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THE EFFECT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY ON
FINANCIAL PERFORMANCE OF COMMERCIAL 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 (Accounting) 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 lovely wife and Children.

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ABSTRACT

The study examined the impact of information and communication technology on the performance of commercial banks in Ghana using annual financial data from 2007 to 2011. Panel data analysis is used to model the impact of the predictive variables including ICT investment, deposits and ICT cost efficiency on the performance indicators. The results suggest that ICT cost efficiency has a significant influence on the performance of the commercial banks. The study further revealed that deposits has positive impact on profit before tax but not on return on asset and return on capital employed of commercial banks. Thus, the higher the total deposits, all things being equal, the more likely the commercial banks can increase profits through loans given out to borrowers. The study further found that investment in information and communication technology in its entirety is also relevant for the performance of the selected commercial banks.

TABLE OF CONTENTS

CONTENT	PAGE
DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT.....	v
TABLE OF CONTENTS	vi
LIST OF TABLES.....	ix
CHAPTER ONE	1
INTRODUCTION	1
1.0 BACKGROUND OF THE STUDY	1
1.1 STATEMENT OF PROBLEM	4
1.2 OBJECTIVES OF THE STUDY	5
1.3 RESEARCH QUESTIONS.....	6
1.4 SIGNIFICANCE OF THE STUDY.....	6
1.6 RESEARCH METHODOLOGY.....	7
1.7 ORGANIZATION OF THE STUDY	7
CHAPTER TWO	9
LITERATURE REVIEW	9
2.1 INTRODUCTION	9
2.2 THEORETICAL BACKGROUND	9
2.3 THE THEORY OF RESOURCE AND FIRM PERFORMANCE.....	10
2.4 FIRM INVESTMENT INTO ICT	11
2.5 COST EFFICIENCY OF ICT USAGE	13
2.6 BANK PERFORMANCE.....	14
2.7 ROLE OF ICT IN THE BANKING INDUSTRY	15
2.8 ICT INVESTMENT AND BANKS' PERFORMANCE.....	17
2.9 CONCEPT OF ELECTRONIC BANKING	19
2.10 FINANCIAL INNOVATION IN THE GHANAIAN BANKING INDUSTRY..	20
2.11 THEORETICAL REVIEW OF ELECTRONIC BANKING SERVICE	22
2.12 The Electronic Banking and Bank Performance.....	24

2.13 EMPIRICAL REVIEW.....	26
CHAPTER THREE.....	32
METHODOLOGY AND ORGANISATIONAL PROFILE	32
3.0 INTRODUCTION	32
3.1 SOURCES OF DATA	32
3.2 STUDY POPULATION AND SAMPLE SIZE	32
3.3 DATA COLLECTION	33
3.5 DATA ANALYSIS	33
3.6 MEASUREMENT OF VARIABLES.....	34
3.7 PROFILE OF THE STUDY AREAS	35
3.7.1 CAL BANK	35
3.7.2 GCB	35
3.7.3 ZENITH BANK	36
3.7.4 SG-SSB	37
3.7.5 BARCLAYS BANK	37
3.7.6 HFC BANK.....	38
3.7.7 STANDARD CHARTERED BANK.....	38
3.7.8 FIDELITY BANK GHANA	39
3.7.9 PRUDENTIAL BANK LIMITED.....	39
CHAPTER FOUR	41
DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS	41
4.1 INTRODUCTION	41
4.2 DESCRIPTIVE STATISTICS	41
4.3 IMPACT OF ICT INVESTMENTS ON TOTAL DEPOSITS OF THE COMMERCIAL BANKS.....	43
4.4 IMPACT OF ICT INVESTMENTS, DEPOSITS AND ICT COST EFFICIENCY ON ROA	44
4.5 IMPACT OF ICT INVESTMENTS, DEPOSITS AND ICT COST EFFICIENCY ON ROCE.....	46
4.6 IMPACT OF ICT INVESTMENTS, DEPOSITS AND ICT COST EFFICIENCY ON PROFIT	47

CHAPTER FIVE	49
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION	49
5.0 INTRODUCTION	49
5.1 SUMMARY OF MAIN FINDINGS.....	49
5.2 CONCLUSION.....	50
5.3 RECOMMENDATIONS	51
 REFERENCES	 53

LIST OF TABLES

TABLE	PAGE
Table 4.1: Descriptive Statistics and Correlation Matrix	41
Table 4.2 Results of the impact of ICT and cost efficiency on commercial banks deposits	43
Table 4.3 Results of the impact of ICT, Deposit and ICT cost efficiency on ROA	44
Table 4.4: Results of the impact of ICT, Deposit and ICT cost efficiency on ROCE.....	46
Table 4.5: Results of the impact of ICT, Deposit and ICT cost efficiency on profit	47

CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND OF THE STUDY

Financial innovations in recent decade have changed the face and manner in which financial services and products are delivered to customers. There has been significant change and improvement in the structure of commercial banking industry all over the world even though their traditional functions have being the same. There has been a major overhaul in the various channels through which financial services and products are delivered. In order to improve service in the financial sector, electronic banking products such as mobile banking, Internet banking, and ATM products are the new delivery technologies which are now replacing the traditional delivery methods. There has been a complete improvement on banks performance and provision of good customer service within the banking sector due to the adoption of ICT. In trying to move in line with global development, improvement in customer service quality as well as reduction in cost of transacting businesses, commercial banks are investing huge amounts of money into ICT and are using ICT networks for providing variety of products and services which add value to customers. The ICT development has a major impact on the development of flexible and user-friendly banking services.

The application of information and communication technology in the banking industry involves the use of electronic and telecommunication networks in delivering the various value added products and services to the customers of banks (Steven, 2002). It strategically implies carrying out banking operations through the use of information technology. Accordingly, evidence from prior studies such as Ovia (2001) report that ICT is a major aspect of e-banking which is a component of e-commerce within the

banking and financial services industry. ICT has become the major force behind electronic banking in every country. There has been an improvement in the way and efficiency with which banks render services to customers since the introduction of electronic banking (Steven, 2002; Josiah and Nancy, 2012). The Banking industry in every country including Ghana cannot do without information systems because information systems play an important role in current banking system because all the cash flows of almost every bank is linked to the information systems within that particular bank (Connel and Saleh, 2004).

An issue which has been of crucial importance and concern to all banks and as well as a necessity for both local and international competitive banking is the application of information and communication technology concepts, techniques, policies and implementation of strategies to banking services (Connel and Saleh, 2004; Adesina and Ayo, 2010). The banking industry has witnessed an improvement in service delivery standards 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 individual to check his/her account balance and make payments without going to the banking hall by means of online banking (Adesina and Ayo, 2010).

Banks are using mobile banking in order to provide for customers' needs because most people now own mobile phones and carry them along anywhere they go. The introduction of mobile banking by banks will enable individuals to check their account balances as well as use their phones to do transfers funds. As a result of this innovation, banks have been improving their operations and services by connecting deposit accounts

of customers with mobile money transfer. Due to the e-banking innovation in the banking sector, banking transactions and activities have been made easier around the World of which Ghana is no exception. Even though empirical evidence reiterate on the potential benefits associated with ICT and e-commerce, there has been a debate regarding whether adopting ICT in the banking industry can help enhance the performance of the banks.

The use and investment in ICT requires complementary investments in skills, innovation, investment and change entails risks and costs as well as bringing potential benefits. Investment in information and communication telecommunication can have a positive impact on bank turnover and profitability as well as on employment, especially when ICT is made composite of larger business strategies of bank. Improvement in bank performance in terms of increased market share, expanded product range, customized products and better response to client demand can be achieved through the use of e-banking. Information and communication technology has been influencing banking activities and income levels. Some of the activities that are most likely to change are those that have not been combined with ICT developments. This is especially true for some retail banking activities that can be standardized (Adesina and Ayo, 2010). The main objective of this study is to examine the relevant literature to assess the relevance of information and communication technology on performance of Ghanaian commercial banks and customer service delivery (Kariuki, 2005).

1.1 STATEMENT OF PROBLEM

The banking sector has witnessed many changes since the introduction of electronic banking (Adesina and Ayo, 2010; Josiah and Nancy, 2012). Evidence from research indicated that banks customers have been enjoying convenient, efficient and fast banking services. Most banks are investing huge amounts of money into information and communication Technology in order to help improve upon their service delivery and business activities and operations (Josiah and Nancy, 2012). The investment in information and communication technology has helped ensures that some banking operations and activities are very efficient and cheaper and as a result most banks are investing huge amounts of money into ICT thereby resulting in the investment in technological consuming a significant amount of bank's resources.

At the moment, aside costs associated with payments usually made to the employees of the organization, cost associated with investment in technology is usually the significant item in the budget of most commercial banks (Josiah and Nancy, 2012) and as a result banks have to try to minimize costs and risks which usually result from electronic banking. There is the need for electronic banking innovations to be made through sound evaluation of risks and associated costs in order not to harm the performance of the bank. Banks performance are associated with efficiency and effectiveness of their information and communication technology as well as banks ensuring that there are tight controls and standards to avoid losses associated with the rapid change in information technology within the banking sector. This can be made possible if overall impact of information and communication technology on the banks as well as their customers is known and well comprehended (Adesina and Ayo, 2010).

According to Kariuki (2005) investment in ICT has positive influence on the financial operations and performance of commercial banks. By measuring performance using bank turnover and profits, he noted that banks that are experiencing high profit growth are possibly using significant numbers of advanced ICTs and as such he concluded that e-banking usually leads to higher profits mostly in the long-term instead of the short-term due to high ICT investment cost. On the other hand, the use of and investment in ICT (Davenport 2003, Oshikoya 2007 and Jean-Azam 2006) requires complementary investments in skills, organization and innovation which might reduce bank profits. There has however be little work in this area in Ghana thereby necessitating the need for further research into the relationship between the ICT and banks performance within the Ghanaian sector especially when little is known about the sector, except for the few works of Appiah, Frimpong and Domeher (2014).

1.2 OBJECTIVES OF THE STUDY

The main objective of the study is to assess the Relationship between Electronic Banking and Financial Performance among Commercial Banks in Ghana. From this main objective, the following specific objectives have being developed:

- 1) To assess the impact of ICT investments on total deposits of the commercial banks in Ghana.
- 2) To assess the impact of ICT cost efficiency on the profit of commercial banks in Ghana.
- 3) To assess the relationship between ICT investment and returns on capital employed among commercial banks in Ghana.
- 4) To assess the relationship between ICT investment and returns on assets among commercial banks in Ghana.

1.3 RESEARCH QUESTIONS

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

- 1) What is the impact of ICT investments on deposits of the commercial banks in Ghana?
- 2) What is the impact of ICT cost efficiency on commercial banks profit in Ghana?
- 3) What is the impact of ICT investment on returns on capital employed of commercial banks in Ghana?
- 4) What is the effect of ICT investment on returns on assets of commercial banks in Ghana?

1.4 SIGNIFICANCE OF THE STUDY

This long essay will add to the existing body of knowledge and literature on the subject of the relationship between investment in ICT and financial performance among commercial banks in Ghana. Even though there has been a lot of research materials and studies in this area in other countries, there has not been enough research in the area of ICT investment and commercial banks financial performance in Ghana.

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

This research will further enable commercial banks in Ghana to know whether to continue to increase investments in computer hardware and software or not as it seeks to find out if there is any relationship between investment in computer hardware and

software and the financial performance of the commercial banks in terms of the impact it will have on their profit before tax and returns on assets and return on capital employed of the commercial banks.

1.5 SCOPE AND LIMITATIONS OF THE STUDY

The research population is made up of all commercial banks in Ghana. For the purpose of achieving the research objectives; attention has been focused on all commercial banks. However, due to time factor and resources constraints, this study will focus on only some selected commercial banks operating in the Ghanaian banking industry.

1.6 RESEARCH METHODOLOGY

All commercial banks operating in Ghana make up the population of the study. Due to time and resources constraints, the sample size is however made up of the selected commercial banks operating in Ghana. This study will use secondary data which will make up of the annual reports of the selected commercial banks for all the relevant years under consideration. Descriptive and inferential statistics have been used in the study to analyse the data. Conclusions and recommendations will be based on the findings of the study.

1.7 ORGANIZATION OF THE STUDY

The study comprises of five chapters. Chapter one provides the introductory of the topic. It covers the background of the study, Problem statement, Objectives of the Research, research questions, Justification of the study, Scope of the study and limitation of the study.

Chapter Two discusses the literature review of previous studies conducted in the area of credit risk determinants.

Chapter three examines the methodology used in the study. It covers sources of data, study population and sample size, data collection technique, data analysis and overview of rural banking in Ghana.

Chapter four reports the data analysis and discussions of research findings.

Chapter five reviews the summary of main research findings, conclusions, and policy implications of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Recent financial innovations have led to a major debate about the contents of financial products and services financial institutions offer to their customers. Though, financial progress and development 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 occurrences of new and innovative financial products and services 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 new innovations in financial development 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 review the numerous literatures on the impact of electronic banking on commercial banks performance in Ghana.

2.2 THEORETICAL BACKGROUND

Information and communication technology in the Ghanaian banking industry combines banking with high speed computing. As noted in Alabi, (2005) ICT in the banking industry incorporates banking with the manipulation and transfer of information using electronic means. Information and communication technology here is seen as both the hardware and software that enables users to access information, collect and convert these information into useful data (see Laudon, 2001).

The association between information and communication technology and banking activities have been widely studied in both developed and developing economies but however, much attention have not been paid to its effects on firm performance in terms of cost. However, evidence from similar studies suggests that the impact of ICT on banking performance is inconclusive since the result found in different countries is mixed. For instance, the theory of value chain analysis by Porter (1985) reveal that competitions among firms is as a results of the natural monopoly each firm holds from the unique resources available to each firm in the market. This therefore makes it difficult for other firms to copy or reproduce the resources of the other as a result of property right issues inherent in the market system (Melville, 2004). Thus, the theory assumes that firms have superiority over their resources hence affords them the opportunity to increase their performance at the expense of other competing firms in the market.

2.3 THE THEORY OF RESOURCE AND FIRM PERFORMANCE

Empirical studies including Corner (1991) argue that competition amongst firms take place due to the underlying resource limitation inherent in the economic system. However, Barney (2001) examined that the resource based theory of the firm performance operates under certain theoretical assumptions which he noted to include conception of ideas, choice as well as implement of strategies. These assumptions he further revealed to operate in a heterogeneously distributed firm with stability over time. In line with assertions of Bharadwaj (2000) resource are classified into two sub-categories based upon the use of the assets, the knowledge base of the user as well as organizational processes and capabilities if the firm. However, Grant (1991) examines that resources and capabilities of the firm can further be categorised into tangible (those

that can be seen and touch), intangible (those that cannot be seen nor touch) and personnel-based resources.

Consequently, the tangible aspects of the resources according to Grant (1991) involve both financial and physical assets. These include plants, equipment and stock of raw materials owned by the firm. The intangible part of the resources is based on the firm's reputation, or corporate image as well as the quality of products. In terms of personnel, Grant show that technical know-how also plays a fundamental role in the resources capacities of the firms acquired through education and training. Also, to increase ones competitive advantage, empirical studies including Russo and Fouts, (1997) have revealed that it depends on the motive as well as the capabilities of the firm to integrate and deploy essential resources to the market. This will help create a value resource chain to cushion the operation as well as sustain the performance of the firm in the market.

2.4 FIRM INVESTMENT INTO ICT

Infrastructural facilities of firms in terms of ICT comprises of both the tangible and intangible assets of the firm. Thus, the operations of the firm are influence by the trend in the firm's stock of resource. McKenney (1995) argue that major firm resources that enhance long term survival of the firms are more prone to competition if the firm is unable to sustain and hold the resources available to it. In line with these findings, Barney (2001) argue that the physical components of the firm's assets can be a major form of competitive advantage since large firms enjoy some form of economies of scale as a result expansion in the business firm which is also reflected in its assets components. Based on this ideology, he notes that other firms with critical investment capacities can imitate and take advantage in a competitive market hence outweigh the benefits the large firm is supposed to derive from holding or sustaining its assets base. This can therefore

reflect in the competitiveness of the market and hence increase the tendency for synergy or merger if no rules and regulation are set to guard to enhance the organizational competitiveness.

According to Bitler (2001), many institutional firms and academicians have investigated the effect of ICT on firm performance but none have been able to pinpoint the actual effect of information and communication technology on firm performance. He examines that the existence of positive link between ICT investments and small businesses' performance which he attributed to fact that these firms because of their size, they are able to efficiently utilise the ICT facilities they have without having to do repurchasing of new ICT facilities.

In line with Berger et al. (2003) technological progress is of pertinent for banking industry since it affords banking institutions to bring up innovative product lines and services that deepen financial development in most economies. However, their findings reveal that ICT investment increases firm markup cost hence increases the rate of interest and other charges levied on banking activities of their customers. Improvement in productivity of these banking sectors and increase in their deposit size or assets have culminated into the rise in competition in the banking sector. This has however, increased and expanded the products and service delivery to customers.

Findings from surveys (see Shawkey, 1995), concerning the influence of automated teller machines (ATMs) on banks' performance have shown that ATMs investment raises both the size and amount of deposit accounts, diminishes banking operation costs, and decreases the staff size and the number of bank branches thereby resulting in an

expansion in the profitability and performance of banks (Abdullah, 1985). Accordingly, Kozak (2005) examines the impact of ICT on return on capital of listed banking institutions in the US. He revealed that the amount generated through the use of the assets of the firm for the banking sector in the US has risen by 51% implying a progress in ICT investment in relation to other facilitating factors used normally by commercial banks to boast their performance. In addition, he revealed that factors such as extensive office networks also accounted for the increase in the return enjoyed by the banks since these increases the extent to which they are able to receive deposits from the customers across the sub-regions. Contrarily, Osei and Harvey (2011) argue that increase in the investment opportunities in ICT has prospects for bank performance in Ghana since there are limited numbers of banks operating within the spheres of the banking industry in Ghana. This they note can increase the long term benefits associated with investment in resources.

2.5 COST EFFICIENCY OF ICT USAGE

Though, the usage of information and communication technology is increasing in both developed and developing economies, its importance cannot be overemphasized. For instance it facilitates modernised ways of storing and capturing information. This notwithstanding influences the processing, distribution and transmission of relevant data internally and externally for firms. Accordingly, Kollberg and Dreyer (2006) expound that contemporary dynamics eminent in the business environment due to information and communication technology has facilitated efficiency in operational chains, structure and strategy of organizations.

Notwithstanding, Buhalis (2003) argues that the usage of ICT is geared at enhancing performance of certain investments available to the organization. This therefore trickles down to returns on invested assets as well as improve equity of shareholder in the long run. Conversely, Spanos et al. (2002) examine that the influence of globalization has increased the importance of ICT adoption to survive the pressure existing in the business environment (see Ongori and Migiro 2010). However, evidence suggests that productivity gains from the usage of ICT manifest itself in many ways. Apulo and Latham (2011) further suggest that ICT increases the effectiveness of data transmission hence increases the extent to which the staff can readily access company information to improve the productivity of the organization.

Trist, (1990) further argues that technology does not necessarily have the capacity to enhance the overall performance of a business entity. Trist's perspective lies in the interdependence existing between technology and other organizational factors as well as systematic effect of technology on banking processes. Barney (2001) reveals that the routines of the firm can be challenging to duplicate hence developing the foundation of economic advantage and performance. Accordingly, cost efficiency in line with strategic management of the firms expense increase the effectiveness of the firms to cut down on cost to obtain supreme revenue using little efforts (Fethi and Pasiouras, 2010; Casu 2004).

2.6 BANK PERFORMANCE

Empirical studies have employed various methods to evaluate profitability as well as performance of banking institutions using cross-country data. The reliable measure almost used by these studies have mainly relied on return of assets and equity since they

reveal the actual impact of changes in the firm operations on assets as well as investor capital.

In line with survey conducted by Sinkey (1992), return on asset measures the overall performance of the firms from its accounting perspective. Thus, he notes that return on asset bolsters as a primary indicator of managerial efficiency hence reveal the performance of the management in line with its efficient utilisation of the firms resources to increase shareholder capital as reveal in the agency and stakeholder theories (Rose and Hudgins 2006). However, these studies retain that return on equity since it is linked to shareholder capital, is also imperative as a performance indicator that seeks the interest of the investors and owners of the firms (Akintoye 2004). However, Russo and Fouts (1997)examines that since ICT is a function of the capital employed by the firm in its operation, it is relevant to consider return that accrues to capital employed by the firm since it has benign effect on performance of the firms.

2.7 ROLE OF ICT IN THE BANKING INDUSTRY

Existing literature indicated that banks efficiency and productivity may be affected adversely by ICT. Solow (1987) posits that "you can see the computer age everywhere these days, but in the productivity statistics". Meanwhile, during the 1970s up to the period Solow argued that growth was decelerating due to the fact that technologies were becoming universal. Turban, et al. (2008) noted that "discrepancy between measures of investment in ICT and measures of output at the national level". One of the most crucial factors relating to efforts but cannot improve earnings but which is constantly changing

is ICT as noted in a survey carried out in USA by Shu and Strassmann (2005) between the periods of 1989 to 1997.

However, a lot of literatures indicated that ICT expenditure has a positive influence on the value of businesses. For instance, Saloner and Shpard (1995) carried out a study in USA within the period of 1971-1979 and noted that network effect interest is substantial in using Automated Teller Machines (ATMs) and this notion has also gained the support of Milne (2006). Kozak (2005) however examines the impact of the evolution of ICT on the cost effectiveness and profit of banks within the banking industry during 1992-2003 and noted that the relationship between ICT, cost savings and productivity is significant.

The developments in ICT have created room for major progress in banks business procedures across the globe. The development of the worldwide network for instance has resulted in a reduction in global fund transfer cost. Berger (2003) posits that "banks that are using ICT related products such as online banking, electronic payments, security investments, information exchanges, and financial organizations can deliver high quality customer services delivery to customers with less effort". Brynjolfsson and Hitt (2000) noted that "ICT contribute significantly to firm level output". According to them, investment in ICT has resulted in an increment in output of businesses by 81% whereas capital relating to non-information technology contributes only 6% increase in output. They also revealed that personnel in charge of information systems are more productive than those who do not deal with ICT.

According to Economides and Salop (1992) and Farrell and Saloner (1985), the relationship between ICT and performance of banks have two major outcomes. First, ICT can help reduce banks operational costs. For instance, internet technology can help

speeds up procedures of banks in order to achieve standardized and low value added transactions such as bill payments and balance inquiries processes via online network. Secondly, ICT can support transactions between bank customers within the same network.

2.8 ICT INVESTMENT AND BANKS' PERFORMANCE

Research capturing the relation between ICT and firms performance are mainly found in developed economies. However, Furst et al (2002) investigates the relationship between the provision of e-banking services and bank performance. He reveals that federal banks in the US exhibit higher return on equity than non-chartered banks. His studies was based on the conventional business model which emphasises that banks which adopted and implemented ICT after 1998 will become movers of the financial system. In line with these findings, Carlson et al (2000) find no substantial evidence of major differences in banks performance due to electronic banking.

Subsequently, Sullivan (2000) reveals that there is absence of systemic evidence on the impact of harnessing ICT in Kansas Metropolis in the US. In line with this, Sathye (2005) argued on the credit unions between the periods of 1997 to 2001 revealing that financial innovation through e-banking cannot be applied as a yardstick for measuring performance among banks with different sizes and economies of scale. However, bank performance hinges on the ability of the bank to achieve economies of scale in minimizing asymmetry of information between its customers (Haq 2005). One major issue challenging the existence of the banking industry in recent years has been the problem of how ICT should be used whether efficiently or effectively. Buttressing the findings is Claessens et al (2001) views that emphasises on how improvement in

information and communication technology can influence the global economy to provide virtual financial systems before establishing fully fledge infrastructure to complement the system. E-banking has been cheaper as evidenced by most empirical studies, because it is believed to depress costs associated with day-to-day processing of customer information. This therefore will be expediency in the services and products rendered by the banks in the short term and long term financial intermediation for savers and borrowers.

Similarly, DeYoung (2005) assesses the profitability between the traditional and universal banking in the US financial market. He revealed that general experience effects have influenced the viability of start-up banking firms since the introduction of ICT in banking systems. He further found that multi-channel banks are somewhat more profitable as a result of charges from deposit service charges. Transfer of customer deposits from checking accounts to money market deposit accounts raised the usage of brokered deposits as well as increases the average salaries of bank employees. This evidence affirm Hernando and Nieto (2007) revealing that electronic banking is a complementary but not substitute channel for the banking industry. In line with Simpson, (2002) operating costs minimization as has been the underlying factor that has motivated the growth of internet banking in most developed economies. This has increased the substitution of the electronic banking for the conventional banking system for efficient and effective deliveries of products and services (Gurau 2002).

A survey conducted by Centeno (2004) reports that positive application and expansion of electronic banking is subject interrelated factors. The cost component, accessibility of the

innovation and skill factor of the users have rendered the technology in the banking system currently more profitable than the usual conventional banking system.

2.9 CONCEPT OF ELECTRONIC BANKING

Although, many academicians have defined e-banking to encompass many aspects of technological innovations in the financial sector, Tan and Teo (2000) for instance define electronic banking as a system enabling the quick implementation and conduct of financial transactions through the website or automated machines employed in banks. Steven (2002) also examines e-banking to be the conveyance of services to a range of users across electronic or telecommunication networks. Thus, use of information technology in banking operations forms the basis for e-banking.

Ovia (2001) argue on e-banking. He notes e-banking may include the use of ATMs, pay-by-phone, debit card payment or through the use of personal computer to initiate transactions. Although, e-banking has numerous challenges including confidentiality, integrity and authentication issues various benefits have been associated with its adoption in many developed and developing economies. For instance, prior studies (see Ozuru, Chikwe and Idika 2010; Christopher, Mike and Amy 2006; Harris and Spence 2002; Williamson 2006) have argued on the benefits of electronic banking. They examine that the adoption of e-banking in the case of customers, is significant in saving time when banking services are automated. Gurau (2002) also notes that e-banking reduces associated costs of in accessing and using banking services as well as increase comfort and time saving in banking transaction. However, it is also noted that electronic banking leads to quick and continuous access to information.

Kamel (2005) in his work also examine that the use of e-banking in developing economies may facilitate better cash management since it may help cushion the flow of money as well as raise the efficiency and effectiveness processes inherent in the management of large scale financial institutions. Though beneficial, electronic banking has been criticised on the basis that it can further impair risks inherent in conventional banking systems. Banks need to increase the harmonization and coordination of electronic banking to its highest on the global level. The ease of capital flow across borders creates a greater sensitivity to economic policy management on electronic banking since most studies believe that electronic banking can breed money laundering activities. To make an informed policy decisions on e-banking, policy makers need a solid analytical foundation to analyse the economic cost associated with the adoption of electronic banking hence the banks performance.

2.10 FINANCIAL INNOVATION IN THE GHANAIAN 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 (see Acquah, 2006). For instance, technological improvement in the banking industry have presented new delivery channels for communicating financial products and services to customers including Automated Teller Machines (ATMs), Internet banking and PC and mobile banking 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 in the banking industry has

created a cost-effective cashless economy where convenience and efficiency have become the hallmark of the financial sector while growing the firms profit as well as improving competitiveness. Banks that offer Automated Teller Machine services have networked their machines, to increase user accessibility of the banks products and services. Accordingly, Rose (1999) postulates that ATMs are a cost-efficient technology in the financial system that has tendency for yielding higher productivity for the banking industry. Since Trust Bank Ghana introduced ATMs in 1995, the technology has found acceptance on a massive scale from the banking industry. Currently, almost all commercial banks in Ghana offer ATM services with few also offering internet based services to their clients. The combined services of the ATMs' and the human tellers' means that Ghanaian banks have become more productive during banking hours. Hence, limiting queues in banking halls.

Consequently, Domeher et al (2014) examine that since the presence of these new innovation including the ATM and internet banking provide an alternative to queuing in banks, customers are able to invest their time in other productive activities. As noted by Hinson et al., (2006) the commercial banks due in part to their size have collaborated with the telecommunication industry in the provision such banking services through internet and mobile phones which according to Asante et al., (2011), have a higher likelihood of transforming the basis of financial intermediation compared to the case of developed economies and hence, provide a sustainable competitive advantage and goodwill to the commercial banking industry.

Although, the brain behind financial innovations such as internet banking (see Essinger 1999) is to provide customers accessibility to their bank accounts to undertake certain

transactions on their account, given compliance and stringent security checks, most banking firms with greater convenience and flexibility provide the customers with virtually absolute control over their transactions. With the emergence of the mobile banking in Ghana, its importance has increased from its insurance and the formal banking usage for delivering financial and insurance products and service to Ghanaian banking customers. With increasing number of mobile applications, customers are able to perform account balance and transaction history checks, transfer funds and pay bills through few clicks on their mobile devices including on cell phones, smartphones and Personal Digital Assistants (PDAs).

These innovations in the Ghanaian banking industry are moving financial intermediation from inefficient and costive to cost-effective and efficient intermediation. The widespread introduction of these products onto the banking market means customers are benefiting from such innovations. The introduction of technological (e-banking) innovations has meant shorter queues inside banks, which has helped to improve the convenience of banking (Frimpong, 2010). Conclusively, Acquah (2006) argues that the innovations in electronic banking in Ghana not only improved efficiency but also fostered a higher progress in financial intermediation.

2.11 THEORETICAL REVIEW OF ELECTRONIC BANKING SERVICE

The essence of incorporating modernization in the Ghanaian financial industry stems from the speed at which the global financial environment is dynamically shifting across geographical spheres. Prior studies (see Singh 2006; Im *et al.* 2003; Rogers 1995) for instance comment on the importance of innovation and dynamism and the benefits that comes with it. Innovation is imperative for the existence of every firms in the economy.

For instance Damanpour et al (2009) affirms that innovation significantly impacts positively on firm's financial performance. Thus, innovation depends on the quality and quantity of the products and services the banking sector presents its customers (Kumar, 2011). Frei et al (1998) notes that the liberalization of domestic regulations, competition, innovations in financial market and growth in information technology is more likely to propel the growth of innovative ideas in the banking industry than the case of regulated banking sector.

Consequently, Domeher, Frimpong and Appiah (2014) examine that financial innovations including absence of complexities and compatibility leads to the creation of user friendly electronic banking products which according to Merton (1992) limits costs associated with transactions in the banking industry. Consequently, Domeher et al. (2014) note that in terms of cross industry innovations and dynamism, the utmost benchmark upon which financial innovations can be made must include the extent to which financial innovations improves efficiency in the banking sector through modifications and inventions of new financial products. Tufano (2003) in his argument on the importance of innovations and dynamism, notes that two innovation processes are employed by the banking industry in their activities including product and process innovations.

Tufano (2003) espouse that whilst the product incorporated new derivative contracts, corporate securities and pooled investment products, the process innovation employs new distribution channels including ways of distributing securities, processing transactions and pricing transactions in the commercial banking system to yield customer satisfaction and investor goodwill. However, Schiffman and Kanuk (2009) also assess

that contrary to the innovation in diffusion theories, the users as well as the process and product are imperative since it may influence the market reputation of the bank as well as the returns to shareholder if consumers are not satisfied or the product do not impact significantly on the day-to-day transactions of the consumers or user of the product. Though, consumer characteristics are employed as the predictors of the innovation, the process may only incorporate the profit motive of the commercial bank rather than the full information set on the motives of the firm or its shareholder interest (see Polatoglu and Ekin 2001; Black *et al.* 2001). Accordingly, Frimpong (2010) examine that, innovations in the banking sector forms an impetus which leads to improvement in the banks capacity, efficiency and financial performance.

2.12 The Electronic Banking and Bank Performance

Price factors suggest that perceived relative economic advantages will motivate consumers to use electronic banking (Sathy, 1999). However, Carlson et al. (2001) and Furst et al. (2002a) 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.

Sathy (1999) argue that in the case of internet banking, two kinds of price were accounted for; the normal costs associated with internet activities, and the bank costs and charges. Consequently, Polatoglu and Ekin (2001) identify that users of electronic banking are significantly satisfied with the cost saving factor through electronic banking.

However, it is noted that in cases where consumers perceive electronic banking as expensive, then it does not add to the satisfaction they derive from the product or service rendered by the financial institution (see Gerrard and Cunningham, 2003). Notwithstanding these conflicting findings, Sathye (1999) showed that the costs of electronic banking poses a negative impact on its adoption (see Akhalumeh and Ohiokha 2012; Adeniyi and Olutayo 2015; Freedman 2000).

Mohammad and Saad, (2011) examines that electronic banking poses a negative impact on performance of commercial banks in Jordan. Thus, they note that e-banking in its entirety has not improved the performance of financial institutions that are 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 costs associated with adopting electronic banking are still higher in developing economies hence less beneficial to the financial industry.

Simpson (2002) noted that the motivation for e-banking is largely based on prospects minimizing operating costs and maximization of operating revenues. An evaluation of online banking in developed and emerging markets shows that in developed markets lower costs and higher revenues are more noticeable. While Sullivan (2000) provides no systematic evidence on the importance of e-banking, Jayawardhena and Foley (2000) examine that e-banking result in cost and efficiency gains for banks in the U.K.

2.13 EMPIRICAL REVIEW

Ajayi and Ojo (2006) note that the most noteworthy precondition for economic development is to encourage a financial system that is secure, convenient, and affordable to its consumers. In spite of this, Humphrey (2004) examine that developed economies are hastily moving away from the traditional paper payment instruments toward electronic ones, especially payment cards. In Sub-Saharan Africa and especially Ghana, currency is the primary mode of payment and a large percentage of the populations are unbanked (see Ajayi and Ojo 2006). This makes the country to be heavily cash-based economy. Prior studies (see Lockett and Littler, 1997; Daniel, 1999; Lee et al., 2000) find significant positive association between financial innovation and firm performance in the banking industry. Other studies including Davis (1989), Karahanna et al. (1999) also find consistent positive relationships between usefulness, the ease of use as well as the adoption of automated teller machines (Chau and Hu, 2001).

Elizabeth and Greg, (2004) in their assessment of the linkage between efficiency, financial performance and customer service quality among financial institutions in Australian, find that all financial performance measures including interest margin, expense/income, return on assets and capital adequacy were positively associated with customer service quality scores. However, they further reveal that the lack of reliable association between efficiency and financial performance reveal that pursuance of improved banking service will increase performance by cutting down on costs for quality service provision. Rogers (1962) in his theory of diffusion finds robust evidence for financial innovation in the financial sector in terms of time savings and convenience in transactions.

However, Snel (2000) argue on issues surrounding financial innovations. He posits that since privacy is a concern to the consuming public, it may inhibit the adoption of an electronic banking service (Karjaluoto et al. 2002). Lee and Lee (2000) find not support for direct bill payment but noted that rise in consumer income and education tend to be positively linked with the adoption of innovations in the banking industry (see Daniel, 1999; Polatoglu and Ekin 2001). Accordingly, Colgate, Nguyen and Lee (2003) report that when users of financial innovations make decisions concerning available alternatives in the marketplace, improvements in operations of the existing alternatives form a major determinant for users remain faithful to their banking provider.

Consequently, Sathye (1999) examine that the lack of information about electronic banking and its usefulness undermines the adoption of electronic banking by commercial banks. Moreover, 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.

Consequently, Pooja and Balwinder (2010) using financial performance data of 82 Indian commercial banking institutions from 1998-2007, find that larger commercial banks have better operating efficiency ratios and rely less on traditional source of financing than inexperienced ones. However they report insignificant association between profitability and experience in offering of electronic banking services, hence concluding that electronic banking does not imperatively imply financial performance.

In line with prior studies, Irechukwu (2000) examine that directors in the banking industry cannot do away with the critical roles played by information and

communication technology in the organization and implementation of banking policies. Financial innovations through technological advancement have broadened the scope of information and communication technology usage in the banking industry. For instance, banking concepts linked to accounting information systems cannot be complemented with the traditional banking techniques hence the usage of information and communication technology has remained an important aspect of today or modern banking industry in facilitating the ease with which banks can accumulate and transact business with their clienteles.

Due in part to reputation and global competitiveness of the banking industries, information and communication technology influences the how, the why and when banking activities should be conducted or planned for efficiency. For instance, quality service provision in the banking sector is easily done through electronic banking services than the tradition mode of operations. Other studies assess that the proliferation of ICT devices and software models including data recognition services, electronic payments including deposits has eased pressure from banking halls hence given management full autonomy and room to operation effectively to yield shareholder interest (see Adeoti, 2005).

Almost, the entire aspirations of human endeavours to reach higher efficiency have been reached from the inception of the information and communication technology. Advancement in routine data processing and information storage as well as retrieval has fashioned an innovative growth agenda in the private sector where information processing is a key for economic growth. Through revolutionised banking, movement of money across borders have been safer than before where people are trapped with money

in their homes. Here, virtual money has become important such that millions of currencies can be moved from one country to another easily with having to go through the hassles of hidden cash from criminals (Ovia, 2005).

Notwithstanding, information and communication technology has transformed the business communities since their accounting processes can be easily computerised for assessment in cases where the businesses require loans or credit facilities to expand. Consequently, Harold and Jeff (1995) examined that as a result of the transformations, processes including credit lines, accounts opening and mandate as well as processing of operation have changed within the banking industry with most of them being carried out for example through telephone calls and the internet. This said, virtual documents on clienteles are circulated over the internet on secure repositories which mandates customers to securely validate their information including account numbers and receipt of credit information. Currently, electronic data interchangeable and credit cards have created the ease to which customers can assess their funds, capital or trade over secure lines without any constrictions.

Yet, evidence suggest that the growth of information and communication technology in the banking industry in developing countries have been minimal such that services experienced in the developed world are lacking in banking industries of developing world. To reiterate this, Harold and Jeff (1995) conclude that service providers in the banking industry need to streamline as well as complement the traditional service delivery with the modernised financial sector processes inherent in developed markets. This said will increase the harmonisation of global financial services and hence eliminate some of the challenges limiting free movement of money.

Accordingly, Orhan (1997) argues that reputations of banks will only increase when the banking industry is transformed to provide ICT related services since this is the only process through which the banking industry can survive with current financial innovations. Thus, the dynamisms inherent in information and communication technology increases the pace of progress hence the growth of the economy (see Woherem 2000).

In line with studies conducted in the US, Ova (2005) reveal that the inherent disparities in income diversification in the banking industry have reduced the risk associated with modern banking. Thus, the large and stronger a financial institution becomes when it increases its information and communication technology operations in the banking sector since it pulls customer trust from the ease and efficiency with which they can process and transfer services through the banking industry. Notwithstanding, wide view of contemporary banking activities shows that recent and upcoming banking institutions including the microfinance institutions are adopting information and communication technology as their mainstay of success in the private banking business. This can be attributed to the fact that the cost associated with this form of banking is minimal; the moment the bank invests in the infrastructure all that is necessary is its maintenance which is key to the banks performance.

However, Colecchia and Schreyer (2002) examine that ICT has become the embodiment of the banking industry which propels the economy. The impact of globalisation, competition and financial innovation within the financial sector allows the provision of services and products essential for the household. Thus, the inclusion of information and communication technology as part and parcel of the banking industry

has led to the achievement of effective service delivery through online which minimises the operational cost of the bank hence their performance.

For instance, Schreyer (2000) examines that output growth in the European zone has increased tremendously, as a result of progress and innovations in the financial industry in Europe. Though, information and communication technology investments have remained as portion of intangible assets of the banks, its output is overwhelming as it has remained as the potential source of productivity gains contributing enormously to the output of the financial sector in the European economies. However, disparities in flexibility of product and services in the labour markets remain as the facilitating point for the adoption or dissemination of new technologies among banking organizations and their productivity. However, the decline in global computers and other necessary ICT facilitating equipment have increased in demand. For instance, economies that have benefited from financial innovations emanating from the influx of ICT include the US, Europe and China since its adoption has accelerated the growth of their economies. Thus, rapid accumulation of capital goods with short service lives have raised the average investment cycle of capital services.

CHAPTER THREE

METHODOLOGY AND ORGANISATIONAL PROFILE

3.0 INTRODUCTION

The focal point of this chapter is to investigate the impact of ICT on financial performance of commercial banks in Ghana. The findings of the results as well as the ensuing conclusions deduced from the study hinges on the quality of the information gathered for the study as well as the analysis. In order to ascertain the necessary information, the researchers used quantitative measure to access information for the study through secondary data. This chapter therefore, will describe the methods and procedures used in acquiring data, how they would be analysed, interpreted and how conclusions would be met.

3.1 SOURCES OF DATA

Data source and collection method pre-informs the researcher the necessary information required to address the critical questions identified in the study. Although, numerous methods and sources of data were identified, the most important issue was selecting the appropriate data to be used for the analysis. The data used for this study is mainly secondary data which make up the annual reports of the selected commercial banks for all the relevant years under consideration.

3.2 STUDY POPULATION AND SAMPLE SIZE

The population of the study is all commercial banks in Ghana. However, due to time factor and resource constraints, the researchers conducted the study on ten selected commercial banks in Ghana namely GCB, Barclays bank, Ecobank, Standard Chartered bank, Zenith bank, SG-SSB bank, Cal bank, Access bank, Prudential bank and HFC

bank. These commercial 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 commercial 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 commercial banks to examine the effect of ICT on financial performance among commercial banks in Ghana.

3.3 DATA COLLECTION

For the purpose of this research, the researchers used secondary data sources to examine the effect of ICT on financial performance among commercial banks in Ghana. Data for the study were therefore extracted from the annual reports of the selected commercial banks under consideration for a period spanning from 2007 to 2011.

3.5 DATA ANALYSIS

The study examines the effect of ICT on financial performance among commercial banks in Ghana. Purposively, the researcher employs Ordinary Least Squares regression analysis (Anderson and Reeb 2003; De Andres et al 2005) 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 commercial banks. However, the independent variables employed to determine the financial performance of the commercial banks include total expenditure on ICT (both software and hardware expenditures). Correlation was consequently employed to detect multicollinearity amongst the variables. The OLS regression models for this study are therefore stated as follows;

3.6 MEASUREMENT OF VARIABLES

Prior studies have used different proxies for the measurement of bank performance. For instance Ahmed and Khababa (1999) and Sinkey (1992) reveal that return on asset (ROA) is a good measure of overall bank performance from an accounting perspective. They posit that ROA as a primary proxy for managerial efficiency denotes the capabilities of the commercial banks in transforming total bank assets into profits. Rose and Hudgins (2006) and Akintoye (2004) further argue that return on capital employed and profit before tax also signify the net benefits the banks are able to accumulate during their operation. The proxies for the variables employed in the study are described as follows:

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

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

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

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

Profit = Profit before tax.

ICT is measured in terms of the total amount invested in both computer hardware and software.

3.7 PROFILE OF THE STUDY AREAS

3.7.1 CAL BANK

CAL Bank was given license to operate within the shore of Ghana in 1990. The bank however, was appended a universal banking license from the central bank in 2004 to provide retail banking services to both importers and exporters alike.

The banks which has been adjudge as the innovative local bank since its establishment boast of highly qualified and skill professionals manning the banking and fund management of the institution. CAL Bank Limited has two subsidiaries including the banking aspects and the brokerage part. The banking aspect provides services and products to merchants as well as the general community. However, the brokerage aspect of the bank deals in security exchanges on the Ghana stock exchange through its fund management branch. It also provide a range of service to the general public, government and other public sector institutions.

3.7.2 GCB

Having celebrated our 60th anniversary in 2013 and having launched a new image for our Bank in 2014 to help drive us forward for the next 60 years, we can say with total conviction and confidence that we are excited about our future.

In order to maintain our position as the leading bank in Ghana and to continue to grow, it is now more important than ever to refocus and re-arm our position in the marketplace through a new, evolved brand, better communication and a tireless commitment to serve our customers better.

As part of the change, we have adopted an internal change programme that has been -firmly embedded in our business plans, our staff training, our branches and our

services. This programme overhauled the Bank' score values and brand, resulting in a new evolved logo and a stronger on-the-street presence.

Our dedication to higher standards will witness the introduction of new banking products and services. We are refurbishing our branch network to international standards, updating our systems and technology and focusing on increased customer satisfaction right across our business channels. This is a long-term programme, but you will see progress over the coming months.

Our goal as a Bank has always been to be the leading -financial services provider in Ghana through a commitment to superior service and best practice. Our commitment to our country and its heritage, values and future are demonstrated every day through the actions that we take as an organization. This has not, and will not, change.

We are delighted to share with you our underlying business principles, fundamental values and brand systems. Through these assets, and with the commitment and support of our shareholders and partners, we are confident we will enjoy growth and prosperity for all our stakeholders and, of course our customers.

3.7.3 ZENITH BANK

Zenith Bank (Ghana) Limited is incorporated in Ghana in 2005 under the Ghana Banking ACT 2004 (ACT 673). Zenith bank seeks to become a principal, technology-driven, global financial institution, providing distinctively unique range of financial services. The overall vision of the bank is to make the Zenith brand a trustworthy global financial services network recognised for innovation, superior customer service and performance while creating premium value for all stakeholders. In Ghana, our vision is "to be a

reference point in the delivery of prompt, flawless and innovative banking services in the Ghanaian Banking industry".

3.7.4 SG-SSB

Societe Generale Ghana, a strong local bank, has been one of the leading banks in Ghana. Societe Generale Ghana Ltd operates 45 fully networked branches, Agencies and outlets across the country and serves corporate customers, Individuals and Small and Medium Enterprises (SMEs). Incorporated as a private limited liability company with the name Security Guarantee Trust Limited and was solely owned by the Social Security and National Insurance Trust (SSNIT). SSNIT changes the Bank's name from Security Guarantee Trust Limited to Social Security Bank Limited. Bank of Ghana grants a licence to Social Security Bank Ltd to operate as a Bank on 17 September 1976. The Bank officially opens to the public with the first Branch, Accra Main located on the ground floor of the Head office on 17 January 1977. The next branch to be opened is the North Industrial Area branch. The Bank successfully merges with the National Savings & Credit Bank and retains the name Social Security Bank Ltd on 3 May 1994.

3.7.5 BARCLAYS BANK

It is one of the oldest financial institutions to operate in Ghana since the colonial periods. The stakeholders of the bank include Barclays Bank PLC. Barclays Africa Group Limited is one of Africa's major financial services institutions offering personal and business banking, credit cards, corporate & Investment banking and wealth management products and services as well as bancassurance. Thus, the bank employs both global

expertise and product knowledge with rich experience from different dimension to project their services by bringing the best of banking to its customers.

3.7.6 HFC BANK

The bank acquired its operational license from the central bank to operate in Ghana in 2003, as a mortgage house financial the real estate businesses in the country. However, due to the central banks directives, it was given a universal operational license to operate not only as mortgage bank but also as a commercial bank in Ghana. Currently, the bank has increased its services from mortgage and commercial banking into investment and microfinance with some equity and venture capital management services. The operations have assured the investment community of the diversification of banking environment in Ghana hence has increased the portfolio size of this bank tremendously. Currently, about 50% of the banks stakes is owned by local investors with the remaining being acquired by a universal bank operating in Trinidad and Tobacco.

3.7.7 STANDARD CHARTERED BANK

Standard Chartered Bank Ghana Limited is a market – leading financial services brand in Ghana, listed on the Ghana Stock Exchange. It has operated for 118 years in the country and is currently the highest priced stock on the exchange. The Bank's focus and commitment to developing deep relationships with clients and customers have driven its consistent growth in recent years. With a current network of 27 branches and 56 ATMs across Ghana, Standard Chartered offers exciting product propositions for customers and clients as well as career opportunities for more than 1,000 staff in Ghana. It is committed to building a sustainable business over the long term in Ghana and is trusted worldwide

for upholding high standards of corporate governance, social responsibility, environmental protection and employee diversity.

3.7.8 FIDELITY BANK GHANA

The bank started official operation as a universal bank in 2006 after the bank of Ghana issued the banking licence to it under the Banking Act, 2004 (Act 673). The shareholders of the bank include individual investors, institutional investors and senior executives of the bank. As a results of in-house reformations, the bank attracts into the country investors from different countries as a results of its initial activities as an investment bank. The bank boast of qualified chartered professional with diverse skills and experience. Further, due to its attractiveness, the bank has invested much in infrastructure including ICT, education and training of its staff as well as introduced innovative financial products and service in the competitive Ghana banking community for its potential customers. Currently, the bank has acquired ProCredit Savings and Loans Company Limited (PCSL) from ProCredit Holding Germany (PCH) and the DOEN Foundation of the Netherlands. The banks has two subsidiaries including Fidelity Asia Bank Limited (FABL) which is wholly owned by Malaysia for offshore banking activities. In addition, the bank operates the Fidelity Securities Limited (FSL) which is the investment side of the subsidiary. It provides advisory services, issuance of government securities as well as underwrite securities for corporate investment.

3.7.9 PRUDENTIAL BANK LIMITED

The bank was established in 1993 as a private limited liability bank. In line with the Companies Code Act 179, the bank officially started operations in 1996 with most of the

bank branches being situated in Accra. Currently, the bank boast of 29 branches with two major headquarters in Accra and Tema. Some of its branches are widely spread across the major cities in Ghana including Accra, Kumasi, Takoradi, Cape Coast and Tamale respectively. Notwithstanding, the bank owns three subsidiary firms in addition to the banking activities. These subsidiaries include; PBL Properties Limited which was established as a real estate development agency task in the development and acquisition of banking premises and management of ancillary estates for its staff; the Prudential Securities Limited, on the other hand was task to manage pension funds and play business advisory roles for the government and other large institutions in the country. The last subsidiary is the Prudential Stockbrokers Limited which is into stock brokerages as well as economic research and security advisory services.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 INTRODUCTION

The current chapter enumerates of the findings from the analysis and data presentation. For the researcher to achieve the set objective of the study, the empirical analysis starts from the description of data followed by the correlation analysis between the respective variables employed in the study. After these, the respective regressions models are estimated for the variables of the study and finds out how these variables influence the performance of the selected commercial banks in Ghana. The results from the analyses are presented below.

4.2 DESCRIPTIVE STATISTICS

This section of the study covers the descriptive statistics and correlation analyses of the data set between the Variable used in the study.

Table 4.1: Descriptive Statistics and Correlation Matrix

	Mean	S.D	1	2	3	4	5	6
1. Profit	16.63	1.45	1.000					
2. ICT	14.92	0.82	.496**	1.000				
3. Deposit	19.88	0.83	.750**	.568**	1.000			
4. ROCE	0.03	0.02	.565**	.268*	.217	1.000		
5. ROA	0.03	0.02	.562**	.273*	.220	.985**	1.000	
6. ICT Efficiency	10.06	18.95	.413**	-.264*	.303*	.380**	.384**	1.000

* and ** Correlation significant at the 0.05 and 0.01 level respectively.

Table 4.1 reports the results of the descriptive statistics and the correlation analyses of the data set. These include the mean and standard deviation for firm-year observations.

On information and communication technology (ICT), the results show a mean of 14.92 and a standard deviation of 0.82, implying that on the average the commercial banks invest approximately about GH₵14,920,000 into ICT. The table further reports a mean of 16.63 and a standard deviation of 1.45 for the commercial banks profit before tax suggesting that on the average the selected commercial banks are able to accrue a profit before tax of GH₵16,630,000 annually. On deposits, the table exhibits a mean of 19.88 and a standard deviation of 0.83 indicating that the commercial banks employed in the study on the average receive about GH₵19,880,000 as deposits annually from their respective customers.

Regarding efficient usage of information and communication technology, the results show that the commercial banks record a mean of 10.06 with a standard deviation of 18.95. The return on asset ratio of the banks (ROA) reveals how well the management of the commercial banks are utilising the bank's asset to generate profits. Accordingly, the results show a mean of 0.03 with a standard deviation of 0.02 suggesting that on the average the commercial banks in this study are able to generate approximately 3% profit from their total asset base. In relation to the banks return on capital employed, the results exhibit a mean of 0.03 and standard deviation of 0.02 suggesting that on the average the selected commercial banks are able to generate about 3% annually on their total capital employed.

Further analysis conducted to establish the extent of multicollinearity using the correlation analysis reveal that all the variables employed in the study have correlation coefficients below 0.8 with the exception of the correlation between ROA and ROCE (0.985) and hence no issues of multicollinearity among the variables. The correlation

matrices record positive significant associations. The table records positive significant correlation between ICT and Profit (0.496), Efficiency and Profit (0.0413), Efficiency and ROA (0.384), Efficiency and ROCE (0.380), Efficiency and Deposit (0.303), Deposit and Profit (0.750), Deposit and ICT (0.568), ROA and ICT (0.273), ROA and Profit (0.562) and ROCE and Profit (0.565).

4.3 IMPACT OF ICT INVESTMENTS ON TOTAL DEPOSITS OF THE COMMERCIAL BANKS

This section covers the impact ICT cost efficiency and ICT investments have on the total deposits of the selected commercial banks employed in the study.

Table 4.2 Results of the impact of ICT and cost efficiency on commercial banks deposits

	Coefficient	Std. Error	t-statistics	P>t
ICT Efficiency	0.0212127	0.0044464	4.77	0.000***
ICT	0.7050545	0.1032804	6.83	0.000***
Intercept	9.151998	1.555163	5.88	0.000***

Note: ***p<0.01 significant level F (2, 47) = 28.04, P<0.01 R-squared = 0.5440

Table 4.2 reports the regression results for the impact of ICT and ICT cost efficiency on commercial banks deposits. On the issue of how efficiency influences the total deposits of the commercial banks, the results show positive and significant relationship between efficiency and the total deposits received by the selected commercial banks annually [$\beta = 0.0212$, $P < 0.01$]. This implies that 1 unit increase in the ICT cost efficiency of the banks would increase their ability to influence customer deposits by approximately 2.12% annually. This finding confirms prior studies such as Binuyo and Aregbeshola (2014),

Kollberg and Dreyer (2006) and Buhalis (2003) indicating that the strategic cost management of commercial banks through the efficient application of ICT facilities enhances the efficiency of the banks in serving their customers hence a positive impact on their performance in terms of them getting more deposits from their customers.

The results on ICT also show positive and significant impact on the deposits of the commercial banks revealing that an increase in information and communication technology investment by the commercial banks will result in an increase in the amount of deposits being made by their customers. The results record an F-statistics value of 28.04 with an r-squared of 0.5440 implying that changes in ICT cost efficiency and ICT investment can explain about 54.4 percent of changes in the total deposits of the commercial banks.

4.4 IMPACT OF ICT INVESTMENTS, DEPOSITS AND ICT COST EFFICIENCY ON ROA

This section of the study discusses the impact that ICT investments, total deposits and ICT cost efficiency have on the return on assets of the selected commercial banks employed in the study. The results of the analysis are shown in Table 4.3 below.

Table 4.3 Results of the impact of ICT, Deposit and ICT cost efficiency on ROA

	Coefficient	Std. Error	t-statistics	P>t
ICT Efficiency	0.0007679	0.0001749	4.39	0.000***
Deposit	-0.0092479	0.0047108	-1.96	0.056*
ICT	0.0174205	0.0047071	3.70	0.001***
Intercept	-0.0511404	0.066191	-0.77	0.444

Note: *p<0.1 and ***p<0.01 significance levels F(3, 46) = 8.33, P<0.01 R-squared = 0.3520

The table 4.3 above reports the impact of ICT investment, deposit and ICT cost efficiency on the return on assets of the commercial banks. The results show that the banks record positive significant relationship between return on assets and ICT cost efficiency [$\beta = 0.0007$, $P < 0.01$] suggesting that a one unit increase in the cost efficient utilisation of the banks ICT facilities will increase the return on assets by approximately 0.07 percent. The table further reveal positive association between return on asset and ICT [$\beta = 0.017$, $P < 0.01$]. This implies that a one unit increase in ICT investment by the commercial banks will result in 1.7 percent increase in return on assets. This implies that a maximal investment in ICT have a trickling effect such that it improves accessibility to the banks by increasing customer deposits which further increases the ability of the commercial banks to create more loans hence their performance.

Contrarily, the results reveal negative and significant relationship between deposits and return on assets of the selected commercial banks [$\beta = -0.009$, $P < 0.1$]. This finding suggest that an increase in deposits received from customers will results in an increase in interest expense thereby negatively influencing their profit margin hence their return on asset. The results record an F-statistics value of 8.3 with an r-squared of 0.3520 suggesting that changes in ICT cost efficiency, deposits and ICT investment can explain about 35.2 percent of changes in the return on asset of the commercial banks.

4.5 IMPACT OF ICT INVESTMENTS, DEPOSITS AND ICT COST

EFFICIENCY ON ROCE

This section of the study discusses the impact that ICT investments, total deposits and ICT cost efficiency have on the return on capital employed of the selected commercial banks employed in the study. The results of the analysis are shown in Table 4.4 below.

Table 4.4: Results of the impact of ICT, Deposit and ICT cost efficiency on ROCE

	Coefficient	Std. Error	t-statistics	P>t
ICT Efficiency	0.0008083	0.0001874	4.31	0.000***
Deposit	-0.0097245	0.005046	-1.93	0.060*
ICT	0.0182779	0.005042	3.63	0.001***
Intercept	-0.0531555	0.0709009	-0.75	0.457

Note: *p<0.1 and ***p<0.01 significance levels F(3, 46) = 8.02, P<0.01 R-squared = 0.3434

Table 4.4 reports the impact of ICT investment, deposit and ICT cost efficiency on the return on capital employed of the commercial banks. The results show that the banks record positive significant relationship between return on capital employed and ICT cost efficiency [$\beta = 0.0008$, $P < 0.01$] implying that a one unit increase in the cost efficient utilisation of the banks ICT facilities will increase the return on capital employed by approximately 0.08 percent. The table further reveal positive association between return on capital employed and ICT [$\beta = 0.018$, $P < 0.01$]. This implies that a one unit increase in ICT investment by the commercial banks will result in 1.8 percent increase in return on their capital employed. Thus, optimal investments in ICT have a phenomenal impact on return on capital employed.

On the other hand, the results further reveal negative and significant relationship between deposits and return on capital employed of the selected commercial banks [$\beta = -0.01$, $P <$

0.1]. This finding suggest that an increase in deposits received from customers will results in an increase in the banks interest expenses thereby negatively influencing their profit margin hence their return on capital employed. The results record an F-statistics value of 8.023 with an r-squared of 0.3434 suggesting that changes in ICT cost efficiency, deposits and ICT investment can explain about 34.34 percent of changes in the return on capital employed of the commercial banks.

4.6 IMPACT OF ICT INVESTMENTS, DEPOSITS AND ICT COST

EFFICIENCY ON PROFIT

This section of the study discusses the impact that ICT investments, total deposits and ICT cost efficiency have on profit before tax of the selected commercial banks employed in the study. The results of the analysis are shown in Table 4.5 below.

Table 4.5: Results of the impact of ICT, Deposit and ICT cost efficiency on profit

	Coefficient	Std. Error	t-statistics	P>t
ICT Efficiency	0.0334642	0.0113616	2.95	0.005***
Deposit	0.5621015	0.3118776	1.80	0.078*
ICT	0.7671615	0.308197	2.49	0.017**
Intercept	-6.357829	3.40891	-1.87	0.069*

Note: *p<0.1 and ***p<0.01 significance levels F(3, 44) = 25.54, P<0.01 R-squared = 0.6352

Table 4.5 reports the impact of ICT investment, deposit and ICT cost efficiency on the profit before tax of the commercial banks. The results show that the banks record positive significant relationship between profit before tax and ICT cost efficiency [$\beta = 0.033$, $P < 0.01$] implying that a one unit increase in the cost efficient utilisation of the

banks ICT facilities will increase the profit before tax of the commercial banks by approximately 3.3 percent. The table further report positive association between profit before tax of the commercial banks and their ICT investments [$\beta = 0.767$, $P < 0.05$]. This implies that a one unit increase in ICT investment by the commercial banks will result in 76.7 percent increase in profit before tax of the commercial banks annually.

Also, the results reveal positive and significant relationship between deposits and profit before tax of the selected commercial banks [$\beta = 0.562$, $P < 0.1$]. This finding suggest that an increase in deposits received from customers will results in an increase in the banks interest income through loans thereby positively influencing their profit margin. The results record an F-statistics value of 25.54 with an r-squared of 0.6352 suggesting that changes in ICT cost efficiency, deposits and ICT investment can explain about 63.52 percent of changes in the profit before tax of the commercial banks.

Conclusively, it is evident from the analysis that investment in information and communication technology as well as its efficient usage impacts positively on the commercial banks performance by increasing the volume of deposits they receive hence the ability of the banks to advance more loans thereby increasing their interest incomes.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION

5.0 INTRODUCTION

The current chapter gives the final summary as well as conclusion. Also, policy implications resulting from the findings are also provided. Limitations as well as possible suggestions for further studies are also provided.

5.1 SUMMARY OF MAIN FINDINGS

The study examined the effect of information and communication technology on the performance of commercial banks in Ghana. Annual data from 2007 to 2011, panel data regression analysis using the Ordinary Least Squares approach is used to estimate the models. The researcher finds enough evidence to establish significance of the study for implication. This indicates that the association between the variables gives substantial grounds in predicting the effect of information and communication technology on commercial banks performance in Ghana.

The study finds evidence for the relationship between ICT cost efficiency and the total deposits received by the commercial banks suggesting that efficient utilisation of their information and communication technology will increase the extent to which customers patronise the services as well as deposit monies with the commercial banks. Notwithstanding, the results further revealed positive impact on the performance indicators used in the study. This implies that investment in ICT facilities can be combined with new and innovative financial products and services if the commercial banks aim to increase their performance.

Further evidence also reveal that deposits have negative effect on return on assets as well as return on capital employed of the commercial banks suggesting that higher deposit turnover of the commercial banks, although necessary to improve performance through profits from loans, increase their interest expense when the commercial banks are unable to transform the deposits into loans thereby putting a drain on the returns that the commercial banks make on their assets but not necessarily improving their performance.

Finally, the findings also reveal strong significant linkage between profit before tax and the predictive variables including the ICT cost efficiency, deposit and ICT investment of the commercial banks implying that efficient usage of the ICT is relevant to the performance of the commercial banking industry. However, on deposits, the findings suggest positive association with profit before tax of the commercial banks revealing that improvement in total deposits due to improved and efficient usage of information and communication technology may help improve the performance of the commercial banks.

5.2 CONCLUSION

The study examined the impact of information and communication technology on the performance of commercial banks in Ghana using annual financial data from 2007 to 2011. Panel data analysis is used to model the impact of the predictive variables including ICT investment, deposits and ICT cost efficiency on the performance indicators. The results suggest that ICT cost efficiency has a significant influence on the performance of the commercial banks. The study further revealed that deposits has positive impact on profit before tax but not on return on asset and return on capital employed of commercial banks. Thus, the higher the total deposits, all things being equal, the more likely the commercial banks can increase profits through loans given out

to borrowers. The study further found that investment in information and communication technology in its entirety is also relevant for the performance of the selected commercial banks.

5.3 RECOMMENDATIONS

The study concludes that the performances of commercial banks are influenced by ICT cost efficiency, deposits and ICT investment. Therefore, implications of these findings underscore the need for a cost efficient and well-coordinated policy that emphasizes on policies that will enhance the optimal utilization of ICT resources among commercial banks. Hence, it is recommended that attention must be given to information and communication technology since its efficient usage will serve as a lubricant that facilitates the growth of commercial banks in Ghana.

It is also recommended that commercial 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. This will help them make more profits hence improve the returns to shareholder capital.

Also, it is recommended that commercial banks prioritize issue concerning deposits since it has negative impact of return on assets and return on capital employed. Thus, the commercial banks are encouraged to transform deposits into loans facilities at lower interest rate to motivate borrowers to seek for funds from them. This will help increase interest income to defray interest expense on deposits made by customers.

Since most of the commercial banks are more reluctant to disclose their investment in information and technology, the researcher recommends that future studies should consider using more closely related variables such as expense on ATM and performance of the commercial banks in order to make a tentative generalisation.

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