St. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE IMPACT OF INFORMATION COMMUNICATION TECHNOLOGY ON BANK'S PERFORMANCE: IN THE CASE OF DASHEN BANK S.C

BY

NETSANET WORKU ZEGEYE

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A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTERS OF BUSINESS ADMINSTRATION (MBA).

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Dedication

I dedicated this thesis to the memory of my late father, Ato Worku Zegeye who believed in diligence, hard work and the pursuit of academic excellence. His words of inspiration and encouragement in pursuit of excellence still remain on.

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ACKNOWLEDGEMENTS

LIST OF ACRONYMS

ICT   Information and communication Technology

ATM   Automated Teller Machine

WAN   Wide Area Network

POS   Point of Sale

ROA   Return on Asset

ROE   Return on Equity

NIM   Net Interest Margin

SPSS   Statistical Package for Social Science

CAR   Capital Adequacy

NPL   Asset Quality (Non-Performing loans to total loans)

MEF   Management Efficiency (operating expenses to total asset)

LIQM   Liquidity Management (Total loan to customer deposits)

LIQ1   Liquidity (Liquid asset to total asset)

SIZ   Natural logarithm of total assets

LGR   Annual growth rate of gross loans

ITINV   Information Technology Investment

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ABSTRACT

The Information Communication Technology revolution in commerce is strongly affecting the performance of the economy especially in banking industry. This study examines the impact of Information Communication Technology in Bank performance. For the purpose of this study explanatory quantitative research approach were adopted. The data which are collected from the secondary source were analyzed using multiple regression and t-statistics techniques. Hypothesis formulate were tested and the study revealed that the adoption of Information Communication Technology has positively and significant impact on the profitability performance measured by ROE and NIM. However, it is negatively correlated with ROA significantly. On liquidity performance of the bank as measured by LIQ1 has negative strong significant correlation with ICT. The result of paired sample test also revealed that the mean value of profitability performance during post adoption of ICT is positive and greater than the pre adoption of ICT. In the contrary, with regard to liquidity, the mean value is decrease during the post adoption of ICT and smaller that the pre adoption period of ICT. Based on those findings, the study recommends the bank to give emphases on efficient utilization of ICT products that help to increase the gains from investing on ICT. These enable the bank to increase their profitability and stay competitive on the industry.

Keyword Terms: Information and Communication Technology, Electronic banking, Bank performance.

CHAPTER ONE

1. Introduction

1.1.   Background to the Study

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; 24x7 operations; and space and cost savings (Sivakumaran, 2005). In recent times, the application of ICT in banking operations has become popular because of its convenience, flexibility, and transaction processing-related benefits like speed, efficiency, accessibility (Omotoso, Dada, Adelowo, &Siyanbola, 2012). ICT allows for tailor-made services with high added value, such as e-banking combined with the option of face-to-face advisory meetings to a level that satisfies the customers. The ICT systems developed for automated bank processes enable banks to relocate resources to different areas of service in the branch banks. The wide spread use of Debit cards, ATMs, mobile banking, electronic banking, telephone banking, twenty four hours service, the overall quality of services, expanded portfolio of products and services, better customer relationship management with the use of advanced tools and variety of products has enabled banks to better service their customers with the advent of ICT (Rambøll,2008).

With the advance of Information and Communications Technology (ICT), the financial sector meets with rapidly evolving tools for developing new services and raising efficiency (Rosita et al, 2012).

According to Turnbull et al, (2007) as sited on Rono (2012) Banks aim to reduce costs, enhance efficiencies and guarantee customer retention with use of technology.

Banks in particular adopt information 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 (Luka & Frank, 2012). ICT

directly affects how managers decide, how they plan and what products and services are offered in the banking industry (Akinlolu, n.d)

Brücher, Scherngell et al. (2003) as sited on Agbolade (2011) opined that ICT adoption will improves three critical domains which are efficiency, quality, and transparency in any organisation.

The use of ICT in banks has become a global phenomenon and every bank must be ICT compliance in order to survive in global competitive environment. The introduction of ICT has changed manual and traditional forms of doing business and is being replaced by the sophisticated technology that is based on automation and interconnection of computers and other electronic devices. (Adesola, Moradeyo & Oyeniyik, 2013)

According to Ovia (2001) sited in Adesola, Moradeyo & Oyeniyik (2013) said that the banking industry has moved into an era of menu-driven ultra- robust specialized software programs called banking applications and these applications can carry out virtually all banking functions relying heavily on information collection, storage, transfer and processing.

1.2.   Background of the Organization

The study conducted on Dashen Bank S.C, which is privately owned company, established in 1995 with the aim of rendering quality commercial banking services. In August 2003 Dashen Bank became the first Ethiopian bank to interconnect its branch offices with WAN and in January 2005 it was the first bank to effectively implement a state-of-the-art core banking system. In May 2006, it launched Ethiopia's first payment card service and in September 2010 its first mobile banking service, Modbirr.

For the past 20 years, Dashen Bank's overarching financial and operational performance has maintained its position as a leader among Ethiopian banks. The bank's mission stated as overcoming the challenges while providing efficient and customer focused domestic and international banking services via the application of appropriate technology. In the above bank's mission, it provided technology based Core Banking and E-Banking service like ATM

(Automatic teller machine), POS (point of sale) and Mobile Banking. Public awareness of E-banking among customer has been increased and thus people are ready to migrate to better technology applications service, the bank should give quality services in order to survive in the industry.

1.3.   Statement of the Problem

Information Communication Technology has dramatically changed the way banking is done with in recent year in Ethiopian Banking Industry. The change become a potential tool in the hands of banks for sustainable growth it has revolutionized the banking industry. Moreover, ICT advent has enormously increased the capabilities of banks as they are now able to offer wider range of services to their customers including core banking system, mobile banking and ATMs and also expand at a great rate.

ICT help banks to improve the efficiency and effectiveness of services offered to customers, and enhances business processes, managerial decision making, and workgroup collaborations, which strengthens their competitive positions in rapidly changing and emerging economies (Luka & Frank, 2012).

The rapid development of technology particularly the internet and the availability of other resources has made customer less dependent on the branch offices.

Despite all innovations in the banking industry ICT along with globalization challenge banks with rapidly stiffening competition worldwide. With these opportunities and challenges picking up pace, the bank be able to increase its efficiency.

In spite of the potential benefits of ICT, there are arguments about adoption of ICT improves bank performance. Several studies have been made to examine the impact of ICT on bank performance. Studies by Binuyo & Aregbeshola (2014) proved that the use of ICT increases return on capital employed as well as return on assets. Researchers also conclude that the performance of banks is influenced both by ICT investment as well as ICT cost efficiency. Whereas studies by Abubakar,Getawa & Haruna (2013) conclude that investment in ICT does

not improve commercial bank's performance in Nigeria. Therefore, this study contributes to the debate made by the two extremists as disused above.

Keeping this in consideration, the study conducted on the topic The Impact of Information and Communication Technologies (ICT) on Dashen Banks' profitability and liquidity performance and also to realize the significant impact ICT has had on their operations so as to guarantee their customer satisfaction.

1.4.   Research Questions

Based on the above problem formulation, the research expected to answer the following basic research questions:

1. To what extent does investment in ICT have an impact on Bank's Return on Asset?

2. To what extent does investment in ICT have an impact on Bank's Return on Equity?

3. To what extent does investment in ICT have an impact on Bank's Net Interest Margin?

4. To what extent does investment in ICT have an impact on Bank's Liquidity Performance?

5. What can be recommended regard to investment and use of ICT in Dashen Bank?

1.5.   Objectives of study

1.5.1.   General Objective

The main objective of this research is to ascertain the impact of Information Technology on Bank performance. Specific objectives of study are as follows

1.5.2.   Specific Objectives

✓ To determine the extent to which investment in ICT has contributed to Return on Asset
✓ To determine the extent to which investment in ICT has contributed to Return on Equity.
✓ To determine the extent to which investment in ICT has contributed to Net Interest Margin.
✓ To determine the extent to which investment in ICT has contributed to Liquidity Position.
✓ To recommend regard to investment and use of ICT in Bank

1.6. Significance of the Study

Every organization is concerned with the best possible way of improving performance to guarantee sustainable growth that lead to the achievement of organizational goals.

Therefore, the finding that would be obtained from this research assists management of bank to measure or evaluate the importance and use of ICT products to achieve overall efficiency and effectiveness in their operations in regard to the bank performance. Additionally, it helps the management to make decision in regard to spending investment on Information and technology to achieve maximum returns and attract large number of clients. The study proves the importance of ICT for bank performance and also adds more knowledge on the concept of ICT in banking industry for further research. The topic makes it relevant from both the academic and practical point of view. The study will also be used as a source of reference material in addition to suggesting areas where future research may be conducted.

1.7. Delimitations/Scope of the study

This study focuses on impact of Information Communication Technology advancement on Bank's performance that benefits both organization and customers. In order to make the research manageable, the study is delimited on analyzing the impact of ICT on profitability and liquidity performance of Dashen Bank.

1.8. Limitation

The major limitation of the study is luck of sufficient literature on relationship between ICT investment and Liquidity performance of Bank, especially from Ethiopian context.

1.9. Hypothesis

In order to establish the nature of the relationship between ICT and Bank performance, the hypotheses listed hereunder are tested.

H0: There is no relationship between investment in ICT and bank performance

H1: There is relationship between investment in ICT and bank performance

1.10. Organization of the Research Report

The summary of the study is given in details as presented below.

Chapter one contains the introduction to the whole research work. This include background of the study, Statement of the Problem, research questions, objectives of study, hypothesis, definition of terms, significance of the Study, delimitations/ scope and Limitation of the study were discussed.

Literature review related with the research study presented in chapter two. The chapter will also talk about Information and Communication Technology, Electronic Banking, The Role of Information Technology in Banking Industry, Importance of ICT in banking industry, Quality Service, Dimensions of Quality Service, Customer Satisfaction, and Benefit of Information Communication Technology (ICT) on banking industry.The third chapter presents the research methodologies used for the research work. In this chapter, the research methods namely quantitative research discussed and also the types of instrument such as secondary data are discussed. The chapter 4 presents data analysis of the research work. The fifth chapter of the research presents summary, conclusion and recommendation of the research work.

CHAPTER TWO

The purpose of this chapter is to introduce the various literatures that have been conducted in relation to the impact of ICT on bank performance. The chapter arranged as follows; section 2.1 presents the theoretical part of the study, section 2.2 presents empirical review of the study and 2.3 presents summary of literature review.

2. Literature Review

2.1. Theoretical Review

The purpose of this section to discusses the theories that support the relationship between ICT and Bank performance.

2.1.1 Definition

Information Communication Technology (ICT) is the automation of processes, controls, and information production using computers, telecommunications, software 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, teleccomputing and teleconferences using real time and online system (Adeoti, Cited in Agbolade, 2011)

According to Attom (n.d) defined Information Technology as a support for all activities under the processes like creation, data manipulation, sharing and communication of information is using information system resources such as computer. ICT involves all information system resources such as hardware and software technologies that a firm used to achieve their business objectives (Laudon&Laudon, 2010 as sited by Attom (n.d)

Mwangi (2012) define Information Communication Technology (ICT) as encompass different computer technology which is hardware and software in relation with telecommunications

technology such as data, image and voice networks. Johnson 2005 as sited by Abubakaret al.,(2013), 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.

Longley and Shain (1992) as sited by Adesola et al., (2013) defined information communication technology as the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a micro-electronic based combination for computing and telecommunication. The use of information communication technology in banking operations is called electronic banking (Adesola et al., 2013).

ICTs "refer to technologies people use to share, distribute and gather information to communicate through computers and computer networks" (Laudon and Laudon, 2001 as sited by Asesola et al, 2013). ICTs can be described as a complex varied set of goods, applications and services used for producing, distributing, processing, transforming information (including) telecoms, TV and radio broadcasting, hardware and software, computer services and electronic media" (Laudon and Laudon; 2010 as sited by Adesola et al., 2013)

2.1.2   ICT in Banking Industry

Information communication technology has become global tool for banking industry to reach global markets. The use of ICT in banks has become a global phenomenon and every bank must be ICT compliance in order to survive in global competitive environment. The introduction of ICT has changed manual and traditional forms of doing business and is being replaced by the sophisticated technology that is based on automation and interconnection of computers and other electronic devices (Adesola et al., 2013).

The advancement in Technology has played an important role in improving service delivery standards in the Banking industry. In its simplest form, Automated Teller Machines (ATMs) and deposit machines now allow consumers carry out banking transactions beyond banking hours. With online banking, individuals can check their account balances and make payments without having to go to the bank hall. This is gradually creating a cashless society where consumers no longer have to pay for all their purchases with hard cash (Josiah and Nancy, 2012 as sited by Adesola et al., 2013).

The revolution in ICT has made the banking sector changed from the traditional mode of operation to presumably better ways with technological innovation that improves efficiency. According to Mejabi (2008), information communication technology is a general term that describes any technology that helps to produce, manipulate, store, communicate and/or disseminate information (Adesola et al., 2013).

The application of information communication technology concepts, techniques, policies and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and indeed a prerequisite for local and global competitiveness. ICT directly affects how managers decide, how they plan and what products and services are offered in the banking industry. 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 (Alawode& Kaka, 2011).

Akpan, (2008) and Johnson, (2005) as sited by Abubakar,(2013) identified ICT products in use in the banking industry include automated teller machine, smart cards, telephone banking, MICR, electronic funds transfer, electronic data interchange, electronic home and office banking. Ojokuku and Sajuyigbe (2012) as sited by Adesola et al.,(2013) identified ICT banking products as Point of Sale Terminal (POS), card system: debit card and credit card, Automated Teller Machine (ATM) and Mobile Banking

According to Christopher et al. (2006) as sited by Abubakar et al., (2015) discovered the importance of electronic banking as a channel to sell products and services and it is essential order to continue as profitable and successful in the industry.

2.1.3   ICT investment and Bank Performance

Banking sector efficiency has improved from the traditional way of doing things to better way of doing things through the transformation of technology (W.Ugwuanyi&G.Ugwuanyi, 2013). Banks have embarked on unprecedented deployment of ICT based banking products and services such as Automated Teller Machine (ATM), internet banking, mobile banking solutions, point of sale terminals, computerized financial accounting and reporting, human resources solution

among others, of which plays salient roles in enhancing the performance of banks over the world (Ovia,2005 as sited by Ibrahim & Muhammad, 2013). Automated Teller Machine (ATM) has become a major indicator of ICT investment by banks (Jonathan, 2013). The advancement in Technology has played an important role in improving service delivery standards in the Banking industry (Adesola et al., 2013).

W.Ugwuanyi and G.Ugwuanyi (2013) revealed that IT expenditure has a negative relationship with banks profitability due to the fact that investment in IT increases expenditure as well as increases assets thereby reducing operating profits as well as return on assets (ROA). According to Harker& Baba (1997), increasing investment in IT may use as strategy to stay competitive in the industry instead of getting the real benefits from the investment.

Advancement in information technology has brought about tremendous progress in banking sector across the globe. This is because information communication technology has brought about dramatic and dynamic changes in the global system of banking (Seun, 2014). Technological advances are the most important variables which have contributed to the radical shift in the patterns of the banking business in the era of globalization; technology has focused the keen interest of banks to intensify attempts to take advantage of the latest information technologies, communications and computers, and to adapt efficiently in order to invent banking services and the development of novel methods of submission (Aliyu and Tasmin, 2012 as sited by Saeed & Roberta, 2013).

According to W.Ugwuanyi&G.Ugwuanyi (2013) ICT improves productivity and profitability as it enhance the creation of customized service, reduces the operational cost as well as used as a competitive tool among the industry.

According to Alawode& Kaka (2011) Investment in information communication technology should form an important component in the overall strategy of banking operators to ensure effective performance. It is imperative for bank management to intensify investment in ICT products to facilitate speed, convenience, and accurate services, or otherwise lose out to their competitors.

2.1.4   Bank Performance Measures

Bank performance measurement can also help improve managerial performance by identifying best and worst practices associated with high and low measured efficiency (Kumbirai and Webb 2010). According to Berger & Humphrey (1997) as sited by Kumbirai and Webb (2010) state banks that are performing well from those which are doing poorly are differentiate by measuring bank performance. Financial ratios can be used to identify a bank's specific strengths and weaknesses as well as providing detailed information about bank profitability, liquidity and credit quality policies (Hempel*et al*, 1994: Dietrich, 1996 as sited by Kumbirai and Webb, 2010).

According to Ahmed and Khababa (1999) as sited by Binuyo&Aregbeshola (2014)they assessed bank performance in Saudi Arabia using Return on Investment, Return on Asset and Percentage change in earning per share as measures of performance. Sinkey (1992) as sited by Binuyo&Aregbeshola (2014)he postulates that from an accounting perspective bank performance is determined by return of asset is a complete measure that indicate managerial efficiency as how capable the management of a bank has been in converting the bank's asset into net earnings. Rose and Hudgins (2006) as sited by Binuyo&Aregbeshola (2014)suggested that from the shareholder perspective, accounting profitability is measured by Return on Equity that is the net benefit that the stockholder have received from investing their capital.   According to Fazil&Yasuo (2013) Profitability is measured by return on equity, return on assets, and return on investment.

According to casu et al (2006) as sited by Kumbirai and Webb (2010) to estimate the potential for problems, Bank regulators monitors banks by evaluating overall performance like Liquidity and solvency to enable them to intervene when there is need.

Liquidity measure the ability of the bank to meet ordinary and extra ordinary request with cash and current assets that are converted in to cash (Nwaezeaku 2006 as sited by Abubakar et al.,2015)

Pandey (2010) as sited by Abubakar et al., (2015), the company will end up closing the firm if they failed to meet its obligation due to lack of sufficient liquidity. When the funds put as idle in current assets without generating income will result in high degree of liquidity. It is better to make a proper balance between high and lack of liquidity.

2.1.5   Benefits of ICT in Banking Industry

Commercial banks consider the adoption of ICT as a means to increase the banks' efficiency and performance as well as quality of service. In addition, another advantages of banking technology is that it provide excellent banking services which meet the needs and comfort of the customer, it allows customers to request bank services such as checking their balances, withdrawing money at any time during 24 hours 7 days, transferring money (Saeed & Roberta, 2013). The use of e-banking can contribute to improved bank performance, in terms of increased market share, expanded product range, customized products and better response to client demand (Josiah and Nancy, 2012).The adoption of ICT improves the banks' image and leads to a wider, faster and more efficient market. It has also made work easier and more interesting, improves the competitive edge of banks, improves relationship with customers and assists in solving basic operational and planning problems (Akinlolu, (n.d)). In most developed countries, technology is a central element to deal with challenges in modern banking, such as lowering costs and enabling efficiency improvements (Saeed & Roberta, 2013).

2.2. Empirical Review

Ibrahim & Muhammad (2013) investigated the impact of ICT on Banks performance using panel unit root, panel co-integration, Fully Modified Ordinary Least Square (FMOLS) and generalized Method of Moments (GMM) to reveals a positive impact of ICT on banks performance in the country. They found that bank performance has influenced negatively by ROE in the short run and influenced positively in the long run. Therefore, they conclude that careful application of ICT equipment will continue to improve commercial banks performance in Nigeria.

Agbolade (2011) investigated the relationship that exists between Banks profitability and the adoption of Information Communication Technology using Ordinary Least Square approach econometric techniques. The result suggested that a positive correlation exists between ICT and banks profitability in Nigeria. This implies that the profit level increase proportionally as the marginal change in the level of the investment and the adoption of ICT. This is confirmed by the level of the regression coefficient as well as the factor analysis which revealed that as insignificant size of profit exist without the introduction of the ICT. The study concluded that banks that have a high level of ICT will make intensive use of production and efficiency practices such as business re-engineering, outsourcing and flexible work arrangements which will yield the best performance.

Abubakar et al., (2015) investigated the relationship between electronic banking and liquidity of deposit money banks in Nigeriadescriptive and correlation analysis toidentify the association between electronic banking and liquidity. They conclude that point of sale and mobile banking had no significant relationship with liquidity, while internet banking had a significant negative relationship with liquidity as per the finding of the study

Abubakar et al., (2013)examined the Impact of Information Communication Technology on Bank Performance on selected commercial Banks in Nigeria. They study used sample annual financial report and Fact books of various bank. They employed Hausman specification test method to choose between fixed effects or random effects to be adopted for the study and they found random effects model is appropriate for their study. Accordingly, the result of the study showed as follows:

a. Investment in information communication technology (ICT) does not improve performance in the Nigerian Commercial Banks.

b. An increase in bank's profitability enhances commercial bank's performance in Nigeria.

c. The coefficient related to e-banking services shows a positive influence on bank performance but it is not statistically significant.

Binuyo&Aregbeshola (2014)investigates the impact of information communication technology (ICT) on commercial bank performance: Cost Efficiency (ICTCE) and ICT investment on the performance of banks. The study assessed the impact of ICT on the performance of South African banking industry using annual data over the period 1990-2012 published by Bank scope – World banking information source. Data analysis is carried out in a dynamic panel environment using the orthogonal transformation approach. The robustness of the results was affirmed by residual co-integration regression analysis using both Pedroni and Kao methods. The study identified ICT investment (ICTINV), ICT cost efficiency (ICTCE) as explanatory variables and Net Profit Margin (NPMARG), Return on Capital Employed (ROCE), Return on Assets(ROA) as response variable. The results showed that ICT investment and ICT cost Efficiency have a significant relationship with performance of banks in South Africa. The study concluded that the performance of banks is influenced both by ICT investment as well as ICT cost efficiency. The impact of ICTE on performance of banks found to be more than that of ICT investment.

Josiah and Nancy (2012) assessed the Relationship between Electronic Banking and Financial Performance among Commercial Banks in Kenya by using the data that was collected from annual report of target banks and Central Bank of Kenya. Inferential statistics was employed to analyze the data. The result indicated that bank performance (measured by return on assets) are explained by independent variable the e-banking measured by Investments in e-banking and number of debits cards issued to customers. This indicates E banking has strong and significance marginal effects on returns on asset in the Kenyan banking industry. Thus, there exists positive relationship between e-banking and bank performance. The study concluded that based on the major findings as follows:

a. the adoption of electronic banking has enhanced Kenyan banking industry by making it more productive and effective;

b. Electronic Banking also has a strong positive relationship on the overall banking performance by making workers performance more effective and efficiency;

c. The adoption of electronic banking has enhanced the fortune of the Kenyan commercial banks.

PoojaandBalwinder(2009) assessed the Impact of Internet Banking on Bank Performance and Risk on the Indian experience. The study conducted using the information drawn from the survey of 85 scheduled commercial bank's websites during the period of June 2007. From the survey result only 57 percent of the commercial banks operating in India offer Internet Banking as on March end 2006. used a sample of 85 banks operating as March end that was taken for the period of 1998-2006 to analyze the Impact of Internet Banking on Bank performance. They also analyzed the performance of an Internet group in comparison to non-Internet banking group and impact of Internet banking on banks' performance and risk. The result showed that there are several significant differenceshave been found in the profile of banks that offer Internet banking and banks that do not. On an average, Internet banks are larger, more profitable and are more operationally efficient than non-Internet banks. Internet banks have higher asset quality and are better managed to lower the expenses for building and equipment.

Alawode& Kaka (2011) concluded that the quality of banking operation has influenced by the adoption of ICT. It generates huge potential for Nigerian Banks in regarding to business process reengineering. They also mentioned usefulness of increase investment in ICT products by bank management for better speed, convenience and accurate services otherwise they will lose out to their competitors. To ensure effective performance, investment in ICT is should be one of the components in bank's overall strategy.

Acharya, *et al*., (2008) as sited by Abubakar et al.,(2013)examined the impact of web design features of a community bank's performance using a sample of 55 community banks with online services in the five mid-western states of the USA. The author utilized both primary and secondary data by applying multiple regression models. The results show that banks with higher usability of ICT perform significantly better than those with low ICT usability.

Musara and Fatoki (2010) employed chi-square technique to investigate the relationship between Technological Innovations and efficiency. The results showed that the use of advanced technological innovations has improved the efficiency of the banking sector and reduce cost to the customers. The study identified important technological advances that contributing to the improved efficiency and cost reductions for customers as Automated Teller Machines (ATMs), credit cards, computers, internet and cell phones. Out of them ATMs have made the greatest contributions in improving the efficiency and reducing banking costs for customers.

Oginni et al (2013) examined the impact of E-Banking on Bank Performance using panel data from 8 commercial banks which have adopted e-banking between 1999 and 2010. The result indicated that E-Banking begins to contribute positively to bank performance after two years of adoption in terms of Return on Asset (ROA) and Net Interest Margin (NIM) while a negative impact was observed in the first year of adoption.

Onay, Ceylan; Ozsoz, Emre (2013) as sited by Saranya, Anitha, Vasanthastates that ICT banking adoption has a positive impact on the level of profits, deposits and loans per branch. As operational activities are now provided via ICT branches, ICT banking facilitates banking activities in branches that require more human input. They also find that ICT banking adoption has a negative impact on bank profitability.

2.3.   Summary

Some scholar's identified that ICT have a positive impact on bank performance. Ibrahim & Muhammad (2013) found that bank performance influenced negatively by Return on Equity in the short run and influenced positively in the long run. Obsan (2011) proved that marginal change in the level of the investment and the adoption of ICT increase profit level proportionally. Binuyo&Aregbeshola (2014) suggested that ICT investment and ICT cost efficiency have a significant relationship with performance of banks in South Africa. Josiah and Nancy (2012) they found that E-Banking has strong and significance marginal effects on returns on asset in the Kenyan Banking industry. Pooja and Balwinder (2009) the study result showed that several significant differences has been found in the profile of banks that have Internet Banking and Banks that do not.Alawode& Kaka (2011) proved that unless Bank management increase investment in ICT for better speed, convenience and accurate service, they will lose out to their

competitors Acherya et al (2008) as sited by Abubakar, Getawa, &Haruna (2013)the study showed that banks with higher usability of ICT perform significantly better than those with low ICT usability. Musara and Fataki (2010) they identified that Technology advancement that contributing to the improved efficiency and cost reductions for customer. This is made greatest contributions in improving the efficiency and reducing cost for customers. Oginni et al (2013) the result of the study revealed that E-Banking contributed positive to bank performance after two years of adoption in terms of Return on Asset and Net Interest Margin (NIM) while negative impact also observed in the first year of adoption.

In contrary to the above study some scholar's identified that ICT have negative impact on profitability and Bank's performance.Onay et al(2013) as sited by Seranya, Anitha and Casantha explained that as a result of ICT adoption in banks that result in a negative impact on bank profitablity. Abubakar, Getawa, &Haruna (2013)identified that three finding on their study: Nigerian Commercial Banks does not improved performance as a result of investment in ICT, insignificant positive influence has been observed on bank performance due to investment in E-Banking.

To clear out the above dispute the study conducted on the impact of ICT on Bank's performance: In the case of Dashen Bank. Additionally, none of the above empirical studies address the issues of relationship between ICT investment and Bank's liquidity performance; those are the gap that this study intends to fill.

CHAPTER THREE

This chapter describes the research methodology of the study. Section 3.1describes research design, 3.2 describes source and procedures of data collection, 3.3 data analysis and presentation, 3.4 variable definition and measurement, and 3.5 model specifications.

3. Methodology

Research methodology is a systematic way to solve a problem. It is a science of studying how research is to be carried out. Essentially, the procedures by which researchers go about their work of describing, explaining and predicting phenomena are called research methodology. It is also defined as the study of methods by which knowledge is gained. Its aim is to give the work plan of research. This section identifies the research design, describe how the data collected, analyzed and presented in the study.

3.1.   Research design

Based on the objectives, the study used causality research approach. It is used to investigate causes of independent variables among dependent variables. Thus, the study used the causality approach to investigate the causes of ICT on bank performance. Descriptive and explanatory research designs were adopted to conduct the impact of Information Communication Technology in Bank's Performance in the case of Dashen Bank.Descriptive statistics is used to describe bank's performance trend on the study. Explanatory approach is used to investigate the relationship between ICT investment and bank performance.

3.2.   Source and Procedures of Data Collection

To investigate the effects of ICT in bank performance the study used secondary data collection method to get the necessary data to conduct the research. The data collected from the annual audited financial report of the bank. The data comprises annual information for the period of 1996/1997-2013/2014 financial years. The data grouped in two portions. The first portion is the data which is found before the adoption of ICT and the second portion is the data which is found after the adoption of ICT.

3.3.   Data analysis andpresentation procedures

After collecting the necessary data, multiple regression and t-statisticsmodels were usedto analyze the data by using Statistical Package for Social Sciences (SPSS) software.The study used accounting approach that is financial ratio to measure the bank's Liquidity performanceand ProfitabilityPerformance. There are two main efficiency concepts; cost and profit efficiencies. Cost efficiency measured by using cost to income ratio. Return on assets (ROA) and return on equity (ROE) and Net interest Margin (NIM) used as a measurement of Bank's profit Performance, LIQ1 used as measurement of Bank Liquidity performance. Finally, the output presented using table and chart following interpretations.

3.4.   Variable Definition and Measurement

3.4.1 Dependent Variables

The study used Bank performance as dependent variable. Bank performance measurement can help improve managerial performance by identifying best and worst practices associated with high and low measured Performance. Accordingly, for the purpose of the study Bank Performance is measured by Profitability and Liquidity of the Bank.

3.4.1.1   Profitability Performance:

The primary aim of business establishment is making profit regardless of other purpose. In order to run the business smoothly profitability is an important factor in today's competitive industries and it has significant impact on the business performance. Scholars used CAMEL framework to proxy the bank specific factor. CAMEL stands for Capital Adequacy, Asset Quality, Management Efficiency, Earnings Ability and Liquidity.

Dependent Variable	Label	Definition
Profitability Performance	Y_1, ROA	**Net profit/total assets:** This ratio indicates how much net income isgenerated per one birr of assets. The higher the ROA, the more the profitable the bank.

	Y$_2$, ROE	**Net profit/ total equity:** It is the rate of return to Shareholders or the percentage return on each birr of equity invested in the bank.
	Y$_3$, NIM	**Net interest income/total Income:**NIM focuses on the profit earned on interest activities, which is the main source of revenues for financial institutions

Bank specificmeasures for Profitability Performance

Independent Variable	**Label**	**Proxy and Definition**
Capital Adequacy	X$_1$, CAR	Total Capital to Total Asset-Capital adequacy ratio shows the internal strength of the bank to withstand losses during crisis.
Asset Quality	X$_2$, NPL	Nonperforming loans to total loans - shows that the health of the portfolio a bank. The lower the ratio the better the bank performing.
Management Efficiency	X$_3$, MEF	operating expenses to total asset - shows that level of operating expenses and in turn affects profitability
Liquidity Management	X$_4$, LIQM	Total loan to customer deposits- measure liquidity level of the bank
ICT Investment	X$_5$, ITINV	The Ratio of ICT cost expenditure to total cost

3.4.1.2   **Liquidity Performance**

Liquidity is measured by the ratio of liquid asset to total assets. The lower the ratio, the lower the bank has liquidity. In fact , the loan agreements have various maturities and thus in case of urgent need of capital, the bank cannot replay on these loans, since the will only be reimbursed later

Dependent Variable	Label	Definition
Liquidity Performance	Y_4, LIQ1	Liquidity indicates the ability of the bank to meet its financial obligations in a timely and effective manner. (Liquid Asset to Total Asset)

Bank specific measures for Liquidity

Independent Variable	Label	Definition
Capital Adequacy	X_1, CAR	Total Capital to Total Asset - Capital adequacy ratio shows the internal strength of the bank to withstand losses during crisis.
Bank Size	X_2, SIZ	Natural logarithm of total assets
Loan Growth	X_3, LGR	Annual growth rate of gross loans and advances to customers
Asset Quality	X_4, NPL	Nonperforming loans to total loans - shows that the health of the portfolio a bank. The lower the ratio the better the bank performing.
ICT Investment	X_5, ITINV	The Ratio of ICT cost expenditure to total cost

3.4.2 Independent Variable

The key independent variable in this study is Information and Technology advancement which is denoted as **ITINV**. In order to measure the independent variable the study used the cost which is incurred by the bank for Technology advancement during the period of 2005-2014.

Independent Variable	Label	Definition
	X_{11}, ITINV	The Ratio of ICT cost expenditure to total cost

3.5. Model Specification

For the purpose of this study profitability and liquidity are the major dependent performance indicators were used. The major independent variables CAP, NPL, MEF, LIQM, SIZ, LGR and ITINVwere used. To investigate the impact of independent variable on dependent variable the study used regressionmodel. In order to test for the empirical relevance of the hypotheses regarding the causes of bank performance, the study adopt multiple regression framework to analyze the panel data set that has been constructed. The basic equation applied on the study is taken fromAndreea M.

$$Y_t = b_0 + b_1X_{1t} + \ldots\ldots + b_kX_{kt} + \varepsilon_t,$$

Where

Y_t – dependent variable, performance of the Bank at time t as expressed by profitability and Liquidity

X_j – independent variable, j = 1, 2, ..., k

X_{jt} – observation t of the independent variable X_j

β_0– constant β_1,..., β_k

β_k– regression coefficients

ε_t– residual variable which incorporates the influence of the other factors not included in the model

t – time, t = 1, 2, …, n

Based on the above model formulation, the following questions are derived for each dependent variable

Model One - Profitability Performance:

$$ROA = \beta_0 + \beta_1CAR_t + \beta_2 NPL_t + \beta_3 MEF_t + \beta_4 LIQMt + \beta_5ITINV_t + \text{\euro}_t$$
$$ROE = \beta_0 + \beta_1CAR_t + \beta_2 NPL_t + \beta_3 MEF_t + \beta_4 LIQMt + \beta_5ITINV_t + \text{\euro}_t$$
$$NIM = \beta_0 + \beta_1CAR_t + \beta_2 NPL_t + \beta_3 MEF_t + \beta_4 LIQMt + \beta_5ITINV_t + \text{\euro}_t$$

Model Two - Liquidity Performance:

$$LIQ = \beta_0 + \beta_1 CAR_t + \beta_2SIZ_t + \beta_3 LGR_t + \beta_4 NPL_t + \beta_5ITINV_t + \text{\euro}_t$$

CHAPTER FOUR

This chapter presents the results of the findings. Section 4.1.1 presents the financial performance trend of the bank, section 4.1.2 presents the performance of the bank in pre-adoption of ICT, 4.1.3 presents the performance of the bank in post-adoption of ICT and 4.1.4 presents findings of regression analysis.

4. Data Analysis and Discussion of the result

This section sought to determine the impact of ICT investment on Bank performance. The objective of this research is to answer the research question stated on the study. Accordingly, to have a more clear view on the impact of ICT investment on Bank performance, the study considered appropriately to make another analysis to include pre-ICTadvancement period (1997-2004) and the post-ICT advancement period (2005-2014)

4.1. Findings

In order to verify the relationship that exists between the applications of Information Communication Technology (ICT) on the business growth in the Bank, some variables were used to address the research problems, these include; profitability and liquidity performance of the Bank as dependent variables, ITINV as independent variable.

4.1. 1 Financial Performance trend of the Bank

4.1.1.1. Trend of Profitability (ROA, ROE and NIM) over the study period

Figure 4.1 Profitability performance trend
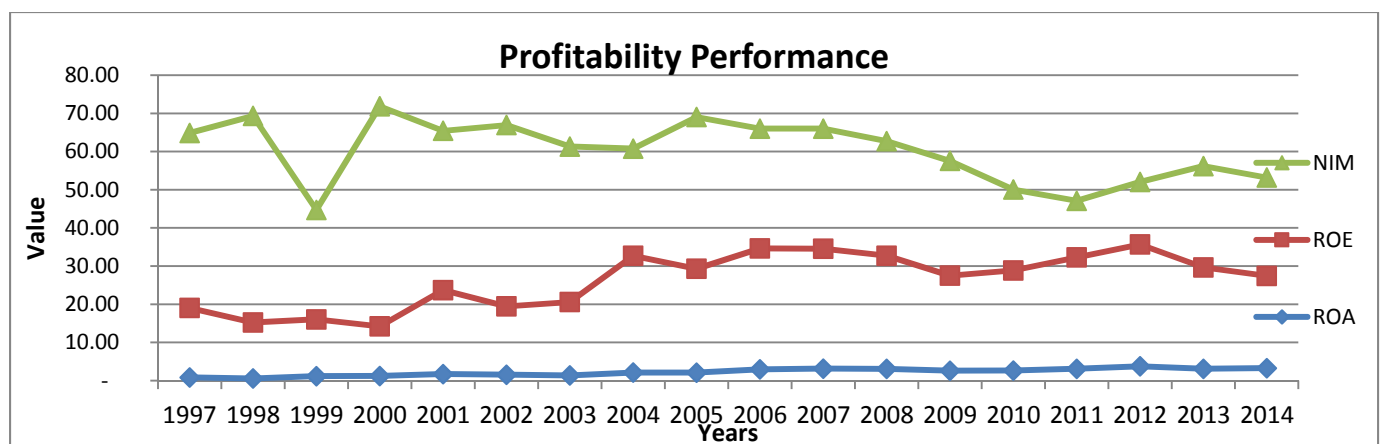
Figure 4.1 present Profitability Performance trend of the bank over the study period (1997-2014) Profitability is measured in terms of ROA, ROE and NIM. As it indicatedinthe figure ROA increased from 1999 before slightly decreased in 2002. The figure showed an increased in 2004 to 2.10% before a decreased in 2005 to 2.08%. As can we see from the trend there are up and down on the ROA value during the study period. The downward trend is attributable to investing the fund on Technological Advancement of the Bank; installing core banking system and ATM across the Branches starting from 2005. Since the return of investment on the technology is long turn, ROA has been showed slightly increases starting from 2006. Up and down trend also reflected on profitability performance measured on ROE and NIM. In general the bank's profitability progress has shown an increase with a decreasing rate.

4.1.1.2.   Trend of liquidity Performance over the study period

Figure 4.2 Liquidity performance trend (Liquid asset to total asset - LIQ1)
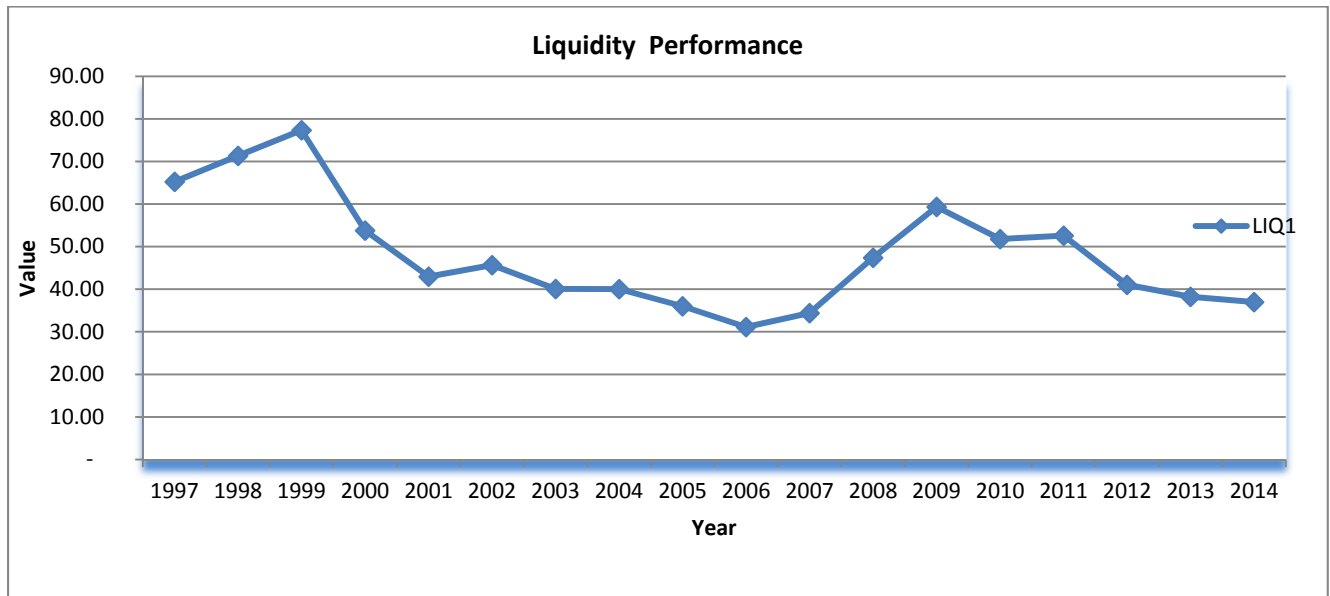
Figure 4.1 present Liquidity Performance trend of the bank over the study period (1997-2014). As it indicated in the figure, LIQ1 increased up to1999 and from 2007 up to 2009, this indicated that the bank hold more liquid asset out of the total asset. Starting from 2000 up to 2006, the trend shows that up and downward value. From 2010 until now the value have a decreased trend throughout the periods. This shows that how the bank assets are tied into non liquidassets.

4.1. 2   Bank Performance pre-adoption of ICT

4.1.2.1.   Descriptive statistics of ROA, ROE, NIM and Independent variables

In this section the empirical value of descriptive statistics ofprofitability performance before the adoption of ICT; ROA, EOE, NIM and independent variable; CAR, NPL, MEF and LIQMare presents. The data analyzed using SPSS and the result presented on table with interpretations. The table includes minimum, maximum, mean, Std.Deviation, Skewness and Kurtosis value of the variables.

Table 4.1 Descriptive Statistics of ROA, ROE, NIM and Explanatory Variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ROA	8	.55	2.10	1.2938	.49071	.120	.752	-.089	1.481
ROE	8	14.21	32.68	20.1100	5.95638	.478	.752	1.510	1.481
NIM	8	44.70	71.83	63.1363	8.32798	-.755	.752	1.867	1.481
CAR	8	3.62	8.34	6.4175	1.66667	-.872	.752	-.380	1.481
NPL	8	1.45	6.90	4.4650	1.70091	-.685	.752	.456	1.481
MEF	8	4.24	6.87	5.2513	.78390	1.258	.752	2.390	1.481
LIQM	8	64.14	88.00	74.9425	8.69549	-.001	.752	-1.204	1.481
Valid N (listwise)	8								

Source: *Own calculation*

Table 4.1 shows descriptive statistics value of variables used in the model of profitability performance of the Bank before the adoption of ICT. The table shows that maximum value of ROA, ROE and NIM is 2.10%, 32.68% and 71.83% respectively. The minimum value of ROA, ROE and NIM is 0.55%, 14.21% and 44.70% respectively. Total capital to total asset is 6.42% on average; it indicated that the bank used its capital on investment which results in better profit instead of hold the capital. The value of NPL is 4.4%; it indicated that 4.4% of total asset is non performing loan on average. The mean value of LIQM is 74.94%; it indicated that 74% of customer deposit is granted for lending. The mean value of MEF is 6.87. According to George

and Mallery (2010) as sited by Medrano,Liporac, & Pérez(2014),skewness and kurtosis values in the study have considerable acceptable range of +/- 2.This shows that the assumption of normality test is not violated. The standard deviation value of the variables has lower deviation from the mean except ROE, NIM and LIQM variables. ROE, NIM and LIQM has higher standard deviation value 5.9, 8.33 and 8.69% respectively.

4.1.2.2. *Descriptive statistics of LIQ1 and Independent variables*

In this section the empirical value of descriptive statistics of Liquidity performance before the adoption of ICT; LIQ1 and independent variable; CAR, SIZ, LGR andNPL are presents. The data analyzed using SPSS and the result presented on table with interpretations. The table includes minimum, maximum, mean, Std.Deviation, Skewness and Kurtosis value of the variables.

Table 4.2 Descriptive Statistics of LIQ and Explanatory Variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
LIQ1	8	40.01	77.34	54.5563	14.87901	.544	.752	-1.580	1.481
CAR	8	3.62	8.34	6.4175	1.66667	-.872	.752	-.380	1.481
SIZ	8	6.07	7.90	6.9950	.61605	-.021	.752	-.882	1.481
LGR	8	.18	1.00	.3638	.26736	.442	.752	1.225	1.481
NPL	8	1.45	6.90	4.4650	1.70091	-.685	.752	.456	1.481
Valid N (listwise)	8								

Source: *Own calculation*

Table 4.2 shows descriptive statistics value of variables used in the model of Liquidity performance of the Bank before the adoption of ICT. The table shows that maximum value of LIQ1 is 77.34%. The minimum value of LIQ1 is 40.01 %. The average liquid asset to total asset is 54.56%; it indicated that 54.56% of total asset is liquid asset. Total capital to total asset is 6.42% on average; it indicated that the bank used its capital on investment which results in better

profit instead of hold the capital.The mean value of SIZ, LGR and NPL is 6.99%, .36% and 4.47% respectively. According to George and Mallery (2010) as sited by Medrano et al. (2014),skewness and kurtosis values in the study have considerable acceptable range of +/-2.This shows that the assumption of normality test is not violated.The standard deviation value of the variables has lower deviation from the mean except LIQ1. LIQ1 has higher standard deviation value 14.88% among other variable.

4.1.2.3. *Correlation analysis Between ROA,ROE, NIM and Explanatory Variables*

In this section correlation coefficient analysis between Profitability performance: ROA, ROE, NIM and explanatory variables: CAR, NPL, MEF and LIQM were undertaken. The coefficient shows the direction and magnitude of the relationships, whether it is strong, weak, positive and negative. A strong relationship has higher coefficient value where as smaller coefficient value is an indicator of weak relationship.

Table 4.3 Correlation Analysis of ROA, ROE, NIM and explanatory variables

Correlations

	ROA	ROE	NIM	CAR	NPL	MEF	LIQM
ROA	1						
ROE	.823[*]	1					
NIM	.145	.096	1				
CAR	.601	-.048	.127	1			
NPL	-.092	-.108	-.467	.272	1		
MEF	-.450	-.332	-.099	-.282	-.451	1	
LIQM	.570	.247	.486	.682	-.018	-.143	1

*. Correlation is significant at the 0.05 level (2-tailed)
c. Listwise N=8
Source: *Own calculation*

Table 4.3 shows correlation analysis of variables used in the model of profitability performance of the Bank before the adoption of ICT. The result shows on the above table, there are positive relations between CAR with ROA and NIM. The relationship indicates that increase in CAR has a positive impact on ROA and NIM whereas increase in CAR has a negative impact on ROE. NPL and MEF are negatively related to ROA, ROE and NIM. This indicated that increase on NPL and MEF has a negative impact on all the three profitability performance indicators. LIQM is also positively related to ROA, ROE and NIM. However, the result indicated that no statistically significantly relationship between the dependent and explanatory variables.

4.1.2.4. *Correlation analysis between LIQ and Explanatory Variables*

In this section correlation analysis between Liquidity performance: LIQ1 and explanatory variables: CAR, SIZ, LGR andNPLwere undertaken. The coefficient shows the direction and magnitude of the relationships, whether it is strong, weak, positive and negative. A strong relationship has higher coefficient value where as smaller coefficient value is an indicator of weak relationship.

Table 4.4 Correlation Analysis of LIQ and explanatory variables

Correlations

	LIQ1	CAR	SIZ	LGR	NPL
LIQ1	1				
CAR	.434	1			
SIZ	.830[*]	.521	1		
LGR	-.264	-.455	-.617	1	
NPL	-.215	.272	.151	-.654	1

*. Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=8

Source: *Own calculation*

Table 4.4 shows correlation analysis of variables used in the model of Liquidity performance of the Bank before the adoption of ICT. The result shows on the above table, there are positive relations between LIQ1 with CAR and SIZ. The relationship indicates that increase in CAR and SIZ has a positive impact on LIQ1. The output indicated that there is strong significant relationship between LIQ1 with SIZ. Loan growth rate (LGR) and non-performing loan ratio (NPL) are negatively related to LIQ1. This indicated that increase on LGR and NPL has a negative impact on liquidity performance of the bank. Concerning the other variables, the result indicated that no statistically significantly relationship between the dependent and explanatory variables except LIQ1 and SIZ.

4.1. 3   Bank Performance post-adoption of ICT

4.1.3. 1   *Descriptive statistics of ROA, ROE, NIM and Independent variables*

In this section the empirical value of descriptive statistics of profitability performance after the adoption of ICT; ROA, EOE, NIM and independent variable; ITINV, CAR, NPL, MEF and LIQM are presents. The data analyzed using SPSS and the result presented on table with interpretations. The table includes minimum, maximum, mean, Std.Deviation, Skewness and Kurtosis value of the variables.

Table 4.5 Descriptive Statistics of ROA, ROE, NIM and Explanatory Variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ROA	10	2.08	3.72	2.9470	.44116	-.395	.687	1.206	1.334
ROE	10	27.43	35.67	31.2550	3.08398	.138	.687	-1.694	1.334
NIM	10	47.08	69.02	57.9780	7.57224	.116	.687	-1.455	1.334
CAR	10	7.10	11.83	9.4500	1.25855	.082	.687	1.323	1.334
NPL	10	2.38	7.38	4.2910	1.55327	.700	.687	.027	1.334
MEF	10	3.99	5.41	7.4950	9.58136	.148	.687	1.931	1.334
LIQM	10	49.77	85.79	64.4670	13.61154	.607	.687	-1.564	1.334
ITINV	10	19.02	18.17	10.4220	4.38329	-.250	.687	.515	1.334
Valid N (listwise)	10								

Source: *Own calculation*

Table 4.5 shows descriptive statistics value of variables used in the model of profitability performance of the Bank after the adoption of ICT. According to George and Mallery (2010) as sited by Medrano et al. (2014), skewness and kurtosis values in the study have considerable acceptable range of +/- 2.This shows that the assumption of normality test is not violated.

ROA has 2.08%, 3.72% and 2.95% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of ROA has shown an increasing trend during the post adoption of ICT with 1.53%, 1.62% and 1.65%.

ROE has 27.43%, 35.67% and 31.26% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of ROE has shown an increasing trend during the post adoption of ICT with 13.22%, 2.99% and 11.15%.

NIM has 47.08%, 69.02% and 57.98% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of NIM has shown an increasing trend during the post adoption of ICT with 2.38 %, and 5.16 % in minimum and mean value where as a decreasing trend on its maximum value (2.81 %).

CAR (total capital to total asset) has 7.10%, 11.83% and 9.45% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of CAR has shown an increasing trend during the post adoption of ICT with 3.48 %, 3.45% and 3.03%.

NPL(non-performing loans to total loans) has 2.38%, 7.38% and 4.29% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of NPL has shown an increasing trend during the post adoption of ICT with 0.93%, 0.48 % in minimum and maximum value where as a decreasing trend on its mean value (0.17%.)

MEF (operating expense to total asset) has 3.99 %, 5.41% and 7.50% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of MEF has

shown an increasing trend during the post adoption of ICT with 2.24 % in mean value whereas a decreasing trend on its minimum and maximum value of 0.25% and 1.46%respectively.

LIQM (Total loan to customer deposit) has 49.77%, 85.79% and 64.47% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of LIQMhas shown a decreasing trend during the post adoption of ICT with 14.37 %, 2.21 % and 10.47%. The minimum and maximum value of ITINV is 19.02 % and 18.17%. The mean value of ITINV is 10.42; it indicated that 10.42% of total cost is invested on ICT infrastructure.

4.1.3. 2   *Descriptive statistics* **of** *LIQ1 and Independent variables*

In this section the empirical value of descriptive statistics of Liquidity performance after the adoption of ICT; LIQ1 and independent variable; ITINV, CAR, SIZ, LGRand NPL are presents. The data analyzed using SPSS and the result presented on table with interpretations. The table includes minimum, maximum, mean, Std.Deviation, Skewness and Kurtosis value of the variables.

Table 4.6 Descriptive Statistics of LIQ and Explanatory Variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
LIQ1	10	25.27	72.54	49.6720	15.19779	-.279	.687	-.790	1.334
CAR	10	7.10	11.83	9.4500	1.25855	.082	.687	1.323	1.334
SIZ	10	8.14	10.00	9.2100	.63891	-.429	.687	-1.074	1.334
LGR	10	.01	.42	.1950	.13193	.305	.687	-1.048	1.334
NPL	10	2.38	7.38	4.2910	1.55327	.700	.687	.027	1.334
ITINV	10	19.02	18.17	10.4220	4.38329	-.250	.687	.515	1.334
Valid N (listwise)	10								

Source: *Own calculation*

Table 4.6 shows descriptive statistics value of variables used in the model of Liquidity performance of the Bank after the adoption of ICT.   According to George and Mallery (2010) as sited by Medrano et al. (2014),skewness and kurtosis values in the study have considerable acceptable range of +/- 2.This shows that the assumption of normality test is not violated.

LIQ1 (Liquid asset to total assets) has 25.27%, 72.54% and 49.67% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of LIQ1shows a decreasing trend during the post adoption of ICT with 14.74%, 4.80% and4.88%. This shows that the liquidity position of the banks has decreased during the post adoption of ICT since their asset is tied up more on non-liquid asset.

SIZ (natural logarithm of total assets) has 8.14%, 10% and 9.21% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of SIZ has shown an increasing trend during the post adoption of ICT with 2.07%, 2.10% and 2.21%.

ITINV shows a minimum, maximum and mean ratio of 19.02%, 18.17% and 10.42% respectively with 4.38% of minimumvariation of the standard deviation value of the ITINV from the mean. The result indicated that 10.42% of total cost is invested on ICT infrastructure.

LGR (annual growth rate of gross loan) has 0.01%, 0.42% and 0.19% minimum, maximum and mean value respectively. As compared from the pre adoption of ICT the value of LGR has shown decrease during the post adoption of ICT with 0.17 %, 0.58% and 0.17 %.

4.1.3. 3   *Correlation analysis Between ROA, ROE, NIM and explanatory variables*

In this section correlation analysis between Profitability performance: ROA, ROE, NIM and explanatory variables;CAR, NPL, MEF,LIQM and ITINV were undertaken. The coefficient shows the direction and magnitude of the relationships, whether it is strong, weak, positive and negative. A strong relationship has higher coefficient value where as smaller coefficient value is an indicator of weak relationship.

The result shows on the blow table, there are positive relations between ROA with CAR and LIQM, ROE with LIQM and ITINV, NIM with CAR, LIQM and INTIV. While there are negative relations between ROA with NPL, MEF and ITINV, ROE with CAR, NPL and MEF, NIM with NPL and MEF.

Table 4.7 Correlation Analysis of ROA, ROE, NIM and explanatory variables
Correlations

	ROA	ROE	NIM	CAR	NPL	MEF	LIQM	ITINV
ROA	1							
ROE	.554	1						
NIM	.420	.205	1					
CAR	.760*	-.092	.594	1				
NPL	-.557	-.565	-.270	-.156	1			
MEF	-.495	-.163	-.490	.669	-.485	1		
LIQM	.668	.583	.860**	-.474	.006	-.522	1	
ITINV	-.165	.413	.821**	-.514	.015	-.487	.662	1

*. Correlation is significant at the 0.05 level (2-tailed).

 **. Correlation is significant at the 0.01 level (2-tailed).
c. Listwise N=10

Source: *Own calculation*

Table 4.7 shows correlation analysis of variables used in the model of profitability performance of the bank after the adoption of ICT. The relationship between variables is analyzed and tested using Pearson correlation. The table presents there is positive correlation between ROA with CAR and LIQM at coefficient value of 0.760 and 0.668 respectively. The result indicated that the correlation coefficients of ROA and CAR shows strong relationships at 95% of significant level whereas and no statistically significant relationship between ROA and LIQM. However, ROA is correlated negatively with NPL, MEF and ITINV by coefficient value of -0.557, -0.495 and -0.165respectively with no significant level.

The other profitability measure is ROE, as indicated on the above table correlation coefficient between ROE with LIQM and INTIV is positive which is 0.583 and 0.413 respectively. Even though both variables have small coefficient value, they contributed positively for ROE. ROE also have a negative correlation with CAR, NPL andMEF by coefficient value of -0.092,
 -0.565 and -0.165 and the result indicated that the relationship is not statistically significant.

The other profitability measure is NIM, as indicated on the above table correlation coefficient between NIM with CAR, LIQM and ITINV is positive which is 0.594, 0.860 and 0.821 respectively. This indicated that the relationship is strong at a significant level of 99% for LIQM and ITINV. However, NIM is correlated negatively with NPL and MEFby coefficient value of -0.270 and -0.490 respectively but the relationship is not statistically significant.

4.1.3. 4   *Correlation analysis between LIQ1 and Explanatory Variables*

In this section correlation analysis between Liquidity performance: LIQ1 and explanatory variables: CAR, SIZ, LGR, NPL and ITINV were undertaken. The coefficient shows the direction and magnitude of the relationships, whether it is strong, weak, positive and negative. A strong relationship has higher coefficient value where as smaller coefficient value is an indicator of weak relationship.

Table 4.8 Correlation Analysis of LIQ1 and explanatory variables

Correlations

	LIQ1	CAR	SIZ	LGR	NPL	ITINV
LIQ1	1					
CAR	.475	1				
SIZ	.742*	.602	1			
LGR	-.540	-.493	-.545	1		
NPL	-.303	-.282	-.300	-.314	1	
ITINV	-.524	-.330	-.348	.202	.022	1

*. Correlation is significant at the 0.05 level (2-tailed).
c. Listwise N=10
Source: *Own calculation*

Table 4.8 shows correlation analysis of variables used in the model of liquidity performance of the Bank after the adoption of ICT. The table shows that there are positive correlation coefficient between LIQ1 with CAR and SIZwith coefficient value of 0.475 and 0.742 respectively. This mean increase in CAR and SIZ has a positive impact on LIQ1. The result

indicated that the relationship is strong at 95% of significant level between LIQ1 and SIZ whereas the relationship is not statistically significant between LIQ1 and CAR. However, LIQ1 is correlated negatively with LGR, NPL and ITINV by coefficient a value of -0.540, -0.303 and -0.524 respectively with no significant level.

4.1. 4 Findings of Regression Analysis

To determine the effect of ICT on bank performance, multiple linear regressions was conducted to establish the effect of ICT on bank performance. Regression analysis helps in establishing a functional relationship between two or more variables and predicts the values of dependent variables from the value of independent variables. In the model, Bank performance:ROA, ROE, NIM and LIQ1 as dependent variable and CAR, NPL, MEF, LIQM, SIZ, LGR AND ITINV as independent variables were used, as the effort of this research is to achieve some clearer set of objectives on the research topic. The regression analysis results are present in table 4.10 to 4.20

4.1.4.1. Regression Analysis of ROA
- **Model Summary**

The tables blow shows the key components of regressions model which is multiple correlation (R), R squared (R^2) to determine the amount of variance in the dependent variable explained by the independent variables. The dependent variable here is ROA and five independent variables are CAR, NPL, MEF, LIQM and ITINV were used.

Table 4.9 Regression Analysis Model Summary for ROA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.948[a]	.898	.771	.21119	2.277

a. Predictors: (Constant), ITINV, NPL, CAR, MEF, LIQM

b. Dependent Variable: ROA

Source: *Own calculation*

R (Coefficient of Correlation):-showsthe magnitude of the relationship between the dependent variable and the combination of the predictor variables. In this case, R=.948 which tells there is a strong relationship between dependent and independent variables.

R Square (Coefficient of Determination): -shows the proportion of variation in dependent variable accounted for by the set of independent variables.In this case, R^2=.898 which means 89.8% of the variation in ROA is accounted for through the combined linear effects of the independent variables;CAR, NPL, MEF, LIQM and ITINV. The remaining 10.2% of variation in ROA is accounted for other factors which are not included in the model of profitability performance of the study.

Durbin-Watson: - used to test autocorrelation in the residuals in the regression analysis. As a general rule of thumb a value close to 0 indicates strong positive correlation while a value close to 4 indicates strong negative correlation. In this case, the Durbin-Watson d=2.27, which is between the two critical values of 1.5<d<2.5 and therefore, there is no first order linear auto-correlation on the multiple linear regression data.

- **Anova**

The tables blow presents the test of significance of the regression equation used the model.

Table 4.10 ANOVA table for ROA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	1.573	5	.315	7.055	.041[b]
1	Residual	.178	4	.045		
	Total	1.752	9			

a. Dependent Variable: ROA

b. Predictors: (Constant), ITINV, NPL, CAR, MEF, LIQM

Source: *Own calculation*

Table 4.10 shows the result of ANOVA analysis of ROA. To predict the goodness of fit of the regression model, F- ratio and Significant (P-value) were examined. The analysis shows that F-stat is 7.06 and the level of significant is less than 5% (0.041). This implies that the regression equation was well specified.

Table 4.11 Coefficient table for ROA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.573	1.161		1.355	.247		
	CAR	.271	.063	.998	4.339	.012	.481	2.079
	NPL	-.218	.077	-.559	-2.822	.048	.650	1.539
	MEF	-.188	.163	-.320	-1.158	.311	.332	3.008
	LIQM	.009	.012	.264	.799	.469	.232	4.301
	ITINV	-.082	.023	-.718	-3.579	.023	.152	6.588

a. Dependent Variable: ROA

Source: *Own calculation*

The analysis predicts the ROA with about 89.8% explanatory power by the following model:

$ROA = \beta_0 + \beta_1 CAR_t + \beta_2 NPL_t + \beta_3 MEF_t + \beta_4 LIQM_t + \beta_5 ITINV_t + \varepsilon_t$

$ROA = 1.573 + .271*CAR_t - .218*NPL_t - .188 MEF_t + .009*LIQM_t - 0.082*ITINV_t$

To assess the significance of each independent variable on the dependent variable ROA, the above table reports the actual impact of each independent variable in predicting the dependent variable.

Unstandardized coefficients (β) interpreted as the size of the difference in the dependent variable that corresponds with a one unit difference in the independent variable. As shown in the table, the coefficient for CAR is 0.271; it indicated that for every one unit increase in the CAR, there is a predicted increase in the ROA by .2.71. The relationship is significant since the P-value is less than 0.05 (t=4.339 and p=0.012)

For independent variable NPL, the coefficient value is -0.218; it indicated that for every one unit increase in the NPL, there is a predicted decrease in the ROA by 0.218. The relationship issignificant since the P-value is less than 0.05 (t=-2.82 and p=0.048)

For independent variable MEF, the coefficient value is -0.188; it indicated that for every one unit increase in the MEF, there is a predicted decreasein the ROA by 0.188. However, the relationship isinsignificant since the P-value is greater than 0.05 (t=-1.158 and p=0.311)

For independent variable LIQM, the coefficient value is 0.009; it indicates that for every one unit increase in the LIQM, there is a predicted increase in the ROA by 0.009.However, their relationship is insignificant since the P-value is greater than 0.05 (t=--0.799 and p=0.469)

For independent variable ITINV, the coefficient value is -0.082; it indicates that for every one unit increase in the ITINV, there is a predicted decline in the ROA by 0.082. The relationship is significant since the P-value is greater than 0.05 (t=-3.58 and p=0.023). Since the value of p<.05, the study reject the null hypothesis and retain the alternative hypothesis.

Standardized Beta Coefficient is used to compare the strength of the effect of each independent variable on the dependent variable. In this case, CAR has the strongest coefficient (0.998), followed by LIQM (0.264). This indicated that the effect of the independent variables on the dependent variable is strong.

4.1.4.2. Regression Analysis of ROE

- **Model Summary**

The tables blow shows the key components of regressions model which is multiple correlation (R), R squared (R^2) to determine the amount of variance in the dependent variable explained by the independent variables. The dependent variable here is ROE and five independent variables are CAR, NPL, MEF, LIQM and ITINVwere used.

Table 4.12 Regression Analysis Model Summary for ROE

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.945ª	.894	.761	1.50699	1.903

a. Predictors: (Constant), ITINV, NPL, CAR, MEF, LIQM
b. Dependent Variable: ROE
Source: *Own calculation*

R (Coefficient of Correlation):- shows the magnitude of the relationship between the dependent variable and the combination of the predictor variables. In this case, R=.945 which tells there is a strong relationship between dependent and independent variables.

R Square (Coefficient of Determination):- shows the proportion of variation in dependent variable accounted for by the set of independent variables. In this case, R^2 =.894 which means 89.4% of the variation in ROE is accounted for through the combined linear effects of the independent variables;CAR, NPL, MEF, LIQM and ITINV. The remaining 10.6% of variation in ROE is accounted for other factors which are not included in the model of profitability performance of the study.

Durbin-Watson: - shows used to test autocorrelation in the residuals in the regression analysis. As a general rule of thumb a value close to 0 indicates strong positive correlation while a value close to 4 indicates strong negative correlation. . In this case, the Durbin-Watson d=1.90, which is between the two critical values of 1.5<d<2.5 and therefore, there is no first order linear auto-correlation on the multiple linear regression data.

- ▪ **Anova**

The tables blow presents the test of significance of the regression equation used the model.

Table 4.13 ANOVA table for ROE

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.514	5	15.303	6.738	.044[b]
	Residual	9.084	4	2.271		
	Total	85.598	9			

a. Dependent Variable: ROE

b. Predictors: (Constant), ITINV, NPL, CAR, MEF, LIQM

Source: *Own calculation*

Table 4.13 shows the result of ANOVA analysis of ROE. To predict the goodness of fit of the regression model, F- ratio and Significant (P-value) were examined. The analysis shows that F-stat is 6.738 and the level of significant is less than 5% (0.044). This implies that the regression equation was well specified.

Table 4.14 Coefficient table for ROE

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	37.909	8.388		4.519	.011		
	CAR	1.009	.498	.469	2.025	.113	.494	2.023
	NPL	-2.261	.512	-.815	-4.417	.012	.778	1.285
	MEF	-2.743	.882	-.833	-3.109	.036	.369	2.707
	LIQM	.095	.084	.395	1.133	.321	.218	4.586
	ITINV	.797	.261	1.003	3.050	.038	.152	6.588

a. Dependent Variable: ROE

Source: *Own calculation*

The analysis predicts the ROE with about 89.4%% explanatory power by the following model:

$ROE = \beta_0 + \beta_1 CAR_t + \beta_2 NPL_t + \beta_3 MEF_t + \beta_4 LIQM_t + \beta_5 ITINV_t + \epsilon_t$

$ROE = 37.91 + 1.009*CAR_t - 2.261*NPL_t - 2.743*MEF_t + .095*LIQM_t + .797*ITINV_t$

To assess the significance of each independent variable on the dependent variable ROE, the above table reports the actual impact of each independent variable in predicting the dependent variable.

Unstandardized coefficients (β) interpreted as the size of the difference in the dependent variable that corresponds with a one unit difference in the independent variable. As shown in the table, the coefficient for CAR is 1.009; it indicated that for every one unit increase in the CAR, there is a predicted increase in the ROE by 1.009. However, the relationship is insignificant since the P-value is greater than 0.05 (t=-2.025 and p=0.113).

For independent variable NPL, the coefficient value is -2.261; it indicated that for every one unit increase in the NPL, there is a predicted decease in the ROE by 2.261. The relationship issignificant since the P-value is less than 0.05 (t=-4.417 and p=0.012).

For independent variable MEF, the coefficient value is -2.743; it indicated that for every one unit increase in the MEF, there is a predicted decline in the ROE by 2.743.The relationship is significant since the P-value is less than 0.05 (t= -3.109 and p=0.036).

For independent variable LIQM, the coefficient value is 0.095; it indicated that for every one unit increase in the LIQM, there is a predicted increase in the ROE by 0.095. The relationship is insignificant since the P-value is greater than 0.05 (t=1.133 and p=0.321).

For independent variable ITINV, the coefficient value is 0.797, it indicated that for every one unit increase in the ITINV, there is a predicted increase in the ROE by0.797. The relationship is significant since the P-value is less than 0.05(t= 3.050 and p=0.038). Since the value of $p<.05$, the study rejectthe null hypothesis and retain the alternative hypothesis.

Standardized Beta Coefficient is used to compare the strength of the effect of each independent variable on the dependent variable. In this case, ITINV has the strongest coefficient (1.003) followed by CAR (0.469) and LIQM(0.395). This indicated that the effect of the independent variables on the dependent variable is strong.

4.1.4.3.   Regression Analysis of NIM

▪ **Model Summary**

The tables blow shows the key components of regressions model which is multiple correlation (R), R squared (R^2) to determine the amount of variance in the dependent variable explained by the independent variables. The dependent variable here is NIM and five independent variables are CAR, NPL, MEF, LIQM and ITINVwere used.

Table 4.15 Regression Analysis Model Summary for NIM

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.946^a	.895	.763	3.68459	2.240

a. Predictors: (Constant), ITINV, NPL, CAR, MEF, LIQM

b. Dependent Variable: NIM

R (Coefficient of Correlation):-shows the magnitude of the relationship between the dependent variable and the combination of the predictor variables. In this case, R=0.946 which tells there is a strong relationship between dependent and independent variables.

R Square (Coefficient of Determination): -shows the proportion of variation in dependent variable accounted for by the set of independent variables. In this case, $R^2 =0.895$ which means 89.5% of the variation in NIM is accounted for through the combined linear effects of the independent variables,CAR, NPL, MEF, LIQM and ITINV. The remaining 10.5% of variation in NIM is accounted for other factors which are not included in the model of profitability performance of the study.

Durbin-Watson: -shows used to test autocorrelation in the residuals in the regression analysis. As a general rule of thumb a value close to 0 indicates strong positive correlation while a value close to 4 indicates strong negative correlation. . In this case, the Durbin-Watson d=2.24, which is between the two critical values of 1.5<d<2.5 and therefore, there is no first order linear auto-correlation on the multiple linear regression data.

▪ **Anova**

The tables blow presents the test of significance of the regression equation used the model.

Table 4.16 ANOVA table for NIM

ANOVAª					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	461.745	5	92.349	6.802	.043ᵇ
1 Residual	54.305	4	13.576		
Total	516.050	9			

a. Dependent Variable: NIM

b. Predictors: (Constant), ITINV, NPL, CAR, MEF, LIQM

Source: *Own calculation*

Table 4.16 shows the result of ANOVA analysis of NIM. To predict the goodness of fit of the regression model, F- ratio and Significant (P-value) were examined. The analysis shows that F-stat is 6.802 and the level of significant is less than 5% (0.043). This implies that the regression equation was well specified.

Table 4.17 Coefficient table for NIM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-51.896	20.852		-2.489	.068		
	CAR	-1.162	1.486	-.136	-.782	.478	.361	2.769
	NPL	-3.670	1.106	-.395	-3.317	.029	.767	1.304
	MEF	-9.627	2.228	-.678	-4.321	.012	.441	2.265
	LIQM	.629	.122	.829	5.153	.007	.419	2.386
	ITINV	.932	.325	.396	2.869	.046	.571	1.752

a. Dependent Variable: NIM

Source: *Own calculation*

The analysis predicts the NIM with about 89.5% explanatory power by the following model:

$NIM = \beta_0 + \beta_1 CAR_t + \beta_2 NPL_t + \beta_3 MEF_t + \beta_4 LIQM_t + \beta_5 ITINV_t + \epsilon_t$

$NIM = -51.896 - 1.162 * CAR_t - 3.67 * NPL_t - 9.627 * MEF_t + .629 * LIQM_t + .932 * ITINV_t$

To assess the significance of each independent variable on the dependent variable NIM, the above table reports the actual impact of each independent variable in predicting the dependent variable.

Unstandardized coefficients (β) interpreted as the size of the difference in the dependent variable that corresponds with a one unit difference in the independent variable. As shown in the table, the coefficient for CAR is - *1.162*, it indicated that for every one unit increase in the CAR, there is a predicted decrease in the NIM by 1.162. The relationship is insignificant since the P-value is greater than 0.05 (t=-0.782 and p=0.478).

For independent variable NPL, the coefficient value is -3.670; it indicated that for every one unit increase in the NPL, there is a predicted decreasein the NIM by 3.670. The relationship is significant since the P-value is less than 0.05(t= -3.317 and p=0.029).

For independent variable MEF, the coefficient value is -9.627; it indicated that for every one unit increase in the MEF, there is a predicted decreasein the NIM by 9.627. Their relationship is significant since the P-value is less than 0.05 (t=-4.321 and p=0.012).

For independent variable LIQM, the coefficient value is 0.629; it indicated that for every one unit increase in the LIQM, there is a predicted increase in the NIM by 0.629. Their relationship is significant since the P-value is less than 0.05 (t= 5.153 and p=0.007).

For independent variable ITINV, the coefficient value is 0.932, it indicated that for every one unit increase in the ITINV, there is a predicted increase in the NIM by 0.932. Their relationship issignificant since the P-value is less than 0.05 (t=2.869 and p=0.046). Since the value of p<.05, the study rejectthe null hypothesis and retainthe alternative hypothesis.

Standardized Beta Coefficient is used to compare the strength of the effect of each independent variable on the dependent variable. In this case, LIQMhas the strongest coefficient (0.829), followed by ITINV (0.396). This indicated that the effect of the independent variables on the dependent variable is strong.

4.1.4.4. Regression Analysis of LIQ1

▪ **Model Summary**

The tables blow shows the key components of regressions model which is multiple correlation (R), R squared (R^2) to determine the amount of variance in the dependent variable explained by the independent variables. The dependent variable here is LIQ1 and five independent variables are CAR, SIZ, LGR, NPL andITINV was used.

Table 4.18 Regression Analysis Model Summary for LIQ1

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.945^a	.892	.758	3.36439	2.40

a. Predictors: (Constant), ITINV, NPL, SIZ, LGR, CAR

b. Dependent Variable: LIQ1

Source: *Own calculation*

R (Coefficient of Correlation):-shows the magnitude of the relationship between the dependent variable and the combination of the predictor variables. In this case, R=0.945 which tells there is a strong relationship between dependent and independent variables.

R Square (Coefficient of Determination): - shows the proportion of variation in dependent variable accounted for by the set of independent variables. In this case, $R^2 = 0.892$ which means 89.2%% of the variation in LIQ1 is accounted for through the combined linear effects of the independent variables; CAR, SIZ, LGR, NPL and ITINV. The remaining 10.8% of variation in LIQ1 is accounted for other factors which are not included in the model of profitability performance of the study.

Durbin-Watson: -showsused to test autocorrelation in the residuals in the regression analysis. As a general rule of thumb a value close to 0 indicates strong positive correlation while a value close to 4 indicates strong negative correlation.In this case, the Durbin-Watson d=2.27, which is between the two critical values of 1.5<d<2.5 and therefore, there is no first order linear auto-correlation on the multiple linear regression data.

- ▪ **Anova**

The tables blow presents the test of significance of the regression equation used the model.

Table 4.19 ANOVA table for LIQ1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	374.950	5	74.990	6.625	.045[b]
	Residual	45.277	4	11.319		
	Total	420.226	9			

a. Dependent Variable: LIQ1

b. Predictors: (Constant), ITINV, NPL, SIZ, LGR, CAR

Source: *Own calculation*

Table 4.19shows the result of ANOVA analysis of LIQ1. To predict the goodness of fit of the regression model, F- ratio and Significant (P-value) were examined. The analysis shows that F-stat is 6.625 and the level of significant is less than 5% (0.045). This implies that the regression equation was well specified.

Table 4.20 Coefficient table for LIQ1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	55.505	18.649		2.976	.041		
	CAR	-8.719	3.000	-1.359	-2.906	.044	.106	9.439
	SIZ	11.608	4.148	1.260	2.799	.049	.114	8.746
	LGR	-62.957	19.346	-.582	-3.254	.031	.723	1.383
	NPL	-.680	1.150	-.103	-.591	.586	.770	1.299
	ITINV	-.883	.298	-.636	-2.965	.041	.504	1.983

a. Dependent Variable: LIQ1

Source: *Own calculation*

The analysis predicts the LIQ1 with about 89.2% explanatory power by the following model:

$LIQ = \beta_{0} + \beta_{1} CAR_{t} + \beta_{2} SIZ_{t} + \beta_{3}LGR_{t} + \beta_{4}NPL_{t} + \beta_{5}ITINV_{t} + \epsilon_{t}$

$LIQ = 55.51 - 8.72*CAR + 11.61*SIZ_{t} - 62.96*LGR_{t} - 0.68*NPL_{t} - 0.88*ITINV_{t}$

Multi Collinearity occurs when variables have strongly redundant information. If variables are collinear, there is not enough distinct information in these variables for the multiple regression procedure to operate correctly. Multi collinearty is indicated when the tolerance value for an independent variable is less than 0.10. In this case the tolerance values for all of the independent variables are larger than 0.10 Therefore; the assumption of multi collinearity is not a problem in this regression analysis.

To assess the significance of each independent variable on the dependent variable LIQ1,theabove table reports the actual impact of each independent variable in predicting the dependent variable.

Unstandardized coefficients (β) interpreted as the size of the difference in the dependent variable that corresponds with a one unit difference in the independent variable. As shown in the table, the coefficient for CAR is -8.72; it indicated that for every one unit increase in the CAR, there is a predicted decrease in LIQ1 by 8.72. The relationship is significant since the P-value is less than 0.05 (t=-2.906 and p=0.044).

For independent variable SIZ, the coefficient value is 11.61; it indicated that for every one unit increase in the SIZ, there is a predicted increase in LIQ1 by 11.61 The relationship is significant since the P-value is less than 0.05 (t=2.799 and p=0.049).

For independent variable LGR, the coefficient value is -62.96; it indicated that for every one unit increase in the LGR, there is a predicted decrease in LIQ1 by 62.96. The relationship is significant since the P-value is less than 0.05 (t=-3.254 and p=0.031)

For independent variable NPL, the coefficient value is -0.680; it indicates that for every one unit increase in the NPL, there is a predicted decline in the LIQ1 by =0.680. The relationship is insignificant since the P-value is greater than 0.05 (t=-0.591 and p=0.586)

For independent variable ITINV, the coefficient value is -0.883, it indicates that for every one unit increase in the ITINV, there is a predicted decrease in LIQ1 by 0.883. The relationship is significant since the P-value is less than 0.05 (t=-2.965 and p=0.041). Since the value of p<0.05, the study reject the null hypothesis and retain the alternative hypothesis.

Standardized Beta Coefficient is used to compare the strength of the effect of each independent variable on the dependent variable. In this case, SIZ has the strongest coefficient (1.26). This indicated that the effect of the independent variables on the dependent variable is strong.

Table 4.21 Paired Samples Statistics Table

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ROAPostICT	2.8950	8	.48240	.17056
	ROAPreICT	1.2938	8	.49071	.17349
Pair 2	ROEPostICT	31.9325	8	3.04142	1.07530
	ROEPreICT	20.1100	8	5.95638	2.10590
Pair 3	NIMPostICT	58.8012	8	8.31926	2.94130
	NIMPreICT	55.1113	8	23.51861	8.31509
Pair 4	LIQ1PostICT	34.1025	8	7.78664	2.75299
	LIQ1PreICT	36.2563	8	5.40503	1.91097

Source: *Own calculation*

As shown in the above table ROA, ROE and NIM shows bank performed better in regard to profitability during post adoption of ICT (2005-2014) while compared with the pre adoption of

ICT period (1997-2004). The table revealed that the mean value for ROA was 2.89 for the period 2005-2014 compared to 1.29 for the period 1997-2004. ROE shows the mean value of 31.93 for the period 2005-2014 compared to 20.11 for the period 1997-2004. NIM shows the mean value of 58.80 for the period 2005-2014 compared to 55.11 for the period 1997-2004. With regard to Liquidity, LIQ1 shows the mean value of 34.10 for the period 2005-2014 compared to 36.26 for the period 1997-2004. The trend shows deterioration during post adoption of ICT.

Table 4.22 Paired Samples Test Table

Paired Samples Test

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	ROAPostICT - ROAPreICT	1.60125	.49732	.17583	9.107	7	.000
Pair 2	ROEPostICT - ROEPreICT	11.82250	6.52246	2.30604	5.127	7	.001
Pair 3	NIMPostICT - NIMPreICT	3.69000	28.63241	10.12308	.365	7	.726
Pair 4	LIQ1PostICT - LIQ1PreICT	-2.15375	12.57558	4.44614	-.484	7	.643

Source: *Own calculation*

Paired sample test is used to compares the mean value of the two periods. The purpose of the test is to determine whether there is statistical evidence that the mean difference between paired data is statistically significant. Accordingly, the above table shows the result of Paired samples test for difference of means applied to test pre and post adoption of ICT. As shown on table 4.22the p-value of ROA, ROE and NIM are 0.000, 0.001 and 0.726 respectively. The differences between the two periods performances are statistically significant as the P-values of ROA and ROE are below 0.05. This indicated that the bank significantly progressed in profitability performance measured in ROA and ROE during post adoption of ICT (2005-2014). Whereas, the p-value of NIM is 0.726, this indicated that the bank progress is insignificant in regard profitability performance measured in NIM during post adoption of ICT (2005-2014). With regard to LIQ1, the P-value is 0.643. The difference between the liquidity performances for the two periods is statistically insignificant as the P-value is above 0.05. This indicates that the bank has not shown a significant progress in liquidity performance during the post adoption of ICT (2005-2014).

CHAPTER FIVE

This chapter summarizes the conclusion and recommendations which were arrived at after analysis of the data. It also gives the limitation of the research and suggestions for further research.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The study assessed the impact of ICT investment on Bank performance: Profitability and Liquidity performance of Dashen Bank. In this chapter summary and conclusion of the findings are presented. And finally the recommendation has been given that would be important for the Bank and for further study of the impact of ICT investment on Bank performance.

5.1. Summary of the Findings

The objective of this study is to identify the impact of information communication technology (ICT) on Bank performance in Dashen Bank. To achieve the objective, the study used eighteen year financial data of the bank as ROA, ROE, NIM and LIQ1 used as dependent variables of the study and ITINV as independent variable. To determine the percentage contribution of the identified significant independent variables on dependent variable, multiple regression analysis was utilized. Since the study used more than one independent variable, normality of the distribution and multicolinearity test has been done. The findings are summarized as follows:

Considering the result from descriptive statistics analysis, mean value of post adoption of profitability performance; ROA, ROE and NIM have been showed an increase when comparedwith pre adoption of ICT. The value is changed by 1.65%, 11.15% and 5.16 % for ROA, ROE and NIM respectively. The result represented that the bank profitability is better during the post adoption of ICT. However, in regard to liquidity performance of the bank as represented as LIQ1, the mean value has shown a declinein the post adoption of ITC period. The value is decreased from 54.56% liquidity position of the bank to 49.67%; it indicated that the assets are tied up on non-liquid assets since they invest more on ICT.

In relation to correlation analysis result, ITINV has a positive correlation with profitability performance of the bank; ROE and NIM with correlation coefficient value of 0.413 and 0.821

respectively. The relationship between ITINV and NIM is statistically significant with 99% confidence level. However, ITINV has negative impact to ROA with correlation coefficient value of -0.165 but the relationship is not statistically significant. In relation to Liquidity performance of the bank ITINV has a negative and statistically insignificant relationship with correlation coefficient value of -0.524with LIQ1.

The result obtained from regression analysis of ROA, ROE, NIM is R=0.948, 0.945 and 0.946respectively. This indicated that there is strong relationship between the dependent and independent variable employed on the model. The $R^2$is 0.898, 0.894 and 0.895 for ROA, ROE and NIM respectively. The result indicated that a minimum of 89.1% variation on profitability performance of the bank has been via independent variables. The findings ANOVA table also revealed that the p value is 0.041, 0.044, and 0.043 for ROA, ROE and NIM respectively; this indicated that the regression model and equations is well specified. The value of regression coefficient of ITINV in the model ROA, ROE and NIMis -0.082, 0.797 and 0.932 respectively. This indicated that one unit change in ITINV there is a decrease in ROA by 0.082 and an increase on ROE and NIM by 0.797 and 0.0932 respectively on profitability performance of the Bank. As shown the result the ITINV is correlated positively with the profitability performance measured by ROE and NIM at statistically significant level of 0.038 and 0.046. Negative correlation has been shown between ITINV and ROA at significant level of 0.023. The result also showed that ITINV is the strong contributor for profitability performance measure on ROE and NIM from the specified regression model variables. On the other hand the regression coefficient result of Liquidity performance model revealed that there is statistically significant relationship between LIQ1 and ITINV since the P-value is less than 0.05.

Form Paired sample test result, the mean value of profitability performance measured by ROA, ROE and NIM is increased after the period of post adoption of ICT by 1.6, 11.823 and 0.756 respectively. However the test result shows a decreased in regard to Liquidity during the post adoption period by 4.69. The study also found that as compared the mean value of the two periods the profitability performance mean difference is significant since the P-value is less than 0.05. In contrary to this finding the mean difference is not significant on Liquidity performance since the P-value is greater than 0.05

5.2.　　Conclusion

The study focus on the impact of ICT investment on Bank Performance over the period of eighteen year by separated the period in two; pre adoption of ICT (1997-2004) and post adoption of ICT (2005-2014). For the purpose of this study qualitative research approach were adopted. The data which are collected from the secondary source were analyzed using descriptive and multiple regression statistical technique*s*. For measuring Bank performance the study used two indicators, the profitability and liquidity performance of the Bank. Hypothesis formulate were tested and based on the finding of the study drawn the following conclusions.

In regard to the profitability performance of the bank, the finding of regression analysis shows that ITINV significantly affect profitability performance measured by ROA, ROE and NIM since the p-value is less than 0.05. Therefore, the study rejects the null hypothesis and retains the alternative hypothesis. The analysis result of ROE and NIM supported the study of Ibrahim &Muhammed (2013), Agbolade (2011) and Binuyo&Aregbeshola (2014) that ITINV has a positive impact on profitability performance of the bank in general and improves same. The increase in ITINVE has an increase impact on profitability performance measured on ROE and NIM. Unlike the finding of Josiah & Nancy (2012), the study suggests that information technology investment has a negative relationship with bank profitability measured by ROA. The increase in ITINV has a decrease impact on ROA. ICT investment is deployed with higher cost, including fixed cost and maintenance cost, thus affecting negatively the profitability performance (ROA) of the bank. The effect of ITINV on liquidity performance of the bank as measured by LIQ1 is significant since the P-value is less than 0.05. Therefore, the study rejects the null hypothesis and retains the alternative hypothesis.

In considering the paired sample test, the mean value of post adoption of ICT is positive and greater than the pre adoption of ICT. This indicated that investment on ICT has a significant influence on profitability performance of the bank as measured by ROA and ROE after the adoption of ICT. The mean difference of NIM is not statistically significant. Even though, profitability of the bank has shown increased during the post adoption of ICT, the liquidity performance has showed decreased position. This implies that the bank asset has more tied up on non-liquid asset during the post adoption on ICT.

In conclusion, ICT investment has significant effect on the profitability performance of the bank. Thus, the results of the first model of regression analysis reject the null hypothesis and accept the alternative hypothesis. The result of the second model of regression analysis also rejects the null hypothesis and retains the alternative hypothesis as there is as statistically significant relationship between ITINV and LIQ1.

5.1.   Recommendations

Regardless of other purposes, making profit is the primary objective of establishing business. In order to achieve this objective and run the business smoothly, ICT is an important factor in today competitive Banking industry. In trying to identify the impact of ICT investment on Bank performance, the bank has achieved higher profitability during the post adoption of ICT as compared to pre adoption of ICT period. However, the bank liquidity position has exhibited a decreasing trend during the post adoption of ICT. Based on the finding of the study, the following recommendations are drawn to keep the bank competitive advantages on regard to the profitability position among other private banks and to improve the liquidity performance of the bank.

As can be seen from the finding and conclusion of this study investment in ICT has significant negative correlation with ROA. The bank should give emphasis on efficient utilization of ICT products by create awareness of their different service using different media like Television and organize workshop and public lecture on the implementation of ICT and its product to their customers. This will aid to increase acceptance and use of various products of the bank and will increased the gains from investing on ICT. This in turn increase the profit of the bank and increase the generation of income per birr cost of asset. In order to further enhance the performance, the bank should train their workers who in turn educate their customer on ICT and its products to keep them up to date the innovation in the use of ICT. This will enhance the performance of the bank and customer retentions among other competitors.

There is a positive correlation between bank profitability performance as measured by ROE and NIM with investment in information technology. It becomes imperative to increase ICT investment in order to increase profitability. Therefore, the study recommends investing in useful

ICT products and services by insuring they can get returns from such investments before the technology become outdated in order to remain successful.

The result of the second model has shown ICT investment has a negative correlation with liquidity performance of the bank after the adoption of ICT period. To overcome this challenge, Dashen Bank should use alternative mechanisms that can help to mobilize deposit since their liquid asset more tied up on non liquid asset. First of all the bank should mobilize deposit by educating its customer more about the implementation of ICT and its product. This will aid to customer more understanding on the products and the way how they utilize the system. Therefore, more customers will be attracted and the bank deposit will be grown. The introduction of ICT products and services not attract only new customer but also improves on customer retention and loyalty. Branch expansion also plays a major role in mobilization of funds by introducing agent banks on rural area without opening full fledge branches that reduces costs. This gives the bank a chance to tap the unbanked society. Therefore, the bank maintains its liquidity performance by increasing liquid assets as this will enable them meet their short term obligations.

5.2.   Limitation of the Study:

The following point is stated as limitation of the study:

- ✓ The research conducted on a single private bank which is Dashen Bank S.c. Increasing the sample size might increase the validity of the study.

5.3.   Suggestion for further Study

- ✓ Increase the population size of the study which includes private and government banks could improve the validity of the research.

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