THE EFFECT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY ON FINANCIAL PERFORMANCE OF RURAL BANKS IN GHANA

BY

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DECLARATION

I hereby declare that this submission is my own work towards the Master of Business Administration (Strategic Management) and that, to the best of my knowledge, it contains no materials previously published by another person nor material which has been accepted for the reward of any other degree of the university, except where due acknowledgement has been made in the text.

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DEDICATION

With much joy I dedicate this thesis to my beloved Wife and Child. They have been my inspiration.

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ABSTRACT

The study investigates the impact of information and communication technology on the performance of rural banks in Ghana using annual financial data stream from 2011 to 2014. Panel Data Regression was used to model the impact of the predictive variables on the dependent variables. The study revealed that deposits as well as efficiency have significant influence on the return on assets of the rural banks. This suggest that in the presence of efficient usage of ICT facilities the rural banks are more likely to experience high deposit turnover hence their ability to transform these deposits into more loans. However, evidence from the analysis suggest weak association between ICT investments and return on assets implying that continuous investment in ICT from competition with other rural banks will put a drain on the returns that the rural banks are to earn on their assets. The findings also reveal significant linkage between efficiency and the dependent variables; return on capital employed and gross profits of the rural banks suggesting that efficient usage of the ICT is relevant to the performance of the rural banking industry than reinvestment into different ICT components. However, on deposits, the findings suggest negative association with return on capital employed but positive association with gross profit of the rural banks. The study finds evidence for the relationship between ICT cost efficiency and the total deposits of the rural banks suggesting that efficient utilisation of their current ICT facilities will increase the extent to which customers deposit cash with the rural banks than continually investing in new information and communication technology facilities.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

There has been substantial improvement in the banking industry globally over the years. The way and manner in which financial services are delivered to customers has changed over the years. There has been significant change and improvement in the structure of the banking industry even though the banks traditional functions have being the same. Adewale and Afolabi (2013) asserted that there has been an increased in the various channels through which people can access financial services. New delivery technologies through e-banking products such as Internet banking, mobile banking and various Automated Teller Machine (ATM) products are now replacing the traditional delivery methods.

Electronic banking involves using electronic and telecommunication networks in deliveringthe various processed products and services to the clients of banks (Stephen, 2002). That is, it is simply carrying out banking operations through the use of information technology. It has been argued by Ovia (2001) that, Electronic banking emerged from e-commerce in the field of banking and financial services. It can be said that, the driving force of electronic banking in every country is Information and Communication Technology (ICT). There has been an improvement in the way and efficiency with which banks render services to customers since the introduction of electronic banking (Stephen, 2002). The Banking industry in every country including Ghana cannot do without information systems because information systems have an important roleto play in current banking system. All the cash flows of almost every bank are linked to the information systems within that particular bank. This is an issue which has become very important and of great concern to the industryas well

as a necessity for both local and international competitive banking is the application of information and communication technology concepts, techniques, policies and implementation strategies to banking services (Connel and Saleh, 2004). The banking industry has undergone an improvement in the delivery of services as a result of the improvement in Technology. For instance, consumers can now carry out banking transactions beyond banking hours through Automated Teller Machines (ATMs) and deposit machines. It is possible for an individualto check his/her account balance and make paymentswithout going to the banking hall by means of online banking. The end result is likely to be the creating of a society whereconsumers no longer have to pay for all their purchases with hard cash. Bank customers can for instance pay bills and purchase other goods by transferring the money directly from their accounts, or pay for various services by electronic transfers of credit to the sellers account(Adewale and Afolabi 2013).

As mobile phones have become commonly used by the populace in every area of the country, banks had the urge to introduced mobile banking service to cater for customers who are always on the move. Mobile banking allows individuals to check and receive their account balances and transfer funds from their accounts for various purposes using their mobile phones (Abor, 2004). Since the inception of this innovation, banks have employed various methods for perfecting this service through the interlinking of customers' deposit accounts with mobile money transfer systems. By so doing, this e-banking service has made banking transactions easier around the World of which Ghana is no exception. Effective financial performance is required to enable the organization to be able to survive in both the short and in the long run. As noted by Gompers, Ishii and Metrick (2003) firm performance can be represented by the Tobin's Q. Another measure of firm performance usually used by researchers is the earnings quality concept which is subjective and based on the context in

which it used. Therefore, it does not conform to anysingle definition. There are various perspectives of viewing and assessing earnings quality. Schipper and Vincent (2003), put forward that earnings quality can be viewed and assessed by using two different perspectives. The first perspective of the assessment is known as decision usefulness. This perspective is context specificand so assessments of earnings quality is made from the perspective of decision usefulness which inevitably confronts a myriad of users and uses…"The second perspective of assessing earnings quality used by Schipper and Vincent, (2003) refers to the use of the Hicksian concept of income (Hicks, 1935), which has been noted by many authors as not being capable of empirical observation.

Even though there are many enumerated importance of Information Communication Technology and e-commerce, there has been various arguments on whether their adoption improves banks' financial performance or not. The investment in and use of ICT needs investments additionally in skills, structural changes in the organization together with innovation to be able access the full impact. The investment and change also involves risks and costs notwithstanding its potential benefits. E-banking has the potential of creating a great influence on turnover and profitability of Banks by creating employment opportunities, especially when it is part of the overall corporate strategy of the Bank (Kariuki, 2005). The overall increment and improvement in the financial performance of the bank in terms of market share value, increased product range, tailor-made products and efficient customer demand response can be obtained by the use of e-banking. E-banking services continuously affect banks operations and their income structure. Some of the operations and services that are most likely to be affected by the change are those that have not been combined with ICT developments. This is especially true for some retail banking activities that can be standardized, and also to developments in remote banking (Kariuki, 2005). It is against this

background that there is the need to research into the effects of Information Communication Technologyon financial performance in the rural banking sector.

1.1 STATEMENT OF PROBLEM

Ghana banking sector has witnessed many changes since the introduction of e-banking. At the moment, customers of banks have efficient, fast and convenient banking services. In the efforts of providing quality and acceptable services, most banks in Ghana have resulted to invest huge funds in information and communication Technologies. While the rapid growth in information technology has made some banking tasks more efficient and cost effective, investments in various technological infrastructure are taking a larger share of banks' accrued income (Abor, 2004). Currently, apart from staff costs and other operational costs, technology is usually the item in the budget with the highest cost of most rural banks, and the fastest growing item as well.

Rural banks' branches in Ghana were not networked to operate together implying that if a person has an account at say Juaben rural bank, Ejisu branch, that person can only withdraw from and save at only that branch. But now, branches of rural banks in Ghana have now been networked through software called T24. The networking of rural banks in Ghana through this software implies that customers of rural banks in Ghana can now deposit or withdraw money from any branch of a rural bank without necessarily going to his/her main branch.

This huge investment in ICT infrastructure by these Rural Banks will have variable impacts on both the operational and financial performance of the Rural Banks but there has being no research on the effects of networking of all rural banks on their financial performance. This research therefore seeks to bridge this gap.

1.2 OBJECTIVES OF THE STUDY

The prime objective of the study is to make an assessment of the effects of ICT on financial performance among rural banks in Ghana. From this main objective, the following specific objectives have being developed:

1) To assess the impact of ICT investments on profit before tax of the rural banks in Ghana.

2) To assess the impact of ICT Investments on deposits and efficiency of rural banks in Ghana.

3) To assess the relationship between ICT investment and Returns on capital employed among rural banks in Ghana.

4) To assess the relationship between ICT investment and Returns on assets among rural banks in Ghana.

1.3 RESEARCH QUESTIONS

To provide answers to the research objectives, the researchers outline the following questions:

1) What impact does ICT investments have on profit before tax of the rural banks in Ghana?

2) What impact does ICT investments have on deposits and efficiency of rural banks in Ghana?

3) What is the relationship between ICT investments and Returns on capital employed among rural banks in Ghana?

4) What is the relationship between ICT investments and Returns on assets among rural banks in Ghana?

1.4 SIGNIFICANCE OF THE STUDY

This important thesis will bring a new dimension to the existing pool of knowledge and literature on the debate of the relationship between ICT and financial performance among rural banks in Ghana.Various researchers in many areas of the globe have studieson this area,as such many materials exist. However, here in Ghana, research in the area of ICT and financial performance of rural banks has not been indulged much.

This research will also help financial institutions in Ghana especially rural banks to know if the expenditures they have been incurring on ICT has any bearing on their profit before tax and returns on assets or not, and whether there is the need for them to continue to invest substantial amounts of money into this area.

This research will also enable rural banks in Ghana to know whether to continue to increase investment in ICT or not as it seeks to find out if there is any relationship between ICT and the financial performance of the rural banks in terms of the impact it will have on their return on capital employed, deposits and efficiency of cost management.

1.5 SCOPE OF THE STUDY

The population to be used for this study consisted of all rural banks in Ghana. For the purpose of achieving the research objectives; attention has been focused on all rural banks. However, due to time factor and resources constraints, this study will focus on only 20 selected rural banks namely Abokobi Area, Ada, Adansi, Adonten, Afram, Agave, Agona, AhafoAno, AhafoComm, Ahantaman, Akatakyiman, AkimBosome, Akoti, Akrofuom, Akuapem, Akyem Mansa, Akyempim, Ga, AtwimaKwanwoma, Bosomtwe.

1.6LIMITATIONS OF THE STUDY

According to best and Khan (1989) 'limitations are those conditions beyond the control of the researcher that will place restrictions on the conclusions of the study and their application to other situations. This study is, therefore, constraint by the wide area the study is supposed to have captured, shorter period for the completion of the study, inadequate funds for this study and bureaucratic rules in the study settings.

The study as a matter of fact should have captured all banks in Ghana if not Africa. This is, however, impractically impossible due to many factors such as a huge research team and so on.

The researcher per the rule of the university is supposed to complete this study within one semester. This is a rule ought to be complied with strongly. This condition was beyond the control of the researcher as he was expected to present the report of this study within a relative shorter period.

One major limitation of this study was the lack of fund. The researcher as an individual student had to manage his meagre income in undertaking this study. It is a known fact that there is lack of financial support for research in Africa of which Ghana is of no exception. With the necessary research sponsorship the study could have captured a wide spectrum rather than the three selected banks. This may affect the findings of this particular study especially in making general conclusions and comparing this study to similar ones with the requisite financial support.

1.7 RESEARCH METHODOLOGY

The population of the study is all the rural banks operating in Ghana. Due to time and resources constraints, this research will focus on only the selected rural banks above. This study will use mainly secondary data. Data has been obtained mainly from the annual

reportsof selected rural banks. The data will cover the period from 2011 to 2014. The study used descriptive as well as inferential statistics in analysing the data. Analysis was carried out by making use of Statistical Package for social scientists (SPSS). The Pearson correlation coefficient together with regression analysis was employed to test the relationship between the variables.

1.8 ORGANISATION OF THE STUDY

The study was divided into five chapters. Chapter One was concerned with the background to the study, statement of the problem, research question, objectives of the study, significance of the study, the organisation of the study, scope, limitation of the study and lastly how the whole study is organised. Chapter Two dealt with the literature review. The chapter examined the views of other theorists and authors about the issues under discussion as well as review of previous studies on electronic banking and customer service delivery. Chapter Three outlined the research methods the researcher employed in carrying out the study. The chapter also dealt with the study area, sample size and the sample selection as well as methods of data collection, management among others. Chapter Four presented the analysis and presentation of data in this study. Chapter Five being the final chapter of this study presented the summary, conclusion and the necessary recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Revolution in the financial sector has led to a major debate on the operations of rural banks and microfinance institutions. Though, financial growth in the banking system is essential for the economic development and growth of every nation, its relevance has been argued as to how it influences bank performance. This imperatively, suggests that amidst new occurrences of financial sophistications and dynamism in banking system reliance on traditional banking system has become less effective in providing comprehensive services to bank customers. Accordingly, prior studies (see Kamel 2005) contend that the introduction of new technological innovations such as bank networking must impact positively on both the customers and the financial institution through cost-effective methods of transaction and financial intermediation. Therefore, this chapter proceeds to put forward the numerous literature reviewed on the effect of Information and Communication Technology (ICT) on financial performance of rural banks in Ghana.

2.2 DEFINITION OF ICT

I.T is defined by Laudon and Laudon (2001) as interconnected components that gather, process, store, and distributes information to support decision making of users. Information Technology consists of both hardware and software with accompanying knowledge that firms or enterprises uses to achieve business objectives. Information Communication Technology (ICT) is one of the technological resources that are being used by organization to enhance their operations. IT Technology give users' quality and up to date information that businesses need to make useful decisions for their organization (Laudon and Laudon, 1991) opined that

managers cannot do without Information Systems because they play important role in contemporary business organisation. They further contended that IT flattens organization by:

- Pushing decision-making to the lower level employees as they receive information they require to make decisions with minimal supervision.
- IT enables managers to receive much more accurate and timely information which enhance decision making.
- Cost of management becomes much lower with integration of IT in business organization.

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; 24hour operations; and space and cost savings (Sivakumaran, 2005). Harrison Jr., chairman and chief executive officer of Chase Manhattan, which pioneered many innovative applications of ICT in banking industry, observed that the Internet caused a technology revolution and it could have greater impact on change than the industrial revolution (Engler & Essinger, 2000).

2.3 SIGNIFICANCE OF ICT IN THE BANKING INDUSTRY

The **revolution in** ICT has distorted the normal banking culture and created the avenue for banks to emerge into various markets thereby creating value where customer needs are sorted into various categories for prompt attention (Aliyu and Tasmin, 2012). Through this means, the banks are able to sell other products such as insurance and securities together with the banking products they already sell which are all unique to the particular firm. (Delgado and Nieto, 2004). However, the basic reason for making use of the internet and other ICT tools as delivery channels is its power to reduce operational expenses by eliminating the cost of running physical branches. This becomes relevant in the Spanish banking system which has too many branches across Europe since the banks using the internet and other ICT tools as delivery increase their income drastically than those using normal distribution channels DeYoung (2005) and Delgado et al (2006).. Haq (2005) posits that financial institutions are able to survive by maximizing income through the reduction of operational costs. The unit cost of using ICT tools in banking reduce rapidly than the cost associated with physical branch deliver as income grows. Thus Internet banking has become the only innovation that can substitute physical branches in the service delivery of banks (DeYoung et al 2007).Birch and Young (1997) posit that expectations of consumers are about comfort ability, prompt and quality service delivery and transactional security. The introduction of ICT tools in banking has raised the awareness of customer to the existence of a fast and efficient customer service delivery.

2.3.1 ICT in Business.

ICT is central to the operations of business globally and their relevance has assumed global dimension. According to Boateng and Molla (2002) Information and communications technologies (ICTs) has significantly altered the way business transactions are conducted and responding to ever growing demands of customers for most businesses organization. According to Garau, (2002), "The promise of ICTs in the banking sector has been seen in terms of its potential to increase customer base, reduce transaction costs, improve the quality and timeliness of response, enhance opportunities for advertising and branding, facilitate self-service and service customization, and improve customer communication and relationship". Information Communication Technologies is imperative and has found itself in every business environment. According to Abor (2004) Electronic commerce which is one of the tools of ICT in business is believed to hold the promise of a new commercial revolution as it makes available less expensive and accessible way of exchanging information as well of conducting business transaction. This development has sparked a revolution in the banking sector for the provision of a payment system to match with the demands of the evolving market place (Balachandher *et al*, 2001).

According to OECD (2004), Computers accompanied by various categories of business software can improve information and knowledge management within an enterprise and bring about development of superior business processes and enhance performance. OECD further opined that the use of e-mail and the Internet can support and lead to improve business communication as in business to customers or business to business. In effect cost of transaction could be reduced, trigger in an increase transaction speed and reliability as well as bring about improvement in quality of service. With regard to banking, a lot of studies have confirmed positive effects of ICT on bank output, cashiers' work, banking transaction, bank

patronage, bank services delivery, customers' services quality as well as bank services. They concluded that, these have positive effects on the growth of banking (Balachandher *et al*, 2001: Idowu *et al*, 2002; Hunter, 1991; Whaling, 1995; Yasuharu, 2003), (Abor 2004).

2.3.2 Categories of information technologies

The Information Technologies can be divided into five categories. Computers, storage media, database, software and communications. Computers are hardware having configurations that consist of input device, output device and memory and storage device. Other equipment's of computer system include the screens/monitor, mouse, Keyboard, speakers, scanners and UPS. Other various types of computer include: mainframe minicomputers, microcomputers. Laptop and notebook storage media also includes: internal, backing and archival magnetic media tape devices, magnetic, risks, optical media and microform. Database is just a collection of file of information but organized in such a way that the same information can be accessed from different computer in different locations. Closely allied to database, is a data dictionary. A data items used in a computer system, with details of their size and where they are stored and used. This help to prevent anomalies and duplication of information. Databases are also in types, local, corporate and public / subscribes. Software is the most important part of any information technology system. It is a tool, which enables the effective use of the computer. Information technologies are mixtures of solid-state technologies (hardware) and embedded software. Software is a set of instruction with which the computer can operate and each individual's set of instruments is called a program. Types of software include system software, application software and general-purpose software. (Adewale and Afolabi, 2013).

2.4 CHALLENGES OF INTEGRATING ICT IN BANKING OPERATIONS.

Information communication Technologies has proved to be a valuable tool to business for that matter banking. Notwithstanding, implementing ICT has not been without challenges. The following are some reviewed papers in relation to the challenges banks encounter with the integration of ICT. Related literatures on the challenges of integrating ICT in banking operations were reviewed extensively in this particular section.

Kevin et al (2013) investigated into the impact and Challenges of Information Communication

Technology Adoption in the Tanzanian Banking Sector. Descriptive research design was employed as it facilitated collection of information from various categories of bank managers i.e. Customer relations manager who informed the study on how customers use technology to relate with the bank, Cash manager who informed the study on how cash flows using technology and the IT managers who informed the study on technical issues and challenges and allow them to state their perceptions on impact and challenges on IT adoption in the banking sector. Their research instrument captured under the methodology was categorized into two sections; that is the first part comprising the demographic characteristics/profile and the second part exploring positive impacts of ICT adoption in banking sector, bankers' and bankers opinions on the need, what encouraged them to adopt ICT and section two which consisted of 10 questions on challenge's facing ICT adoption. The main data collection they adopted was questionnaire. From the empirical findings, they discovered that majority of the respondents agreed that ICT has a major impact in banking .Other findings included; information communication technologies like mobile banking products, internet banking products help customers and bankers have remote access of banking solutions; ICT related online banking products like digital financial

services saves time in making transactions and can be accessed from any anywhere at any time; CT has a positive impact where by it enables ;wider networking and links banks globally therefore enhancing smart banking solutions and services to the customers and also enabling wider networking, global links of banks. They therefore outlined a number of challenges in their study in including ; slowing down of ICT systems and equipment's, network communication errors; ignorance by majority of the customers about ICT usage especially online services and they don't own ICT gadgets which can enable them access online services;

Sonja (2010) investigated the effects of computerization on savings and credit cooperatives in Uganda. They found out that, majority of the respondents agreed that information communication technology has really promoted microfinance sustainability, reaching the poor people and Management information systems. However one of the challenging aspects of the usage of ICT revealed as lack of human resource capacity in the banks in Uganda to man the administration of the computing services. They therefore suggested that more training should be required to ensure human resource capacity.

Adewale and Afolabi (2010) studied the effects of ICT on the growth of Nigerian banking industry. Information communication technology has become the engine block of every banking institution worldwide and Nigerian banking institutions are not exempted. They adopted the historical and survey research methods. Data were collected from both primary and secondary sources using chi-square and regression analysis were used in the aspect of formulated Hypothesis testing. They discovered that, banking system is not in line with global trends and that the application and usage of information technology in the banking system is necessary for efficient service delivery. They also realised that, the usage of electronic banking contribute to significantly revolutionizing service delivery to improve

customer satisfaction through the various electronic fund transfer and payment services such as the automated teller machine (ATMs). The study recommends that, banks and other financial institutions should embark upon training programme for all operational staff of all banks and public awareness should be instituted to improve the knowledge of information communication technology and for performance adequacy to support the much needed efficiency and operational effectiveness and also to control the regular system failure that customers face.

Ofori-Dwumfuo and Botchway-Anang (2012) assessed issues and challenges encountered in the computerization of ARB Apex Banks by connecting rural banks as well as community banks in Ghana. They outlined some objectives of rural banks in Ghana as; provision of basic financial services to the poor; plays financial intermediary role by mobilizing financial resources from within their area of operations in order to support small scale and medium enterprises and also ultimately improve the socio-economic well-being of the people in the rural communities they serve; since banking services in the rural areas are highly lacked, their introduction helps inculcate banking culture and attitude into the citizens in the rural communities in order to reduce the high volume liquidity and also serve as a financial source through which resources from government to the communities are channeled into. They used both qualitative and quantitative approaches in gathering the relevant information for the study. In order to address the challenges faced by the rural banks in Ghana based on the adoption of ICT, a survey was conducted on some of the staff of the banks involved directly in the implementation of the ICT process. A cross sectional comparative analysis approach was adopted through sampling a cross section of workers in the selected rural banks. The staff and management of both ARB Apex bank and the rural banks constituted the population for the study where 15 banks were selected. However, purposive and systematic sampling

techniques were used to sample 50 respondents who participated fully in the study. Based on the results, they realised from the respondents that, 64% of the total respondents opined that they have been fully involved in the implementation of the ICT project. They conclusively stated that majority of the respondents have fully participated in the computerisation programs. Almost all the major variables used to measure the success of the ICT implementation in the rural banks was found to be performing above average. The study concluded that, on the whole, the project was well designed and implemented and envisaged challenges were adequately specified and catered for and that the first phase progressed successfully.

The "emerging role of information technology in banking sector's development of India" was studied by the researchers Mittal and Gupta (2013). Their study was based on the following objectives; to find out the progress of computerization in all the public sector banks in India; to analyse the banking innovations after computerization of public sector banks of India; to analyse the ATM progress in the public sector banks of India and; to identify challenges in the implementation of I.T. solutions in the public sector banks of India. Regulatory and competitive reasons combinations has led to the increasing importance of total banking automation in the Indian Banking Industry. They discovered from their study that, the bank that adopted the appropriate and right technology increased their productivity as well as gained competitive edge. They therefor recommended that, Indian Banks are to observe the latest technology and modify it to suit their environment. Information technology offers a chance for banks to build new systems that address a wide range of customer needs including many that may not be imaginable today.

2.5 ICT TOOLS USED IN BANKING.

In recent times, the world is gradually becoming ever more integrated as a result of the integration of information and communication technologies. According to Mousoumi and Jamil (2010), ICT tools such as Email and messaging are now part and parcel of every day's communication life. This section looks at the various tools used to provide services in banking industry. One of the IT enabled tools used in banking globally is automated teller machine (ATM). Automatic Teller Machines (ATMs), according to El-haddad and Mahmeed, 1992) is one of the essential the technological innovations introduced in banking. According to them ATMs are probably the most obvious pieces of electronic device used to provide financial services and is indeed growing rapidly. The growth in ATM usage actually reveals it acceptability among customers as a means of accessing banking services.

ATMs is described as: "an ATM combines a computer terminal, record-keeping system and cash vault in one unit, permitting customers to enter the bank's book keeping system with a plastic card containing a Personal Identification Number (PIN) or by punching a special code number into the computer terminal linked to the bank's computerized records 24 hours a day" (Rose, 1999),. Adewale and Afolabi (2013) described "automated teller machine as a machine built into a well with a computerized system connected to the bank that is providing it". The automated teller machine is self-service terminals usually at viable locations mainly to provide the services of a cashier and customer related services during and after banking hours. ATMs perhaps due to the nature of its operations are usually located outside of banks, in some instances found at airports, malls, and at places far remote from the home bank of users Abor (2004). In Ghana ATM services are provided by almost all commercial and development banks. Any bank which is not providing this service is likely loose competitiveness. ATM can provide a lot of services to customers without human interface. With ATM capabilities increasing rapidly, it is possible to use the presence and utilization of

ATMs to take care of ever increasing customer needs. There are ATMs which can accept checks, receive payments of bills, give change and some issue stamps. This means ATM usage can reduce cost of transaction and give convenience to customers.

According to Abor (2004), using of both the ATM and human teller's means that productivity of banks will increase during banking period. He further opined that ATM's saves customers time in accessing service which in effect reduce queuing in bank halls, hence customers can use such time saved into other productive ventures. In the same study Abor (2004) revealed that, ATMs are the most widely accepted and highly patronized for service delivery as customers used them more than other form of electronic channel of service delivery.

Telephone banking has become a new initiative in banking industry in Ghana due to the improve telecommunication network. It encompasses the delivery of banking services to customers via the telephone which gives customers the opportunity to obtain banking services and products via telephone irrespective of the time, location and the way and manner they desire Adewale and Afolabi (2013).

According to Balachandher *et al*, (2001); "Telebanking (telephone banking) can be considered as a form of remote or virtual banking, which is essentially the delivery of branch financial services via telecommunication devices where the bank customers can perform retail banking transactions by dialling a touch-tone telephone or mobile communication unit, which is connected to an automated system of the bank by utilizing Automated Voice Response (AVR) technology"

 Telephone networks are used for direct connection either as private network or dedicated telephone lines or public networks. Customers to be able to access service dial into the banks system via an access code and make enquiry for their balance, to transact or request for a statement. The enhanced telecommunication infrastructures and network as well as increasing

usage of personal computers have prompted banks to take this move so as to provide customers access to their accounts and do business with the banks quite easier than before.

PC banking is another electronic delivery channel used by banks to give services to their customers. PC banking could be used by customers who actually have access and can use a personal computer and a modem, unlike Internet banking which furthermore needs access to the World Wide Web as advanced by (Frei *et al.,* 1997; Kalakota and Frei,1997). "Early versions of PC banking were expensive, complicated and did not achieve a sufficient level of consumer acceptance" (Channon, 1997), however, PC banking is relatively cost-effective as compared to telephone banking, and it is also superior in terms of convenience (Katz and Aspden, 1997).

According to Abor (2004) "PC-Banking is a service which allows the bank's customers to access information about their accounts via a proprietary network, usually with the help of proprietary software installed on their personal computer". When customer gain access is he can perform several retail banking activities. Due to the increase in access and usage of personal computers, PC banking is having the potential to grow as several people are capable of using it to bring banking services to their homes.

Internet banking according to Essinger (1999) is: "to give customers access to their bank accounts via a web site and to enable them to enact certain transactions on their account, given compliance with stringent security checks". Adewale and Afolabi (2013), "Internet banking is an outgrowth of personal computer banking". According to them, Internet banking makes use of the internet as its delivery channel where it enables electronic banking by connecting to the bank for variety of services. Internet banking literally means the setting up of good webpage in a bank to offer information about its variety of products and services. Through the internet users can access their account from browser software that carries out

internet banking programs situated on the bank world wide web server. Internet banking offer more convenience and a great deal flexibility to customers as the can have a greater degree over their banking activities.

2.5.1 Branch Networking

Networking of branches is the computerization and inter-connecting of geographically scattered stand-alone bank branches, into one unified system in the form of a Wide Area Network (WAN) or Enterprise Network (EN); for the creating and sharing of consolidated customer information/records.

It offers quicker rate of inter-branch transactions as the consequence of distance and time are eliminated. Hence, there is more productivity per time period. Also, with the several networked branches serving the customer populace as one system, there is simulated division of labour among bank branches with its associated positive impact on productivity among the branches. Furthermore, as it curtails customer travel distance to bank branches it offers more time for customers' productive activities.

2.5.2 Electronic Funds Transfer at Point of Sale (EFTPoS)

An Electronic Funds Transfer at the Point of Sale is an on-line system that allows customers to transfer funds instantaneously from their bank accounts to merchant accounts when making purchases (at purchase points). A POS uses a debit card to activate an Electronic Fund Transfer Process (Chorafas, 1988).

Increased banking productivity results from the use of EFTPoS to service customers shopping payment requirements instead of clerical duties in handling cheques and cash withdrawals for shopping. Furthermore, the system continues after banking hours, hence continual productivity for the bank even after banking hours. It also saves customers time and energy in

getting to bank branches or ATMs for cash withdrawals which can be harnessed into other productive activities.

2.6 THEORIES EXPLAINING PERFORMANCE AND PROFITABILITY

Various theories have been proposed to give explanations about the influencing factors that affect the profitability of organisations. Among these theories are the Structure Conduct Performance (SCP) Model, Efficiency Hypothesis, and Expense Preference Behaviour.

2.6.1 The Structure Conduct Performance (SCP) Model

According to Baye (2010) the structure of an industry connotes factors such as concentration, technology and market conditions whiles conduct refers to how individual firms act in the market; it involves decisions to invest in expansion or not. Performance on the other hand refers to the resulting profits and social welfare that arise in the market from the firm's investment. The Structure Conduct Performance (SCP) paradigm views these three aspects of the industry as being integrally related and asserts that the market structure causes firms to undertake innovations. In turn, this behaviour causes resources to be allocated in profitable ways leading to either an efficient or inefficient market.

Accordingly, the profit of firms operating in highly concentrated industries with better network coverage are better and higher than that of firms operating in industries with lower concentration. The Structure Conduct Performance (SCP) paradigm presupposes that a higher banking industry concentration permits the collusion of banks to improve on their networking experience and consequently gain substantial profits (Alzaidanin, 2003; Sathye, 2005; Samad, 2008).

2.7 THEORETICAL BACKGROUND

Information Communication Technology combines information technology and communication technology in its operation. The combination of computing having high-speed communication links carries video, data and sound (Alabi, 2005). It is associated with the transfer of information after data has been collected, stored and manipulated through an electronic medium. Communication technology is made up of the physical hardware devices together with software with which a links can be created between the various computer hardware components for the purpose of transferring data to and fro various places (Laudon, 2001).

The link between Information Communication Technology and performance has attracted the attention of researchers in recent times. Several researches have been done to as certain this relationship. It is highly worthy of note that, there has never been an agreement on whether ICT contributes to organizational performance or not. Researchers trying to find the nature of the relationship between ICT and firm performance over the years have adopted different theoretical approaches. These theoretical approaches include Transaction cost theory (Williamson, 2006), Value chain analysis (Porter, 1985) and Resource-based view (RBV). The Resource-based view is a more recent theory that is widely embraced by many including Bharadwaj (2000). This resource-based view (RBV) of the firm indicates that, competition of firms is on the issue of "uniqueness" or peculiar corporate resources that are considered to be valuable and rare but difficult to either imitate or substituted by other resources. The theory stemmed from the study of strategic management research and widely draws attention to the benefits of examining the value brought about by IT resources (Melville, Kraemer and Gurbaxani, 2004). The resource-based theory rationalizes firm's superior performance to organizational resources and capabilities. The firm's view based on resources addresses the

effects and linkage of the financial performance of organizations to its specific and peculiar resources that is difficult to imitate or substitute (Barney, 1991).

2.8 ICT COST EFFICIENCY

ICT use has continued to permeate virtually every organization and is utilized in various areas. Various methods of storing, processing, distributing, and exchanging information with customers and within organizations have been identified and simplified (Kollberg and Dreyer, 2006). Recently, development of ICT affects the strategy, operations and structure of organizations significantly (Buhalis, 2003). ICT usage does not only provide low operational costs, improve efficiency and increase profitability, but it also enhances the performance of the organisation to provide better customer services. Spanos et al. (2002) posit that ICT possesses enhancement and coordination attributes to be able to exercise control over the operations AND activities of many organizations and as such increase the use of management systems. Conversely, Ongori and Migiro (2010) posit that many organisations have been able to adopt the usage of ICT in its operations due the impact of globalization as a means of surviving in the industry and also to meet the ever-growing competitive markets. Bresnahan et al. (2002) argue that the usage of ICT results in long-lasting productivity gains in enterprises that use ICT. This is attributed to the fact that ICT promotes the efficient flow of data which helps these organizations to achieve desired results. Furthermore, ICT introduces changes in businesses and promotes competitive advantages and thus forcing organizations of all types to incorporate the usage of the innovation in their operations (Apulo and Latham, 2011).

However, on the basis of the socio-technical view (STV) of an organization, it is instructive to note that the ICT acquisition is in itself not a guarantee of improved organizational performance. The principle of STV holds that for there to be an optimal benefit from

acquisition of ICT, its potential must be optimally harnessed in the interest of achievement of organizational objective (Trist, 1990). The theory posits that technology rarely possesses the capacity to improve the total performance of an organization. The underlying factor of this view is that, it recognises the phenomenon of interdependency between technological and social factors as well as sequential impacts of technology. The theory argues that organizations are neither exclusively social nor predominantly technical systems but are rather best conceived as sociotechnical systems.

The two dimensions of an organization though are independent but yet are correlative thus; organizational activities and its associated outputs are maximized when both social and technical structures of an organization are strengthened (Trist, 1990). This theory (STV) helps and adds to the RBV to brings to the fore the social complexity of a firm's use of technological and manual inputs. Thus organizational routines become unique making it difficult to copy and this becomes the basis for competitive urge and improved performance (Barney, 2001). The STV principle underscores the argument in favour of ICT cost efficiency being a necessary condition for the attainment of optimality in the deployment of ICT to enhance organizational performance. Cost efficiency in the spirit of strategic cost management is concerned with strategies aimed at obtaining maximum possible revenue with minimum possible inputs (Fethi & Pasiouras, 2010). Furthermore, Casu (2004) posit that efficiency can be measured in terms of observable increase in efficiency owing to technical progress which is a function of technological change.

2.9 MEASURES OF PERFORMANCE

Performance signifies the ability of a business to make significant revenue than what it cost it in the process of investment. Sanni (2006), argue that performance in terms of profitability measures the extent to which income is generated during a given period exceeds the expenses incurred during the same period, for the sole purpose of generating income. The performance of banks is usually measured by the Return on Assets (ROA) and Return on Equity (ROE). These variables are expressed as a function of internal and external determinants. The internal determinants may include banks specific variables such as the number of networked branches and quality of service they provide.

The external variables reflect the macro-economic environment and may include the inflation and monetary base. Returns on Assets (ROA) have been frequently used as proxies for performance. Return on Asset (ROA) reflects a bank's ability to effectively and efficiently manage its assets to generate maximum returns. It indicates the profit earned per cedi of assets. The ROA is a performance indicator because it is directly related to the profitability of banks (Sufian and Habibullah, 2009).

2.10 FINANCIAL INNOVATION IN THE RURAL BANKING INDUSTRY

Contemporary, literature on financial development imperatively, show that the emergence of globalisation and financial dynamism are transforming the process of financial intermediation including the accessibility and usability of financial products worldwide (Acquah, 2006). For instance, technological improvement in the rural banking industry have presented new delivery channels for communicating financial products and services to customers including easy access to bank networks at a low transaction cost. However, Abor (2004) and Domeher et al (2014) examine that these developments which are associated with the growth in

innovative ideas and merger of the rural banking industry through a defined cost-effective banking service have become the hallmark of the rural banking industry while growing the firms profit as well as improving competitiveness. Banks that offer improved networked services have the opportunity to increase their customers' accessibility to the banks products and services.

2.11 THE INFORMATION TECHNOLOGY AND BANK PERFORMANCE

According to Price factors, consumers will be motivated to make use of electronic banking as a means of gaining perceived economic advantages (Sathye, 1999). However, Carlson et al. (2000) and Furst et al. (2002) assess the viability between electronic banking and bank profitability. They reveal in their studies that the larger US banks had higher return on equity. However they concluded that since the adoption of electronic banking has no first mover advantage in the case of a developed economy, it is too small a factor to have influenced the performance of the banks at that time. This conclusion was also evidenced by Egland et al. (1998) in the US.

However, the Wallis Report (1997) shows that, the price of technology usage will have to be cheaper than its alternatives in order for consumers to accept and make use of it. Sathye (1999) argue that, considering internet banking, two forms of price arise; the costs related to normal internet activities, and the second being the banks' costs and charges. Consequently, Polatoglu and Ekin (2001) identify that the cost saving factor associated with using electronic banking brings satisfaction to its users. Conversely, there is no satisfaction to the users of electronic banking when they perceive the products or services rendered by the banks as expensive.(See Gerrard and Cunningham, 2003).

In spite of these adverse findings, Sathye (1999) identifies that, there will be a negative effect on adoption of electronic banking due to its high associated costs and risks.(See Akhalumeh and Ohiokha 2012; Freedman 2000). Berlin and Mester (1998) suggest a complementary link between deposit mobilization and credit delivery in the sense that rate-insensitive core deposits allow for inter-temporal smoothing in lending rates. If this were the case, increased competition on deposits would threaten the viability of relationship lending. Kariuki (2005) also brings proof that the use of e-banking can add to improved bank performance, in terms of greater market share values, increased product range, tailor-made products and services together for prompt response and solutions to client demands

Mohammad and Saad, (2011) examines that electronic banking poses a negative impact on performance of rural banks in Jordan. Thus, they note that e-banking in its entirety has not improved the performance of financial institutions holding on to these financial innovations. However, Mohammad and Saad, (2011) attribute this phenomenon to the issue of high dependence of bank customers on traditional channels of banking to carry out their banking operations. Also, they posit that the resultant associative emerging from adopting electronic banking are still higher in developing economies hence less beneficial to the financial industry. Simpson (2002) notes that, the motivation for e-banking is largely based on the notion of reduction in operational cost but an increase in operating income. This effect is highly noticeable in developed markets than emerging as shown by studies. While Sullivan (2000) provides no systematic evidence on the importance of e-banking, Jayawardhena and Foley (2000) examine that e-banking is the main reason for the reduction in cost and increase in efficiency of United Kingdom banks.

2.12 EMPIRICAL REVIEW

Ajayi and Ojo (2006) note that the most noteworthy precondition for economic development is to develop a financial system that contains high security, convenience, but affordable to its consumers. In spite of this, Humphrey (2004) examine that developed economies are hastily removing the traditional cheque payment systems and moving towards electronic ones, especially payment cards. In Sub-Saharan Africa and especially Ghana, currency has become the primary form of payment because a large part of the populations do not assess banking transactions (seeAjayi and Ojo 2006). This turns the country's economy to be heavily cash one. Prior studies (see Lockett and Littler, 1997; Lee et al., 2000) find significant positive association between financial innovation and firm performance in the banking industry. Other studies including Karahanna et al. (1999) also find consistent positive relationships between bank networking and the adoption of automated teller machines (Chau and Hu, 2001).

Elizabeth and Greg, (2004) in their assessment of the linkage between number of networked firms, efficiency, financial efficiency and quality of customer service delivery among rural banks, report that Australian banks' performance levels including interest income, information technology cost and other financial performance ratios were associated positively with quality of customer service levels. However, they further reveal that the non-existence of a fundamental link between information technology and financial performance means that banks that try to improve upon their financial performance by considering the effects of only lower costs may be misguided in their creation of cost-effective and quality services. Accordingly, Snel (2000) argue on issues concerning information technology. He elucidates that since privacy is a concern to the consuming public, it may inhibit the adoption of an electronic banking service (Jayawardhena and Foley, 2000; Venkatesh and Morris, 2000). However, Lee and Lee (2000) find support for the link between financial innovations and

number of customers in the banking industry (see Polatogluand Ekin 2001; Mattila,Karjaluoto and Pento, 2001). Colgate, Nguyen and Lee (2003) report that when users of financial innovations make decisions concerning available alternatives in the marketplace, improvement in operations of the existing alternatives form a major determinant for users to remain faithful to their banking provider. Consequently, Sathye (2005) reveals that electronic banking does not have a significant impact on performance and risk. Sullivan (2000) on the other hand observes that the profitability and risk of banks with electronic products and services and those without are similar. Contrarily, Delgado, Hernando, and Nieto (2007) examine that improvement in electronic banking influences profitability negatively in the case of banks operating in the European Union. Studies such as DeYoung, Lang, and Nolle (2007) and Ciciretti, Hasan, and Zazzara (2009) report positive link between the adoption of electronic banking and financial performance in the US.

CHAPTER THREE

RESEARCH METHODOLOGY AND CORPORATE PROFILE

3.0 INTRODUCTION

The chapter contains discussions on the methods employed in this research. The main focus of the study was to examine the effect of ICT on financial performance among rural banks operating in Ghana. The credibility of the findings and conclusions extensively depends on the quality of the data source, data collection, data management and data analysis. Therefore, in order to gather the necessary data, the researchers used quantitative approach of study to source for data. Therefore, this chapter would be dedicated to the description of the methods and procedures employed in obtaining the required data, how they would be analysed, interpreted and how conclusions would be met.

3.1 RESEARCH DESIGN

A research design includes an outline of what the investigator will do from untying the hypothesis, or research questions, and their operational implications to the final analysis of data (Polit & Beck, 2006).

Again, Mouton (2001) defines research design as a plan or blueprint of someone intending to conduct research. Research design involves how the researcher has planned to carry out the research. The research design for this study among other things concentrates on the type of study, the approach to study and the strategy.

The type of study is a descriptive study. Descriptive research design refers to social research which explores a certain phenomenon with the primary aim of understanding the phenomenon or situation (Bless &Hingson-Smith, 2010).

Descriptive research is also used to get clarity and define the problem at hand clearly (Brink, 2008). As a descriptive study the researcher aims at establishing the relationship between ICT investments and Returns on capital employed among rural banks in Ghana as well as the relationship between ICT investments and Returns on assets among rural banks in Ghana?

The study adopts the social survey strategy in investigating the phenomena. A social survey has been defined as the method for collecting quantitative information about members in a population (Amedahe, 2002). Social survey became eminent since the researcher has to combine twenty banks and as such require same data from all participating banks.

The approach to the study is quantitative approach. A quantitative research study aims at establishing or determining the relationship between one thing and another one in the population (Hopkins, 2000,). A quantitative research design is selected for this study because it is a formal objective, systemic process in which numerical data are utilized to obtain information (Burns & Grove, 2005).

3.2 SOURCES OF DATA

Data source and collection method pre-informs the researcher of the necessary information required to be able to examine the significant questions raised in the study. Although, numerous methods and sources of data were identified, the most important issue was selecting the appropriate respondents to answer questions raised in the study. Therefore, the researcher employed secondary sources.

3.3 STUDY POPULATION AND SAMPLE SIZE

The researchers conducted the study on 20 selected rural banks in Ghana namely Abokobi Area, Ada, Adansi, Adonten, Afram, Agave, Agona, AhafoAno, AhafoComm, Ahantaman, Akatakyiman, AkimBosome, Akoti, Akrofuom, Akuapem, Akyem Mansa, Akyempim, Ga,

Atwima Kwanwoma and Bosomtwe. These rural banks were chosen primarily due to the availability and reliability of data because it is required statutorily to provide annual reports at the end of the year. The target population for the work is the rural banking industry in Ghana. It is out of this population that the sample was been drawn. The study therefore used data on the above selected rural banks to examine the effect of ICT on financial performance among rural banks in Ghana.

3.4 DATA COLLECTION

For the purpose of this research, the researcher used secondary data sources to examine the effect of ICT on financial performance among rural banks in Ghana. Data for the study were therefore retrieved from the annual reports of the rural banks under consideration for a period spanning from 2011 to 2014.

3.5 MODEL SPECIFICATION

The research employs panel regression. The general form of this econometric model is as follows:

$$y_{it} = \alpha_i + \beta X_{i,t} + \varepsilon_{i,t}$$

The 'i' denominated in the panel regression relates to the cross-sectional aspect of the data and the 't' represent the time series aspect of the data. The left hand side of the model represents the dependent variable and the right hand side represents the independent variables. The 'ε' represents the stochastic error term. The 'a' represents the constant term or the y-intercept where the dependent variable attains a value even when the independent variable (x) has no value. The research employs panel regression to enable the unobserved heterogeneity related not explicitly stated in the model to be incorporated. This is hard to achieve under ordinary least square regression.

3.6 DATA ANALYSIS

The study examines the effect of ICT on financial performance among rural banks in Ghana. Purposively, the researcher employs panel regression to examine the effects of the predictive variables employed in the study. Financial performance, the dependent variable in the model is defined in terms of Profit before Tax, Return on Assets, Total Deposits by customers and Return on Capital employed of the rural banks. However, the independent variables employed to determine the financial performance of the rural banks include total expenditure on ICT (both software and hardware expenditures). Correlation was consequently employed to detect multicollinearity amongst the variables. The regression models for this study are therefore stated as follows;

$$Deposit_{it} = \beta_1 + \beta_2 Efficiency_{it} + \beta_3 ICT_{it} + \varepsilon_{it} \qquad (1)$$

$$ROA_{it} = \beta_1 + \beta_2 efficiency_{it} + \beta_3 Deposits_{it} + \beta_4 ICT_{it} + \varepsilon_{it}\ldots\ldots \qquad (2)$$

$$ROCE_{it} = \beta_1 + \beta_2 efficiency_{it} + \beta_3 Deposits_{it} + \beta_4 ICT_{it} + \varepsilon_{it}\ldots\ldots \qquad (3)$$

$$Profit_{it} = \beta_1 + \beta_2 efficiency_{it} + \beta_3 Deposits_{it} + \beta_4 ICT_{it} + \varepsilon_{it}\ldots\ldots\ldots \qquad (4)$$

Where; the subscript i and t represents the cross-sectional and time series dimension of the data respectively,

Deposits = Total deposits been made by customers of the rural banks,

ROA = Returns generated on assets

ROCE = Return on capital employed.

Efficiency =   Efficiency with which ICT helps in strategic management of costs in rural banks

Profit = Profit before tax of rural banks

E = Residual term.

3.7 MEASUREMENT OF VARIABLES

$$ROA = \frac{Profit\ before\ tax}{Total\ Assets}$$

$$ROCE = \frac{Operating\ profit}{Capital\ employed}$$

ICT = Expenditure on computer software + Expenditure on computer hardware

$$Efficiency = \frac{Profit\ before\ tax}{Total\ ICT\ investment}$$

Profit = Profit before tax of rural banks

Deposits = Total deposits made by customers of rural banks during the years under consideration.

3.8 ESTIMATION TECHNIQUE

The research uses panel regression model and the choice of appropriate panel regression model used for the models set is determined by the hausman effect. The hausman effect tests the appropriateness of the assumptions underlying the fixed effect model and the random effect model. The fixed effect model assumes that the unobserved heterogeneity in relation to the banks relates with the regressors whiles the random effect assumes otherwise. The appropriateness of the fixed or random effect is further checked through the Breusch-Pagan's Lagrange multiplier test (LM test) for random effects and the Wald test also for fixed effects. Following this systematic approach, the random effect is used for model 1 while the fixed effect is used for the remaining models 2, 3 and 4.

DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1 INTRODUCTION

This chapter deals with the analysis, discussions and presentation of data. In order to achieve the main purpose of the study, the analysis begins with the descriptive statistics and the correlation between the respective variables employed in the study. Having described the data set, the researcher, further continued to estimate the regression analysis between the dependent variables and independent variables of the study and finds out how these variables influence the performance of rural banking industry. The results from the analyses are presented below.

Table 4.1 Hausman test

χ^2 value	Prob> χ^2	Fixed/random effect	
Model 1	2.42	0.2986	Random effect
Model 2	41.82	0.0000	Fixed effect
Model 3	16.09	0.0011	Fixed effect
Model 4	134.74	0.0000	Fixed effect

The table above shows the chi-square value and related probabilities as outcome of the hausman test. The test finds out the appropriateness of the assumption under the fixed effect and random effect model. The null hypothesis of the test suggests that there is no systematic difference in the co-efficient meaning that there is randomness in the unobserved

heterogeneity not explicitly stated in the models. The null hypothesis is thus the random effect model.

The probabilities show that in model 1, the null cannot be rejected since the probability is above 5% criterion level. The random effect is thus used in model 1. In the remaining models 2,3 and 4, the probabilities are below the 5% criterion level and the null hypothesis is rejected. The fixed effect is thus used in the remaining models

Table 4.2 Test for fixed effect and random effects

	χ^2	Prob> χ^2	Test	Conclusion
Model 1	70.09	0.000	LM test	Random effects exist
Model 2	3.11	0.0005	Wald test	fixed effects exist
Model 3	2.40	0.0058	Wald test	fixed effects exist
Model 4	15.68	0.0000	Wald test	fixed effects exist

The presence of unobserved heterogeneity or individuality accompanying banks efficiency, investment in ICT, deposits and profitability was tested. The outcome of the test confirms the presence of this and rejects the assumption underlying the pooled Ordinary least square that no differences exist among the rural banks in respect of these statistics. The probabilities in the above table are below the 5% criterion level and therefore in model 1, the Lagrange multiplier test for random effects (LM test) rejects the pooled OLS, which is the null and confirms the appropriateness of the random effect model as determined by the hausman effect. In the remaining models the F-test or the Wald test also rejects the pooled OLS, which is the null and confirms the appropriateness of the fixed effect model as determined by the Hausman effect. Fixed effect is used for the remaining models.

Table 4.3: Model 1- Results of the Impact of ICT and Efficiency on Rural Banks'
   Deposits

	Coefficient	Std. Err.	z	P>|z|
ICT	0.1182889	0.1988694	0.59	0.552
Efficiency	0.1179948	0.0212299	5.56	0.000***
Constant	12.17179	2.533886	4.80	0.000***

Note *p<0.1,**p< 0.05, ***p<0.01 levels R-squared =0.1799,Wald chi2(2)=31.83, Prob> chi =0.0000

Table 4.3 reports the regression results for the variables employed in the study. On the issue of how cost efficient usage of ICT facilities and continuous ICT investment influence the total deposits of rural banks, the results in model I shows positive and significant relationship between ICT cost efficiency (EFFICIENCY) and deposits of the rural banks [$\beta = 0.118$, P< 0.01] suggesting that 1% increase in the ICT cost efficiency of the rural banks would increase the ability of the rural banks to make deposits by approximately 11.8%. This finding confirms prior studies such as Buhalis (2003), Kollberg and Dreyer (2006) and Binuyo and Aregbeshola (2014) suggesting that the strategic cost management through the efficient application of ICT enhances the efficiency of the rural banks in serving their customers hence a positive impact on their performance. Contrarily, the results show that the LOG(ICT) although positive, has so significant impact on the deposits of the rural banks suggesting that it is the efficient utilisation of the information and communication technology installed but not continuous investment in ICT that influences the increase in the rural banks deposit size. The results record a chi value of 31.83 with an r-squared of 0.1799 suggesting that changes in

efficiency and ICT investment can explain about 17.99 percent of changes in the deposit capacity of the rural banks.

Table 4.4: Model 2-Results of the Impact of ICT, Deposits and Efficiency on Rural Banks ROA

Coefficient.	Std. Err.	t	P>|t|	
ICT	0.0295092	0.0147502	2.00	0.050**
Deposit	0.0386581	0.0101632	3.80	0.000***
Efficiency	0.0079386	0.0019478	4.08	0.000***
Constant	-0.9048081	0.2170118	-4.17	0.000***

Note *p<0.1, **p< 0.05, ***p<0.01 levels R-squared =0.6748, F (3, 57) =25.56, Prob> F = 0.0000

Table 4.4 reports positive significant relationship between return on assets and efficiency [β = 0.00794, P< 0.01] suggesting that a one percent increase in the cost efficient utilisation of already installed ICT facilities will increase the return on assets by approximately 0.8 percent. The table further reveal a positive association between return on asset and log (ICT) [β = 0.0295, P< 0.1] suggesting that an increase in information and communication technology has slight tendency to influence the return accrued on the assets of the rural banks. The results also show positive significant relationship between return on asset and the total deposits of the rural banks [β = 0.0387114, P< 0.01] suggesting that an increase in the deposit due to efficient utilisation of the installed ICT facilities help improve the banks total deposits hence their ability to make more loans to their customers. The results record an F-Statistic value of 25.56 with an r-squared of 0.6748 suggesting that changes in efficiency,

deposits and ICT investment can explain about 67.48 percent of changes in the return on assets of the rural banks.

Table 4.5: Model 3-Results of the Impact of ICT, Deposits and Efficiency on Rural Banks ROCE

	Coefficient	**Std. Err.**	**t**	**P>|t|**
ICT	-0.002658	0.0217462	-0.12	0.903
Deposit	-0.050658	0.0149836	-3.38	0.001***
Efficiency	0.0053705	0.0028716	1.87	0.067*
Constant	1.078594	0.3199405	3.37	0.001***

Note *p<0.1, **p< 0.05, ***p<0.01 levels R-squared =0.4676, F(3,57)= 3.92, Prob> F = 0.0130

Table 4.5 record a weak relationship between return on capital employed and efficiency [β = 0.0054, P< 0.1] suggesting that an improvement in the efficient use of the installed ICT facilities of the rural banks is likely to contribute about 0.5 percent in the growth of the return on capital employed. Contrarily, the results show negative association between return on capital employed and total deposits of the rural banks [β = -0.0507, P< 0.01].

Table 4.6: MODEL 4- Results of the Impact of ICT, Deposits and Efficiency on Rural Banks Gross Profit

	Coefficient.	Std. Err.	t	P>|t|
ICT	0.1886265	0.1113387	1.69	0.096 *
Deposit	0.9046287	0.0767148	11.79	0.000***
Efficiency	0.0339426	0.0147026	2.31	0.025**
Constant	-2.33347	1.638071	-1.42	0.160

Note *$p<0.1$, **$p< 0.05$, ***$p<0.01$ levels R-squared $=0.9383$, F $(3, 57) = 91.08$, Prob> F $= 0.0000$

Regarding the impact of efficiency, ICT investment and deposits on the gross profit of the rural banks, the results in model IV suggest the existence of positive link between efficiency and profits [$\beta = 0.0339$, $P< 0.05$] implying that an increase in the cost efficiency of the usage of ICT facilities is going to increase the gross profits of the rural banks. Similar evidence is revealed for the association between total deposits, log(ICT) and gross profits of the rural banks. The results record an F-Statistic value of 91.08 with an r-squared of 0.9383 suggesting that changes in efficiency, deposits and ICT investment can explain about 93.83 percent of changes in the gross profit of the rural banks.

Conclusively, the study accepts the hypothesis that ICT cost efficiency of the rural banks has no significant influence on the rural banks' ability to increase the size of their deposits. Similarly, the hypothesis stipulating the existence of a relationship between ICT investment and return on capital employed is accepted for this study.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION

5.0 INTRODUCTION

The chapter entails a summary and conclusion to the research, including the policy implications resulting from the findings. The chapter will provide the limitations and provide favourable suggestion for conduct further studies.

5.1 SUMMARY OF MAIN FINDINGS

The study researched into the effects of information and communication technology on the financial performance of rural banks in Ghana. Annual data from 2011 to 2014, panel data regression analysis is employed to estimate the models. From the discussion of the results, there is enough evidence to establish that the model formulated is significant for prediction purposes. This indicates that the association between the variables gives substantial grounds in predicting the effects of information and communication technology on the performance of the rural banks in Ghana.

The study finds evidence for the relationship between ICT cost efficiency and the total deposits of the rural banks suggesting that efficient utilisation of their current ICT facilities will increase the extent to which customers deposit cash with the rural banks than continually investing in new information and communication technology facilities. This implies that their current capacities can be used along with new and innovative financial products and services without the need to re-invest in new ICT developments. This will help the rural banks cut down on cost hence increase their gross profit as well as the return on their assets.

Further evidence also revealed that deposits as well as efficiency have significant influence on the return on assets of the rural banks suggesting that in the presence of efficient usage of ICT facilities the rural banks are more likely to experience high deposit turnover hence their ability to transform these deposits into more loans. However, evidence from the analysis suggest weak association between ICT investments and return on assets implying that continuous investment in ICT from competition with the rural bank will put a drain on the returns that the rural banks are to earn on their assets.

Finally, the findings also reveal significant linkage between efficiency and the dependent variables; return on capital employed and gross profits of the rural banks suggesting that efficient usage of the ICT is relevant to the performance of the rural banking industry that reinvestment into different ICT components. However, on deposits, the findings suggest negative association with return on capital employed but positive association with gross profit of the rural banks. This suggests that whilst the total deposits may help improve the profit capacity of the rural banks it will however, have a toll on the return to the capital employed in undertaking the new investments in the information and communication technology.

5.2 RECOMMENDATIONS

The paper concludes that the performance of rural banks is influenced by efficiency, deposits and ICT investment. Therefore, implication of these findings underscores the need for an efficient and well-coordinated policy that emphasizes on policies that will enhance the optimal utilization of ICT resources rather than new ICT investments. Hence, it is commendable to emphasize that serious attention must be given to the usage of information and communication technology because its efficient usage will serve as a lubricant that facilitates the growth in the performance of the rural banks.

It is also recommended that rural banks in Ghana should consider taking advantage of their current information and communication technology capabilities to create more and reliable financial products and services to attract more customers than to engage in competition with the rural banking industry. This will help them make more profits hence improve the returns to shareholder capital.

Since most of the rural banks are more reluctant to disclose their investment in information and technology, the researcher recommends that future studies should consider using more of closely related variables that can predict more accurately the impact of information and communication technology on performance of rural banks in order to make a better generalisation.

5.3 CONCLUSION

The study examined the impact of information and communication technology on the performance of rural banks in Ghana using annual financial data stream from 2011 to 2014. Panel data analysis was used to model the impact of the predictive variables on the dependent variables. The result indicates that ICT cost efficiency has a significant effect on the performance of the rural banks. The study further revealed that deposits also have a positive and significant effect on the rural banks performance. Thus, the higher the total deposits the rural banks have the more likely they are able to increase profits and return on their assets from loans. The study further found that investment in information and communication technology rather than its efficient usage has little impact on the performance of the rural banks. Thus instead of investing in new information and communication technology facilities, the rural banks can utilise their current capacities by transforming the financial products and services they render to their customers and this will have more influence on

their performance than making new investment in the light of competition from the rural

banking industry.

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