and 4.67% of the respondents are found in the age range of 41-50 years and age more than 50 years is 1.33%. This shows that 94% of the respondents are below the age range of 40 years. As shown in the table 78% of the respondents hold bachelor's degree and 18.67% hold master's degree and the rest 3.33% hold diploma. According to the survey, there are no IT Professional, IT manager, IT Executives, Business Professionals, Business Managers and Business Executives holding a PhD degree. Respondents with working experience of more than 10 years are only 15.64% and those who work less than one year are 2.67% and those who are in range of 1-5 years working experience are 43.33% and 6-10 years working experience are 38.67% indicating slightly high turnover of employees in banking sector an those 11 – 15 years of experience are 10.67% and 4.67% more than 16 years of experience. According to the survey, 59.33% of the respondents are IT Professionals, 7.33% of the respondents are IT Managers, 26% of the respondents are Business Professionals, 5.33% of the respondents are Business Managers and only 2% are Business Executives. Respondents working on present position are also represented in the table below. 6% of the respondents are working in present position less than a year, 66.67% of respondents are working in present position for 1 – 5 years, 24.67% of respondents are working in present position for 6 – 10 years and only 1.33% of respondents are working in present position between 11 – 15 years and also 1.33% of respondents are working in present position more than 16 years. This implies fair growth and promotion opportunity in the sector and also implies high turnover rate in the sector.

Table 4.1 Respondents' Demographic Profile

		Frequency	Percent
Gender	Male	114	76.0
	Female	36	24.0
	Total	**150**	**100.0**
Age	21 – 30 Years	82	54.67
	31 – 40 Years	59	39.33
	41 – 50 Years	7	4.67
	More than 50 Years	2	1.33
	Total	**150**	**100.0**
Level of Education	College Diploma	5	3.33
	Bachelor's Degree	117	78.0
	Master's Degree	28	18.67
	Total	**150**	**100.0**
Work Experience	Less than 1 Year	4	2.67
	1 – 5 Years	65	43.33
	6 – 10 Years	58	38.67
	11 – 15 Years	16	10.67
	More than 16 Years	7	4.67
	Total	**150**	**100.0**
Position	IT Professional	89	59.33
	IT Manager	11	7.33
	Business Professional	39	26.0
	Business Manager	8	5.33
	Business Executive	3	2.0
	Total	**150**	**100.0**
Present Position Experience	Less than 1 Year	9	6.0
	1 – 5 Years	100	66.67
	6 – 10 Years	37	24.67
	11 – 15 Years	2	1.33
	More than 16 Years	2	1.33
	Total	**150**	**100.0**

On the biases of the respondents 33.33% of the respondents are from public bank and 66.67% of the respondents are from private banks. The proportion of the respondents is shown in the following Figure 4.1. Larger sample size is given to private banks because of their increasing number.

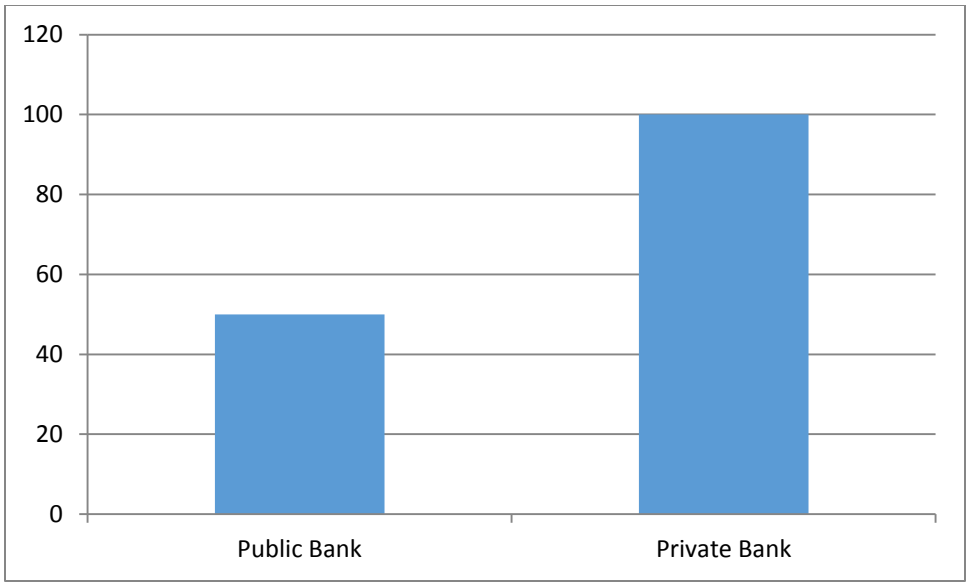


Figure 4.1 Respondents' Bank

4.2. Analysis and Interpretation of the survey result

The findings from Ethiopian commercial banks is represented, interpreted and analyzed in this section and sub sections. The numeric representation and descriptive frequency is listed in each theme which are people, hardware and network, software and database, service deliver, and IT governance. The result of this study is obtained from 5 point Likert scale questionnaire with 65 factors. Each factor has value from 1 to 5. 1 representing "Strongly Disagree", 2 "Disagree", 3 "Neutral", 4 "Agree" and 5 "Strongly Agree". The score of the result is dichotomized using median and mean value according to MacCallum, et al., (2002). The result is separated using median, where the independent variable is split at the median to form high and low groups, which are then compared with respect to their means on the dependent variable. The median value of the dichotomized result is taken to evaluate the overall themes impact. The median can be low, high or else both (low and high) both low and high result may occur when the total numbers of variables are even numbers. In this case, further research should be done.

On categorizing standard deviation in to high and low, there is no standard value to categorize high standard deviation and low standard deviation; because standard deviation measures the

degree of dispersion. Though, as a rule of thumb, value greater than one indicates a relatively high variation, while value less than one can be considered as low. This means that distributions with a coefficient of variation higher than 1 are considered to be high variance whereas those with a CV lower than 1 are considered to be low-variance.

4.4.1 The People Component

The people component includes user of information system who are employees of the bank and are working as business professional and IS professionals. In most banks business professional includes Customer Service Officer (CSO), Customer Service Manager (CSM), Accountant, Controller, Branch Manager and Head office workers who use the core banking system or any other systems provided by the bank. The others are IT professionals, including IT officers, Database Administrators, Security Officers, Network and Hardware Specialist, Solution Developers (Programmers) and other positions IS professionals are assigned. The People Impact in public bank is assessed using questionnaires with seventeen factors. People impact is assessed in two different categories which are the present people impact and the future impact. The qualitative data representation is embodied as the following.

The People Present Impact

The present people impact is assessed in this section using seven factors and interview. The table below shows respondents' views on the present people impact. On a Likert's five point scale.

Table 4.2 People Present Impact

Statistics

	HC01	HC02	HC03	HC04	HC05	HC06	HC07
Mean	4.0333	4.3933	3.8800	3.7400	4.3733	3.8667	3.6867
Median	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
Mode	4.00	5.00	4.00	4.00	4.00	4.00	4.00
Std. Deviation	.68949	.68441	.86637	.90805	.67104	.78293	.82849
Variance	.475	.468	.751	.825	.450	.613	.686
Range	4.00	3.00	4.00	4.00	3.00	4.00	4.00
Minimum	1.00	2.00	1.00	1.00	2.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Result	High	High	Low	Low	High	Low	Low

Table 4.2 summarizes the present impact of people in commercial banks. The present impact of people is taken the value of median of each variable impact. Table 4.2 illustrates data for factors affecting present impact of people. HC02 and HC03 (*"Employees regularly use computers to undertake their work and Employees use email for work purpose"*) has the highest mean and median value in the group. Employees in commercial banks are computer literate and have skill of computers to undergo there responsibility and also use email for work purpose. These two factors help employees to do their present responsibility more efficiently and effectively. These two factors also had low standard deviation implying that there is almost consensus among the respondents regarding these factors. Factor HC01 *("Employees know their work and responsibility"*) has low mean and median value when it is compared with in group and lowest standard deviation with in group and variance this indicates that the respondents have a consensus on this factor and responses are aggregate to the mean value. Factor HC04 (*"Employees do their job more quickly and easily"*) has the lowest mean and median value and highest standard deviation and variance among the other five factors. This implies there is no consensus in this factor. The range of the result is from 1 to 5 which means from strongly disagree to strongly agree. This indicates that some employees do strongly agree that employees do their job quickly and easily while some strongly disagree. Also factor HC07 (*"IT staffed adequately, with right skills and competencies."*) has low value of mean with better median and lower standard deviation and variance indicates that there is better consensus in this factor and responses are better aggregated to the mean when it is compared with in group. Factor HC06 (*"Information needed is known by employees"*) has slightly low mean and median and also low standard deviation and variance. This indicates employees know what kind of information is relevant for their work and what is not irrelevant. Factor HC05 "*IT helps employees to achieve a larger number of task*" has low standard deviation. When we evaluate the mode of the factors all the six factors score 4 which means "Agree" on the issue. Most answered result in this category is "Agree".

To summarize the result, four variables scored high impact and three scored low. Plus, all factors scored low value of standard deviation. According to MacCallum, et al., (2002), the median value will be the people present impact. The median of People present impact theme is low. Therefore, the people present impact has low present impact which means the people in commercial banks has low present impact.

The People Future Impact

The future impact of people in public bank is assessed using ten factors. The table below shows respondents' views on the future people impact. Ten factors are represented to assess the future impact of people.

Table 4.3 People Future Impact

Statistics

	HF01	HF02	HF03	HF04	HF05	HF06	HF07	HF08	HF09	HF10
Mean	4.2933	4.2467	4.3867	4.2533	3.4267	4.3733	3.6933	3.3933	3.3667	3.3800
Median	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	3.0000	4.0000
Mode	4.00	5.00	5.00	4.00	4.00	5.00	4.00	4.00	3.00	4.00
Std. Deviation	.70040	.81047	.69308	.71594	1.06403	.69075	.79382	1.06750	.92987	.93887
Variance	.491	.657	.480	.513	1.132	.477	.630	1.140	.865	.881
Range	3.00	3.00	3.00	3.00	4.00	3.00	4.00	4.00	4.00	4.00
Minimum	2.00	2.00	2.00	2.00	1.00	2.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Result	High	High	High	High	Low	High	Low	Low	High	Low

Table 4.3 summarizes the people future impact. It illustrates data for factors affecting present impact of people. Factor HF02, and HF03 (*"IT help employees to improve their effort to learn more and apply new knowledge and IT improves performance of bank's employees"*) have the highest mean in the group and HF02 has also high mean value with in group. Both have high median value low standard deviation with in group. This means, all most all of the respondent answered the mean value and has also consensus. The respondents strongly agree that IT has positively affected employees' performance and also positively affected the learning and application of knowledge. In these factors, the independent variable is IT and the independent variables are employees' performance and application and sharing of knowledge. Factor HF01 (*"IT help employees to improve work continuously"*) has the low standard deviation. This means, it has consensus among the respondents. This factor indirectly analyzes the willingness of employees to improve work continuously by the help of IT. Factor HF06 (*"I have no problem sharing my knowledge"*) has also the high mean and median value when it compare with other

factor means in the group. This gist, respondents have no problem in sharing their knowledge to their coworkers. This will benefit commercial banks presently and in the future because the learned and acquired knowledge will be shared to new recruits if the mechanisms are good enough. Factor HF05 (*"Knowledge sharing techniques are available"*) has high standard deviation and variance implying no consensus in this factors and also answers given by the respondents ranged from "Strongly Disagree" to "Strongly Agree". Factor HF07 (*"My ideas and suggestions are respected"*) has low mean value in group and low standard deviation. This implies, employees' idea and suggestion are respected and majority of employees' do believe so. Factor HF09 (*"Employees know the bank's strategic plan"*) has low standard deviation and low mean value when it is compared with in group. Factor HF08 (*"Training programs are available for employees"*) has low value of mean in group and has high standard deviation. Factor HF10 (*"The IT staff has access and is offered appropriate working tools to develop the needed skills"*) have low mean value. The respondents disagree with the two factors. This mean, availability of training programs and appropriate working tools for the staff is almost zero and it has no impact. When we evaluate the mode of the factors all the six of ten factors score 4 which means "Agree", three of ten scores 5 which means "Strongly Agree" on the issue and one of ten scores 3 which means "Neutral". Most answered result in this category is "Agree".

Table 4.3 summarizes the people future impact. The result obtained is that, six variables scored high impact and four scored low. According to MacCallum, et al., (2002), the median value will be the people present impact. The median of People present impact theme is resulted "high". Therefore, the people future impact has high future impact.

4.4.2 Hardware and Network Component

Hardware and Network impact is assessed using questionnaires with sixteen factors. It is assessed in two different categories which are the present hardware and network impact and the future impact. It has seven present factors and nine future factors. The qualitative data representation is embodied as the following.

Hardware and Network's Present Impact

The present Hardware and Network's impact is now assessed in this section using seven factors and interview. The table below shows respondents' views on the present Hardware and Network's impact in relation to the system provided.

Table 4.4 Hardware and Network's Present Impact

Statistics

	TC01	TC02	TC03	TC04	TC05	TC06	TC07
Mean	4.2867	4.2533	4.1400	4.1400	4.1133	4.3067	4.3000
Median	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
Mode	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Std. Deviation	.60575	.61510	.72380	.62423	.61890	.62333	.65282
Variance	.367	.378	.524	.390	.383	.389	.426
Range	3.00	3.00	4.00	3.00	3.00	3.00	3.00
Minimum	2.00	2.00	1.00	2.00	2.00	2.00	2.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Result	High	High	High	High	High	High	High

Table 4.4 encapsulates the impact of Hardware and Network in public bank the table illustrates data for factors affecting present Hardware and Network impact. Factor TC01 (*"Using computer has increased employees efficiency."*) has the high mean and median value when compared within group and also has low standard deviation. Factor TC03 (*"IT help employees to reduce errors."*) has the high value of mean and median with the low standard deviation and variance implying that there is consensus on this factor among the respondents. Factor TC02, TC04, TC05, TC06, TC07 (*"IT helps to lesser workload of employees; IT helps employees to perform their work within the required specifications; IT help to achieve greater flexibility in work; IT has made work easier and interesting and IT improve effectiveness of communication flow"*) have high value of mean and median with low standard deviation and variance. This indicates that there is consensus in this category. All factors' mean is greater than average. When we see the overall mode value, seven of seven value is 4 which is "Agree".

Table 4.4 summarizes the Hardware and Network's present impact. All seven factors are categorized in to "high" group. The median for the result is category of "high". Therefore, Hardware and Network's present impact is high present impact.

Hardware and Network's Future Impact

The future Hardware and Network impact is now assessed in this section using nine factors and interview. The table below shows respondents' views on the future Hardware and Network's impact.

Table 4.5 Hardware and Network's Future Impact

Statistics

	TF01	TF02	TF03	TF04	TF05	TF06	TF07	TF08	TF09
Mean	3.9600	3.5133	2.5467	4.0133	4.0400	3.7133	4.3133	4.2867	4.1867
Median	4.0000	3.0000	2.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
Mode	4.00	3.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00
Std. Deviation	.77615	.92495	1.19612	.76839	.91871	.92204	.61455	.62752	.64907
Variance	.602	.856	1.431	.590	.844	.850	.378	.394	.421
Range	3.00	4.00	4.00	4.00	4.00	4.00	2.00	3.00	3.00
Minimum	2.00	1.00	1.00	1.00	1.00	1.00	3.00	2.00	2.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Result	Low	High	High	High	High	Low	High	High	High

Table 4.5 encapsulates the future hardware and Network impact in public bank. The above table illustrates data for factors affecting future impact of hardware and network. Factor TF07 and TF08 (*"IT has impact on all aspects of the organization and The integration of telecommunications, data processing and office automation provides better competitive results"*) has the highest mean and median value comparing with in group and low standard deviation indicating that consensus among respondents and high value of mean. Factor TF04, TF05 and TF09 (*"The bank uses technologies to transform business, IT assets are the most important asset in the organization and IT investments help the organization for product quality and diversification"*) have mean value of greater than average with low standard deviation. Factor TF03 (*"The bank has IT training/research center(s)"*) has the lowest mean value when it is compared within group and high standard deviation. High standard deviation means the response has no consensus. Factor TF01 and TF06 (*"IT investments are high quality, comprehensive and*

safe and Profits come from investments in IT") have low mean and high median value when it is compared within group, both has low standard deviation. Factor TF02 (*"IT projects have a clear budget and timeline"*) has low mean and median value; when we see the mode value, seven of nine valued 4 or "Agree" and one of nine valued 3 or "Neutral" and the last one valued 2 or "Disagree".

Table 4.5 summarizes hardware and network's future impact. Among nine factors, seven factors are categorized into "high" group and two categorized into "Low". The median for the result is "high". Therefore, Hardware and Network's future impact is high future impact.

4.4.3 Software and Database Component

Software and database component is assessed using questionnaires with six factors and through interview. Software and database impact is assessed in two different categories which are the present Software and Database impact and the future impact. The quantitative data representation is embodied.

Software and Database's Present Impact

The present Software and database's impact is assessed in this section. Integrated and applied software and database's impact is now assessed in this section using four factors. The table below shows respondents' views on the present software and database.

Table 4.6 Software's Present Impact of Public Bank

Statistics

	SC01	SC02	SC03	SC04
Mean	4.3733	4.5067	4.6600	4.1200
Median	4.0000	5.0000	5.0000	4.0000
Mode	4.00	5.00	5.00	4.00
Std. Deviation	.61901	.61028	.51592	.76781
Variance	.383	.372	.266	.590
Range	3.00	3.00	2.00	3.00
Minimum	2.00	2.00	3.00	2.00
Maximum	5.00	5.00	5.00	5.00
Result	High	Low	Low	High

Table 4.6 condenses the software's present impact. To understand the present impact of the Software and Database, four factors have been used and analyzed and interpreted as the following. Factor SC03 (*"Using automated system is better than using manual system"*) has the high value of mean and median when comparing with others in group and low standard deviation and variance indicating good consensus. Majority of the response obtained shows that, respondents strongly agree. The mode and median value for this factor is 5 ("Strongly Agree"). Factor SC02 (*"Using CORE banking system has increased efficiency"*) has the next highest and high mean value in group with the low standard deviation and variance. This shows the consensus among the respondents. SC02 has highest value of median and mode which is 5 ("Strongly Agree"). Factor SC01 (*"Employees' daily work is dependent on the system the bank has"*) has high value of mean and median with low standard deviation and variance. Factor SC04 (*"The system is clear and could be understood easily"*) has low mean and median when it compares with the other three factors with low standard deviation value. When we see mode value, two of four valued 5 ("Strongly Agree") and the rest two of four valued 4 ("Agree").

Table 4.6 summarizes ssoftware's present impact. Software and database present impact has median of two values which are "low" and "high" each resulted equal number of occurrence. In this case, further research should be done to study the present impact of Software and database has on public bank of Ethiopia.

Software and Database's Future Impact

The future Software and database impact is assessed in this section. Software's impact is assessed in this section using two factors. The table below shows respondents' views on the future Software and database impact.

Table 4.7 Software and Database's Future Impact

Statistics

	SF01	SF02
Mean	4.1533	3.7133
Median	4.0000	4.0000
Mode	4.00	4.00
Std. Deviation	.85716	.92204
Variance	.735	.850
Range	4.00	4.00
Minimum	1.00	1.00
Maximum	5.00	5.00
Result	High	Low

Table 4.7 condenses the future impact of Software and database including central systems, ore banking systems and so on. To understand the future impact of the software(s) two factors have been used and analyzed and interpreted as the following. SF01 (*"The bank has standardized central system"*) has greater than average mean and low value of standard deviation. This indicates, respondents lack consensus on this factor. The other factor SF02 (*"The bank deploys Information System strategy"*) has low standard. When we see rang the respondents response resulted between the two extremes which is between "Strongly Disagree" and "Strongly Agree" for both question and have equal value of mode which is 4 ("Agree")

The Software and database future impact scored one "high" and another one "low" which means the median is both "high" and "low" The future impact of software and database need to be further studied.

4.4.4 Service Delivery

Service Delivery of the bank is analyzed and interpreted below. To summarize the effect or impact of information delivery three factors were chosen and responses were obtained. According to the responses obtained by Likert scale, information delivery is assessed as the following.

Service Delivery Present Impact

Service delivery present impact is assed using two factors as the table below. Table 4.8 shows respondents' views on the present Hardware and Network's impact.

Table 4.8 Service Delivery Present Impact

Statistics

	OC01	OC02
Mean	4.2000	4.1200
Median	4.0000	4.0000
Mode	4.00	4.00
Std. Deviation	.65539	.74112
Variance	.430	.549
Range	4.00	4.00
Minimum	1.00	1.00
Maximum	5.00	5.00
Result	High	High

Factor OCD01 has mean value which is greater than average OCD01 (*"IT help employees to deliver output timely"*) has low standard deviation. Respondents agree that IT helps them to deliver output timely. The response ranged from "Neutral" to "Strongly Agree". Factor OCD02 (*"IT help employees to deliver consistent output even in high work pressure"*) has low standard deviation and response ranges from "Disagree" to "Strongly Agree".

The above table shows service delivery present impact scored "high". Both factors OCD01 and OCD02 scored "high" impact. The present impact service delivery is "high". This is because the median of one "high" and another one "high" is high.

Service Delivery Future Impact

Service delivery future impact is assed using one factor. The table below shows respondents' views on future service delivery impact.

Table 4.9 Service Delivery Future Impact

Statistics

	OF01
Mean	3.6467
Median	4.0000
Mode	4.00
Std. Deviation	.97027
Variance	.941
Range	4.00
Minimum	1.00
Maximum	5.00
Result	Low

Factor OF01 (*"Customer satisfaction are assessed when evaluating IT investments"*) has the mean value greater than average with low standard deviation. The response range ranged from the two extremes (between "Strongly Disagree" and "Strongly Agree". Table 4.9 shows sservice delivery present impact scored "low". This means, the future service delivery impact is "low". Median of one variable is the value of variable itself.

4.4.5 IT Governance

IT governance is assessed using twenty three factors. The table below shows the respondents response on the issue. It is assessed in two different categories which are the present IT Governance impact and the future impact. The present impact has eleven factors and future impact has twelve factors. The quantitative data representation is embodied as the following.

IT Governance Present Impact

The present IT Governance impact is assessed in this section using eleven factors. The table below shows respondents' views on the present IT Governance impact.

Table 4.10 IT Governance Present Impact

Statistics

	MC01	MC02	MC03	MC04	MC05	MC06	MC07	MC08	MC09	MC10	MC11
Mean	3.3067	3.9800	3.4933	3.7133	3.4600	3.7400	3.6400	3.3400	3.3333	3.5733	4.3600
Median	3.0000	4.0000	4.0000	4.0000	3.0000	4.0000	4.0000	3.0000	3.0000	4.0000	4.0000
Mode	3.00	4.00	4.00	4.00	3.00	4.00	4.00	3.00	3.00	4.00	4.00
Std. Deviation	.92647	.69966	.97448	.88490	.94571	.92996	.89202	.85003	.97393	.78874	.63753
Variance	.858	.490	.950	.783	.894	.865	.796	.723	.949	.622	.406
Range	4.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00
Minimum	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Result	High	Low	Low	Low	High	Low	Low	High	High	Low	High

Table 4.10 shows present factors affecting IT governance. Factor MC01 (*"IT investments are formally evaluated."*) has low value of mean when it is compared in group and low standard deviation. Factor MC11 (*"Proper use of information is critical for the bank's existence and success in competition"*) has high value of mean when compared within group and has low standard deviation. The other factors have mean value greater than average and low standard deviation.

Table 4.10 summarizes IT Governance present impact. The result obtained is that, five variables scored high impact and six scored low. According to MacCallum, et al., (2002), the median value will be the IT Governance present impact. The median is value scored "Low". Therefore, IT Governance present impact has low present impact.

IT Governance Future Impact

Future IT Governance impact is assessed in this section using twelve factors. The table below shows respondents' views on future IT Governance impact.

Table 4.11 IT Governance Future Impact

Statistics

	MF01	MF02	MF03	MF04	MF05	MF06	MF07	MF08	MF09	MF10	MF11	MF12
Mean	3.4333	3.9667	3.7600	3.8467	3.8467	3.7467	3.4600	4.0067	4.0400	3.2600	3.3133	3.2533
Median	3.0000	4.0000	4.0000	4.0000	4.0000	4.0000	3.0000	4.0000	4.0000	3.0000	3.0000	3.0000
Mode	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00
Std. Deviation	.89305	.71809	.73895	.74848	.82524	.87613	.81620	.69992	.70359	.86257	.89094	.86067
Variance	.798	.516	.546	.560	.681	.768	.666	.490	.495	.744	.794	.741
Range	4.00	3.00	3.00	3.00	4.00	3.00	4.00	3.00	3.00	4.00	4.00	4.00
Minimum	1.00	2.00	2.00	2.00	1.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Result	High	Low	Low	Low	Low	Low	High	High	High	High	High	High

Table 4.11 encapsulates the future IT Governance impact. The above table illustrates data for factors affecting future impact. Factor MF12 (*"The board keeps a least of new developments in IT"*) has lowest value of mean when it is compared with in group and has low standard deviation. Factor (*"IT meets business expectations to create competitive advantage"*) has high value of mean when it is compared within group and it has low standard deviation. The other factors have mean value of greater than average and low standard deviation.

To summarize, IT Governance future impact factors scored as following. Among twelve factors seven of them scored high and the rest five scored low. According to MacCallum, et al., (2002), the median value will be the IT Governance future impact. The median value is "High". Therefore, IT Governance has high future impact.

4.6 Analysis and Interpretation

This section interprets the presented result of the study. To assess the result, the collected and obtained responses were categorized in to five different components of information systems which are people, Hardware and Network, Software and Database, Service Delivery/output and IT governance.

McFalan and McKenney used strategic management grid to evaluate the role of information systems. Management strategic grid uses time of impact to classify among the strategic management grid. The result obtained will be evaluated according to McFalan and McKenney strategic grid which is shown in the following figure

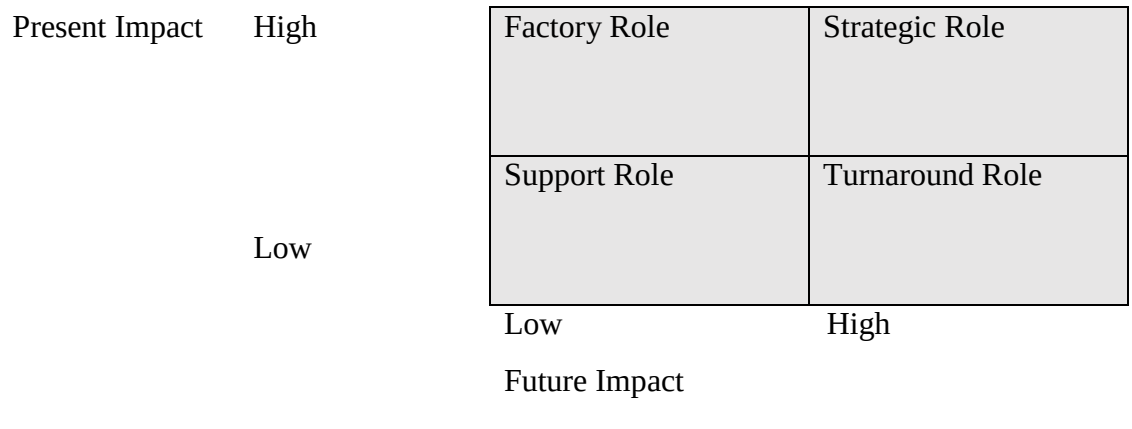


Figure 4.2 Strategic management grid model

Strategic Grid of McFarlan and McKenney is used to evaluate the overall information system in Ethiopian commercial banks. The strategic grid is useful to evaluate the overall information system as a whole or individual IT application. The Four category of strategic grid is:-

- **Strategic** : Information system which is critical for future success
- **Turnaround** : Information system with strategic importance and be able to provide strategic opportunities
- **Factory**: Information system which is required to sustain existing business. This investment aims to improve performance or reduce cost
- **Support**: Information systems that is necessary for improving, but not critical to existing business

The role of people or employees of the bank, the role of technologies available and the role of software's including core banking system; service delivery and IT governance are evaluated distinctly using McFalan and McKenney model. Therefore the impact of People, Hardware and Network, and Software and Databases, Service Delivery and IT governance are only evaluated separately according to McFalan and McKenney model.

4.6.1The People Component

According to McFalan and McKenney, the people impact is assessed and evaluated. This evaluation or assessment is according to the performance and readiness of the employees for the strategic plan implementation. The people component has low present impact and high future impact. This result according to McFalan and McKenney is turnaround impact according to Figure 4.2. The future impact shows that the ability of the people to keep their competency with the improving technology market. The future impact result is nearly equal with the people present impact showing in the future the people may not cop-up with the technologies, systems and improvements. In contrast of high future impact, the people component has low present impact which should be improved. The interview made supports the finding. The interviewee said

> *"We have bought high ranked IBM servers and bought banking Software from well-known worldwide banking Software provider called TEMNOS. And yet, there is a problem on performance which is not problem of hardware and software. It is the because of we have no skilled personal to properly administrator the systems and IBM server. "*

This might occurred because of lack of motivation or job satisfaction or any other. It needs more research in order to identify the cause of low present impact. Therefore, the management of the bank should give attention to its employees and increase their motivation or competency to compete with the market.

4.6.2 Hardware and Network Component

The Hardware and Network component of the public bank is assessed using sixteen factors. According to McFalan and McKenney model, the impact of Hardware and Network is measured; including the present and future impact of Hardware and Network. The response obtained shows high present impact of hardware and network component and high future impact of hardware and network. This according to McFalan and McKenney model, the hardware and network component has strategic impact. The future impact shows the capacity of hardware and Network to hold the future need of the bank. The interviewee made also supports the above data

> "*The bank bought best ranked servers from IBM and has been using network infrastructure form Ethiotelecom which is the only Network service provider in Ethiopia.*

And still the bank has been buying high performance servers, switches, firewall servers, desktop computer etc…. "

To summarize Hardware and Network has high present impact and high future impact. The realized high present and future impact will not guarantee the banks resource utilization. Therefore, the management should give enough attention to the hardware and network components of IS within the changing world and changing customer needs.

4.6.3 Software and Database Component

Software and database component of IS is assessed using six factors. The present impact and the future impact was analysed separately and yet both present and future impact scored neither high nor low. The present and future impact was presented in Table 4.6 present impact and Table 4.7 future impact. Therefore, further research is needed to assess the impact of software and database. In contrast, the result obtained from quantitative data shows high present impact.

"The bank is using TEMNOS T24 banking system, the company severs all over the world. TEMNOS had released its earliest development which is R15 and yet the bank has R10 development".

The interview shows the bank has the oldest development package from TEMNOS which is now 5 versions backward.

4.6.4 Service Delivery

Every information system has an output or delivery. The delivery could be service, product, system etc… tangible product or intangible service or even it could be system or different. This section assesses the impact of service delivery. To assess the service delivery, three factors were presented and analysed. According to the Table 4.8 and Table 4.9, service delivery has high present impact and low future impact. This according to McFalan and McKenney model service delivery has factory impact. This means, the bank should restructure its delivery methods and research the market need and add additional delivery mechanisms if necessary in order to achieve high future service delivery impact.

The interview made shows some ways to add deliverables to the bank and the interviewee stated that.

> *"The bank has not purchased all the necessary deliverability and functionality of the core banking system even if it has increased effectiveness and efficiency, yet some functionality like identification code for each customer need to be added and number of POS should be increased" the other problem which should be solved according to the him is connectivity. If there is no connectivity there is no service."*

4.6.5 IT Governance

IT governance is the decision and accountability model to encourage use of IT. IT governance goes in to the broader corporate governance principles while focusing on management and usability of information systems to achieve the corporate vision. IT governance of in the public bank is assessed using twenty three factors and interviews. Table 4.10 and Table 4.11 show summary of the result obtained through the questionnaire. Present IT Governance impact is low and future IT Governance impact is high. This according to McFalan and McKenney model, IT Governance has turnaround impact.

4.6.6 The Impact of Information System in Commercial Banks

The impact of information systems is studied by seriously understanding and analysing 65 factors in to account. The summary of the study is analysed using Microsoft Excel and SPSS by using descriptive statics. According to MacCallum, et al., (2002) two groups which are present impact and future impact was dichotomized in to "high" and "low". The study identified 31 present factors and 34 future factors. Summary of obtained result is presented in present and future impact of information systems.

Present Impact of Information System

The overall information system present impact is presented in the following table. Table 4.12 shows the information system level of impact. Table 4.12 shows that, the overall information system has high present impact. Among the five themes or categories, the people category and IT governance had scored low; Software and database needs further research; and the other, Hardware and Network and Service Delivery scored high present impact. Yet, because of the low governance model and low people competence, the bank is not fully benefiting from the highly

scored Hardware and Network and Services available. To fully benefit from the available Software and Database, Hardware and Network, and Service Delivery, the bank should review its IT governance and employee competence. The management should give emphasis to the internal process of information system which is affected by IT governance and the user as equal attention and emphasis as Hardware and Network to benefit from the available infrastructure. The management should rearrange its governance structure and empower employees and motivate and encourage them to use the system effectively and to easily learn.

Table 4.12 Overall Present Impact of Information System

	Low	**High**	**No. of Factors**
People Present Impact	4	3	7
Hardware and Network Present Impact		7	7
Software and Database Present Impact	2	2	4
Service Delivery Present Impact		2	2
Governance Present Impact	6	5	11
Total	**12**	**19**	**31**
Median			**High**

Future Impact of Information System

The overall information system future impact is presented in the following Table 4.13 which shows the information system level of future impact. To evaluate impact of information systems, five major components were selected and analysed separately and collectively. All the five themes (People, Hardware and Network, Software and Database, Service Delivery and IT governance) or categories scored low future impact or high future impact. Table 4.13 shows that, the overall information system has high future impact. Among the five themes, service delivery scored low future impact; Software and Database needs further research and the rest People, Hardware and Network and IT Governance scored high future impact.

Table 4.13 Overall Future Impact of Information System

	Low	High	No. of Factors
People Future Impact	4	6	10
Hardware and Network Future Impact	2	7	9
Software and Database Future Impact	1	1	2
Service Delivery Future Impact	1		1
Governance Future Impact	5	7	12
Total	**13**	**21**	**34**
Median			**High**

Impact of Information Systems in Ethiopian Commercial Banks

The objective of this study is to evaluate the overall information system impact as a whole. According to Table 4.12 and Table 4.13, IS has scored high present impact and high future impact. According to McFalan and McKenney model, the overall information system impact is strategic impact. Strategic impact means, information system is necessary for improvement of business operations and critical to existing operation. Yet, individual component of IS needs attention and further research. The only component with strategic impact is Hardware and Software. The others need attention and further improvements.

4.7 Discussion

The role of information system which reflects the present and future impact of information system on the Ethiopian commercial banks might vary bank from banks. The impact of IS on commercial banks might fall in different impact. Factors affecting information system is people, Hardware and Network, Software and Database, Service Delivery/output and IT governance.

They are measured and evaluated to assess the role played by information systems. The main objective of this research is to evaluate role of information system and it is done using management grid method based on five constructs of information systems (The People Component, The Hardware and Network Component, The Software and Database Component, Service Delivery and IT governance). The result was presented in the previous section and in this section the findings will be discussed. The findings will be discussed by comparing each themes of information system of public bank and each themes of private bank. And also, the overall information system role will be discussed.

4.8 Discussion against Related Works

The objective of this research is to evaluate impact of information systems in Ethiopian banks. In order to study the impact of information systems, components of information system, service delivery and IT governance were studied separately and collectively. In (Misrak, 2015) and (Senait, 2011) study, the relation between IT governance and strategic alignment was shown clearly and in this study, the relation between IT governance and role of information system in Ethiopian banks or the impact of IT governance in Ethiopian commercial bank is seen.

The impact of information & communication technology on Ethiopian private banks' performance the case of two selected Ethiopian private banks (Dashen Bank and United Bank) was studied by Yalew. The purpose of his study was to examine the impact of Information and Communication Technology on banks' performance in terms of customers' satisfaction and employees'' performance only (Yalew, 2015). But this study, mainly studied the role played by information systems in Ethiopian banks or the impact of information systems in Ethiopian banks. Yalew found that the impact of Information and Communication Technology on the performance of the two banks in terms of customers' satisfaction and employees' performance is significant and these study findings that, the impact of people has in private bank have high present impact and low future impact. High present impact means, employees are performing good currently or employee are performing well on current operation. And low future impacts mean, the strategic future benefit of employees is not considered. The present people impact is clearly seen in this study and the impact of IT on employees' performance and customers' satisfaction is seen in Yalew's (2015) study.

The research done by (Rawani & Gupta, 2002) in Indian banking industries used the same model to evaluate role of information systems in Indian banks. The finding of Rawani & Gupta (2002) is different from the findings of this research. In India, information system is playing strategic role in foreign and private banks, and it is playing support role in public bank. And yet, they did not study the impact of people or employees in the bank and IT governance which incorporates IS procedures. This study incorporated IT governance and System delivery in addition to the components they studied. The findings of this study show that IS is playing factory role in private banks and support role in public bank in Ethiopia.

Obiri-Yeboah, et al., (2013) studied the role of Information Technology on Banking Service Delivery: A Perspective from Customers in Ghana and it showed that introduction of technology facilities by the banks impacted positively on banking services delivery. But, this study shows the impact of service delivery has on the bank. It is shown in this study that, service delivery has high present impact and low future impact. The objective of this study is to evaluate the impact of IS where as the objective of Obiri-Yeboah, et al., (2013) is to answer the question "what is the role of technology on banking services quality in Ghana".

Another study done by Saranya, et al., (2014) focus on examining awareness of ICT banking among customers and analyse the usage of ICT in banking. It uses assertions and hypothesis and testes the correlation and significance. The purpose was to study usage of ICT in banking sector and how the people make use of its products and services. It used Descriptive research design.

The research found that the usage of ICT banking for fund transfer depends on age of the customers; the usage of ICT banking for bill payments does not depend on the income of the customers; and considering ICT banking as safe & secure does not depend on the occupation of customers (Saranya, et al., 2014).

4.8 Summary of Findings

4.8.1 The People Component

The people component has low present impact and high future impact. This located people according to McFalan and McKenney strategic management grid model on turnaround impact.

The performance of the people is not good enough to achieve corporate vision through strategic plan. It is playing high future impact which may benefit the banks in future. Both quantitative and qualitative data shows latest hardware technology and best banking system while there is no enough skilled manpower to effectively use both hardware. The technology and banking systems are unmatched with people skill. If the managements of commercial banks give a little more attention to the human resource, the present impact would be high and the impact could be strategic.

4.8.2 Hardware and Network

Hardware and network component has high present impact and high future impact. This according to McFalan and McKenney strategic management grid model, hardware and network is located on strategic impact. The banks are benefiting high impact of Hardware and Network right now and it has the capacity to benefit them in future which o hold the future need of the bank. The management should give appropriate emphasis to hardware and network. Inability of management to give emphasis to Hardware and Network affects the future impact because technology is changing.

4.8.3 Software and Database

Software and database have not high or low impact. Both present and future impact of software and database are not neither low nor high. This shows software and database component has impact better than low and impact less than high. In this case, further research is needed to assess the impact of software and database

4.8.4 Service Delivery

The delivery could be service, product, system etc… tangible product or untenable service. This assesses the impact of service delivery of commercial banks. Service delivery has high present impact and low future impact. This according to McFalan and McKenney strategic management grid model, service delivery is located on factory impact. This show, commercial banks are giving services which satisfy their customers for today day-to-day activity. In order to gain high future impact, the banks should evaluate customer satisfaction and add more banking service which the future customer may need.

4.8.5 IT Governance

IT governance includes the broader corporate governance principles while focusing on management and usability of information systems to achieve the corporate vision. The impact of IT governance framework is resulted as follows. IT governance has low present impact and high future impact. This, according to McFalan and McKenney model, IT Governance is located on turnaround impact.

4.8.6 Impact of Information System in Commercial Banks

The overall information system has high present and high future impact. The people component has turnaround impact; hardware and network has strategic impact; software and database needs further research; service delivery has factory impact and the last IT governance has turnaround impact. The overall IS impact has scored high present impact and high future impact. According to McFalan and McKenney model, the overall information system has strategic impact.

Chapter Five

Conclusion and Recommendations

5.1 Conclusion

Impact of information system in organization is an important research area to study. Information systems are becoming very essential tool to undertake day to day activity. The competitiveness of the organization is based on the effective use of information system. The efficient use of information system will give organizations with many opportunities and easy decision making process by giving critical data for the manager(s) also allows organization to research new way of doing business. An information system is becoming a change agent in the organization and it is going farther from automation of operation and supporting the existing system. Efficient and effective management is necessary to enjoy benefits of IS.

Banks are the major user of information system to create value to operation and increase accessibility and productivity. Automation of banking system is a vital need for all banks to attract customers and survives in the business. Research on the banking industry provides vital information about the management of information system. Banks use information system to automate operation and to reduce error with increased effectiveness and efficiency. Information system also increases availability and reachability of the business. Information systems appear to have increased productivity of operation.

The primary objective of information system in all commercial banks is to effectively and efficiently serve customers. Research demonstrates problems in measuring the effects of information systems in organization. Evaluation of information systems impact is major research area to assess the gap and to give further recommendation and also appropriate attention. If necessary, restructure and reorganize IS recourses to utilize high benefits of information system.

This study has demonstrated the impact of information system in Ethiopian banks. Information system has strategic impact in Ethiopian commercial banks. In banking service delivery,

Information system has factory impact. The governance of information system has turnaround impact. This show top managers should restructure IS process and should give appropriate attention so that the banks realize high IT governance present and future impact; and better strategic alignment of corporate strategy with IS strategy.

Information system is becoming management's agenda. In order to achieve corporate vision, information system strategy should be aligned with corporate strategic goal. IS components should go beyond having factory and turnaround impact. The better IT governance tends to be better strategic alignment.

Based on the survey, people component of information system is not balanced with the Hardware & Network impact. Hardware and Network scored high present and high future impact; while the people component of information system has low present impact and high future impact. The impact of Hardware & Network and the competency of people seems slightly unbalanced.

However, studding the impact of IS is a difficult endeavour that requires competent methodologies and framework. This methodologies and frameworks should be reviewed and updated with the evolving technology and role of IS. In addition, lack of standardized metrics of measurement has effect on measuring the impact of IS. Therefore, IS researchers should develop standardized metrics for measuring the impact of IS.

5.2 Recommendations

Hardware and Network, Software and database, people and procedure are components of information system. Also, IT governance and service delivery/output is high interrelated with information system. The purpose of the study was to examine and the impact of Information System in Ethiopian bank. Based on the findings and conclusions of the study, the researcher forwards the following recommendations to the management of the banks and suggestion for other researchers. The recommendation is presented in two sections, for practice and for further research. The practice section tries to recommend ideas for bank management and governing bodies for better effective and efficient management of information system. The further research section mainly tries to direct future possible related researches.

5.2.1 For Practice

Based on the findings and conclusions of the study, the following recommendations are presented by the researcher to increase the role of information system in Ethiopian banks and increase the impact of information systems in both public and private bank of Ethiopia.

- IT strategic roadmap which guides the bank toward achieving long term result should be developed while keeping with the mission and vision of the banks. Also to communicate where IS was in the past and where it wants to go in the future and a how it is going to achieve it.
- Training should be given for both IT professionals and business professionals. IT training should be given to business professionals and business training should be given to IT professionals in order to harmonize communication and lesser work burden.
- Proper placement of IS in organizational structure is a base for good IT governance. Not just putting IT Executive on top. It should also incorporate with other committee members from business and IT background.
- The bank should also give balanced attention to technical staff and state of the art technologies which the bank had so that, the bank does not only acquire state of the art technology products; it should also focus on the competency of employees. Thus, the banks should train and develop professional side by sided with the process of acquiring

technologies in order to effectively utilize the acquired hardware and Software and database resource.

- Knowledge sharing and retention mechanisms should be developed in order to retain knowledge and share among business professionals and IT professionals and also between foreign consultant and IT professionals of the banks.
- The top management and board of directors should give proper attention to IS process.
- Trainings should be given to increase IT professionals' skill to effectively administer the system and state of the art products that the company owned.
- To increase response times, reduce error and to improve product quality, updates should be deployed on time and follow-ups on system performance be monitored daily.
- Continuously evaluate the impact of IS on the organization and the benefit it brought to perform well and retain high quality work.
- Easy and interesting IS user manual should be prepared and disseminated to give important information on "how to use the system". To decrease risk security.
- Continuously evaluate customer satisfaction survey on service delivery channels. Customer satisfaction surveys are not only tools of inviting customers to express their opinion; they are also opportunities to invite customers to learn new information about companies' new delivery channels.
- The banks should develop IS strategy along with corporate business strategy in order to gain strategic benefits from IS.
- The companies should emphasis on security to increase public trust.
- Continually evaluate user requirement and run usability testing to evaluate service by testing it with representative users; to identify any usability problems, collect qualitative and quantitative data and determine the participant's satisfaction with the service.
- Research should be done before starting new service or product, continuous researches and developments should be done.

5.2.2 For Further Research

Further research can be done as a continual of this research on the method or possibility of improving the impact of IS on Ethiopian commercial banking sector by taking different countries experience.

Further research can be done using different evaluation method or framework to evaluate the impact of IS on Ethiopian commercial banks.

Undertaking the study, connectivity was raised as a challenge in realizing benefits of information system. Therefore, future research should be taken to assess the impact of network connectivity of branches on Ethiopian banks.

This study has tried to locate public bank and private bank on the strategic grid. However, the level of analysis is based on private and public bank. Hence the level of various banks of private bank may be different and hence their dependency on IT may be different. Therefore, it is recommended to study role of IS in each bank individually.

References

Abdelhak, D. & Dalel, H., 2009. *Computerized Information Systems in the Jordanian Banking Sector: An Empirical Study*, Jordanian: Université Med Khaider Biskra.

Al-Hatmi, A., 2012. *Analysis of ICT Strategic Alignment*, Robina, Australia: s.n.

Aon, et al., 2005. *IT Governance: Developing a successful governance strategy.* 1st ed. Manchester, UK: The National Computing Centre.

Barreiro, P. L. & Albandoz, J. P., 2001. *Population and sample. Sampling techniques*, Sevilla, Spain: University of Seville.

Beck, T., 2011. *The Role of Finance in Economic Development: Benefits, Risks, and Politics.* Tilburg, Netherlands: European Banking Center.

Beck, T. & Cull, R., 2013. *Banking in Africa*, Oxford, United Kingdom: Centre for the Study of African Economies.

Bhojanna, U., 2007. *Research Methods for Management*, Bharathiar: Excel Books Private Limited.

Bourgeois, D. T., 2014. *Information Systems for Business and Beyond.* 1st ed. Washington, DC: The Saylor Foundation's Open Textbook Challenge.

Brownbridge, M., Gockel, A. F. & Harvey, C., 1998. *Banking in Africa: The Impact of Financial Sector Reform Since Independence.* 1st ed. Oxford: James Currey.

Buckle, M. & Beccalli, E., 2012. *Principles of banking and finance.* Second ed. London, United Kingdom: University of London.

Burnard, P. et al., 2008. Analysing and presenting qualitative data. *British Dental Journal*, 204(8), pp. 429 - 432.

Carlsson, S. A., 2006. *Towards an Information Systems Design Research Framework: A Critical Realist Perspective*, Lund, Sweden: CGU.

Caruth, G. D., 2013. Demystifying Mixed Methods Research Design: A Review of the Literature. *Mevlana International Journal of Education*, 1 August.3(2).

Cochran, W. G., 1977. *Sampling Techniques.* 3rd ed. New Jersey, USA: John Wiley & Sons.

Corboy, M., 2007. *Strategic planning models*, s.l.: BPP Ireland.

Creswell, J. W., 2003. *Research Design Qualitative, Quantitative and Mixed Method Approaches.* 2nd ed. London: Sage Publications, Inc..

Creswell, J. W., 2012. *Educational research: Planning, conducting, and evaluating.* 4th ed. Boston: MA: Pearson Education, Inc..

Creswell, J. W., 2014. *Research Design Qualitative, Quantitative and Mixed Method Approach.* 4th ed. London: SAGE Publications, Inc..

Davies, G., 1994. *A History of Money from Ancient Times to the Present Day.* First edition ed. Cardiff, UK: Julian Hodge Bank Limited.

Fama, E. F., 1980. Banking In the Theory of Finance. *Journal of Monetary Economics*, Volume 6, pp. 39-57.

Fischer, S., 2003. *The Importance of Financial Markets in Economic Growth,* s.l.: Citigroup.

Fitzgerald, G., 1996. Evaluating information system projects: a multidimensional approach. *Journal of IT,* Volume Vol. 13, pp. pp.15-27.

Galliers, R. D. & Leidner, D. E., 2003. *Strategic Information Management Challenges and strategies in managing information systems.* Third ed. Oxford, England: Butterworth-Heinemann.

Girmanesh, A., 2015. *Information System Adoption in Selected Ethiopian Organization: towards a new Framework,* Addis ABaba, Ethiopia: Addis Ababa Uinversity, Unpublished.

Goddard, W. & Melville, S., 2004. *Research methodology: An introduction.* Second ed. South Africa: Juta and Company Ltd.

Golafshani, N., 2003. Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report,* 4 December, 8(4), pp. 597-607.

Golafshani, N., 2003. Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report,* 8(4), pp. 597-606.

Heffernan, S., 2005. *Modern Banking.* London, England: John Wiley & Sons Ltd.

Heineman, G. T. & Councill, B., 2001. *Definition of a Software Component and Its Elements.* 1st ed. Boston, USA: Addison-Wesley Longman Publishing Co., Inc..

Hildreth, R., 2001. *The History of Banks: To Which Is Added, a Demonstration of The Advantages and Necessity of Free Competition In the Business of Banking.* Kitchener, Ontario, Canada: Boston: Milliard, Gray & Company.

Homer, S., 1963. *AHistory of Interest Rates, Reutgers University Press New Brunswick.* New Jersey: Rutgers University Press.

Huysmans, P. & De Bruyn, P., 2013. *A Mixed Methods Approach to Combining Behavioral and Design Research Methods in Information Systems Research.* Utrecht, Netherlands , 21st European Conference on Information Systems.

IBM, 2013. *IBM SPSS statistics 20,* Los Angele: Info. Tech. serv.

Idiab, A. I. M., Haron, M. S. & Shofian, A. B. H., 2011. Commercial Banks & Historical Development. *Journal of Applied Sciences Research,* 7(7), pp. 1024-1029.

ISACA, 2003. *Board Briefing on IT Governance.* 2nd ed. Rolling Meadows, IL, USA: IT Governance Institute.

J.Hox, J. & R.Boeije, H., 2005. Data Collection, Primary vs. Secondary. *Encyclopdia of Social Measurement,* Volume 1, pp. 593-599.

Kamel, S., 2005. The Use of Information Technology to Transform theBanking Sector in Developing Nations. *Information Technology for Development,* October, 2(4), pp. 305-312.

Kaufman, A. S. & L.Kaufman, N., 2005. *Essentials of Research Design and Methodology.* Hoboken, New Jersey: John Wiley & Sons, Inc..

Keatinge, T., 2014. *The Role of Public and Private Sector Banking in Ethiopia's Future Economic Growth,* s.l.: Global Center on Cooperative Security.

Krishna, V., 2015. Impact Of Information And Communication Technology (Ict) On Indian Banking Sector. *Voice of Research,* March, 3(4), pp. 54-58.

Luka, M. K. & Frank, I. A., 2012. The Impacts of ICTs on Banks A Case study of the Nigerian Banking Industry. *International Journal of Advanced Computer Science and Applications,* 3(9), pp. 145-149.

MacCallum, R. C., Zhang, S., Preacher, K. J. & Rucker, D. D., 2002. On the Practice of Dichotomization of Quantitative Variables. *Psychological Methods,* 7(1), pp. 19-40.

Magee, M., Marounek, P., Mueller, L. & Phillipson, A., 2008. *IBM IT Governance Approach Business Performance through IT Execution.* 1st ed. Armonk, New York: International Business Machines Corporation IBM Corp.

Mauri, A., 1967. *Il mercato del credito in Etiopia; The credit market in Ethiopia,* Giuffré, Milano: s.n.

Mauri, A., 2003. *Origins and Early Development of Banking in Ethiopia.* Milan: s.n.

Mayer, M., 1987. *The Humbling Of Bank America.* New York: Ochs-Sulzberger.

McFarlan, F. W. & McKenney, J. L., 1983. *Corporate Information Management: The issues facing senior management.* 1st ed. Irwin, US: Irwin.

Me Farlan, F. W., McKenny, J. L. & Pyburn, P., 1983. *The Information Archipelago — Plotting a Course,* s.l.: Harvard Business Review.

Misrak, Y. K., 2015. *Information Technology Investment in Financial Sector of Ethiopia: Towards Qualitative Measurements of an IT ROI Conceptual Model,* Addis Ababa, Ethiopia: Addis Ababa University, Unpublished.

Mitra, S. & Chaya, A., 1996. Analyzing cost-effectiveness of organizations: the impact of information technology spending. *Journal of Management Information Systems,* 13(2), pp. 29-57.

Moore, D. S., Notz, W. I. & Flinger, M. A., 2013. *Confidence Intervals.* 6th ed. New York: W. H. Freeman and Company.

Moursund, D., 2005. *Introduction to Information and Communication Technology in Education.* 1st ed. Oregon: University of Oregon.

Nagarajan, K., 2011. The Code of Hammurabi: An Economic Interpretation. *International Journal of Business and Social Science,* May, 2(8), pp. 108-117.

NBE, 2012. *About Us - History of Banking.* [Online]
Available at: http://www.nbe.gov.et/aboutus/index.html
[Accessed 21 March 2016].

Obiri-Yeboah, K., Kyere-Djan, R. & Kwarteng, K. O., 2013. The Role of Information Technology on Banking Service Delivery: A Perspective from Customers in Ghana. *International journal of Innovative Research in Management,* June.Vol. 6(No. 2).

Olanrewaju, A., 2009. *Fundamentals of Library and Information Science,* Offa, Nigeria: Abdulwahab O. Issa.

Oluwatolani, O., Joshua, A. & Philip, A., 2011. The Impact of Information Technology in Nigeria's Banking Industry. *Journal Of Computer Science And Engineering,* June . 7(2).

Oppong, P., Adjei, H. & Poku, K., 2014. The Role of Information Technology in Building Customer Loyalty in Banking: (A Case Study of Agricultural Development Bank Ltd., SUNYANI). *British Journal of Marketing Studies,* August, 2(4), pp. 9-29.

Purao, S. et al., 2008. *The Sciences of Design: Observations on an Emerging Field,* s.l.: Communications of the Association for Information Systems.

Rajasekar, S., Philominathan, P. & Chinnathambi, V., n.d. *Research Methodology*, Ithaca, United States: Cornell University Library.

Rajesh, T. & Rakesh, K., 2012. Information Technology in Banking Sector. *Asia Pacific Journal of Marketing and Management Review,* September, 1(1), pp. 25-33.

Rawani, A. M. & Gupta, M. P., 2002. *Role of Information Systems in Banks: An Empirical Study in the Indian Context.* New Delhi, International Conference: POMS'99 held at the Indian Institute.

Rojas, R., 1996. *Sixty Years of Computation – The Machines of Konrad Zuse.* Berlin, International Conference on Software Engineering.

Ross, K. N., 2005. *Sample design for educational survey research,* Paris, France: UNESCO International Institute for Educational Planning.

Saranya, J., K, A. & Vasantha, S., 2014. An Empirical Study on Role of ICT in Banking Sector. *International Journal of Multidisciplinary and Current Research,* Volume 2, pp. 336-340.

Senait, B. T., 2011. *IT Governance in Ethiopian Financial Sector: A Case Analysis of Commercial Bank of Ethiopia (CBE),* Daejeon, South Korea: KAIST, Unpublished .

Shah, K. K., 2014. Technological Innovations in Indian Banking Sector. *Tactful Management Research Journal,* Septmeber.2(12).

Shaikh, M. A., 2014. Ethiopian Banker's Perception of Electronic Banking in Ethiopia – A Case of Adama City. *International Journal of Scientific and Research Publications,* September.4(9).

Sharma, M. & Sharma, A., n.d. Role of Information Technology in Indian Banking Sector. *International Journal in Multidisciplinary and Academic Research,* 2(1).

Shiffman, R. N., Liaw, Y., Brandt, C. A. & Corb, G. J., 1999. Computer-based Guideline Implementation Systems. *Journal of th American Medical Informatics Association,* 6(2), pp. 104-114.

Tawar, M. & Keshari, V., 2013. *The Impact of Information Technology on Work and Society.* Madhya Pradesh , India, Pioneer Journal.

Teddlie, C. & Yu, F., 2007. Mixed Methods Sampling: A Typology With Examples. *Journal of Mixed Methods Research,* 1(1), pp. 77-100.

Tesfahunegn, S., 2015. *Challenges of Deposit Mobilization for Private Commercial Banks in Ethiopia : The Case of Awash International Bank S.C.,* Addis Ababa: Addis Ababa University.

Tewdros, S. A. & Vijay, B. R. M., 2011. E-Business: Application of software and technology in selected Ethiopian Banks: Issues and challenges. *International Journal of Computer Science,* November, 8(6), pp. 190-198.

Tongco, M. D. C., 2007. Purposive Sampling as a Tool for Informant Selection. *A Journal of Plants, People and Applied Research,* Volume 5, pp. 147-158.

Trochim, W. M., 2002. *Research Methods Knowledge.* Ithaca, United States: William M.K. Trochim.

Vaus, D. A. d., 2001. *Research Design in Social Research.* London: SAGE.

Vijayaragavan, 2014. Modern Banking Services - A key Tool for Banking Sector. *International Journal of Commerce, Business and Management,* August .3(4).

Vijayaragavan, T., 2014. Modern Banking Services - A key Tool for Banking Sector. *International Journal of Commerce, Business and Management,* August, 3(4), pp. 589-594.

Watson, R. T., 2007. *Information Systems.* 1st ed. Georgia: Global Text Project.

Yalew, N., 2015. *The Impact of Information & Communication Technology on Ethiopian Private Banks' Performance: The Case of Two Selected Ethiopian Private Banks,* Addis Ababa, Ethiopia: Addis Ababa University, Unpublished.

Annexes

Annex I Cooperation letter

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ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

Date March 30, 2016
Ref: -SIS/31/2016

To: Awash International Bank
Birhan Bank
Commercial Bank of Ethiopia
Debub Global Bank
United Bank
Addis Ababa

Dear Sir / Madam

Student Elshalom Endrias (ID. No. GSE/0450/06) is a graduate student at the School of Information Science, Addis Ababa University. He is currently conducting a MSc. thesis research under the title " Role of Information Systems in Ethiopian Banks".

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

With Regards,

Martha Yifiru (PhD)
Head, School of Information Science

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

Annex II Questionnaire Covering Letter

Date March 30, 2016

Dear Participant

Subject: - *Request for survey completion*

My name is Elshalom Endrias and I am pursuing my master's degree at Addis Ababa University. In partial fulfillment of the requirements for the degree, I am working on a thesis called "Evaluating the Impact of Information Systems in Ethiopian Commercial Banks". The purpose of this paper is to measure how IS impacting the bank. Because you are working in bank as an IT expert, IT Manager, Business expert, Business Manager or Business Executive, I am requesting you to participate in this research study by completing the attached questionnaire.

The questionnaire will require approximately 30- 40 min to complete. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, please do not include your name. Copies of the thesis will of course be submitted to Addis Ababa University. If you choose to participate in this project, please answer all questions as timely and honest as possible and return the completed questionnaires promptly. Participation is strictly voluntary and you may withdraw to participate at any time.

Thank you for taking the time to assist me in my educational endeavors. The data collected will provide useful information to analyze and interprets role of information systems. If you would like to receive a copy of this study, please contact me through the address listed below. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below.

If you are not satisfied with the manner in which this study is being conducted, you may report anonymously to my advisor Ato Getachew Jemaneh via getachew_j@yahoo.com.

Sincerely,

Elshalom Endrias Essay

Mobile: - 0913 810906

Email: - shalomendrias@yahoo.com

Annex III Questionnaire

Part I Demographic Information

Please put a "√" mark in the box provided

1 Gender

☐ Male ☐ Female

2 Age

☐ Less than 20 Years ☐ 21-30 Years ☐ 31-40 Years

☐ 41-50 Years ☐ More than 50 Years

3 Highest level of education

☐ College Diploma ☐ Bachelor's Degree

☐ Master's Degree ☐ PhD Degree

Other, please specify _____

4 Work experience in your profession

☐ Less than one year ☐ 1 – 5 years ☐ 5 - 10 years

☐ 10 - 15 years ☐ More than 15 years

5 What is your current position in the bank?

☐ IT professional ☐ IT manager ☐ IT executives

☐ Business professional ☐ Business manger ☐ Business executives

6 How many years of experience do you have in this position?

☐ Less than one year ☐ 1 – 5 years ☐ 5 - 10 years

☐ 10 - 15 years ☐ More than 15 years

Part II Information system influence

Please put a "√" mark in your level of agreement.

People						
	Factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Current Impact	Employees know their work and responsibility.					
	Employees regularly use computers to undertake their work.					
	Employees use email for work purpose.					
	Employees do their job more quickly and easily.					
	Information needed is known by employees.					
	IT staffed adequately, with right skills and competencies.					
Future Impact	IT helps employees to improve work continuously.					
	IT helps employees to improve their effort to learn more and apply new knowledge.					
	IT improves performance of bank's employees.					
	IT staff knows the role of IT in the bank.					
	Knowledge sharing techniques are available					
	I have no problem sharing my knowledge.					
	My ideas and suggestions are respected.					
	Training programs are available for employees					
	Employees know the bank's strategic plan.					
	The IT staff has access and is offered appropriate working tools to develop the needed skills.					
Hardware and Network						
Current Impact	IT helps employees to achieve a larger number of tasks.					
	Using computer has increased employees efficiency.					
	IT helps to lesser workload of employees.					
	IT helps employees to reduce errors.					
	IT helps employees to perform their work within the required specifications.					

	Factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Current Impact	IT helps to achieve greater flexibility in work.					
	IT has made work easier and interesting.					
	IT improves effectiveness of communication flow.					
Future Impact	IT investments are high quality, comprehensive and safe.					
	IT projects have a clear budget and timeline.					
	The bank has IT research center(s).					
	The bank uses technologies to transform business.					
	IT assets are the most important asset in the organization.					
	Profits come from investments in IT.					
	IT has impact on all aspects of the organization.					
	The integration of telecommunications, data processing and office automation provides better competitive results.					
	IT investments help the organization for product quality and diversification					
Software and Database						
Current Impact	Employees' daily work is dependent on the system the bank has.					
	Using CORE banking system has increased efficiency.					
	Using automated system is better than using manual system.					
	The system is clear and could be understood easily.					
Future Impact	The bank has standardized central system.					
	The bank deploys Information System strategy.					
IT Governance						
Current Impact	IT investments are formally evaluated.					
	Top managers know what IT is doing.					
	My supervisor always request report from me.					
	The bank has the right approach for IT decision-making.					

	Factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Current Impact	The bank pays sufficient attention to technology.					
	The making of major IT-decisions is time-efficient.					
	The managers are well informed of the profits of the appropriate IT artifact.					
	Coordination and control of information are established.					
	Different approaches in using information are used in different moments according to the needs of the company.					
	Proper use of information is critical for the bank's existence and success in competition.					
Future Impact	The organizational relation between IT management and senior management is exclusively dependent.					
	ITs' core competencies are maintained at a level to meet required enterprise business strategic objectives.					
	IT investment decisions are aligned to business goals.					
	The bank is becoming strategic in the use of technology.					
	The bank's business objective and IT objectives align together.					
	IT is a regular item on the agenda of the board and is addressed in a systematic manner.					
	IT plays a major role in strategic business planning.					
	IT meets business expectations to create competitive advantage.					
	The board provides well-articulated strategies for how IT-projects can prevent deliver failures.					
	The board is aware of the latest developments in IT from a business perspective.					
	The board keeps a least of new developments in IT					

Service Delivery						
	Factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Current Impact	IT helps employees to deliver output timely.					
	IT helps employees to deliver consistent output even in high work pressure.					
Future Impact	Customer satisfaction is assessed when evaluating IT investments.					
	IT improves effectiveness in decision making process.					
	IT investment provides greatest return value					

Thank you

Annex IV Sampling Formula

$$ss = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = Z value (e.g. 1.96 for 95% confidence level)

p = percentage picking a choice, expressed as decimal (.5 used for sample size needed)

c = confidence interval, expressed as decimal (e.g., .04 = ±4)

For Finite Population

$$\text{new ss} = \frac{ss}{1 + \frac{ss-1}{pop}}$$

Where: pop = population

Annex V Declaration

I declare that the thesis is my original work and has not been presented for a degree in any other university.

_____

Elshalom Endrias

June 16, 2016

This thesis has been submitted for examination with my approval as university advisor.

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Ato Getachew Jemaneh

June 16, 2016