St. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE IMPACT OF INFORMATION TECHNOLOGY ON EFFICIENCY OF ETHIOPIAN BANKING SERVICES

THE CASE OF COMMERCIAL BANK OF ETHIOPIA

A THESIS SUBMITTED IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF BUSINESS ADMINISTRATION

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JUNE, 2014

ADDIS ABABA

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APPROVED BY BOARED OF EXAMINERS

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DECLARATION

I hereby declare that this submission is my own work towards the Masters of Business Administration prepared under the guidance of Tesfaye Debella (PhD) and that, to the best to my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

Samuel Woldeyohannis Nurga ……. … ……...

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ENDORSEMENT

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

……. ……

Advisor **Signature**

St. Mary's University, Addis Ababa

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LIST OF ABREVATIONS/ACRONYMS

ATM= Automatic Teller Machine

CBE= Commercial Bank of Ethiopia

ICT= Information Communication Technology

LMTS= Local Money Transfer Service

POS= Point of Sales Terminal

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ABSTRACT

The major objective of this study was to show the impact of information technology on the efficiency of Ethiopian banking service using the case of Commercial Bank of Ethiopia. Specifically, the study aimed to assess the impact of information technology on customer satisfaction of CBE, to show the impact of information technology on process efficiency of CBE, and to investigate the effects of interruption in telecommunication service on CBE. Using purposive sampling data were collected from managers, technical experts and existing customers. Simple random sampling was used to collect primary data from CBE staffs. Totally, sample size of 85 was used for the study. The data was analyzed using frequencies & percentages, and descriptive analysis technique was utilized. Finding from the study indicate that majority of the bank's customers receive instant notification on their account. Using various ICT related products such as ATM, Mobile Banking Service, and Internet Banking Service have reduced long queues at the branches, and these products have increased efficiency of the individual performers. Hence, this study concluded by highlighting the introduction of modern banking technologies has a great impact on efficiency and customer satisfaction. Finally, the study provides some recommendations such as the bank need to ensure that their banking service quality meets and exceeds customers' expectation, as the newly introduced banking technologies have positive impact on service efficiency and customer satisfaction the bank has to invest more on the ICT related banking technologies. To minimize the challenges such as power and telecommunication service interruptions, complexities in using the products offered by the bank and others CBE has to work hard otherwise it may lead the bank to economic loss.

CHAPTER ONE

1. INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Today's business environment is very dynamic and undergoes rapid changes as a result of technological innovation, increased awareness and demands from customers. Business organizations, especially the banking industry of the 21st century operates in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate. Information and Communication Technology (ICT) is at the centre of this global change curve. Laudon D.P and Laudon J.P, (1991) contend that managers cannot ignore Information Systems because they play a critical role in contemporary organization.

Information Technology (IT) is a man-made resource, embracing principally the electronic technologies of computers and telecommunications (voice, data, and video), and comprising of both electronic hardware and computer software. The significance of IT in today's successful organization cannot be underestimated. It plays a major role in the success of the organization in today's highly competitive world by providing easy and fast means of collecting, storing, retrieving, processing, transmitting and distributing information. There can be various other factors that determine the success of a firm, and a firm may use various strategies to pursue the path of success. However, fast and easy access of information through the use of IT is very important to the firm because it influences all the other success factors, and the competitive strategies cannot be practically implemented without its support. Therefore, no business-firm that minimizes the use of IT can attain the topmost position in its business. This is very much true in the case of financial institutions, which include commercial banks (Loonam, 2008).

Commercial banks have a major role in the economic development of a country. They are the major financial intermediaries between the sources of funds and the users of funds, and their business is heavily dependent on information related to the fund market, which includes fund suppliers, fund users, brokers; information related to the central bank, and Ministry of Finance directives that they have to follow; and information related to their competitors. Besides, their business also includes providing financial information to their customers. Hence, commercial

banks are highly information intensive, and the use of IT by them, for easy and fast means of information collection, storage, retrieval, processing, transmission, and distribution of information, should have extensive contribution to their performance.

One of the modern yardsticks used for rating a modern business enterprise is its ICT infrastructural layout. This is an indication of the importance of ICT for business establishments. Banks in particular adopt information and communication technology to improve the efficiency and effectiveness of services offered to customers, improve business processes, as well as to enhance managerial decision making and workgroup collaborations. This helps strengthen their competitive positions in rapidly changing/emerging economies. Environmental, organizational, and technological factors are creating a highly competitive business environment in which customers are the focal point (Efraim T., Dorothy L., Ephraim M., and James W., 2011)

Information and communication technology (ICT) has in particular brought a complete paradigm shift on the banks performance and on the customer service delivery in the banking industry. In a bid to catch up with global development, improve the quality of customer service delivery, and reduce transaction cost, banks have invested heavily in ICT, and have widely adopted ICT networks for delivering a wide range of value added products and services. The ICT development has a significant effect on development of more flexible and user friendly banking services. (Alhaji A., Rosmaini, 2012)

Castells (2001) reveals that, now transactions worth billions of dollars can only take place in seconds in the electronic circuit throughout the globe by pressing a single button. Although, ICT has revolutionized the way of living as well as conducting businesses and study of Banking industry has received increased attention over the last decade, it continues to pose challenges for marketers and academic alike. According to Loonam (2008), ICT advancements, globalization, competition and changing social trends such as heightened customer proactivness and increased preferences for convenience have caused intense restructuring of the banking industry.

The usage of information technology (IT), broadly referring to computers and peripheral equipment, has seen tremendous growth in service industries in the recent past. The most obvious example is perhaps the banking industry, where through the introduction of IT related products in internet banking, electronic payments, security investments, information exchanges (Berger,

2003), banks now can provide more diverse services to customers with less manpower. Seeing this pattern of growth, it seems obvious that IT can bring about equivalent contribution to profits.

Agboola (2001) studied the impact of computer automation on the banking services in Lagos and discovered that Electronic Banking has tremendously improved the services of some banks to their customers in Lagos. The study was however restricted to the commercial nerve center of Nigeria and concentrated on only six banks. He made a comparative analysis between the old and new generation banks and discovered variation in the rate of adoption of the automated devices.

Osabuohien,(2008) established that while the gender of the bank officials does not affect efficiency in ICT use, factors such as age, educational qualification, computer literacy and type of ICT gadgets, were significant in influencing banks" intensity of ICT usage. Also ICT was found to impact positively the speed of banking service delivery, as well as productivity and profitability.

Bhaskar R. and Tewdros Sisay (2011) stated that, CBE's operational improvement plans will modernize its services to its growing client base in Ethiopia as part of its vision to become a World Class bank in the region. CBE is a government owned bank which offers a range of retail banking services, which has already opened a subsidiary company in Southern Sudan with plans to extend its services to other East African countries. "Temenos' software delivers all the functionality and efficiencies we need to match a world class commercial bank. Its dedicated investment in product development to continually meet the needs of its clients and their customers was a very compelling proposition for us. The lack of flexibility and homogeneity in our current systems impacts product innovation, service delivery, risk management and cost control. Being able to replace all systems with T24 will deliver a single view of the business and customer and therefore provide a better understanding of our customers to improve services, enable us to effectively monitor and manage risk and lower our total cost of ownership. We will have an enormous wealth of functionality and flexibility to develop a wide range of new products, enabling us to strengthen our presence in the retail space, as well as penetrate new markets in the face of increased competition. By using this software CBE is going to provide to their customers better services like E-banking, Mobile banking etc. 'Temenos' software was benchmarked against solutions from Oracle FS and Infosys and proved to be the most functionally rich platform to

deliver end to end operational support and broaden CBE's service offering, such as mobile banking, to enter new markets Bhaskar et al. (2011).

According to Wali (2010) the relationship between ICT and the various organizational activities is similar to government & civil servants while Governments outlines policies and civil servants execute those policies. ICT acts as a tool for the actualization of various organizational activities in order to implement and enforce policies.

But the purpose of this study is to show the impact of information technology on Ethiopian banking service efficiency the case of Commercial Bank of Ethiopia.

1.2 STATEMENT OF THE PROBLEM

Today, information and communication technology has become the heart of banking sector, while banking industry is the heart of every robust economy. If it collapses so will the economy. It is absolutely evident from the current recession, in European banks" crises, and in turn. ICT has created a new infrastructure for the world economy to become truly global and also provided the users of new technology a competitive advantage over their rivals. Electronic banking system has become the main technology driven revolution in conducting financial transactions. However, banks have made huge investments in telecommunication and electronic systems, users have also been validated to accept electronic banking system as useful and easy to use (Berger A. N. 2003).

ICT directly affects how managers decide, how they plan and what products and services are offered in the banking industry. It has continued to change the way banks and their corporate relationships are organized worldwide and the variety of innovative devices available to enhance the speed and quality of service delivery.

Technology is no longer being used simply as a means for automating processes. Instead it is being used as a revolutionary means of delivering services to customers. The adoption of technology has led to the following benefits; greater productivity, profitability, and efficiency; faster service and customer satisfaction; convenience and flexibility; and space and cost savings (Sivakumaran, 2005).

As Bhaskar et al. (2011) showed Ethiopia is lagging behind in the adaption of E-commerce. The software used in the Ethiopian banking industry is almost same as the rest of the African nations

like South Africa, Egypt, and Tunisia. The internet infrastructure is available only in their major cities due to lack of internet facility it is very difficult to engage E-commerce activities in the Sub-urban and rural areas. Now a day some of the banks providing best services to their customers with advanced software and technology, but they are suffering with security issues.

Even if Ethiopia is one of the fastest developing countries in Africa the Ethiopian banking system is still under developing. Ethiopian banking system is comparatively good, but the Electronic banking system is relatively not at in use. Currently Commercial Bank of Ethiopia starts some E-banking services such as Automatic Teller Machine (ATM) service, Internet Banking, Mobile Banking and other services. But compared to other developing countries in Africa it is still at the beginning stage. Due to various reasons the use of Information Technology on the banking services is limited. Hence even if it is limited, Information technology has impact on banking service in Ethiopia.

Conversely, in countries where the telecommunications infrastructure is weak, this can act as a significant brake on development and imposes economic costs on all groups in society: these include increased transaction costs for business, reduced efficiency of markets; and lower productivity, amongst others. Government is not immune from the effects either: improved communications technologies can increase the effectiveness of public service delivery and reduce its cost; poor infrastructure prevents the realization of such benefits. Regardless of the indicator used, Ethiopia's telecommunications infrastructure is lagging behind. The existing weak telecommunications infrastructure in Ethiopia acts as a severe constraint on the development of the Ethiopian business community and imposes additional costs on business activities (Dominique Baron, 2010).

Here in Ethiopia there is frequent power and telecommunication service interruption. These basic service interruptions have greater impact on the operations of Commercial Bank of Ethiopia. When there is interruption in telecommunication, it directly leads to frequent ATM breakdowns, the inability to access funds at other branches, referrals to branches due to network breakdown as it affects the Automatic Teller Machines, POS machines, and in general the whole activity of the bank if so the bank will fail to achieve its strategic goals. This in turn affects the efficiency and profitability of Commercial Bank of Ethiopia.

Therefore, the researcher is interested to assess the impacts of Information Technology i.e. modern banking technology on efficiency of banking service by analyzing the case of Commercial Bank of Ethiopia.

To this end the following Research questions are developed;

- What is the impact of modern banking technology on customer satisfaction of CBE?
- What is the effect of interruption in telecommunication service on CBE?
- Does information technology have an impact on process efficiency of CBE?

1.3 OBJECTIVE OF THE STUDY

A. GENERAL OBJECTIVE

The general objective of this study is to show the impact of information technology on the efficiency of Ethiopian banking service the case of Commercial Bank of Ethiopia.

B. SPECIFIC OBJECTIVES

The specific objectives of this study are;

- To assess the impact of information technology or modern banking technology on customer satisfaction of CBE,
- To show the impact of information technology on process efficiency of CBE,
- To investigate the effect of interruption in telecommunication service on CBE.

1.4 SCOPE AND LIMITATION OF THE STUDY

This study emphasized mainly on analyzing the impact of information technology on Ethiopian banking service efficiency the case of Commercial Bank of Ethiopia for the year 2014. Geographically, the study covered only branches located within Addis Ababa. This is because all the findings are applicable at every branch of commercial bank of Ethiopia whether they are located at the center or remote areas.

In undertaking this study, different limitations were faced. But the major limitation was sufficient recorded data that are necessary to answer my research question. One of the research questions says '*To investigate the effects of interruption in telecommunication service on CBE*'. To investigate this sufficient recorded data is required. But this question was not investigated well due to this limitation.

1.5 SIGNIFICANCE OF THE STUDY

The study have different significances like;-

1. It will give sufficient information to management and planners of Commercial Banks in Ethiopia regarding the impact of Information Technology on banking services,
2. Recommendations forwarded are useful to address the strategic issues of banks especially issues regarding Information Technology related products. Hence, policy makers can use this study to draw some policy implications,
3. It will serve as a reference material for other researchers who conduct their study in related topics.

1.6 ORGANIZATION OF THE STUDY

The study has five chapters. In the first chapter the introductory part is presented. In the second chapter review of related literature was discussed. The Research Methodology described in the third chapter. The collected data was analyzed, presented and interpreted in the fourth chapter. And, the last chapter, chapter five come-up with summary, conclusion and recommendation of the study.

CHAPTER TWO

2. LITRATURE REVIEW

Under this chapter the theoretical and empirical evidences focusing on the Impacts of Information Technology on bank service efficiency are presented and have three sections. Accordingly, the first section presents overview of banking service in Ethiopia. The second section presents the impacts of information technology on banking service. Review of Software Technologies used by Commercial Bank of Ethiopian and Forms of ICT Innovations in Banking Sector are presented in the third and fourth sections respectively**.** And the last section presents review of earlier studies on the impact of ICT on banking service.

2.1 Overview of Ethiopian Banking System

Traditional institutions organized with a sense of cooperation and risk sharing has enabled Ethiopians to experience saving and financial management within its cultural context. Eqqub and Edir are some of the informal financial institutions that shaped the social bond and interaction (Gebeyaw Aychile 2008).

Modern banking in Ethiopia started in 1905 with the establishment of Bank of Abyssinia, which was based on a fifty year franchise given to the British-owned National Bank of Egypt.It has landmark significance in introducing financial services, which were hitherto unknown in the country (Alemayehu G. 2006). A significance feature of commercial banking in Ethiopia then was its innovative nature rather than its contribution to growth and its competitive nature. As the society was new for the banking service, banks had faced difficulty in familiarizing the public and they faced considerable cost of installation. In the pre-1974 era, there hardly was any banking competitive environment, as the banking industry was dominated largely by a single government owned bank, State Bank of Ethiopia. Despite the efforts made to disengage banking from foreign control and to make the institution responsible to Ethiopia's credit needs, these developments did not bring about meaningful competitive environment, as banking industry was characterized by specialization and low level of business. The establishment of privately owned Addis Ababa Bank in 1964 and its growing branch network created relatively better banking competition among commercial banks, with concentration of their branch offices in big towns and trade routes in the

country. The then monetary and banking system gave at most emphasis to stability and balanced growth of the economy rather than competition (proclamation No.206/1963). Competition during the period was generally weak. During the Derge regime competition among banks was not taking place during this regime as it was characterized as command economy, instead of market oriented.

2.2 Information and Communication Technology

Information Technology (IT) is the automation of processes, controls, and information production using computers, telecommunications, software and ancillary equipment such as automated teller machine and debit cards. It is a term that generally covers the harnessing of electronic technology for the information needs of a business at all levels. Communication is the conveyance or transmission of information from one point to another through a medium (Alawode, Ademola John and Emmanuel Uche Kaka, 2008).

Information and Communication Technology (ICT) is the automation of processes, controls, and information production using computers, telecommunications, soft ware and other gadget that ensure smooth and efficient running of activities. It is a term that largely covers the coupling of electronic technology for the information needs of a business at all levels. ICT has surpassed the role of support services or only electronic data processing; its fields of applications are slightly global and unlimited. Its devices especially the Internet and modern computer email facilities have further strengthened early modernizations like the telephone and fax. Other ICT devices include data recognition equipment, factory automation hardware and services, telecommuting and teleconferences using real time and online system (Adeoti, 2005).

It is a concept that is having a remarkable effect on almost entire aspects of the human endeavors. This implies that it involves the application of principles to engage physical component in achieving an intended goal. The merging of computer and telecommunication after about four decades of applying computers to routine data processing, mainly in information storage and retrieval, has created a new development where information has become the engine of growth around the world. This development has created catch-up opportunities for developing countries such as Nigeria to attain desired levels of development without necessarily „reinventing the wheels" of economic growth. This new technology has brought far-reaching revolution in societies, which has tremendously transformed most business (banking) scenes (Ovia, 2005).

2.2.1 The Ethiopian ICT Picture

With a size of about 1.25 million square kilometres and a population of nearly 74 million, Ethiopia is one of the biggest in size and the second most populated country in Africa. Economically however, measured by any standards, it remains to be one of the poorest even among Sub-Saharan African countries. Even if there are encouraging signs of budding and robust economic growth and increasing productivity in recent years, centuries of backward economic conditions and seclusion from the rest of the world in terms particularly of trade has still left its marks on the present day Ethiopia, which however appear to be fast shedding. Improved macroeconomic management, stable government system, privatization and improving private sector involvement in the economy, the recent phenomenon of increased diversification of the export market, fast increasing education coverage at all levels of schools, have helped improve the economic situation in the country and, and above all, have helped in instilling a thinking of entrepreneurship and investment. Nonetheless, the journey the country has ahead of it still a long, perplexing and challenging one. It is still one of the poorest countries on earth ranking 169th out of 177 countries, according to the UN's Human Development Report, and whose per capita income is estimated to be $200. It is still a country with nearly 85% of its population living in rural areas depending on rain-fed subsistence farming using obsolete technical know-how (Aman Assefa, 2009).

2.3 Review of Software Technologies used by CBE

Ethiopia is one of the fastest developing countries in Africa. The Ethiopian banking system is still under developing. The fallowing part reviews software technologies and services offered to customers by Commercial Bank of Ethiopia.

2.3.1 Background of Commercial Bank of Ethiopia

Commercial Bank of Ethiopia is the leading Bank in Ethiopia, established in 1942 G.C and Pioneer to introduce modern banking to the country. Commercial Bank of Ethiopia has 780 branches stretched across the country. It is the bank with assets of Birr 155 billion as on June 30th 2012 and Plays a catalytic role in the economic progress & development of the country. It is the first bank in Ethiopia to introduce Automated Teller Machine (ATM) service for local users and

pioneer to introduce Western Union Money Transfer Services in Ethiopia. Currently CBE has more than 4 million account holders. It has strong correspondent relationship with more than 50 renowned foreign banks and a SWIFT bilateral arrangement with 500 others.

CBE combines a wide capital base with more than 12,800 talented and committed employees. CBE has reliable and long-standing relationships with many internationally acclaimed banks throughout the world.

The Vision of Commercial Bank of Ethiopia is to become a world-class commercial bank by the year 2025. The Mission of Commercial Bank of Ethiopia is that, committed to realize stakeholder's needs through enhanced financial intermediation globally and supporting national development priorities, by deploying highly motivated, skilled and disciplined employees as well as state of the art technology. The values of Commercial bank of Ethiopia are that Corporate Citizenship, Customer Satisfaction, Quality Service, Innovation, Teamwork, Integrity, and Public Confidence.

Thus the bank endeavors to satisfy customers by striving to excel their business, by offering quality service to their customers' and aspire to be branded with quality in the minds of their customers and the general public. Commercial bank of Ethiopia provides Products and services such as

- Account Opening (Local currency and foreign currency)
- Deposit (cash/Negotiable instruments)
- Payment
- Cheque clearance
- Money transfer (Local currency and foreign currency)

CBE extends the following credit facilities to its esteemed customers: Overdraft, Merchandise loan facility, Pre-shipment Export Credit facility, Revolving Export Credit Facility, Special Truck Loan Financing, Short term loan, Medium and long term loans, Agricultural Input Loan, Agricultural Investment Loan, Coffee farming Term Loan Financing, Micro–Finance Institution's Loan .

2.3.2 Software used by Commercial Bank of Ethiopia

Commercial Bank of Ethiopia (CBE), the country's largest bank with more than two million customers, has selected Temenos (SIX: TEMN), the market leading provider of banking software. Founded in 1993 and listed on the Swiss Stock Exchange (SIX: TEMN), Temenos Group AG is a global provider of banking software systems in the Retail, Corporate & Correspondent, Universal, Private, Islamic and Microfinance & Community banking markets. Headquartered in Geneva with 56 offices worldwide, Temenos serves over 1000 customers in more than 120 countries. Temenos' software products provide advanced technology and rich functionality, incorporating best practice processes that leverage Temenos' experience in over 600 implementations around the globe. Temenos' advanced and automated implementation approach, provided by its strong Client Services organization, ensures efficient and low-risk core banking platform migrations. They announced that to transform its entire operational infrastructure across more than 200 branches. CBE's operational improvement plans will modernize its services to its growing client base in Ethiopia as part of its vision to become a World Class bank in the region. CBE is a government owned bank which offers a range of retail banking services, which has already opened a subsidiary company in Southern Sudan with plans to extend its services to other East African countries. "Temenos' software delivers all the functionality and efficiencies we need to match a world class commercial bank. Its dedicated investment in product development to continually meet the needs of its clients and their customers was a very compelling proposition for us. The lack of flexibility and homogeneity in our current systems impacts product innovation, service delivery, risk management and cost control. Being able to replace all systems with T24 will deliver a single view of the business and customer and therefore provide a better understanding of our customers to improve services, enable us to effectively monitor and manage risk and lower our total cost of ownership. We will have an enormous wealth of functionality and flexibility to develop a wide range of new products, enabling us to strengthen our presence in the retail space, as well as penetrate new markets in the face of increased competition. By using this software CBE is going to provide to their customers better services like E-banking, Mobile banking etc. Temenos' software was benchmarked against solutions from Oracle FS and Infosys and proved to be the most functionally rich platform to deliver end to end operational support and broaden CBE's service offering, such as mobile banking, to enter new markets.

2.4 Forms of ICT Innovations in Banking Sector

Information technology has various impacts on financial institutions. The following include some of the major impacts of information technology in banking system: (Sivakumaran, 2005)

A. GSM Banking

This mode of e-banking makes use of the Global System for Mobile communication (GSM) phones as the primary electronic device. GSM has improved the operational efficiency of many banks in the country. The mobile banking services basically allow customers to operate their accounts with the operating banks from mobile phones to a large extent as long as their phones and network support SMS (short messaging service). The user could be able to check account balance up to his two last transactions.

B. Automated Teller Machines (ATMs)

ATMs are a computer-controlled device that dispenses cash, and may provide other services to customers who identify themselves with a Personal Identification Number. ATM dispenses cash at any time of the day and night, unlike the traditional method where customers have to queue for a very long time in order to withdraw cash or transfer funds. An ATM device allows a bank customer to withdraw cash from his account via a cash dispenser (Machine), and the account is debited immediately. A fundamental advantage is that it needs not to be located within the banking premises. It is usually in stores, shopping malls, fuel stations etc. It saves customers time in service delivery as alternative to queuing in bank halls, customers can invest such time saved into other productive activities. ATMs are a cost-efficient way of yielding higher productivity as they achieve higher productivity per period of time than human tellers.

C. Mobile Banking

Mobile Banking refers to provision and avail of banking- and financial services with the help of mobile telecommunication devices. The scope of offered services may include facilities to conduct bank and stock market transactions, to administer accounts and to access customized information.

Mobile banking is being regarded in the industry as "the delivery channel of the future" for various reasons. First and foremost is the convenience and portability afforded. It is just like having a bank in the pocket. Other key reasons include the higher level of security in comparison to the internet and relatively low costs involved. The possibility that customers will adopt mobile banking is high, considering the exponential growth of mobile phone users worldwide. Mobile banking typically provides services such as the last information on account balance, previous transactions, bank account debits and credits, and credit card balance and payment status. They also provide their online share trading customers with alerts for pre-market movements and post-market information and stock price movements based on triggers.

D. Funds Transfer

Customers can now electronically transfer funds across the globe without any problem or delay as compared to the traditional method before the advent of information technology when funds are seriously delayed before they are delivered to the recipients.

E. On-Line Banking

With the aid of information technology, online banking provides the opportunity of paying bills and performing transactions of any kind electronically. Electronic payments can be credited or debited the same day. Customers can make payments for goods or services without necessarily coming in contact with physical cash and running the risk of handling a large amount of money.

F. Electronic Mail

Information technology has given rise to electronic mail which improves communication between individuals, external parties and the bank within or across various geographical regions or boundaries. The availability of online information provides bankers and customers with a powerful vehicle for research.

G. Bankers Automated Clearing Services

This involves the use of Magnetic Ink Character Reader (MICR) for cheque processing. It is capable of encoding, reading and sorting cheque. Also, request for cheque books or purchase of draft can be made and granted via electronic devices that are web-enabled.

It has provided flexible and convenient services to customers. Most current e-banking applications make use of the Internet which allows customers to obtain current account balances at any time. Customers do not need to bother themselves once money have been deposited or withdrawn from their accounts as most banks employs the use of short message service (SMS) to intimate customers of their balances immediately the transaction is performed.

H. Internet banking

Internet banking is a relatively new front-office technology. Banks offer a variety of levels of Internet service and combinations of Internet and physical offices and ATM networks. Some banks employ a "clickand- mortar" implementation strategy in which the banks add a transactional Internet site to their physical offices and ATM networks.

A transactional site allows customers to make transactions on-line such as accessing accounts, transferring funds, applying for a loan, etc. Other banks have set up informational websites that provide information about the banks and their services, but do not allow for on-line transactions. A small number of Internet-only banks offer services through transactional Internet sites and access to ATM networks, but with no physical offices open to the public.

Importantly, although there may be scale economies in setting up and maintaining transactional websites, this technology may still be accessed by small banks. Many small banks are able to outsource the provision of their transactional websites to companies that specialize in these operations.

The fast spread of Internet banking may result in the benefits of this technology going primarily to consumers as banks incur the costs of providing these sites to maintain market shares. That is, competition may currently or in the near future force banks to adopt the technology just to keep existing customers and not charge enough to earn abnormal profits from providing this service.

Developing countries are following the export-led growth example of newly industrialized Asian economies by becoming suppliers and investors in ICT. However, these technologies continue to

be exotic and inaccessible to people, especially, those in the Middle East and Africa. While ICTs can be seen to contribute to economic growth, they also introduce new challenges in Africa, supporting the notion that growth in its use is often thought of as a cause of economic growth (Mansell et al., 1998). In societies that have higher levels of income, ICTs are used to reduce or cut-down on increasingly costly human inputs. They are also used to forge links between information resources and increases due to economic growth. Mansell et al. (1998) suggests that the challenge would be to develop and exploit these emerging opportunities.

2.5 Challenges of ICT in Banking

ICT fosters online exchange of information dialogue. This enables faster resolution of conflict and quicker determination of a customer need. However, Nigerian banks face a lot of challenges. The most identified challenge is Nigeria's poor infrastructure. Electricity supply is sporadic and inefficient. Nigeria also has very low internet penetration with less than one internet service provider per thousand people.

Ovia, J. (2001) highlighted the following as the identifiable challenges facing Nigerian banks in the effective implementation of ICT.

i. Low internet connectivity

Though there is a growing dependence on internet technology, there has been low supply in terms of connection speed. However, the introduction of wireless system has improved the efficiency rate.

ii. Low Tele-density

Nigeria has one of the lowest tele-densities in the world. Tele-density refers to the number of landline telephones in use per 100 individuals living within an area. A tele density greater than 100 means there are more telephones than people. It is however practically impossible to grow and expand the Nigerian financial market without adequate telecommunication infrastructure.

ii. Security

Access to bank servers by unauthorized individuals poses a great threat to the utilization of ICT in the Nigeria's banking industry. Fraud and counterfeit money are challenge confronting ICT-enhanced banking. It is not enough to acquire sophisticated ICT equipment but exposure to information-technology related failure should be minimal.

2.6 Service Quality and customer satisfaction

Quality in a service organization is a measure of the extent to which the service delivered meets the customer's expectations. The nature of most services is such that the customer is present in the delivery process. This means that the perception of quality is influenced not only by the "service outcome" but also by the "service process".

The "perceived quality" lies along a continuum. "Unacceptable quality" lies at one end of this continuum, while "ideal quality" lies at the other end. The points, in between represent different gradations of quality (Ghobadian et al, 1994).

2.7 EMPERICAL LITRATURE REVIEW

Mitra and Chaya (1996) found that higher IT investments were associated with lower average production costs, lower average total costs, and higher average overhead costs. They also found that larger companies spent more on IT as a percentage of their revenues than smaller companies. However, they did not find any evidence IT investment reduced labor costs in organizations.

Aki (2002) analyzed the structural change in Finnish banking sector from the period 1993 to 2002 which showed that 42 per cent of households have internet connection with banks and 90 per cent have mobile banking services. The author concluded that main goals of management of technology were to improve customer satisfaction, reduce cost and develop new methods to collect and analyze the customer information.

Arora (2003) made an attempt to prove that technology had a definitive role in facilitating transactions in the banking sector; and the impact of technology had resulted into the introduction of new products and services by various banks in India. The author discussed various initiatives taken by the banks to manage transformation and these initiatives had brought customers the convenience of anywhere, anytime banking. The author concluded that technology was a facilitator for advancement in the core business of banking and not an end in itself.

Jain and Hundal (2006) described the importance of mobile banking and barriers in the adoption of mobile banking. The paper examined the forces that can act as barriers in mobile banking service adoption. The objective of the study was to find the reasons why the people had not fully accepted the technology though it provided much advantage to the banking customers as compared to previous technologies. The paper attempted to identify the various barriers, viz.

access problems, dissatisfaction and inability of service providers in the adoption of mobile banking services. The results of the study indicated that consumers got disheartened by the complicated function while accessing the mobile banking services which lead to rise in their dissatisfaction level, as no proper guidance was provided to them. The researchers suggested that service providers should be aware of the problems of their customers. The findings of the study gave a brief outlook for the practical implication for managers and policy-makers who have to make strategies and decisions in order to cater the unexplored service market.

Boateng and Molla (2006) indicated that the operational constraints of internet banking is associated with the customer location, the need to maintain customer satisfaction and the capabilities of the Bank's main software to act as an influential factors in motivating the decision to enter electronic banking services and consequently influencing the usage experience and thus affecting the level of satisfaction.

Agboola (2001) studied the impact of computer automation on banking services in Lagos and concluded that electronic banking has tremendously improved the services of the banks to their customers. As a follow up, Agboola evaluated the response of Nigeria banks to the adoption of ICT. He evaluated the nature and degree of adoption of innovative technologies, the degree of utilization of the identified technologies and the impact of the adoption of IT devices on banks operations using both structural analyses and the impact analysis model. He concluded that ICTs impacted positively on all the criteria that formed the basis of evaluation namely; competitive strength, market segmentation, improved revenue, proper forecasting and modernization for global impact, and time saving, error rate reduction, management decisions and speed of transaction for local impact.

2.8 Summary of Literature Review

In summary, this chapter has reviewed a number of issues related to Information Communication Technology and its impact on banking services such as; definition of ICT forms of ICT innovation in banking sector and challenges of ICT in banking are discussed. As the literature review indicates that several researches have been conducted on banking, especially on Ghanaian banks but in Ethiopia, no direct researches in this area of study have been conducted. Therefore, this research will seek to fill the research gap created on the impacts of Information Communication Technology on banking service efficiency in Ethiopia.

CHAPTER THREE

3 RESEARCH METHODOLOGY

This chapter discusses the research methodology. The chapter is organized in five sections. The first section discusses the research design. Sample size is presented in the second section. Sampling Techniques and Methods of Data Collection are presented in the third and fourth sections respectively. In the last section Method of Data Analysis is presented.

3.1 Research Design

Usually researches are grouped into three (Yin, 2003) base on the purpose of the research or the research problems and objectives. These three categorizations are exploratory, descriptive and explanatory. Notwithstanding these categorizations a given research study can have more than one of these purposes (Babbie, 2004). From the research problems, questions and objectives this study will mainly make use of descriptive research. Descriptive research is used to find information about the present status of a phenomenon to describe "what exist" with respect to variables or conditions in a situation. A key limitation to descriptive research is that it does not lend itself the calculation of causal relationship. This is where explanatory research comes in. Explanatory research helps establish the relationship between independent and dependents variables. It is used when there are no clear understanding about the type of models to use and in what quantities as well as in what relations.

The main objective of this study is to show the impact of information technology on Ethiopian banking service efficiency. And the type of research adopted for this study is ***applied research*** because applied research is specifically aimed at solving a currently experienced problem. This study is also aimed at assessing a problem that is currently experiencing in commercial bank of Ethiopia. Currently the major problem that Commercial Bank of Ethiopia faces is frequent telecommunication network and power interruption. This problem directly affects the service efficiency of the bank. Service quality of the bank is also dependent on the Information Communication Technology utilized. Hence, latest ICT used →Operating efficiency (Service

Efficiency) → Customer satisfaction → Customer Loyalty (Retaining Potential Customers) → Profitability of the Bank.

3.2 RESPONSE RATE

A total of eighty five (85) questionnaires were distributed during the survey. However, seventy eighty (78) questionnaires were returned and all questionnaires were considered valid because they were fully filled. This represented a response rate of 91.76%. Of the seventy eight respondents 48.7% were staffs of Commercial Bank of Ethiopia and the rest 51.3% were customers of Commercial Bank of Ethiopia.

3.3 Sampling Techniques

The sampling technique that was used for the managers, technical experts from Information Technology departments and existing customers of CBE is Purposive Sampling Technique. Because instead of using random sampling technique purposive sampling is better in collecting information in such area of studies. The reason behind is to get currently existing detail information regarding electronic banking services that are offered by Commercial Bank of Ethiopia. Since the questionnaire was developed in English and the information needed requires knowledge of previous service delivery by the bank, purposive sampling technique was used for the selection of existing customers of the bank. We usually would have one or more specific predefined groups we are seeking. Purposive sampling can be very useful for situations where you need to reach a targeted sample quickly and where sampling for proportionality is not the primary concern. With a purposive sample, you are likely to get the opinions of your target population. And simple random sampling technique was utilized for employees of Commercial Bank of Ethiopia.

Interview using interview using unstructured schedule/guide was also undertaken with the key Information Technology personals and selected branch managers of Commercial Bank of Ethiopia.

3.4 Sample Size

The target population of the study is employees and managers from different branches of Commercial Bank of Ethiopia, technical experts from Information Technology departments and some selected existing customers of Commercial Bank of Ethiopia. Existing customers of Commercial Bank of Ethiopia are selected because they were served by CBE before and after implementation of different banking software and various technological products. The study covered eight branches from different districts of CBE and totally **eighty five (85)** questionnaires were distributed. These questionnaires were distributed face to face to all the respondents. Because all branches in all districts are using the same banking technology and all the results are applicable at every branch of the bank.

The questionnaire involved questions regarding the demographic profile of the respondents, the effects of interruption in power and telecom services, the impact of modern banking technology on customer satisfaction and other related questions. Degree of customer satisfaction and level of agreement was evaluated using 5 point Likert scales that ranged from 1= Strongly Disagree, 2 = Disagree, 3 = Neutral, 4= Agree to 5 = Strongly Agree.

The total number of clerical staff of these selected eight branches of CBE is 307. As the *table for Determining Minimum Returned Sample Size for a Given Population Size for Continuous and Categorical Data* by Bartlett, Kotrlik, & Higgins (2001) showed using 0.03 for margin of error, 95% confidence level, z at 95% confidence level which is 1.96 and p equal to 0.05 gives us an appropriate sample size of 85 for population size of 300 and 92 for 400. Hence it is better to use total sample size 85 for this study.

3.5 Methods of Data Collection

To accomplish the stated objectives the researcher used both primary and secondary data. The primary data that shows the level of customer satisfaction, the challenges in using ICT products by CBE, and economic costs incurred by the bank due to frequent telecommunication and power interruption was collected **using structured questionnaire** that contains both closed and open ended questions and interview using **unstructured interview guides or schedules**. And additional data form secondary data like different books, Journals, annual reports & other

publications of the bank and web site of Commercial Bank of Ethiopia and National Bank of Ethiopia were utilized.

3.6 Methods of Data Analysis

The study employed descriptive research design. Thus the collected data was analyzed using descriptive statistics (frequencies and percentages) and Statistical Package for the Social Sciences (SPSS) Version 21 software was also used to analyze the collected data.

CHAPTER FOUR

4 ANALYSIS, DISCUSSION AND PRESENTATION OF RESULT

4.1 INTRODUCTION

This chapter presents the results of the data collected, as indicated by the research questions.

This chapter is organized around the research questions in chapter one. And it presents a brief analysis of the data, results of the survey instrument along with a discussion of each research question.

The objectives of the study were used by the researcher as a guide in analyzing the findings obtained from the field work. With the research objectives, the findings of the study were categorized into the following:

- Demographic Characteristics,
- Impact of ICT based products on Process Efficiency,
- Challenges in using ICT Products of CBE,
- Service quality and customer satisfaction.
- Analysis regarding the effects of frequent interruption of power and telecommunication service on CBE, and

Tables and charts were utilized by the researcher to assist in interpreting the findings.

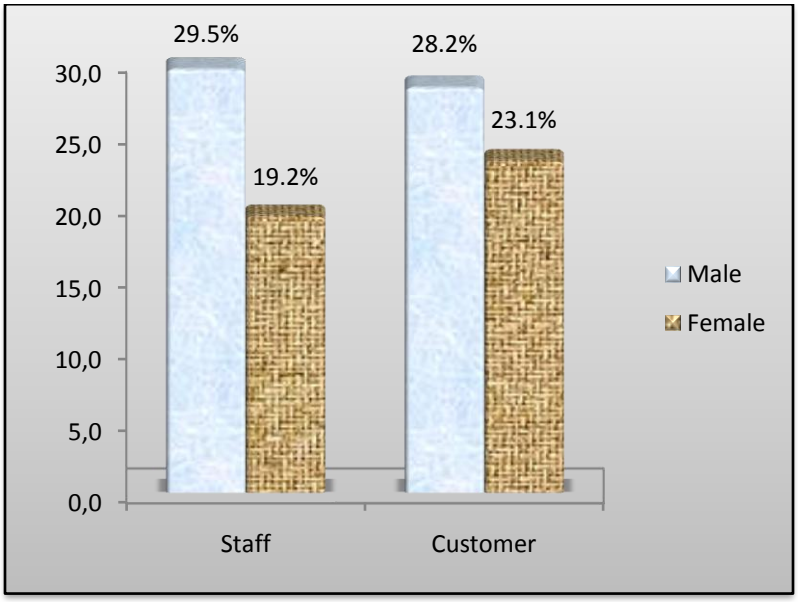
4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The socio-demographic data was taken to know certain characteristics personal to the respondents but could useful in understanding their satisfaction of the bank's ICT innovations. The areas covered included gender of the respondent, their age distribution, educational level and income level.

4.2.1 GENDER OF RESPONDENTS

As the graph below shows from the total female respondents 19.2% were staffs of Commercial Bank of Ethiopia and 23.1% were customers of the bank. And from the total male respondents 29.5% & 28.2% were staffs and customers of CBE respectively.

Chart 4.2.1 Gender of Respondents

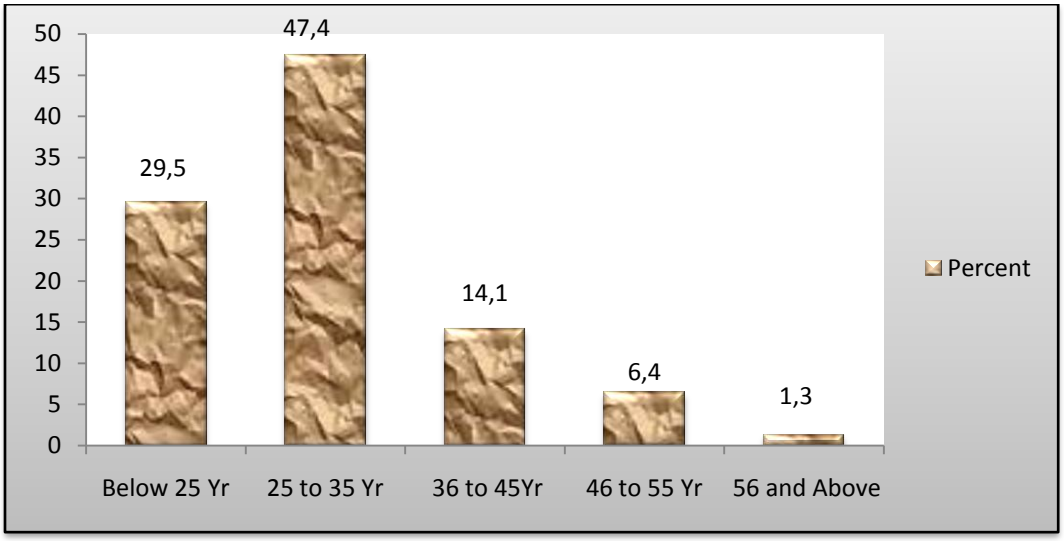


Source: Own Survey, 2014

4.3.2 AGE OF RESPONDENTS

The age of respondents ranged from Below 25 year up to 56 year and above. The Chart below shows that the majority of the respondents fell within the range of 25 up to 35 years which represents 47.4% of the total respondents. The next range of age is below 25 years which represents 29.5% followed by 14.1% of the age group 36 to 45 years, 6.4% of age range 46 to 55 years, and 1.3% of age range 56 and above.

Chart 4.3.2 Ages of Respondents (Percentage)



Source: Own Survey, 2014

4.3.3 EDUCATIONAL LEVEL OF RESPONDENTS

As the table below shows from the total respondents 19.2 % of them have diploma. Majority of the respondents that is 71.8% have Bachelor Degree and the rest 9% of them have Masters Degree.

Table 4.3.3 Educational level of Respondents

Education Status	Frequency	Percent
Diploma	15	19.2
Bachelor Degree	56	71.8
Masters and above	7	9.0
Total	**78**	**100.0**

Source: Own Survey, 2014

As the educational level of the respondents increased from diploma to masters' level their level of using the technologically advanced products also increased.

4.3.4 INCOME LEVEL OF RESPONDENTS

Table 4.1.4 shows that the income level data showed that majority of the respondents earned income 2,001.00 up to 5,000.00 Ethiopian Birr representing 62.8%, followed by less than 2,000.00 Ethiopian Birr representing 24.4%, 5,001.00 up to 10,000.00 Ethiopian Birr representing 9%, and above 10,000.00 Ethiopian Birr representing 3.8%.

Table 4.3.4 Income Level of Respondents

Income Level	Frequency	Percent
Less than 2,000	19	24.4
2001 up to 5,000	49	62.8
5001 up to 10,000	7	9.0
Greater than 10,000	3	3.8
Total	**78**	**100.0**

Source: Own Survey, 2014

4.4 IMPACT OF ICT BASED PRODUCTS ON CUSTOMER SATISFACTION

With respect to the type of ICT product used by customers, branch networking appears to be the most widely accepted and highly used by the respondents as presented in the table above. This is followed by ATMs representing 83.3% of the total respondents and SMS alert around 74%.

Table 4.4 Impact of ICT based Products on Customer Satisfaction

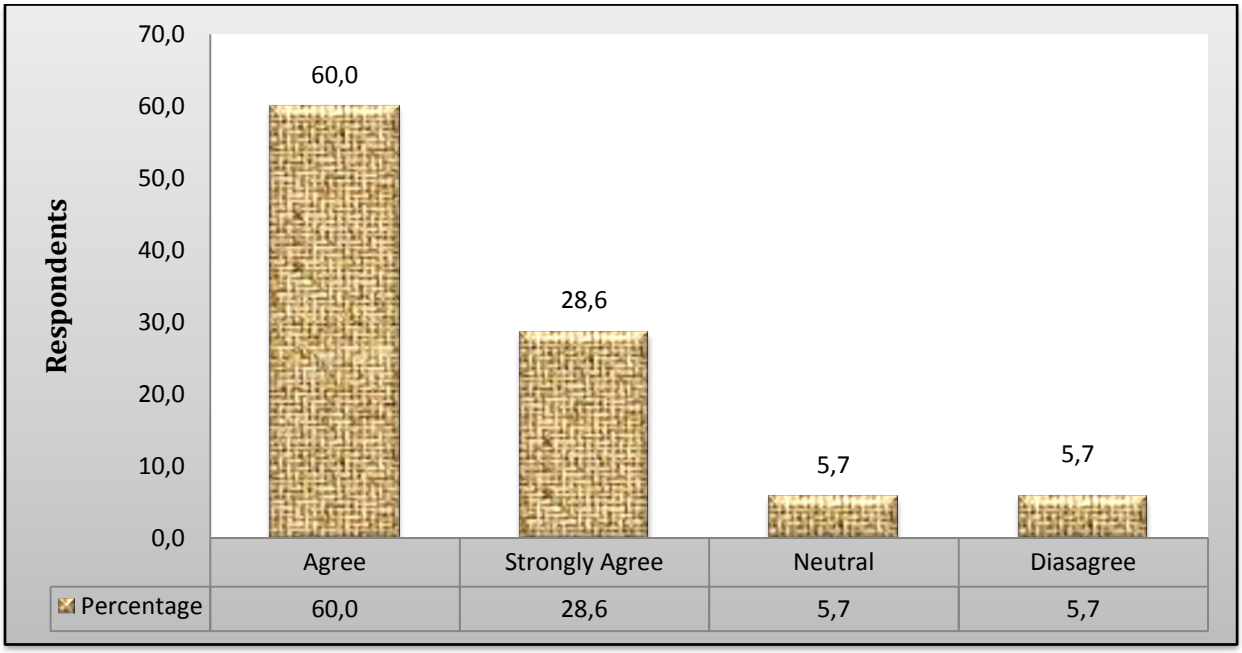
Response	Branch Network	ATM	SMS ALERT	MOBILE BANKING
Frequency	78	65	58	28
Percentage	100	83.3	74.4	35.9

Source: Own Survey, 2014

Mobile Banking which is a new electronic banking innovation introduced to the bank customers recently seems to be the least used electronic delivery channel by bank customers. But branch network is the widely accepted and highly delivery channel.

4.4.1 BRANCH NETWORK

Chart 4.4.1 Using Branch Network saves time and cost



Source: Own Survey, 2014

Some individuals or organizations may prefer to use the branch network instead of using other ICT related products offered by Commercial Bank of Ethiopia such as ATMs, Mobile Banking, Internet Banking or Point of Sale (POS) Terminals for various reasons. This is due to various reasons which are discussed under 'Challenges in Using ICT Related Products of CBE' that is Section 4.5.

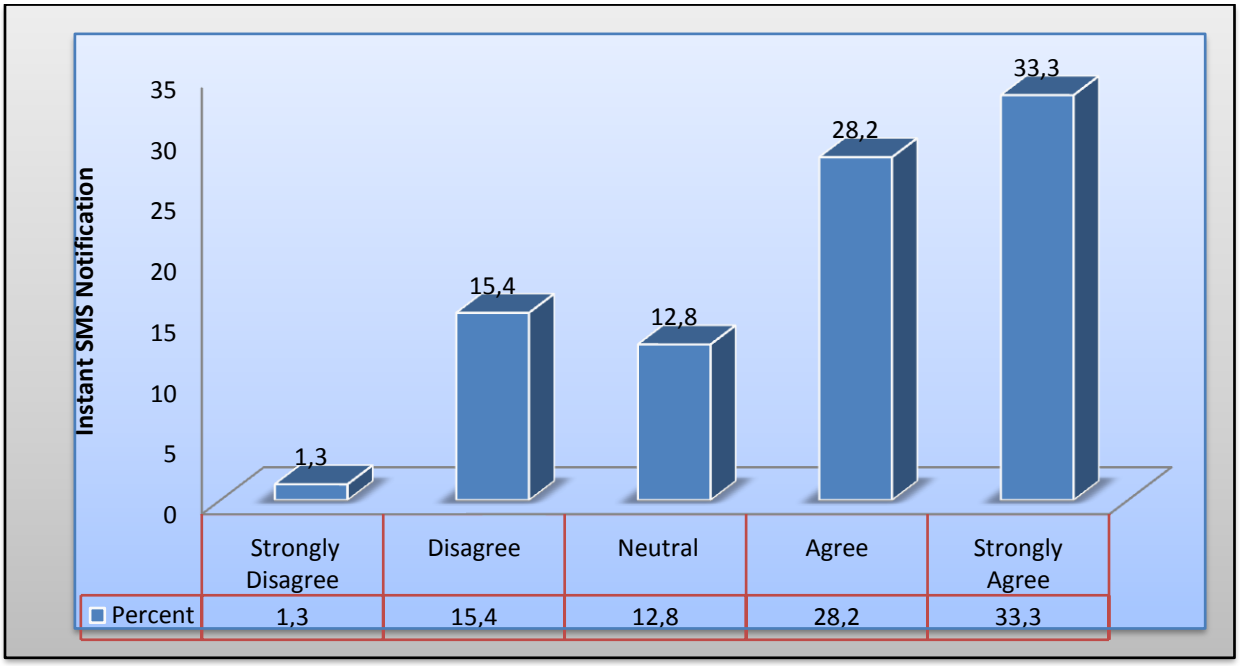
As the Chart above shows 60% of the respondent customers of the bank believe using branch network saves time and cost than that of ICT related products. And only 5.7% of the respondents

disagreed on it and say using branch network doesn't save time and cost but it is more costly to use it rather than using other products. Those who disagreed believe that the cost incurred for the service we get such as internet cost is lower compared to transportation cost and the time spent at the branch halls to get the service.

4.4.2 SMS ALERT

The SMS alert though a fairly new product by Commercial Bank of Ethiopia, majority of the respondents that accounts around 61.5% agreed that it give them instant notification of debit or credit on their accounts. This is indicated in the Chart below.

Chart 4.4.2 Instant Notification of Debit or Credit in My Account



Source: Own Survey, 2014

The above Chart depict that 33.3%, 28.2% of the respondents strongly agreed and agreed respectively that instant notifications of debit or credit are given to them on their account. But 15.4%, 1.3% disagreed and strongly disagreed respectively that the bank do not send them any instant notification of debit or credit on their account and 12.8% of them were neutral.

As one of the modern ICT related products of the bank, Instant Notifications on debits or credits of the banks customers account, it is better to address the whole account holders in the bank. This service may protect unauthorized debit or credit to the accounts of the account holder.

4.4.3 ACCESS TO ACCOUNT DETAILS THROUGH SMS

Table: 4.4.3 Access to account details through SMS

Level of Agreement		Frequency	Percent
Valid	Strongly Disagree	12	15.4
	Disagree	24	30.8
	Neutral	10	12.8
	Agree	16	20.5
	Strongly Agree	10	12.8
Total		78	100.0

Source: Own Survey, 2014

Normally this ICT related product of the bank, that is, 'Access to account details through SMS' is one of the **Mobile Banking Service** products. Hence, the response of the respondents shows whether they use Mobile Banking Service or not.

As the above table shows that majority of the respondents that is nearly 60% do not have access to their account detail through SMS service by the bank. This shows that from the total respondents only 33.3% have access to account details through SMS.

4.4.4 ATM REDUCES LONG QUEUES AT BRANCH HALLS

Currently Commercial Bank of Ethiopia installed a total of Four Hundred Fifty (450) ATMs, of these Fifty (50) have access for foreign currency exchange and 137 (One hundred thirty seven) Point of Sale Machines. In average every ATM transacts from One Hundred Thousand up to One Hundred Fifty Thousand (ETB 100,000.00 up to ETB 150,000.00) Ethiopian birr per day.

As shown on the Table 4.4 above ATM (Automatic Teller Machine**)** remains the most widely used ICT product after the branch network 83.3% of the respondents use ATMs in addition to branch network to get banking services offered by Commercial Bank of Ethiopia. The Chart below shows that more than 90% of the respondents agreed that ATMs reduce long queues at the branch. The customers of Commercial Bank of Ethiopia use Automatic Teller Machine for bank transactions such as making cash withdrawal, fund transfers, checking account balance and mini statements.

Table 4.4.4 Various Responses regarding ATMs

Question Item	Valid	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
ATM Reduces Long Queues at Branch Halls	Frequency	2	2	2	36	35	77
	Percentage	2.6	2.6	2.6	46.2	44.9	98.7
ATM Enhances Access at any Location	Frequency	2	4	6	36	29	77
	Percentage	2.6	5.1	7.7	46.2	37.2	98.7
ATM Enhances Access at any Time	Frequency	2	2	3	41	28	76
	Percentage	2.6	2.6	3.8	52.6	35.9	97.4

Source: Own Survey, 2014

The future plan of the bank is creating cashless society in the country. This may be achieved through increasing the number of customers of the bank that use ICT related products of the bank such as Automatic Teller Machines, Point of Sales (POS) machines, Mobile Banking Service, Internet Banking, etc.

As the number of customers using ATM machines for withdrawal of cash, Funds transfer, Checking account balance, and view mini account statement, it directly reduces the number of customers visiting the banks to get the above listed services by the bank. By this it reduces long queues in the bank. As shown in Table 4.4.4 above, 46.2% of the respondents agree and 44.9% of them strongly agree that introduction of ATM machines reduce long queues in the bank and only 2.6% disagree in this issue.

4.4.5 ATM GIVES ACCESS AT ANY LOCATION

Automatic Teller Machines (ATMs) give services listed above such as cash withdrawal and others. These services are given at any locations where the machines are installed by the bank. Table 4.4.4 shows that from the total respondents 46.2% agreed and 37.2% strongly agreed and also 5.1% of the respondents disagreed that ATM enhances ability to access accounts at any location.

4.4.6 ATM ENHANCES ACCESS AT ANY TIME

In recent years, banks have made their services increasingly convenient through *electronic banking*. Electronic banking uses computers to carry out transfers of money. For example, automated teller machines (ATMs) enable bank customers to withdraw money from their checking or savings accounts by inserting an ATM card and a private electronic code into an ATM. The ATMs enable bank customers to access their money 24 hours a day and seven days a week wherever ATMs are located, including in foreign countries.

Table 4.4.4 above shows that 52.6% of the respondents agreed and 35.9% of them strongly agreed that ATM enhances ability to access accounts at any time including weekends, holydays and out of working hour. Specially, in case of emergency if you need cash on hand you can withdraw up to authorized limit. This is one the advantage of using this product offered by the bank. As indicated in the following graph, only 2.6% of respondents disagreed and another 2.6% strongly disagreed that ATM enhances to access accounts at any time.

4.4.7 MOBILE BANKING REDUCES LONG QUEUES AT BRANCH HALLS

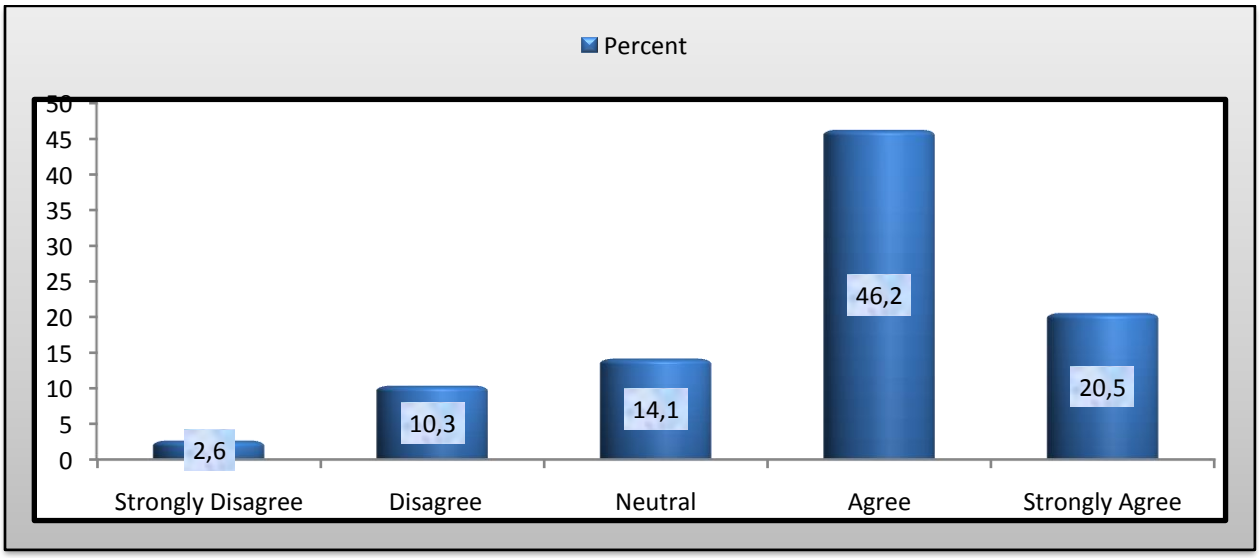
Mobile Banking service is recently introduced ICT related product by Commercial Bank of Ethiopia. And currently has more than Ten Thousand (10,000) mobile Banking service users. It has various features giving the customer different services such as Checking Account Balance, view Mini Account Statement, Account to Account Transfers, Local Money Transfer Service (LMTS) to online branches of CBE, ATM Locator, and other services are given by Mobile Banking.

If individual customers and organizations having account at any Commercial Bank of Ethiopia use Mobile Banking Service for above listed activities, it directly reduces the number of visits to the branches of CBE. Hence, it decreases longer queues at the branches.

As the chart below shows majority of the respondents that is 46% agreed and 21% strongly agreed that Mobile Banking service reduces long queues in banking halls. The rest 10% and 3% of the respondents disagree and strongly disagreed respectively.

Therefore, as the number of visits to branches of CBE decrease, longer queues in the banking halls automatically reduced.

Chart 4.4.7 Mobile Banking Service Reduce longer Queues in the branches



Source: Own Survey, 2014

Table 4.4.8 below reveals that 38.5% and 24.4% of the total respondents agreed and strongly agreed respectively that the use of Mobile Banking service reduces cost and time utilized to get non cash banking services especially LMTS, Account to Account Transfers and Account Balance. And 11.5% and 3.8% disagree and strongly disagreed respectively. This may be reflected in reduction of transportation costs to the banking halls and the time used to get the banking services as the customer of the bank is getting these services at his/her home.

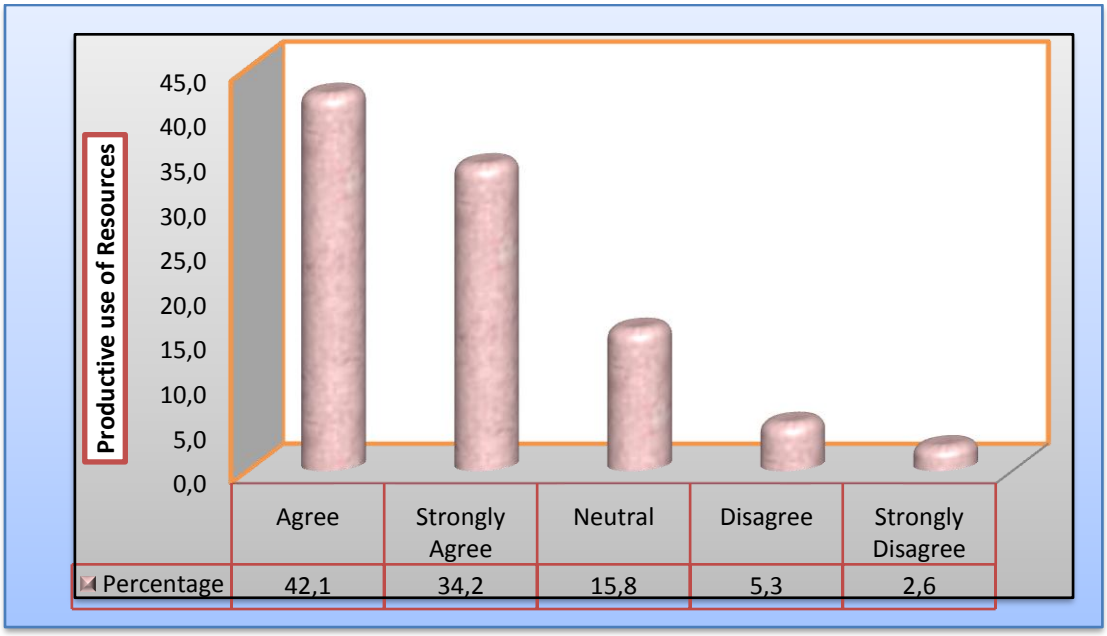
Table 4.4.8 Mobile Banking Reduces cost and time involved in Bank transactions

Level of Agreement		Frequency	Percent	Valid Percent
Valid	Strongly Disagree	3	3.8	4.1
	Disagree	9	11.5	12.3
	Neutral	12	15.4	16.4
	Agree	30	38.5	41.1
	Strongly Agree	19	24.4	26.0
	Total	73	93.6	100.0

Source: Own Survey, 2014

4.4.9 IMPACTS OF ICT ON EFFICIENCY

Chart 4.4.9 Newly Adopted ICT products of CBE are useful in productive use of resources.



Source: Own Survey, 2014

This question was asked to the employees of CBE and 42.1% agreed and 34.2% of the respondent employees of Commercial bank of Ethiopia strongly agreed that newly adopted products of the bank are useful in productive use of resources. This shows that more than 76% of the respondents believe that the ICT related Products that were introduced to the bank for various purpose leads the bank to efficient use of its resources.

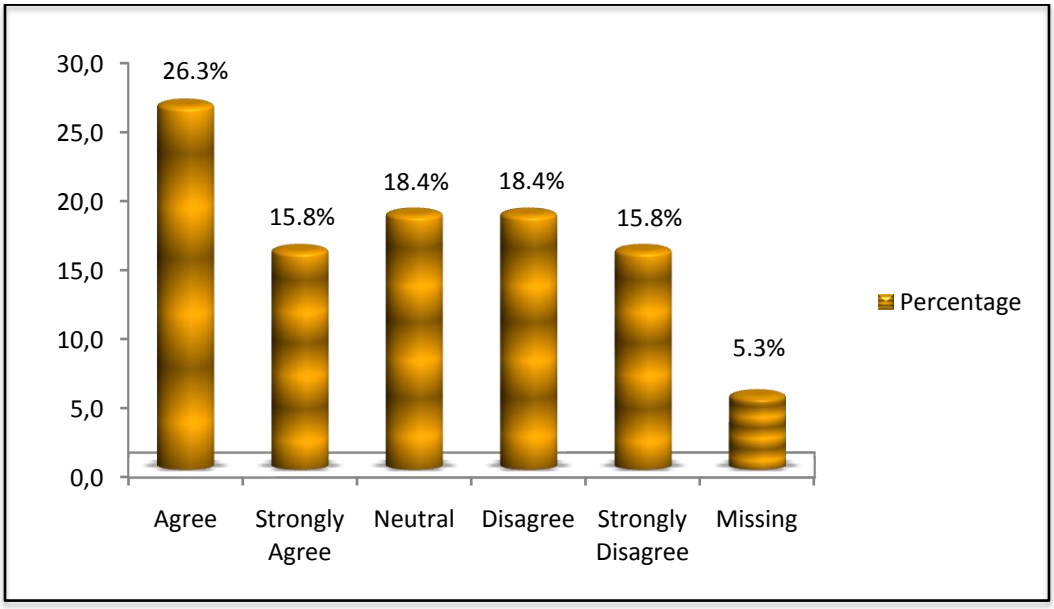
The remaining 7.9% of the respondents have a view of that these newly adopted ICT related products of the bank have nothing on the efficient use of resources of the bank.

4.4.10 INTRODUCTION OF ICT INCREASED THE NUMBER OF TRANSACTIONS

Efficiency of any performer is dependent on the resource used to perform the activity. If backward technology is used the time required to perform a given task is longer. And if modern ICT products are utilized shorter period of time is required to finish the task. Hence, currently Commercial Bank of Ethiopia is using latest banking technologies that facilitate services delivered to the customers. These ICT related products of the bank has direct impact on the performance of the performers in different ways like, reducing service delivery time, reducing errors that may be made in a manual operation, efficient use of resources and others.

As the time required to a given service delivery decreased, the number of customers served by a single server increased. By this number of transactions of the performer increased.

Chart 4.4.10 The use of modern ICT products increases number of transactions



Source: Own Survey, 2014

The above chart shows that 26.3% of the respondent employees of the bank agreed and 15.8% of them strongly agreed that newly adopted ICT related products of the bank has a great impact on the number of transactions of every performer. And around 34% of the respondents disagreed on this. That is, they believe that the latest banking technologies adopted by CBE has no impact on the number of customers served by a single server or performer.

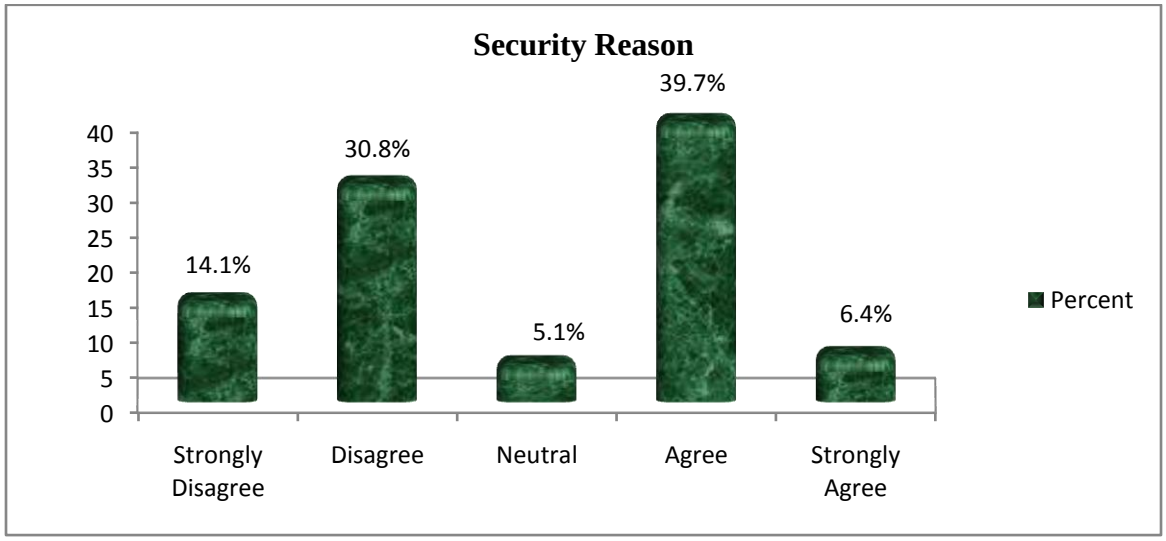
4.5 CHALLENGES IN USING ICT RELATED PRODUCTS OF COMMERCIAL BANK OF ETHIOPIA

4.5.1 SECURITY REASON

Security has been widely recognized as one of the main obstacles to the adoption of ICT related banking services such as ATMs, Mobile Banking, Internet Banking, Point of Sales Machines, etc that are provided by the bank. Many studies suggest that banks must first convince their customers that e-banking and transactions are secure before customers will show a willingness to use the service. Consequently the adoption of e-banking is likely to increase when the risk of using it is low.

Security is a major concern wherever online transactions take place. Internet-based service providers must implement access control, authentication procedures, encryption, firewalls, audit trails and virus protection to secure their online services.

Chart 4.5.1 Fear of using ICT related products due to Security Reason



Source: Own Survey, 2014

The above chart shows that 39.7% of the respondents agree and 6.4% of them strongly agreed that due to fear of security reasons they don't want to use ICT related products of the bank especially Mobile Banking Service. Whereas 30.8% of the respondents disagreed and 14.1% of them strongly disagreed that they fear to use ICT related products due to security reasons.

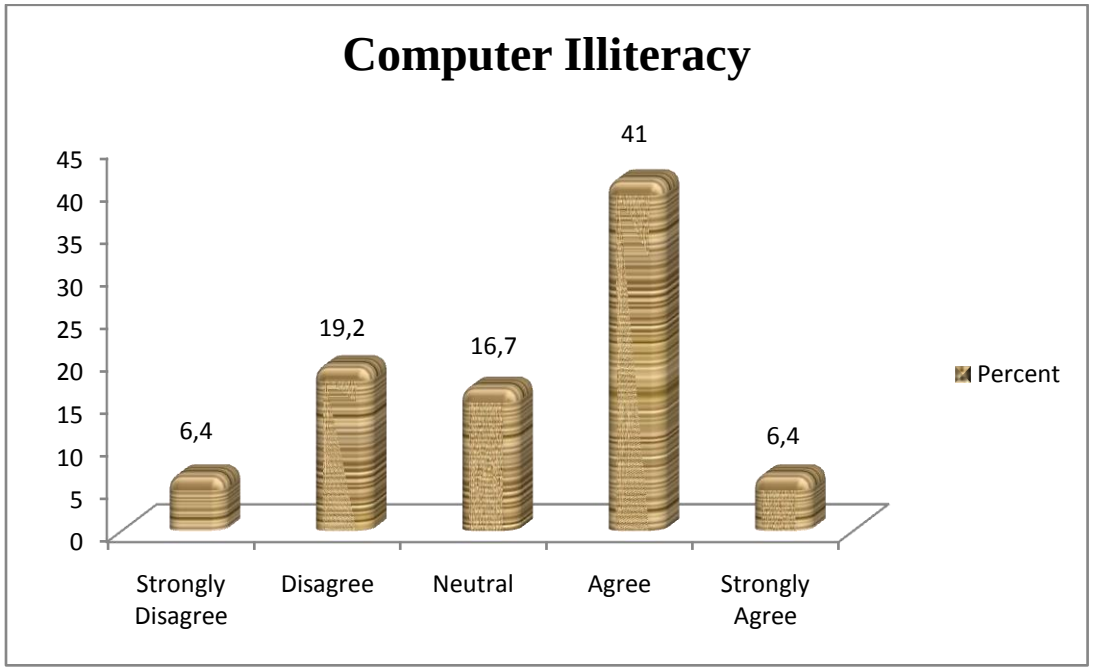
In the previous section Table 4.4 shows that only 35.9% of the respondents are using Mobile Banking Service. This result shows more than 64% of the total respondents are not using Mobile Banking Service offered by CBE due to fear of security reason. Most of respondents who are in this category use Branch Network only. But some use ATM in addition to Branch Networks.

4.5.2 COMPUTER ILLITERACY

The chart below shows that almost 50% of the respondents agree on computer illiteracy is one of the challenges of the bank that limits the increase in customers using ICT related products of the bank. For example Internet Banking and Mobile Banking services needs knowhow to operate the computer or mobile, since the account holders with access code to Internet Banking and Mobile Banking services are expected to operate by themselves.

19.2% disagreed and 6.4% strongly disagreed that computer illiteracy is one of the challenge to access accounts using Mobile Banking or Internet Banking services. And the rest 16.7% of respondents have neutral view on this issue.

Chart 4.5.2 Computer Illiteracy is one of the challenges



Source: Own Survey, 2014

4.5.3 POOR INFRASTRUCTURE

In the rural parts of Ethiopia there is poor or lack of infrastructure. Since majority of Ethiopian population is living in the rural parts of the country, it is difficult to distribute ICT related products of the bank such as Mobile Banking, Internet Banking and others due to lack of technological infrastructures needed to provide this service such as internet service.

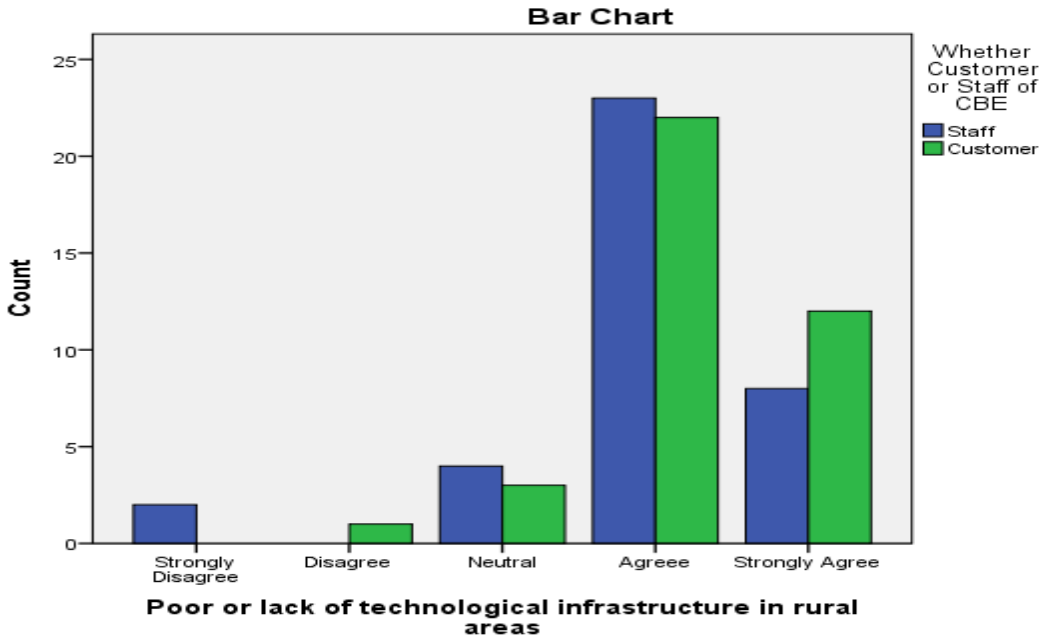
The following chart shows that majority of the respondents i.e. 57.7% agreed and 25.6% of them strongly agreed that there is poor or lack of technological infrastructure in rural areas that are needed to distribute ICT related products of Commercial Bank of Ethiopia. Only 3.9% of the respondents believe that poor or absence of technological infrastructure is not a challenge for the bank to distribute its modern banking technology products.

Table 4.5.3 Poor Infrastructure

Level of Agreement	Percent(Valid)	Frequency
Strongly Disagree	2.6	2
Disagree	1.3	1
Neutral	9	7
Agree	57.7	45
Strongly Agree	25.6	20
Total	96.2	75

Source: Own Survey, 2014

Chart 4.5.3 Poor Infrastructure



Source: Own Survey, 2014

Chart 4.5.3 shows that both staffs and CBE's customers have a common understanding/side regarding poor or lack of technological infrastructure. Both categories agree, strongly agree and also have neutral suggestions almost equally. So we can say that there is no understanding gap. Or both staffs and customers of Commercial Bank of Ethiopia the same view on this issue.

4.5.4 Frequent Network Communication Error

As shown in the above Table, Table 4.5.4, more than 51.3% of the respondents agreed on facing frequent network communication error. 11.8% & 3.9% disagreed and strongly disagreed on facing frequent network communication error.

Chart 4.5.4 I am facing frequent Network communication error

Level of Agreement		Frequency	Valid Percent
Valid	Strongly Disagree	3	3.9
	Disagree	9	11.8
	Neutral	15	19.7
	Agree	39	51.3
	Strongly Agree	10	13.2
	Total	76	100.0

Source: Survey 2014

Previously Commercial Bank of Ethiopia was using Branch Power Banking System but currently it uses Smart Banking System and Temenos (T24) banking system. The Smart Banking System is used for offline branches of the bank especially branches located in some rural areas and the later i.e. Temenos (T24) banking service is used for online branches. Majority of the banks' branches are online but all the branches face connection error. Since Temenos Software is dependent on telecommunication network, online branches can't serve their customers during telecommunication network interruption.

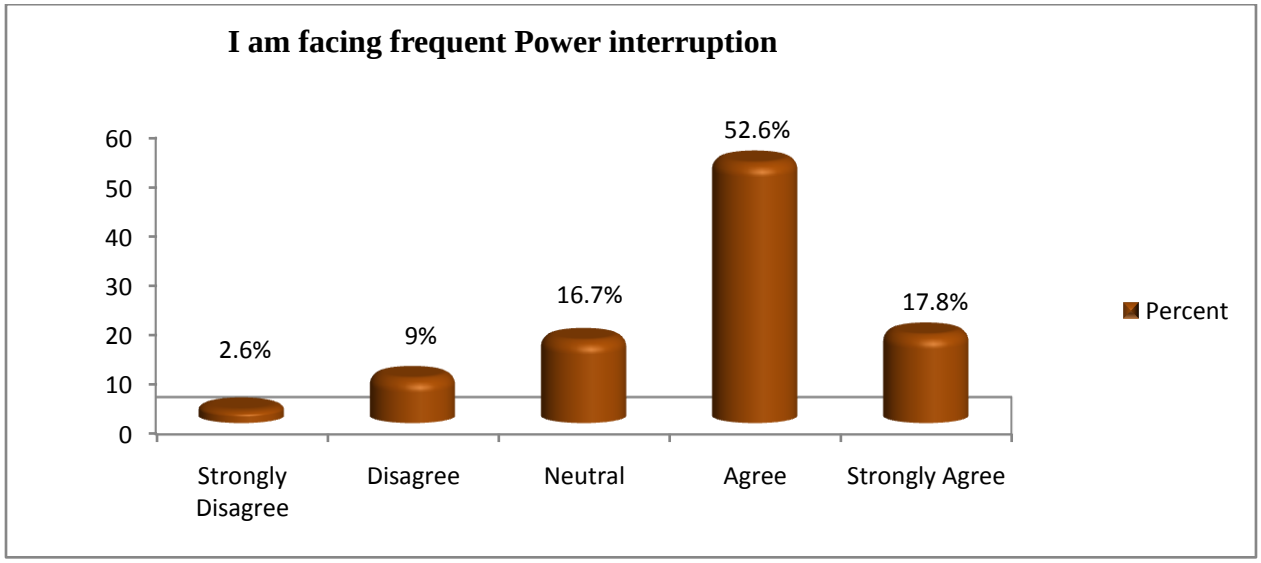
This problem is a bottleneck for the bank because it limits its potential on serving its customers at the time of necessity.

4.5.5 Frequent Power Interruption

The other major challenge for Commercial Bank of Ethiopia is frequent power interruption. This is not only for CBE but also for every business in the country it becomes the major challenge. Even if Ethiopia has a plenty of rivers and hydro power sources, there is a problem in distribution of electric power.

The following chart shows that 52.6% of respondents agreed and 17.9% strongly agreed that there is frequent power interruption and 9% disagreed that they are facing frequent power interruption. This shows majority of the respondents face a great challenge in getting banking services due to frequent power interruptions.

Chart 4.5.5 I am facing frequent Power interruption



Source: Own Survey, 2014

4.5.6 Most of the Time ATMs are out of Service

Any customer of the bank, having ATM or Visa Card, wants to get various services that are delivered through ATMs. But due to various reasons ATMs are out of service. As per some key personals of the bank, most of the time ATMs are out of service due to frequent telecommunication network interruption and in some cases the machines may be out of service due to technical problems on them.

The following table shows that 52.6% agreed and 15.8% strongly agreed that most of ATMs are out of service and 11.8% disagreed on this issue i.e. those individuals who disagreed (11.8% of the respondents) and those who strongly disagreed (1.3% of the respondents) doesn't face a problem at the time of visiting the ATMs to get service.

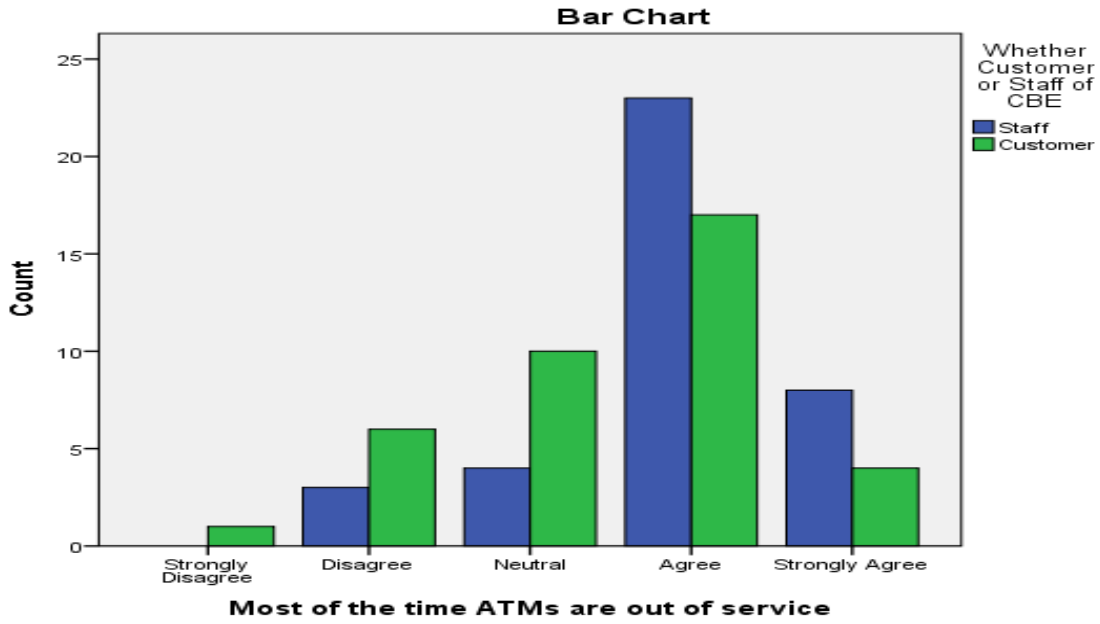
Table 4.5.6 Most of the time ATMs are out of service

Level of Agreement		Frequency	Valid Percent
Valid	Strongly Disagree	1	1.3
	Disagree	9	11.8
	Neutral	14	18.4
	Agree	40	52.6
	Strongly Agree	12	15.8
	Total	76	100.0

Source: Own Survey, 2014

The following graph shows that there is no a significant gap between the staff and the customers of Commercial Bank of Ethiopia regarding this question. More or less both categories of the respondents, that is, staffs and customers of CBE agree that most of the time ATMs are out of service.

Chart 4.5.6 Most of the time ATMs are out of service



Source: Own Survey, 2014

4.5.7 SHORTAGE OF MONEY ON ATM AT PEAK HOUR

Sometimes some of the ATMs may not be out of service as discussed above but shortage of cash. In such circumstances the ATMs give you all the services you need to transact using ATM except Cash Withdrawal. Even the ATM is facing shortage of cash you can transfer funds from your account to another, check your Account Balance, View Mini Statement and other. The problem here is you may not get cash at peak hour or weekends.

The next table shows that 43.6% of the respondents faced shortage of cash on the ATMs and 10.3% of the respondents strongly agreed that they face shortage of money on the ATMs when they at peak hours or it may be out of working hours of the bank. And 15.3% of the respondents don't face shortage of money on the ATMs at peak hours.

Table 4.5.7 I am facing shortage of money in ATMs during peak hours or weekends

Level of Agreement		Frequency	Percent
Valid	Strongly Disagree	3	3.8
	Disagree	9	11.5
	Neutral	22	28.2
	Agree	34	43.6
	Strongly Agree	8	10.3
Total		78	100.0

Source: Own Survey, 2014

4.5.8 PROBLEMS IN ACCESSING FUNDS AT ANOTHER BRANCH

The following table shows that frequency and percentages of respondents that face or not problems in accessing their accounts in another branch i.e. when they open an account in one branch and getting service in another branches of Commercial Bank of Ethiopia.

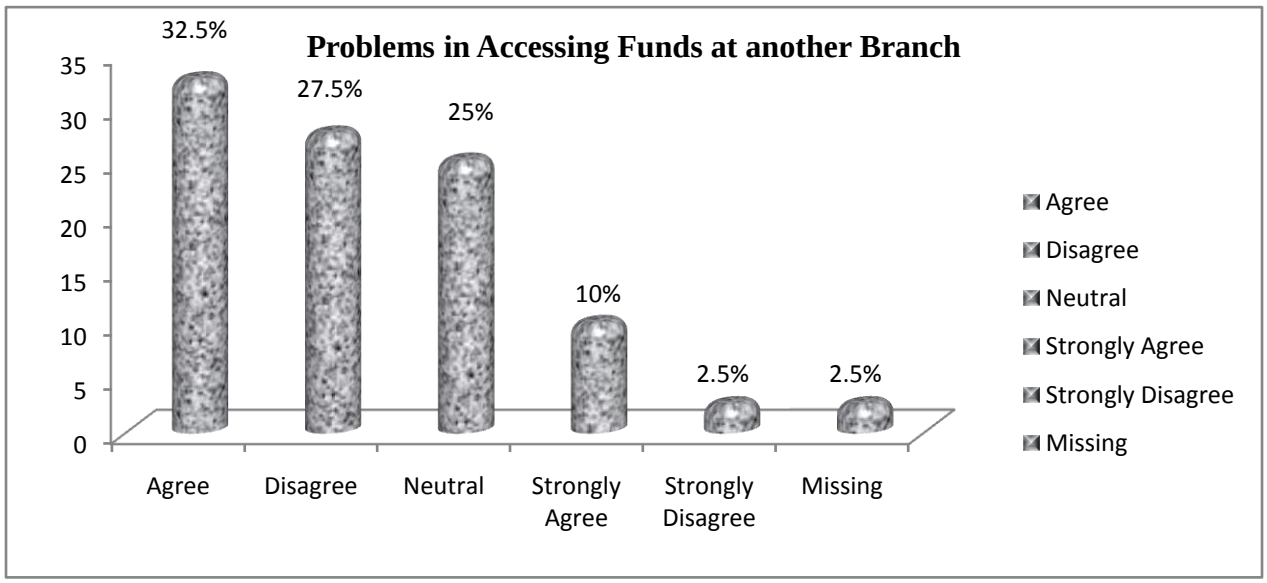
Table 4.5.8 I faced problems in accessing funds in another branch

Level of Agreement	Frequency	Percentage
Agree	13	32.5
Disagree	11	27.5
Neutral	10	25
Strongly Agree	4	10
Strongly Disagree	1	2.5
Total	**40**	**100**

Source: Own Survey, 2014

A problem in accessing funds at another branch is due to various reasons which may be account holders problem or of the banks problem. When **saving** and **current accounts** doesn't have any transaction for contentious period of **one year and six months** respectively, the account becomes dormant and inactive. In such case the account holder gets service only from the branch where the account is opened. Hence we can categorize as the fault of the account holder. In some circumstances there may be a problem in uploading signatures of the account signatories. This becomes the problem of the bank and it limits the account holder from accessing its account in another branch of the bank.

Chart 4.5.8 **Problems in Accessing Funds at another Branch**



Source: Own Survey, 2014

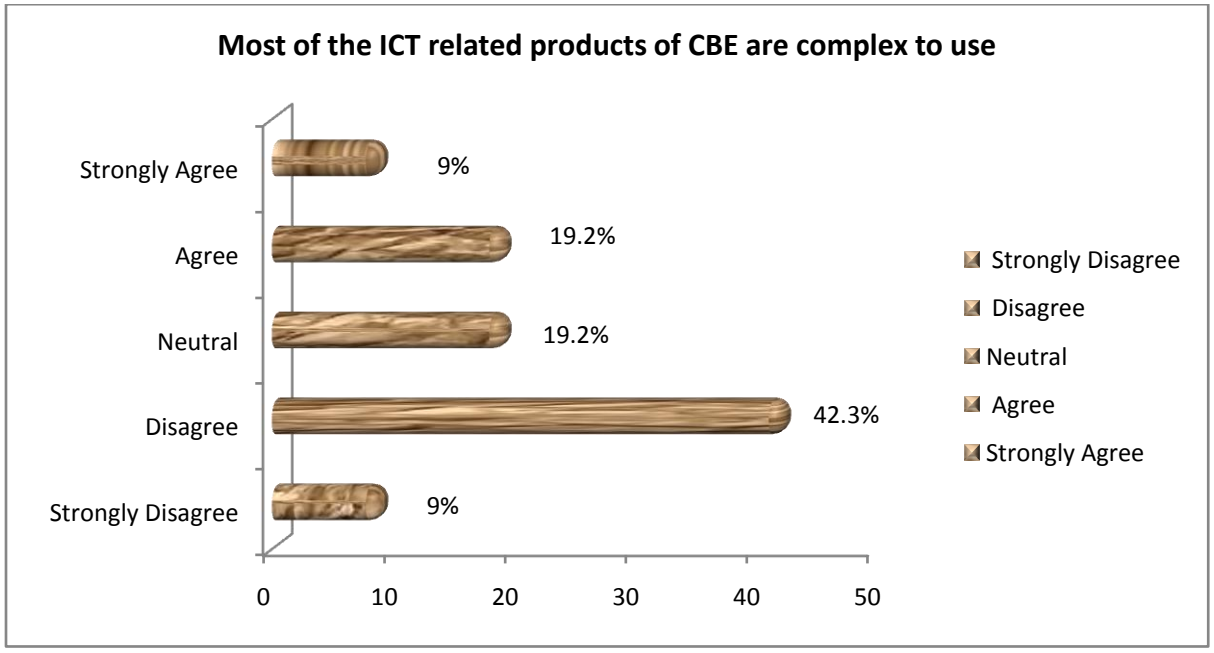
As shown in the above chart around 42.5% of the respondents face problem of accessing funds or their account at another branch of the bank. And around 30% 0f the respondents freely access funds or their own account at another branch of the bank.

4.5.9 ICT RELATED PRODUCTS ARE COMPLEX TO USE

The following chart shows that more than 51% of the respondents believe that most of the ICT related products of Commercial Bank of Ethiopia are not complex to use. That is most of the products of the bank are simple to use. The other 28.2% of the respondents agreed that ICT related products of the bank are complex to use.

From this point we can conclude that those who face problems in accessing ICT related products of CBE due to complex features of the products have knowledge gap in how to use the products. If the bank doesn't introduced the product feature and how to use it when the account holder receives the access codes for Mobile Banking service or Internet banking and ATM card, the customer fails to use the products properly and it becomes complex to use it.

Chart 4.5.9 Most of the ICT related products of CBE are complex to use



Source: Own Survey, 2014

4.6 SERVICE QUALITY AND CUSTOMER SATISFACTION

4.6.1 QUICK AND TIMELY SERVICE

Introduction of modern banking technology to Commercial bank of Ethiopia brought various advantages to the bank. One of the major value of any service giving company or institution that is used to retain existing potential customers of the bank pulling factor for new customers is quick and timely service.

Table 4.6.1 Quick and timely service delivery due to the use of modern banking technology

Question Item	Valid	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Quick and Timely Service	Frequency	1	5	2	17	14	39
	Percentage	2.5	12.5	5.0	42.5	35.0	97.5
Products Meet My needs	Frequency	0	3	5	21	8	37
	Percentage	0	7.9	13.2	55.3	21.1	97.4

Source: Own Survey, 2014

From the total respondents 77.5% of them agreed that they get quick and timely service delivery due to the use of modern banking technology by the bank. But 12.5.3% of the respondents disagreed because they don't get quick and timely service. Before two and three years ago the bank was using back ward technologies for its banking service delivery.

For example, manual type writer to prepare CPOs and Draft checks which takes longer period of time leading to longer queues at the banking halls and increasing customer complaints. But today it is using automated systems to give similar services to its customers with possibly shorter period of time and reduces some of the errors that may be occur in manual preparation CPOs and Drafts.

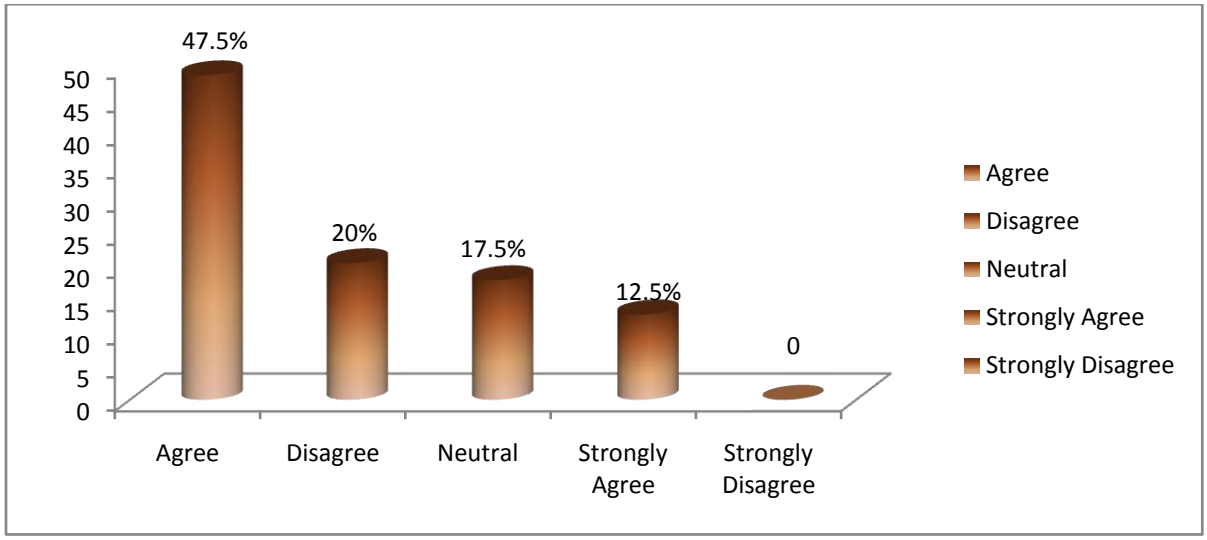
4.6.2 PRODUCTS MEET CUSTOMERS' NEEDS

Table 4.6.1 above shows that 55.3% of the respondent customers of CBE are satisfied with the ICT related products offered by the bank. And 21.1% of them strongly agreed that the products offered by CBE are well adopted to meet their needs in getting banking services. The rest 7.9% of the respondents are not satisfied with the ICT related products of the bank and they believe these products are not well adopted to meet the customer's needs in getting the banking service.

4.6.3 PRODUCTS ARE EASILY ACCESSIBLE

This question was used by the researcher as a **TEST QUESTION**. This question was asked under the sub title '***CHALLENGES IN USING ICT RELATED PRODUCTS OF CBE' Section 4.5.9*** in another form by saying '*MOST OF ICT RELATED PRODUCTS OFFERED BY CBE ARE COMPLEX TO USE*'. Respondent customers of the bank that believe ICT related products of the bank are nor complex were around 42.3% and those respondents that agreed on Complex features of the CBE's products were 19.2%. Here also those respondents who agreed that the ICT related products of CBE are easily accessible accounts for 47.5% and those who disagree are 20% of the respondents.

Chart 4.6.3 Products are easily accessible



Source: Own Survey, 2014

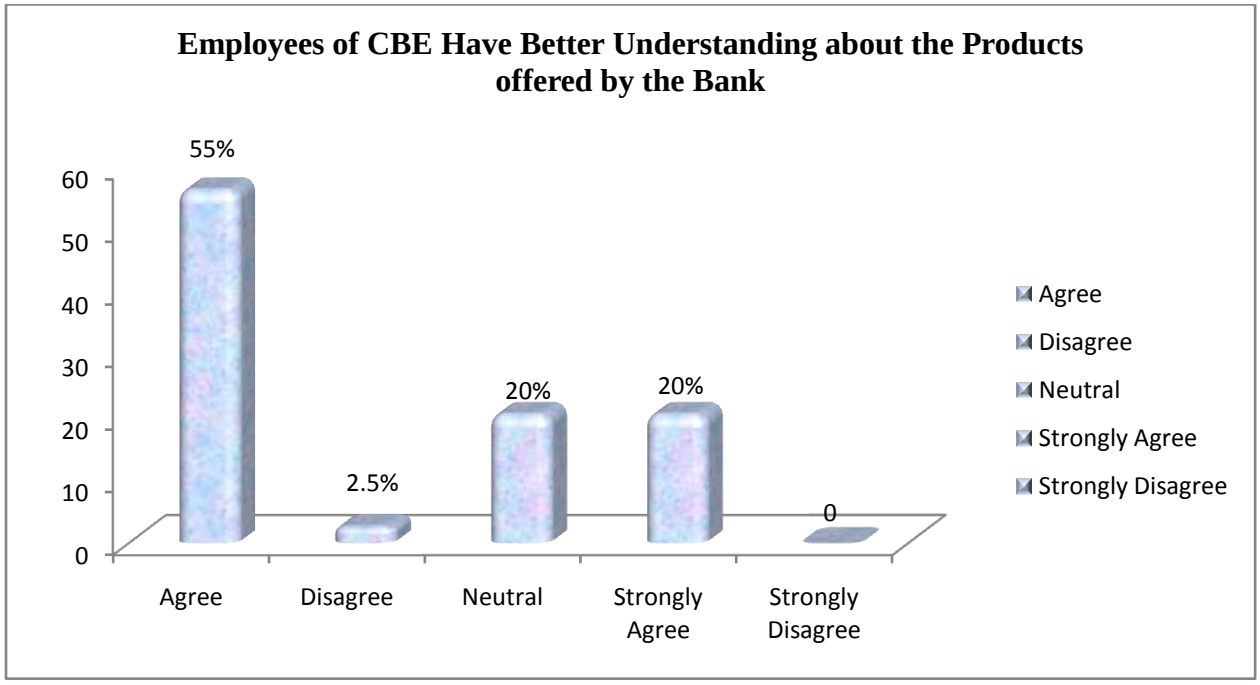
Therefore, I can say that the respondent customers of Commercial Bank of Ethiopia understood the questions well and answered honestly.

4.6.4 EMPLOYEES OF CBE HAVE BETTER UNDERSTANDING ABOUT THE PRODUCTS

Any service provider company or individual should have a better understanding of the service he is giving or a product offering to his customers and should have better knowledge of the service or product on how to manage it than its customers. Otherwise the service provider is at risk.

As the following chart shows 75% of the respondents agreed that the employees of Commercial Bank of Ethiopia have better understanding about the Products offered by the bank. And only 2.5% of them believe that employees of CBE have not better understanding about the products offered by the bank

Chart 4.6.4 Employees of CBE Have Better Understanding about the Products offered by the Bank



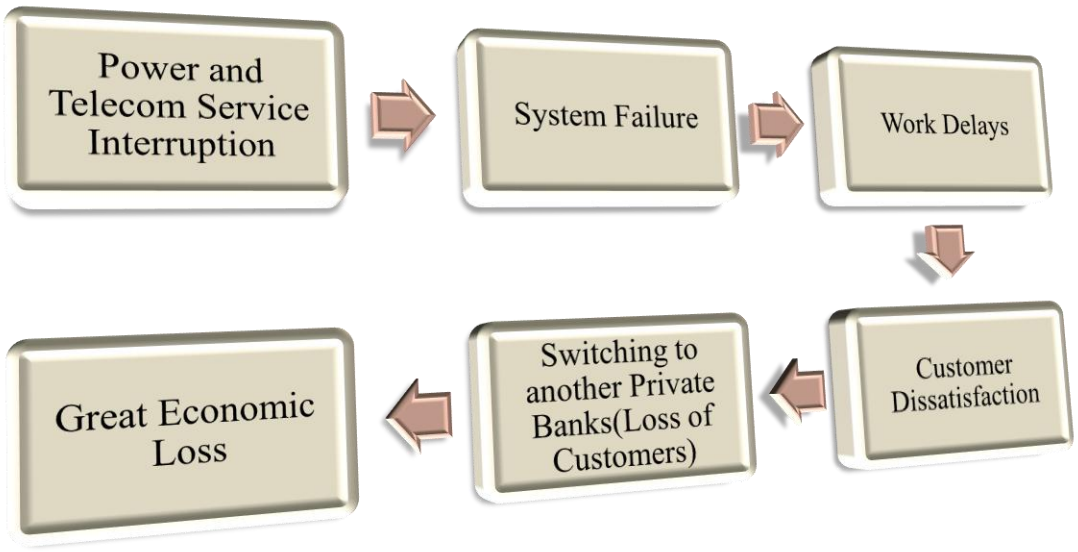
Source: Own Survey, 2014

4.7 The Effects of Interruption in Power and Telecommunication Services

Economic loss that CBE suffers as a result of interruption in telecommunication service can be seen in a different way. Today most of our ICT related products are dependent on power and telecommunication services. Without power no technological device is accessible or functional. And without network connection the system used by Commercial Bank of Ethiopia is not functional. Except that of Smart Banking Systems, which is used for offline branches of the bank, the other systems especially Temenos (T24) banking software is dependent on the telecommunication service provided by Ethio-Telecom. So in case of power or telecommunication service interruption the service delivery process also interrupted.

Frequent power interruption leads the bank to unnecessary cost such as purchase of a power generator for its branches and fuel cost to the generators.

Fig. 4.7 Effects of Interruption in Power and Telecom Services



Source: Own Survey, 2014

As shown in the figure above economic by the bank is a process. To sustain existing potential customers of the bank there should be a quality, quick and timely service delivery is a necessary condition for any service giving institution. When there is power or telecommunication service Interruption the system fails and leads to dalliance of work. This in turn leads to customer dissatisfaction. If a customer is dissatisfied with the service given by any institution he/she directly switch to another institution, in our case to another private banks to get the service. By this way Commercial bank of Ethiopia may lose its potential customers. And this directly leads the bank to a great economic loss. Because it is simple to guess the destination of any financial institution or service giving organization without a customer, that is failure and loss. But exception may exist that existing loyal customers of the bank may stay given this problems.

Another great point is that the frequent service interruption due to power and telecom service interruption may affect the images of the bank on the public which is the greatest failure of all.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter consists of summary of main findings and conclusion of the study and makes appropriate recommendations to Commercial Bank of Ethiopia regarding modern ICT related products offered by the bank.

5.1 SUMMARY OF FINDINGS

The main purpose of this study was to assess the impact of ICT on Ethiopian banking service efficiency the case of Commercial Bank of Ethiopia. Based on objective analysis of the results, the following are the main findings of the study.

- Majority of account holder customers of CBE receive instant SMS Alert or notification of debit or credit in their account.
- Using ATM, Mobile Banking Service and Internet Banking reduces long queues at branch halls. Because customers get various services at their home, especially using Mobile Banking and Internet Banking, or nearby ATMs.
- The newly adopted ICT related products of CBE like POS terminals, ATMs, Internet Banking Service, Mobile Banking etc…are useful in productive use of resources, such as time, cost and others.
- Efficiency of the performers or Customer Service Officers (CSOs) increased as modern technologies were introduced to the bank for transactions. Due to this, the time required to serve a single customer was reduced.
- Large number of customers afraid of using modern ICT related products due to security reasons that may face and others due to Computer illiteracy.
- One of the major challenges for modern banking technology that CBE faced is poor infrastructure available in the country, especially in the rural parts.
- Frequent power and telecommunication service interruption has a great negative impact on customer satisfaction and this leads the bank to huge economic loss.

5.2 CONCLUSIONS

In conclusion, Commercial Bank of Ethiopia introduced various ICT related products such as ATM, Mobile Banking Service, Internet Banking Service, SMS Alert, and others. By increasing the efficiency of the performers the time required to deliver a given service was reduced

significantly. Therefore, from this we can conclude that the newly introduced Modern ICT related products offered by Commercial Bank of Ethiopia have a great positive impact on service or process efficiency of the bank, customer satisfaction, and then sustainability and profitability of the bank.

The ICT related products introduced by Commercial Bank of Ethiopia are not challenge free. One of the major challenges that CBE faced is Security Reason. Due to this problem the newly introduced products especially Mobile Banking Service and Internet Banking have minimum number of users. The other limiting factors are poor infrastructure available in the country, computer illiteracy, frequent power and network communication error.

Frequent power and telecommunication service interruption leads system failure that directly leads to customer dissatisfaction. As dissatisfaction of customers increase the number of customers switching to another private bank also increases. Then due to the loss of potential customers Commercial Bank of Ethiopia faces great economic loss.

5.3 RECOMMENDATIONS

Drawing from the conclusions of this study the following recommendations/suggestions can be made:-

- To prevent potential and existing customer switching, the management of Commercial Bank of Ethiopia need to ensure that their banking service quality meets and exceeds customers' expectation, which has the ability to increase the cost of switching to another private commercial banks.
- Regarding ICT based products offered by CBE,
    - Every account holder customer of the bank should receive instant notification of debit or credit of their account. Because the customer should be informed about every transaction on his/her account.
    - If the efficiency of the performers of the bank increases as the ICT related products utilized increased, CBE has to invest more and more on modern banking technologies such as Mobile Banking, Internet Banking, etc… Because increase in efficiency of the performers has a great impact on the satisfaction of customers then it will be easy to retain them.

- All of the ICT related products of the needs telecommunication network. Hence, government of Ethiopia has to work hard to minimize the problems of poor infrastructure for modern technologies not only in Addis Ababa but also in rural areas of the country.
- Most of the time ATMs are out of service. This may be due to absence of contentious follow-up or network problem. Currently Commercial Bank of Ethiopia has no IT Experts at branch level, but at center. Sometimes due to minor problems the branch work may be delayed. To minimize this problem there should be at least one trained person on ICT or IT expert.
- CBE installed ATMs at different locations to deliver necessary service for its account holder customers. But at peak hours or weekends there is shortage of money on ATMs. So every branch should arrange sufficient money for weekends and peak hours.
- Banks must first convince their customers that e-banking and transactions are secure before customers will show a willingness to use the service. Consequently the adoption of e-banking is likely to increase when the risk of using it is low. Vast awareness creation program also has to be arranged to minimize complexities in e-banking.
- To satisfy the customers' need every branch of the bank should have its own generator to minimize the problems related to frequent power interruption.

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APPENDICES

APPENDIX A

Research Questionnaire (For CBE Staffs ONLY)

Dear Respondent,

This questionnaire is designed to study '**The Impact of Information Technology on Ethiopian Banking Service the case of Commercial Bank of Ethiopia**' as a requirement for the partial fulfillment for the award of Master's of Business Administration at St. Mary's University.
Information received form you would be used for academic purposes and treated with confidentiality. I will be very happy if you give your precious time to answer the questions. *Please be assured that the responses you give are for academic purposes only.*

THANK YOU FOR YOUR ASSISTANCE.

Instructions: Please provide appropriate answer(s) or tick (√) in the box provided where necessary

1. DEMOGRAPHIC FACTORS

1.1 Your gender: Male Female

1.2 What is your age category? ☐ Below 25 yrs ☐ 25 – 35 yrs ☐ 36 – 45yrs

☐ 46- 55yrs ☐ 56 and above

1.3 Your marital status: ☐ Married ☐ Single ☐ Divorced ☐ Widowed

1.4 Your education level: ☐ No formal education ☐ Primary ☐ Secondary education

☐ Diploma ☐ Bachelor Degree ☐ Masters Degree or above

1.5 What is your average monthly income? ☐ Less than Br 2,000 ☐ Br 2,001-5,000

☐ Br 5,001-10,000 ☐ Greater Than Br 10,000.

2. IMPACT OF ICT BASED PRODUCTS ON PROCESS EFFICIENCY

2.1 Which of the ICT products do you use? ☐ ATM ☐ SMS Alert ☐ Mobile Banking ☐ Branch Network ☐ Internet Banking

Please read each statement and put a tick mark in a box which best represents your level of agreement or disagreement with a particular statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SMS ALERT					
I receive instant notification of debit or credit on my account					
I have access to account details through SMS					
Automatic Teller Machine(ATM)					
Reduce time involved in bank transactions					
Reduces long queues in banking halls					
Enhances ability to access accounts at any location					
Enhances ability to access accounts at any time (Weekends and out of working hour)					
Mobile Banking					
Decreases the number of visits of customers to branches of CBE					
Reduces long queues in banking halls					
Reduce cost and time involved in bank transactions					
Efficiency					
Newly adopted ICT products of CBE are useful in productive use of resources.					
Introduction of ICT products Increased the number of transactions of the performers					
Quick and timely service delivery due to the use of modern banking technology.					

3. CHALLENGES IN USING ICT PRODUCTS OF COMMERCIAL BANK OF ETHIOPIA

Please read each statement and put a tick mark in a box which best represents your level of agreement or disagreement with a particular statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PROBLEMS IN USING VARIOUS PRODUCTS OF THE BANK					
Majority of customers shy away from ICT related banking services due to security reasons					
Majority of customers are ignorant about ICT use especially online services					
Computer illiteracy is high					
Poor or lack of technological infrastructure in rural areas					
I am facing frequent Network communication error					
I am facing frequent Power interruption					
Most of the time ATMs are out of service					
I am facing shortage of money in ATMs during peak hours or weekends					
Most of the ICT related products of CBE are complex to use					

4. In what way do you think that **frequent Power and Telecommunication network interruption** lead Commercial Bank Ethiopia to face economic loss?
……
……
……
……
……
…… .

5. What type of solutions do you suggest for **frequent Power and Telecommunication networkinterruption?**……
……
……
……
……
……
……. ……

Thank you for taking time to complete this questionnaire!

APPENDIX B

Research Questionnaire (For CBE Customers Only)

Dear Respondent,

This questionnaire is designed to study '**The Impact of Information Technology on Ethiopian Banking Service the case of Commercial Bank of Ethiopia**' as a requirement for the partial fulfillment for the award of Master's of Business Administration at St. Mary's University.
Information received form you would be used for academic purposes and treated with confidentiality. I will be very happy if you give your precious time to answer the questions. *Please be assured that the responses you give are for academic purposes only.*

THANK YOU FOR YOUR ASSISTANCE.

Instructions: Please provide appropriate answer(s) or tick (√) in the box provided where necessary

1. **DEMOGRAPHIC FACTORS**

1.1 Your gender: ☐ Male ☐ Female

1.2 What is your age category? ☐ Below 25 yrs ☐ 25 – 35 yrs ☐ 36 – 45yrs

☐ 46- 55yrs ☐ 56 and above

1.3 Your marital status: ☐ Married ☐ Single ☐ Divorced ☐ Widowed

1.4 Your education level: ☐ No formal education ☐ Primary education

☐ Secondary education ☐ Diploma ☐ Bachelor Degree

☐ Masters Degree or above

1.5 What is your average monthly income? ☐ Less than Br 2,000 ☐ Br 2,001-5,000

☐ Br 5,001-10,000 ☐ Greater Than Br 10,000.

2. IMPACT OF ICT BASED PRODUCTS ON PROCESS EFFICIENCY

2.1 Which of the ICT products do you use? ☐ ATM ☐ SMS Alert ☐ Mobile Banking ☐ Branch Network ☐ Internet Banking

Please read each statement and put a tick mark in a box which best represents your level of agreement or disagreement with a particular statement.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
BRANCH NETWORK					
I can access funds anywhere branch is located					
Using branch networks has saved my time and transportation cost					
SMS ALERT					
I receive instant notification of debit or credit on my account					
I have access to account details through SMS					
Automatic Teller Machine(ATM)					
Reduces long queues in banking halls					
Enhances ability to access accounts at any location					
Enhances ability to access accounts at any time (Weekends and out of working hour)					
Mobile Banking					
Decreases the number of visits to branches of CBE					
Reduces long queues in banking halls					
Reduce cost and time utilized to get bank services					

3. CHALLENGES IN USING ICT PRODUCTS OF COMMERCIAL BANK OF ETHIOPIA

Please read each statement and put a tick mark in a box which best represents your level of agreement or disagreement with a particular statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PROBLEMS IN USING VARIOUS PRODUCTS OF THE BANK					
Due to security reasons I don't want to use ICT related banking services such as ATM, Mobile Banking and others.					
Computer illiteracy is high					
Poor or lack of technological infrastructure in rural areas					
I am facing frequent Network communication error					
I am facing frequent Power interruption					
Most of the time ATMs are out of service					
I am facing shortage of money in ATMs during peak hours or weekends					
I faced problems in accessing funds in another branch					
Most of ICT related products offered by CBE are complex to use.					

4. SERVICE QUALITY AND CUSTOMER SATISFACTION

Please read each statement and put a tick mark in a box which best represents your level of agreement or disagreement with a particular statement. (**CBE= Commercial Bank of Ethiopia & ICT related Products= ATM Service, Mobile Banking, Internet Banking, SMS Alert…**)

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
SERVICE					
Quick and timely service delivery due to the use of modern banking technology.					
Products are well adapted to meet my needs in getting the banking service.					
ICT related products offered by CBE are easily accessible.					
Employees of CBE have better understanding of Bank's product.					

9. Are you satisfied with the overall service you receive from Commercial Bank of Ethiopia?

☐ Yes ☐ No

10. If your answer for Q 9 is **No**, would you consider switching to another bank?

☐ Yes ☐ No

If **Yes**, why? ……

……

……

…… .

If, **No** why?.....

……

…….....

Thank you for taking time to complete this questionnaire!

APPENDIX C

INTERVIEW SCHEDULE/GUIDE

1. What is the need for the introduction of modern ICT related banking technologies?
2. What types of banking services are given using these banking technologies?
3. From the modern banking technologies introduced to the bank which one has more users? What do you think the reason behind this?
4. What are the major problems encountered in using or adopting these banking technologies?
5. What solutions do you suggest for these limiting factors?
6. How frequent interruptions in power and telecommunication service lead the bank to economic loss? How can we minimize these problems?

APPENDIX D

SAMPLE SIZE DETERMINATION TABLE

Table 1: Table for Determining Minimum Returned Sample Size for a Given Population Size for Continuous and Categorical Data

Population Size	Sample Size					
	Continuous data (margin of error=.03)			Categorical data (margin of error=.05)		
	alpha=.10 t=1.65	alpha=.05 t=1.96	alpha=.05 t=1.96	p=.50 t=1.65	p=.50 t=1.96	p=.50 t=2.58
100	46	55	68	74	80	87
200	59	75	102	116	132	154
300	65	85	123	143	169	207
400	69	92	137	162	196	250
500	72	96	147	176	218	286
600	73	100	155	187	235	316
700	75	102	161	196	249	341
800	76	104	166	203	260	363
900	76	105	170	209	270	382
1000	77	106	173	213	278	399
1500	79	110	183	230	306	461
2000	83	112	189	239	323	499
4000	83	119	198	254	351	570
6000	83	119	209	259	362	598
8000	83	119	209	262	367	613
10000	83	119	209	264	370	623

NOTE: The margins of error used in the table were .03 for continuous data and .05 for categorical data. Researchers may use this table if the margin of error shown is appropriate for their study; however, the appropriate sample size must be calculated if these error rates are not appropriate.

Table developed by Bartlett, Kotrlik, & Higgins.