EFFECTS OF INVESTMENT IN INFORMATION AND COMMUNICATION TECHNOLOGY ON THE FINANCIAL PERFORMANCE OF LISTED INSURANCE COMPANIES IN NIGERIA

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DECLARATION

I hereby declare that this dissertation has been written by me and it is a report of my research work. It has not been presented in any previous application for Master of Science degree in Accounting and Finance. All quotations are indicated and sources of information specifically acknowledged by means of references.

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CERTIFICATION

This dissertation entitled "Effects of Investment in Information and Communication Technology on the Financial Performance of Listed Insurance Companies in Nigeria" meets the regulations governing the award of Master of Science degree in Accounting and Finance of the school of Postgraduate Studies, Nasarawa State University, Keffi, and is approved for its contribution to knowledge and literary presentations.

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DEDICATION

This dissertation is dedicated to the Almighty God " Ebube dike 1". Lord, you are wonderful!

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Abstract

This study examines the effect of Information and Communication Technology investments on financial performance of listed insurance companies in Nigeria. The time frame of this study is a period of seven (7) years, covering the period of 2012 to 2018. Ex-post Facto research design is adopted for this study. The population of this study is made up of 25 listed insurance companies on the Nigerian Stock Exchange as at 2018. Filtering sampling technique was adopted based on the criteria that Insurance companies must have complete data set for the periods of 2012-2018. Sixteen (16) insurance companies were able to meet up with the criteria stated, so they form the sample size. Secondary data in the form of paneldata were used for the study. The data were collected from these 16 selected insurance companies annual financial reports and accounts. The study utilized multiple regressions to analyse the data and it revealed that Investment in Information and Communication Technology Hardware has significant positive effect on financial performance of listed insurance companies in Nigeria. The study also showed that Investment in Information and Communication Technology Software has a significant positive effect on financial performance of listed insurance companies in Nigeria. The study concludes that investment in Information and Communication Technologyimproves the financial performance of listed insurance companies in Nigeria.Based on the conclusions of this study, the study recommends that listed insurance companies in Nigeria should increase the level of their investment in Information and Communication Technologyhardware as this will strengthen their financial performance as the study found that the coefficient of Information and Communication Technologyinvestment in hardware is positive.This study also recommends that insurance companies should strengthen their investment in Information and Communication Technologysoftware by increasing their expenditure on software components of Information and Communication Technologywhich will enhance their financial performance.

CHAPTER ONE

INTRODUCTION

1.1   Background to the Study

Invariably, Information and communication Technology (ICT) is vital and essential in all facets of life. Adoption and usage of ICT as a centerpiece of global developments is undeniable and causes things to be done exceptionally, especially in the financial sector. Human activities have been greatly enhanced by the development of science and technology including activities in the insurance industry. Impressively, studies at the company and country levels have shown that ICT is positively related to corporate and national economic performance (Calderon, Seo & Kim, 2001).

In order to keep up with the demands of a globally integrated marketplace for service and product, insurance companies are increasingly turning to adopt ICT to drive innovation and design products and services that are both effective and efficient for insuring public in the society. Initially, it was a challenge for Nigeria insurance industry to adopt ICT into their routine business operations within the financial sector in the economy, but there is now growing evidence that insurance industry in Nigeria benefits substantially from e-business emanated from the introduction of ICT, as different customers can be attended to at once anywhere around the globe.

ICT is emerging as a phenomenon with its own attractions and has an important role in insurance market. ICT is emerging as a phenomenon with its own attractions and has an important role in insurance market. Development of e-trade makes insurers move from product orientation to customer orientation, which borders mostly on both customer education and all-round satisfaction. Since search costs for policy holders is less, transparency in pricing, products quality and insurance services increases. The usage of ICT in insurance industry increases

production capacity, specialization of activities and improves speed and quality of services. In general perspective, electronic insurance provides customers access to insurance services by using safe intermediates and without physical presence. E-insurance is application of information technology and redesigning business procedure in order to provide optimal insurance services and facilitating inter-action between people and insurance industry.

The Internet provides an opportunity for insurance companies, recently entered market to avoid costly and lengthy process of traditional sales network. It should be noted that the sale of insurance products via the Internet- especially for complex insurance products with high value that need some advices and information- is inappropriate. The history of insurance industry shows that, in the past, brokers and agents contacted insurers and this sales network was expensive for newcomer insurer companies. Nowadays, the internet has made it possible for new insurance companies to achieve low cost insurance market. Furthermore, internet increases market transparency, ease of access to information about kind and price of insurance services on the internet (Adams, 2005).

The close relationship between ICT and insurance industry due to the widespread use of ICT globally, are due to the following reasons of increased speed and quality of insurance services to policy holders of insurance companies, increased speed and accuracy of data entry for policy holders and insurers for better and faster insurance services, processing of recorded information, in order to reduce human errors and increase the speed of decision-making, reduce fraud and disadvantages of phony and illegal services, increase the ability of insurance companies to establish contacts with international insurers to use global knowledge and expertise, the emergence of new risks with new insurance requirements, updates insurance mechanized system on the latest hardware and software, elimination of lengthy and costly process of issuing insurance policies, call center and Increases accuracy in insurance activities, speed up the process of issuing insurance policies and pay damages " compensation".

Currently in Nigeria, adoption of new technologies and in particular the Internet has transformed insurance industry and allows the stakeholders to do business better and efficiently. Evidence of change is shown in the involvement and utilization of modern technology in virtually every aspect of business transactions (Akinade, 2013). The roles of ICT on competitive performance of insurance industry Nigeria are subject to examination because not all research works have demonstrated clear achievement from ICT investments. Also, their results are varying depending on how performances in the Nigeria insurance industry and ICT achievements are evaluated.

The global insurance business environment has been revolutionalised by creativity, innovation and technological advancement thereby increasing customers' awareness, availability of wider range of services and industry performance. New technologies have significantly impacted business organizations to overcome barriers-cost, time and distance to global operations. This is because business organizations, insurance companies inclusive, operate in a complex, dynamic and competitive environment. Notably, there is unprecedented speed in technology development in this century. This development has come with its increased speed and efficiency in operation in all spheres of life. The scope and space of recent change is a function of revolutionary advances in ICT.

Broadly, ICT involves the use of electronic devices for storing, processing, analyzing and distributing data. The rapid expansion and increasing use of ICT has immensely promoted scientific approach to information handling and processing. Moreover, ICT enhances management functions of planning, organizing and the nature of services offered in the insurance industry. It has greatly improved insurance operations globally in view of the available innovation devices to enhance the speed and quality of service delivery. Consequently, ICT enhances process and procurement required to attain organizational and industrial goals. The use of ICT in the insurance industry is relevant and beneficial considering the significant

role of insurance in the economy. Amongst other, insurance promotes business activities by providing financial intermediary services necessary to enhance economic growth (Liedtke, 2007). It is therefore, expected that adequate investment in ICT by Insurance companies in Nigeria will stimulate competitive advantage, accuracy and efficient transactions to improve performance in the Nigerian insurance industry.

Insurance industry is an important part of the economy and a supporting system of financial markets. The funds appropriated from the sales of various insurance policies, leads to economic prosperity, creating employment and long-term and profitable investments. On the other hand, insurance industry by compensating losses due to adverse events and providing insurance coverage against various risks supports all sectors of the economy. Thus, it provides the security and safety of the community and its people (Rekovska, 2001). Nowadays, in any business, such as e-banking, e-learning and e-insurance, the use of ICT can be seen as a key tool, which makes it possible to use information effectively within and outside the organization.

An important application of ICT is the use of these technologies for re-engineering the architecture of the insurance industry, increasing the speed of access to information, greater efficiency and better service to the customer. Through ICT, electronic insurance also called e-insurance has developed. ICT has proven to be majorly advantageous in the service sector such as banking, marketing, trade, education, health and tourism. Applying ICT in the insurance industry for rapid access of information and using it for decision making and planning is essential. So, a lot of developing countries are trying to code and implement electronic insurance projects, adapt to the realities of the new environment and benefit from its advantages. It is a fact that, the more efficiently and purposefully insurance plan is designed and implemented in Nigeria, then the more the public and private sectors of insurance industry will continue to have profound institutional reforms. Insurance services are sensitive to information,

which means that the flow of information between different customers and insurance companies is necessary.

The insurance industry is a highly specialized industry that gives greater security to the fortunes of people in the society be it corporate organizations or individuals. Therefore, looking at how investment in ICT affect performance of listed insurance companies is essential and cannot be over emphasized, and therefore constitutes the need to carry out a study on the effects of investment in ICT on the performance of listed Insurance companies in Nigeria. However, despite the fact that insurance institutions are considered to invest in ICT which invariably announced unusual boom in the financial sector after consolidation, insurance firms have not really been receiving commensurate applause in terms of increase in financial performance in Nigeria. It is against this backdrop that this study seeks to analyse the effect of investments in ICT on financial performance of Insurance companies in Nigeria.

1.2   Statement of the Problem

Prior to the 2005 recapitalization of insurance companies in Nigeria, the National Insurance Commission (NAICOM) identified some factors and challenges among others that restricted the Nigerian insurance industry to perform significantly. Busayo (2007) avers that these challenges include; poor product development, stiff competition, under capitalization of existing industry players, dearth of appropriate human capital, poor returns on capital, existence of too many fringe players and poor asset quality. Other challenges include prominence of unethical practices, significant corporate governance issues, insurance premium flight, poor business infrastructural facilities, especially in the area of ICT, lack of Innovation in product development, lack of awareness on the part of consumers on the uses and suitability of insurance products, low contribution to the Gross Domestic Product (GDP) and poor corporate

governance structures. As the insurance companies consolidate as a means of survival and addressing some of the above mentioned problems, the mergers came with the introduction and more involvement with ICT, also it came with its further difficulties in terms of merging the information and communication infrastructure. It is therefore, pertinent to look at the general effect of ICT on the performance of Nigerian insurance companies.

Despite the benefits of ICT, many business enterprises have not adopted and integrated ICT into their operations. There is dearth of study on the effects of ICT investment on financial performance of listed insurance companies in Nigeria. Moreover, the few available studies on ICT in Nigeria focused mainly on the banking sector (Osabuohien, 2008; Dauda & Akingbade, 2011; Emmanuel, 2011; Obasan, 2011); and on small medium scale industries (Adewoye & Akanbi, 2012).

In recent years, some other scholars have also analyzed the relationship between ICT investment and firm's performance covering several developed and developing countries. However, the results from these studies have remained inconclusive. While some of these studies such as Brynjolfsson and Hitt (1995), Lichtenberg (1995); Brynjolfsson and Hitt (1996), Baldwin and Sabourin (2002; 2003) suggest that the effect of ICT investment on performance is positive, some argued that it is negligible (Ordanini & Rubera, 2010) and yet some other studies maintained that the effect is negative (Loveman, 1994; Barua, Kriebel & Mukhopadhyay (1995). Besides, there are some studies from authors such as Devaraj and Kohli (2000), Brynjolfsson and Kahin (2002), Sabourin and Smith (2003), Li-Hua and Khalil (2006), Bayo-Moriones and Lera-Lopez (2007), Badescu and Garces- Ayerbe (2009) were conducted on large firms in other different industries.

Specifically, most of the previous studies employed primary data for their investigation whereas this study makes use of secondary data over a period of seven years in a panel environment. Moreover, there are few documented study that has investigated the effect of ICT investments

on insurance firms performance, the few studies conducted in this area of study are the studies conducted by Jimoh (2012) and that of Fadun (2013). Identifiably, Jimoh (2012) employed the use of primary data using questionnaires distributed to only Royal Exchange insurance company staff and one on one interviews. The use of Primary data by Jimoh (2012) cannot be relied upon as primary data are biased, emotional and subjective.

Fadun (2013) also used primary data in gathering and analyzing the hypotheses. In as much as primary data gives firsthand information, it is saddled with the problem of being biased and also unverified and therefore less reliable. But this study makes use of secondary data over a period of seven years in a panel environment. This method is viewed more as unbiased, more verifiable and consequently more reliable. Also the use of panel data environment makes it clearer to identify year by year, the information regarding investments in ICT and financial performance of insurance companies in Nigeria. However, the latest work on this subject matter was done in 2013; this study identified and showed the effects of investments in ICT on the performance of Insurance companies in Nigeria from 2012 to 2018 which exposes more current information regarding investment in ICT.

The study, therefore, fills this gap and contributes to knowledge on effect of investment in ICT on insurance companies' performance in Nigeria. Consequently, the study is imperative in view of the need for insurance companies' in Nigeria to develop and maintain a higher level of ICT usage in order to meet the nation's insurance needs, to enhance their profitability and to contribute positively to the economy.

1.3   Research Questions

This study provides answers to the following research questions:

I.   What is the effect of investment in ICT hardware on financial performance of listed insurance companies in Nigeria?

II.   What is the effect of investment in ICT Software on financial performance of listed insurance companies in Nigeria?

1.4   Objectives of the study

The major objective of this study is to examine the effect of ICT investments on the financial performance of listed insurance companies in Nigeria. The specific objectives are to:

I.   Assess the effect of investment in ICT hardware on financial performance of listed insurance companies in Nigeria.

II.   Evaluate the effect of investment in ICT Software on financial performance of listed insurance companies in Nigeria.

1.5   Statement of Hypotheses

Based on the above stated research objectives, the following hypotheses are formulated:

$H_{01:}$ Investment in ICT hardware has no significant effect on financial performance of listed insurance companies in Nigeria.

$H_{02:}$ Investment in ICT software has no significant effect on financial performance of listed insurance companies in Nigeria.

1.6   Significance of the Study

This study is expected to offer theoretical and practical contributions to knowledge in the area of study in a number of ways:

Firstly, the study is expected to be useful to insurance professionals who are continuously striving to understand the impact of ICT on corporate performance. The study will help them to discover the extent to which investment in ICT affects financial performance of the insurance sector. Therefore, this study makes an attempt to examine the impact of ICT investment on financial performance of listed insurance companies in Nigeria.

Secondly, individuals and potential shareholders of financial institutions are expected to find the study useful because the findings can guide their investment decisions in the financial sector in general, and listed insurance institutions in Nigeria in particular.

Thirdly, the study is also expected to be of benefit to National Insurance Commission, corporate organizations and individuals concerned with formulating policies and strategies for insurance institutions. However, this study can assist government policy formulation in the area of ICT, infrastructural development such as telecommunication, encouragement of computer hardware and software which are relevant to the current ICT driven financial system. Finally, the study is expected to stimulate research interest in other aspects of ICT and management of listed insurance institutions.

1.7   Scope of the Study

This study is restricted to the effect of ICT investment on financial performance of insurance companies in Nigeria. The boundary of the study is listed insurance companies on the floors of the Nigerian Stock Exchange. The time frame of this study is a period of seven (7) years, covering the period of 2012 to 2018. This is because in 2012, the adoption of International Financial Reporting Standard came into play and as such the insurance companies in Nigeria were mandated by the authorities FRC to disclose expressly their investments in intangible assets of which ICT investments in software is included in their financial reports. This is in accordance with the requirements for the adoption of IFRS.

CHAPTER TWO

LITERATURE REVIEW

2.1   Conceptual Framework

This chapter discusses the concept of Information and Communication Technology Investment, and the concept of financial performance was explained in this chapter. This chapter examined the empirical studies that relate to this area of study. Social-technical systems theory, Technology Acceptance Model (TAM) and Diffusion of Innovation Theory were used to underpin the study.

2.1.1   Concept of ICT Investment

ICT investment is the amount of money/capital that financial institutions spend on ICT. Although ICT expenditure is regarded as costly and risky, financial institutions are one of the largest investors in ICT. An interesting finding of Morton (1991) supported by Hitt and Brynjolfsson (1996), is that benefits from ICT do in fact exist, but are not captured by the organization. Use of and investment in ICT requires complementary investments in skills, organization and innovation; however, investment and change entails risks and costs as well as bringing potential benefits.

According to Saleem, Salim, AL-Ghamdi and Ullah (2015), the investment is not only for software and hardware resources, but also for human resources in terms of ICT professionals. Thus, investment not only serves to enhance technology, but is also used for upgrading all resources connected to running the project. Therefore, applying investments to buy or rent ICT resources has become a necessary custom of almost every organization seeking to provide consumers as well as employees with the latest technology.

Schniederjans (2010) argued that ICT investment does not mean just one thing; several things must be thoroughly considered, such as application software, personnel, programming languages, system software, and hardware. In addition, (Byrd & Turner, 2000) pointed out a similar point in the way that shared and joint ICT systems consist of ICT resources, data, software and hardware, several core applications, human skills, knowledge, standards, commitments, and values, where the combination of all these factors can improve the values and credibility of the organization.

In the case of a country, ICT investments are referred to as second-order investments that, for example, create opportunities for people to overcome conditions of poverty and marginalization (Morawczynski & Ngwenyama, 2007). Investments in ICT can be thought of as consisting of four facets: hardware, software, internal spending and telecommunication investments. For the purposes of this study, software investment refers to total country spending on software packages, database systems, utility software and programming tools. Hardware investment is the total computer hardware spending in a country (Kim et al., 2008). Internal spending refers to the total national amount spent on software customization, human capital development and other miscellaneous ICT related expenses. Telecommunication spending refers to local and long distance wire-line and wireless communication investments in a country.

According to OECD (2007), investment is defined in accordance with the 1993 System of National Accounts. It covers the acquisition of equipment and computer software that is used in production for more than one year. ICT has three components: information technology equipment (computers and related hardware), communications equipment and software. Software includes acquisition of pre-packaged software, customised software and software developed in house.

According to Mejabi (2008), ICT is a general term that describes any technology that helps to produce, manipulate, store, communicate and disseminate information. Microsoft Encarta (2009) defined ICT as the processing of data via computer: the use of technologies from computing, electronics, and telecommunications to process and distribute information in digital and other forms. Information technology combines the technology of computers and communications to provide information processing services throughout the office or around the world.

The application of ICT concepts, techniques, policies and implementation strategies to financial services has become a subject of fundamental importance and concerns to all banks and indeed a prerequisite for local and global competitiveness. ICT directly affects how managers decide, how they plan and what products and services are offered in financial institutions. ICT has continued to change the way financial institutions and their corporate relationships are organized worldwide and the variety of innovative devices available to enhance the speed and quality of service delivery. All these to a large extent affect financial institutions' performance, insurance institutions inclusive. ICT is a term that largely covers the coupling of electronic technology for the information needs of financial business at all levels. ICT has surpassed the role of support services or only electronic data processing; its fields of applications are considerably global and unlimited. Its devices especially the Internet and modern computer email facilities have further strengthened early modernizations like the telephone and fax. Other ICT devices include data recognition equipment, factory automation hardware and services, telecomputing and teleconferences using real time and online system (Adeoti, 2005).

Nkwocha (2004) defines ICT as an extremely fast, computer driven scientific means and process involved in obtaining, storing, editing, retrieving, packaging, and communicating information with one person or a group of persons with a feedback mechanism. According to

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Samba (2001), Information Technology is the technology that supports activities involving the creation, storage, manipulation and communication of information together with their related methods, management, and application.

In the words of Irechukwu (2000), ICT is the automation of processes, controls, and information production using computers, telecommunication software and ancillary equipment such as automated teller machines and debit cards. Longley and Michael (2007) define ICT as the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numeric information by a microelectronics- based combination of computing and telecommunication. Sajuyigbe and Alabi (2012) posited that ICTs encompass technologies that can process different kinds of information (audio, video, text, and data), and facilitate different forms of communications among human agents, and among information systems. Information and communication technology is a term which generally covers the harnessing of electronic technology for the information needs of businesses at all levels, (Anderson, 1990). In addition, ICT according to Longley and Shain (1992) is defined as the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a micro-electronic based combination for computing and telecommunication. ICT on the other hand provides the technical solutions identified in the information system; including the networks, hardware and software (Accad, 2009).

ICT is conceived of by Ovia (2001) to broadly encompass the information that business creates and use as well as a wide spectrum of increasingly convergent and linked technologies that process the information. In addition to computers, the data recognition equipment, communication technologies, factory automation and other hardware services are involved. Traditionally, telephone, radio and television were referred to as media technology. The use of

ICT in banking operations is called electronic banking while that of insurance operations is called E- insurance.

ICT may be viewed in different ways. The World Bank defines ICT as the set of activities which is facilitated by electronic means; it involves the processing, transmission and display of information (Alu, 2002). ICT refer to technologies people use to share, distribute, gather information and to communicate through computers and computer networks (Laudon & Laudon, 2001). ICT can be described as a complex varied set of goods, applications and services used for producing, distributing, processing, transforming information (including) telecoms, TV and radio broadcasting, hardware and software, computer services and electronic media (Laudon & Laudon, 2010). ICT represent a cluster of associated technologies defined by their functional usage in information access and communication, of which one embodiment is the Internet.

Woherem and Adeogri (2000) claimed that only financial institutions that overhaul the whole of their payment and delivery systems and apply ICT to their operations are likely to survive and prosper in the new millennium. The study advices banks to re-examine their service and delivery systems in order to properly position them within the framework of the dictates of the dynamism of ICT. Abubakar and Rasmaini (2012) observed that ICT has become the heart of the financial sector, which is the heart of every robust economy. The advancement in Technology has played an important role in improving service delivery standards in the Banking industry. In its simplest form, Automated Teller Machines (ATMs) and deposit machines now allow consumers carry out banking transactions beyond banking hours. With online banking, individuals can check their account balances and make payments without having to go to the bank hall. This is gradually creating a cashless society where consumers no longer have to pay for all their purchases with hard cash (Josiah & Nancy, 2012). ICT combines

the technology of computers and communications to provide information processing services throughout the office or around the world.

In addition to computers, the data recognition equipment, communication technologies, factory automation and other hardware services are involved. The use of ICT has delivered a wide range of value added products and services to firms' customers (Ojokuku & Sajuyigbe, 2012). The use of e-insurance can contribute to improved insurance industry performance, in terms of increased market share, expanded product range, customized products and better response to client demand. Only the companies that use their technology resources effectively have the opportunity to secure real competitive advantage in this fast changing industry through real product or service differentiation. ICT may be viewed in different ways. ICT represent a cluster of associated technologies defined by their functional usage in information access and communication, of which one embodiment is the Internet.

This study however aligns itself to the concept of ICT investments as defined by OECD (2007) as the investment on acquisition of information technology equipment (computers and related hardware), communications equipment and software. Software includes acquisition of pre-packaged software, customised software and software developed in house.

2.1.2 Concept of Financial Performance

Financial performance can be described as a measure that reveals the position of an organization. It helps to tell how far and well an organization has improved in terms of its profitability as a result of its services delivery. Performance of a business can be identified using different proxies. The study by Abaenewe, Ogbulu and Ndugbu (2002) proxy performance using return on asset (ROA) and return on equity (ROE). However, it is important to note that firms' profitability is not the only performance indicator of an organization. Thus, studies like that of Ibukunle and James (2012), Olorunsegun (2010) and some others have

identified performance in a different perspective; such as increase in productivity, increase in sales, cost reduction, competitiveness, efficiency and effectiveness.

Financial performance plays a fundamental role in the survival of any organization. The term "performance" has been defined repeatedly and at different times in the social evolution and it is in a continuous development, without having reached an agreement, because there is a numerous series of factors which influence performance directly or indirectly, such as the activities performed by the entity, the interests and the objectives of each economic entity. The term "performance" has a Latin origin, where the verb 'performare' had the meaning of finalizing a predetermined activity.

Nicoleta (2008) states the fact that performance in a modern company may be defined as a state of competitiveness achieved through a high level of efficiency and productivity, having the goal of assuring a durable position on the market. Nadia (2005) considers the concept of performance as not being easy to define, because it is an ambiguous and integrative concept. Performance means success, competitiveness, achievement, action, constant effort, it is optimizing the present and protecting the future. Performance is created by a company through environmental reporting, following the way of creating value.

Camela and Luminita (2013) characterizes company performance, during this period, as being a chain of attributes specific to it: a company capable of coping with foreign competition, a well-run company which manages to quantify its productive effort at minimum costs, a company capable of exploiting a niche and establishing an important enlargement.

This study used return on asset to measure performance, ROA is of the widely used accounting based measures of corporate performance in literature is ROA. It assesses the effectiveness of capital employed and provides a basis in which investors can measure the earnings generated by the firm from its investment in capital assets (Epps & Cereola, 2008). The ROA is a

measure which shows the amount of earnings that have been generated from invested capital. It is an indication of the number of kobo earned on each naira worth of assets. It allows users, stakeholders and monitoring agencies to assess how well a firm's corporate governance mechanism is in securing and motivating efficient management of the firm (Chagbadari, 2011). This study examines one key accounting measures of firms' financial performance which is Return on Assets. The ROA is utilized in this study because it is simple to use, easy to understand, and it is based on audited figures. ROA is the ratio of annual net income to total assets of a business during a financial year. It is measured thus:

ROA = Annual Net Income/ Total Assets.

2.2   Empirical Review

In recent years, numerous scholars have analyzed the relationship between ICT investment and firm's performance covering several developed and developing countries.

2.2.1   Investment in ICT hardware and Financial Performance

Studies on the effects of ATMs on profitability provide evidence of cost savings and better services for customers. Survey of banks conducted by Abdullah (1985) in Malaysia, Katagiri (1989) in Japan and Shawkey (1995) in the USA, revealed that investing in ATMs reduces banking transaction costs, the number of staff and the number of branches. Therefore, investing in ATMs increases the value of deposit accounts, which are cheaper in terms of costs of funds than other sources, such as borrowing money from other institutions, hence reducing the overall cost of funds. This suggests that there is a role for IT investment in the explanation of bank profitability.

Alpar and Kim (1990) used a translog cost function to measure the impact of the use of ICT on economic performance of banks. Based on their analysis of the Federal Reserve Bank's

Functional Cost Analysis data, the study concluded that ICT has been cost reducing and labour saving. In the same vein, Steiner and Teixeira (1990) drew on a wealth of experience with many of the large American banks in McKinsey and Company's financial services consulting practice and presented arguments about why ICT investments in the major lines of the commercial banking business create value for banking customers, but destroy profitability for the firms that service them. The study was conducted in America and results from it cannot be utilized in Nigeria on the grounds that the operational condition varies as far as control, supervision and economy are concerned.

Dos Santos and Peffers (1993) empirically studied the effects of early adoption of Automated Teller Machine (ATM) technology by banks on employee efficiency using a sample of 3,838 banks covering the period 1970 to 1979 by applying multiple regression models. The finding revealed that the introduction of ATM technology improves the bank's performance.

Bansal (1993) discussed the advances in risk management technology and suggested the use of business value linkage to identify the benefits of such ICT investments. The study showed that ATM membership choice being an ICT investment strategy has a significant and positive influence on market share of local deposits based on a study of a group of Pennsylvanian banks. The study was carried out in South Korea while this current study is in Nigerian in light of the fact that the operational condition contrasts as far as direction, supervision and activity are concerned. Based on the same data set, Parsons and Denny (1993) found that although, not all banks benefit from ICT spending, some banks do.

Likewise, Lichtenberg (1995) found that the earliest adopters of ATMs were able to achieve a sustainable gain in the market share based on an analysis of the Federal Deposit Insurance Corporation data in USA. The empirical work of Oyeyinka (1996) was conducted on ICT in the finance sector. It examines the adoption of computers in Nigerian banks with specific reference

to the specific ways computer is affecting the organization of work and constraints to its adoption. The study covered twenty financial institutions comprising of twelve commercial banks, five merchant banks, one development bank and two mortgage institutions. Although the study did not set out to evaluate productivity gains, it concludes that given the enthusiastic adoption of computers by Nigerian banks, the perceived benefits may have outweighed the costs of adoption. These studies indicate that there is paucity of literature on impact of ICT on corporate performance in the banking sector.

Gupta and Collins (1997) reported the results of an empirical study that evaluated the contribution of information systems to various productivity and efficiency measures in a bank. The study used a survey that was mailed to the CIOs of all member banks of the Florida Bankers Association. It presented three main findings: First, there is a lack of rigorous analysis and theoretical framework that explores the link between software investments and a bank's efficiency. Second, top ICT professionals strongly feel the need to develop more rigorous cost-benefit methodologies that will help them sell the technology to top managements. Third, traditional measures of productivity, such as decrease in operating costs and increase in profits, continue to be the most popular measures of efficiency and return on investments, although these measures may not be suitable for information systems and technologies.

Prasad and Harker (1997) examined the effect of ICT investment on both productivity and profitability in the US retail banking sector. The study concluded that additional investment in ICT capital may have no real benefits and may be more of a strategic necessity to stay even with competitors. However, the results indicated that there are substantially high returns on increase in investment in ICT labour, and that retail banks need to shift their emphasis on ICT investment from capital to labour.

Woherem (1997) discovered that since 1980s Nigerian banks have performed better in their investment profile and use of ICT systems, then the rest of the industrial sector of the economy. An analysis of the study carried out by African Development Consulting Group Ltd on IT diffusion in Nigeria shows that banks have invested more on IT, have more IT personnel, more installed base for PCs, LANs, and WANs and have a better linkage to the internet than other sectors of the Nigerian economy. The study, however pointed out that whilst most of the banks in the west and other parts of the world have at least one PC per staff, Nigerian banks are lagging seriously behind, with only a PC per capita 0.18.

Aragba-Akpore (1998) investigated on the application of information technology in Nigerian banks and pointed out that ICT is becoming the backbone of banks' services regeneration in Nigeria. The study cited the Diamond Integrated Banking Services of the Diamond Bank Limited and electronic smart card accounts of All States Bank Limited as efforts geared towards creating sophistication in the banking sector. The empirical study of Ovia (2001) discovered that banking in Nigeria has increasingly depended on the deployment of information technology and that the IT budget for banking is by far larger than that of any other industry in Nigeria. The study contended that the on-line system has facilitated internet banking in Nigeria as evidenced in some of them launching websites. The study found also that banks now offer customers the flexibility of operating an account in any branch irrespective of which branch the account is domiciled.

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

automated devices. The empirical study of Calderon (2001) examined the impact of ICT on the performance of financial companies in South Korea. The study covers a period of three years (1991–1994) and examines the relationship between the effectiveness of ICT and financial growth of publicly traded financial companies in South Korea. It measured ICT effectiveness based on user satisfaction, support for internal business process and system reliability. It reveals that ICT effectiveness and financial growth of Korea banks are significantly associated statistically. This shows an insight into the thesis that enterprises with high business information intensity show a positive association between effective ICT and economic performance. The study was carried out in South Korea while this current study is in Nigerian in light of the fact that the operational condition contrasts as far as direction, supervision and activity are concerned.

Carlson (2001) investigated whether there is a link between offering internet banking and banks profitability. The study developed statistical models to explain why banks choose to adopt internet banking and why some choose to offer a relatively wider array of internet banking products and services. It also investigated whether offering internet banking affects a bank's profitability. The results revealed several significant differences in the profile of banks that offer internet banking and those that do not. The study observed that internet banks rely more heavily in non-interest income and less on core deposits for funding than non-internet banks do. In addition, the study revealed that internet banks have better accounting efficiency ratio and higher returns in equity than non-internet banks. To this end, the study regressed ROE against a set of control variables for banks that adopted internet.

Idowu (2002) did a study on the effect of ICT on the growth of the banking industry in Nigeria. The study assesses the perception of banking customers on the quality of banking services using a questionnaire survey. The study sampled five commercial banks namely; Wema Bank

Plc, Union Bank, Omega Bank, Corporative and Access Bank. It examines one major issue; impact of ICT on bank services but in three different perspectives namely effect of ICT on banking services, effect of ICT on customer services and on bank productivity measured in term of speed of operation. It concludes that ICT has contributed immensely to the growth of the banking industry in Nigeria. The limitation of this study is its use of survey design which could be bias and subjective.

Berger and Wharton (2003) examined technological progress and its effects in the banking industry using data collected from the banking industry in the United States over the period 1967 to 2001. The study employed multiple regression model, and the findings revealed that improvements in costs of lending capacity due to improvements in "back – office" technologies, as well as consumer benefits from improved "front office" technologies suggests significant overall productivity increases in terms of improved quality and variety of banking services.

Delgado and Nieto (2003) studied the performance of banking institutions in Spain and concluded that their negative aggregate profitability until 2002 was due to higher financial cost and lower fee income, which seemed to reflect the fierce competition among internet banks and between them and traditional banks in Spain. Lingam (2004) studied the impact of usability (user experience derived from the usability) of community banks' web banking efforts, particularly homepages, on their performance through heuristic evaluation of their web site homepages. The study revealed that Web banking activities have significant positive impact on the banks' return on assets (ROA) and return on equity (ROE) and improves the asset equality indentifying non perfuming loans. Furthermore, increasing ICT cost reduces ROA and ROE but improves loan quality. The results revealed that the impact of Web sites and Web banking application on the banks' performance can be expected to become pronounced in the long run if these web site are more usable for the masses because more usable web sites attract and retain

more customers in the long run thereby increasing revenues, reducing customer support cost and increasing profits.

Shu and Strassmann (2005) revealed that the data gathered in 1980 might not have pointed to a strong IT productivity in the banking industry, but their research using data from 12 US banks covering the period between 1989 to 1997 showed that IT is the only variable with positive marginal gain and its productivity is far better than labour.

Beccalli (2005) investigated whether investment in IT influences the performance of banking, using a sample of 737 European banks over the period 1994 – 2000. Using simple correlation coefficients, the findings revealed a negative and statistically significant correlation between profit efficiency and information technology.

De young (2005) indentifies and estimates the magnitude of technology based scale effects of a dozen of primarily internet banks in the US over the period 1997-2001. The study finds evidence of technology-based scale economies while the evidence on experience effects is rather weak. The empirical analysis demonstrates that profitability gaps with traditional banks if similar in size and age shrink as primarily internet banks get larger. Kagan, Acharya, Rao and Kodepaka (2005) employed a structural equation model to examine whether index explain differences in community bank performance. The findings revealed that online banking helps community banks improve their earning ability as measured by return on equity and improve assets quality by reducing the proportion of overdue or underperforming assets. In Europe, the majority of the studies have focused on the performance of primarily internet banks: those that most heavily, though not exclusively, rely on internet as a delivery channel.

Kozak (2005) analyzed the values of ROA and over the period of 1992 - 2003 found out that the value of the return on assets for the U.S, the banking sector has increased by 51 percent. This result suggests that IT improvements, associated with extensive office networks and range of

offered services have helped to generate additional revenues for banks. For the same period much smaller reduction of the non-interest costs has been achieved. It means the value of cost efficiency fell by 13 percent. This means that a huge number of diverse operations require higher IT investments and additional non-interest charges. In order to assess relationships between the degree of the IT progress, and the profitability and cost efficiency, the regression analysis was used to achieve more precise statistical results, based on quarterly values obtained from the FDIC.

Hernando and Nieto (2006) studied 27 commercial banks operating over a period of 9 years using regression analysis to determine Return on Asset, Return on Equity, Loans Deposits ICT cost, and Marketing costs. The results show that impact on bank's performance takes time to appear. Cost reduction translates into improvement in bank's profitability, which becomes significant after one and half years in terms of ROA and after three years in terms of ROE.

The study conducted by Ho and Mallick (2006) analyzed how IT-related spending affect bank profits via competition in financial services that are offered by the banks. The study utilized a Hotelling model to examine the differential effects of the ICT on moderating the relationship between costs and revenue. The impact of IT on profitability was estimated using a panel of 68 US banks over 20 years. The study found that bank profits declined due to the adoption and diffusion of IT investment, reflecting negative network effects in the banking industry.

Mashal (2006) examined the effect of IT investment in productivity and profitability by analyzing data from the Arab Bank, one of the leading banks in Jordan, during the period between 1985 to 2004. The results indicated that there are substantial returns due to an increase in investment in IT capital, a fact which incentivizes the bank's management to shift its emphasis on IT investment from labour to capital. The empirical work of Siam (2006) examined the effects of electronic banking on bank's profitability. The study concluded that the impact of

electronic banking on bank's profitability will be a feature of the short run due to the capital investment by the banks on infrastructure and training, but, it will be positive in the long run.

Lin (2007) studied the impact of ICT on US banking industry using a cross-sectional data of 155 banking firms for the period 1995 to 1999 by employing multiple linear regression models. Results of the study indicated that ICT contribute to the overall value-creation performance of banking firms. In addition, Mittal and Dhingra (2007) used the method of Data Envelopment Analysis (DEA) to study the impact of computerization on Indian banks' profitability and productivity. Private sector banks, which took more IT initiative, were found to be more efficient in productivity and profitability parameters than public sector banks.

Casolaro and Gobbi (2007) analyzed the effects of investment in IT on the financial sector using micro-data from a panel of 600 Italian banks from the period between 1989 and 2000. Stochastic cost and profit functions were estimated allowing for individual banks' displacements from the best practice frontier and for non-neutral technological change. The results showed that both cost and profit frontier shifts were strongly correlated with IT capital accumulation.

Acharya and Yorulmazer (2008) examined the impact of web design features of a community bank's performance using a sample of 55 community banks with online services in the five midwestern states of the USA. The study utilized both primary and secondary data by applying multiple regression models. The results showed that banks with higher usability of ICT perform significantly better than those with low ICT usability. The empirical study of Malhotra and Singh (2009) examined the implications of internet banking on the Indian banking industry using information drawn from a survey of 85 scheduled commercial banks' websites, during the period June 2007, by applying multiple linear regression model. Results revealed however, that profitability in the banking industry while offering internet banking does not have any significant association with their overall performance.

Rasoolian, Fathnejad and Nadeali (2009) examined the role of communication and information technology on development of Electronic Insurance' describe the insurance industry as dependent on information. The study sample of community consisted managers and IT experts. The results showed that all the indexes have a great impact on development of electronic insurance. The limitation of this study is its use of survey design which could be bias and subjective.

Opera, Olotu and Maclayton (2010) investigated the impact of technology on relationship marketing orientation and business performance of the Nigerian banks using quantitative and qualitative data generated from 123 different bank branches in Port Harcourt, with 565 targeted respondents. The study employed multiple regression model to analyze the data, and the findings revealed that the technology exists as a moderating variable in the RMO – BP relationships of the Nigerian banks. The study also recommended that banks should be technologically compliant in order to have high performance and lasting customer relationship. England (2010) examined the number of US banks offering internet banking and analysed the structure and performance characteristics of these banks. The study however, found no evidence of major differences in the performance of the group of bank offering internet banking activities compared to those that do not offer such services in terms of profitability, efficiency or credit quality.

The empirical study of Stella (2010) assessed the impact of ICT on the productivity of the Nigerian banking sector. The Transcendental Logarithmic Production function and the CAMEL rating were used for the study. The Results showed that bank output such as loans and other assets increased significantly with changes in expenditure on ICT. ICT labour expenses impacted more on bank output than capital expenditure on ICT gadgets.

Madueme (2010) assessed the impact of ICT on the efficiency of thirteen commercial banks in Nigeria using both primary and secondary data. The findings of the study revealed that information technology improved the efficiency of the banks. Alawneh and Hattab (2009) assessed the value of e-business at the bank level in Jordan using a survey data collected from 140 employees in seven pioneered banks. Based on simple multiple linear regressions analysis; the empirical findings showed that technology is found to have the strongest significant influence on bank performance.

Muhammad and Muhammad (2010) examined the impact of ICT on organizational performance using primary data collected through in-depth interviews and fields surveys of 48 manufacturing and 24 banking industry in Pakistan over the period 1994 through 2005. The data was tested using multiple linear regression model and ratio analysis. The conclusion of the research shows that ICT has positive impact on organizational performance of all the organizations investigated.

Ombati, Magutu, Nyamwange and Nyaoga (2010) studied the relationship between technology and service quality in banking industry in Kenya using primary data drawn from a sample of 120 customers using e-banking services within the Central Business District, Nairobi. The authors used descriptive statistics such as correlation analysis, percentages and means to analyse the data. The findings of the study indicated a direct relationship between technology and service quality in the banking industry.

Akram and Hamdan (2010) examined the effects of ICT on Jordanian banking industry for the period of 2003 – 2007. The study used a sample of 15 banks to analyze the data obtained by applying multiple regression model and diagnostics test to check the normality and multicollinearity problems. The results of the study indicated that there is a significant impact on the use of ICT in Jordanian banks on the market value added earnings per share EPS, ROA and Net Profit Margin.

Similarly, Uppal (2011) examined the growth of information technology in various bank groups in India using data collected over the period 2008 – 2009. The findings revealed that the growth of information technology led to high bank performance. The empirical study of Khrawish and Al-Sa'di (2011) tested the effect of e-banking services provided by banks on the internet on the profitability of these banks. The regression analysis showed that, there is no significant impact of e-banking services on the profitability of recent adopter's banks in terms of ROA, and ROE. For early adopters, the results were much better than those for the early adopters, but still not significant with the profitability of these banks.

Aregbeyen (2011) evaluated the impact of the re-engineering of operational processes on the First Bank Nigeria Plc using paired data samples for the period 1986 to 2008. The study utilized both descriptive and inferential analysis (t-test) to test the hypothesis that business re-engineering has no significant effect on the operational performance (First Bank Nig. Plc). The findings of the study show that re-engineering project significantly improved the profitability performance of the bank in the period under study.

Agbolade (2011) used a primary data sourced through a structured questionnaire administered to selected banks in the south-west region of the country and the OLS approach of econometric techniques was used to examine the nature of the relationship that exists between banks profitability and the adoption of ICT. The data analysis showed that a positive correlation exists between ICT and banks' profitability in Nigeria. On the contrary, in their analysis of four Nigerian banks, using data generated from annual financial reports of the sampled banks for a seven-year period (2005 to 2011), and by applying OLS statistics stated in a multiple form to data generated.

Adebayo (2011) investigated Information and Communication investments in Nigerian Financial institutions with emphasis on their impact on earnings. Annual statements of accounts of eight (8) sampled banks were used to collect data on net income (the dependent

variable) against the various investments of banks, which include ICT investments, investments in non-ICT labour and other investments for a period of ten years (1998 to 2007). Multiple regression analysis was used to test the hypothesis on whether or not ICT applications and investments significantly contribute to the net income of Nigerian financial institutions. The study revealed that ICT investments do not contribute significantly to the earnings of Nigerian banks.

Yunus and Waidi (2011) examined customer's and employee's responses to technology innovation, and their effects on the performance of the Nigerian banks. Fifteen (15) major banks were selected for the research. Two null hypotheses based on two different sets of questionnaires distributed to selected banks employees and customers were formulated to test whether there is no significant relationship between technology innovation and customer's satisfaction; and between technological innovation and Nigerian banks employee's performance. 1912 questionnaires were distributed to customers to test the first hypothesis out of which 1634 were collected which is 85% of the distributed questionnaires, 1458 questionnaires were distributed to selected banks employees to test the second hypothesis, 1223 questionnaires were collected making 84% response rate. Pearson correlation co-efficient was used to analyse the hypotheses. Findings revealed that technological innovation influenced banks employee's performance, customer's satisfaction and improvement in banks profitability. The limitation of this study is its use of survey design which could be bias and subjective.

Dandago and Farouk (2012) investigated the impact of investment in information technology on the return on assets of selected banks in Nigeria for the period 2000-2010, using independent variables (MIS surrogates) which comprise of software, hardware investment, and number of ATMs, while the financial performance as a variable is proxied by the return on assets. The study employed secondary data generated from annual reports and accounts of selected banks

quoted in the NSE. The data were analyzed using multivariate regression analysis. It was found that MIS surrogates which are software, hardware investment and number of ATMs had a significant impact on financial performance of Nigeria banks as measured by ROA because t-statistics results are all significant at 1 percent.

Jimoh (2012) examined the impact of the information system on insurance business in Nigeria. The study collected data from Royal Exchange Insurance Nigeria plc using primary sources of Questionnaire and Interview methods. 50 copies of questionnaire were administered among the staff of the Kano branch of the insurance company. The study used the 30 copies of the questionnaire that were valid. Simple percentage descriptive statistics method was used for data presentation. The study used Chi Square method to analyze the data and test the hypothesis. The study concludes from the test that information system has a significant impact on insurance business. The study recommends that organization should encourage their employees to attend seminar on information system to harvest the benefits toward the advancement of the organization. The limitation of this study is its use of survey design which could be bias and subjective.

Fadun (2013) examined the impact of ICT on insurance companies' profitability which identifies the imperatives for adoption of ICT to promoting effective and efficient service delivery in the insurance industry as a strategy for attainment of the profit maximization objectives of insurance companies in Nigeria. The study is an empirical design which utilizes responses of structured questionnaire of 152 respondents from 18 insurance companies to explore the impact of ICT adoption on quality of service delivery and profitability of insurance companies in Nigeria. The study concludes that there is a positive relationship between ICT adoption and insurance companies' profitability in Nigeria. This implies that adoption of ICT by insurance companies can enhance their efficiency, their quality of service delivery, and their profitability. The implication of the findings for practice is that insurance companies should

endeavour to update their ICT facilities regularly, in view of its impacts on quality of service delivery and profitability. The study also highlights the need for regular training of insurance personnel to keep them abreast of the current innovations in the use of ICT to ensure that the industry contribute positively to the economy. The limitation of this study is its use of survey design which could be bias and subjective.

Hassan (2013) examined the correlation between IT investment and corporate performance in the Nigerian banking sector. The study made use of secondary data sourced from the Central Bank of Nigeria statistical bulletin, the National Bureau of Statistics and archives of the four (4) selected banks (using their websites) for the variables between 1986 and 2011. The model for the study has as its dependent variable the banks' net income and its explanatory variables are investments on ICT, investment on other assets and annual operating cost. Using the Pooled regression techniques; the study revealed that there is a strong positive relationship between the banks' net income and the annual investment in ICT by the selected banks. That is, ICT has greatly impacted positively and significantly on bank operations in Nigeria given the period of study.

Ugwuanyi and Ugwuanyi (2013) evaluated the effect of information technology investment on bank returns. The model was structured in a way that it showed the effect and the relationship between information technology expenditure and bank returns. OLS stated in a multiple form was applied to data generated from a sample of banks that survived the 2005 regulatory bank consolidation exercise in Nigeria. The analysis suggests that information technology expenditure has a negative relationship with bank profitability indicating that IT expenditures of all the studied banks do not increase bank profitability, but rather decreases it insignificantly.

Salatin, Yadollahi and Eslambolchi (2014) examined theoretical relationship between the level of ICT impact on insurance industry in selected average income countries1 by using panel data for the period 2002-2010. The results of estimation by fixed effects panel and GMM method

indicated that the effect of the number of mobile users (per hundred people) as an ICT index on insurance and financial services (% of commercial service exports) as an insurance industry index is positive and significant. In the other word, with the improvement and development of ICT, the insurance industry is also faced with the development and prosperity and vice versa in the absence of ICT boom of the insurance industry will be reduced. Accordingly the usage of ICT in insurance industry will cause increased production capacity, specialization of activities and improvement in the speed and quality of services. In general perspective, electronic insurance provides customers' access to insurance services by using safe intermediates and without physical present.

Abdulrahman and Altmimi (2015) evaluated the effect of investment in information and communication technologies on the profitability and performance of the Jordanian commercial banks, whether it helps to improve sales or it helps to reduce the overall operating expenses. The study used Cobb-Douglas production function as a proxy to measure these effects. The study used two measures of profit: ROA and ROE as dependent variables for this purpose, depending on the annual reports of the sample Jordanian commercial banks as a source for the raw data that was used in the analysis for the period between 2006 and 2013. Multiple regression was used as a statistical tool for the analysis. From the analysis of the study, the study found that there is a positive effect of investment in information and technologies on the profitability and performance of the sample Jordanian commercial banks used in this research. However, this present study concentrates on the effects of ICT on the performance of listed insurance companies in Nigeria using ROA as performance proxy.

Fabian and Nkechi (2017) assessed the effect of ICT on operational efficiency of quoted DMBs in Nigeria. Ordinary least square method of regression was used to analyse primary data collected basically through structured closed ended questionnaires of 4 point Likert Scale format administered to the respondents across the sampled DMBs in Nigeria. The study found

that ICT has a significant effect on the quality of service delivery, time saved in transaction processing and cost reduction of quoted DMBs in Nigeria; while a negative effect of ICT adoption on IT hours spent was found.

Malit and Muendo (2017) established the effect of information communication technology strategy implementation on performance of insurance sector in Kenya. The study adopted a descriptive cross-sectional survey. The population for this study was 50 insurance companies in Kenya. Census survey was used to select all 50 Insurance companies. The unit of observation consisted of heads of two functional areas in each insurance company. A sample of 150 respondents was considered as adequate for this study. The study used primary and secondary data. Primary data was collected using a questionnaire. The study found that ICT investment cost affects the performance of insurance sector in Kenya. ICT investment offers potential for significant organizational improvement and competitive advantage. ICT investment cost is relatively high but improves organization performance in the long run while ICT investment does not always translate into monetary rewards in insurance sector. The study revealed that ICT competency affects the performance of insurance sector in Kenya to a great extent. The insurance sector employees have experience on application of various ICT technologies and are equipped with the right knowledge on information technology.

Ayoni and Oluwasanmi (2018) examined the impact of ICT on Insurance Companies' services delivery and profitability. Insurance sector plays very important role in the growth of both developing and developed economies. Insurance as a service sector operates in a competitive environment. One of the industry's priorities is to increase Insurance penetration and gain control of the final market and this comes through good relationship with the potential insured and policyholders. Quantitative Data were obtained through the use of structured questionnaire. 82 respondents were chosen using simple random sampling from 10 Insurance companies in Ibadan, the capital of Oyo State. The results demonstrate that the presence and intensity of ICT

could be used to explain the higher growth in productivity and profitability of Insurance companies. The paper concludes that introduction of ICT leads to efficient service delivery, good customer cum Insurers' relationship, customer retention and business profitability.

2.2.2 Investment in ICT Software and Financial Performance

Shin (2001) examines empirically the contribution of IT to financial performance as measured by net profit, ROA, and ROE by focusing on the alignment of IT with business strategies such as vertical disintegration and diversification. Empirical analysis shows that IT does not directly improve financial performance. In conjunction with vertical disintegration and diversification, however, it does improve financial performance as measured by net profit. Financial performance ratios such as ROA and ROE, however, are not correlated with the alignment factor of IT with vertical disintegration and diversification. The results indicate that increased IT spending improves net profit, but not performance ratios such as ROA and ROE, of firms with decreased vertical integration and higher diversification.

Adebayo (2011) investigated Information and Communication investments in Nigerian Financial institutions with emphasis on their impact on earnings. Annual statements of accounts of eight (8) sampled banks were used to collect data on net income (the dependent variable) against the various investments of banks, which include ICT investments, investments in non-ICT labour and other investments for a period of ten years (1998 to 2007). Multiple regression analysis was used to test the hypothesis on whether or not ICT applications and investments significantly contribute to the net income of Nigerian financial institutions. The study revealed that ICT investments do not contribute significantly to the earnings of Nigerian banks.

Dandago and Farouk (2012) investigated the impact of investment in information technology on the return on assets of selected banks in Nigeria for the period 2000-2010, using independent

variables which comprise of software, hardware investment, and number of ATMs, while the financial performance as a variable is proxied by the return on assets. The study employed secondary data generated from annual reports and accounts of selected banks quoted in the NSE. The data were analyzed using multivariate regression analysis. It was found that MIS surrogates which are software, hardware investment and number of ATMs had a significant impact on financial performance of Nigeria banks as measured by ROA because t- statistics results are all significant at 1 percent.

Hassan (2013) examined the correlation between IT investment and corporate performance in the Nigerian banking sector. The study made use of secondary data sourced from the Central Bank of Nigeria statistical bulletin, the National Bureau of Statistics and archives of the four (4) selected banks (using their websites) for the variables between 1986 and 2011. The model for the study has as its dependent variable the banks' net income and its explanatory variables are investments on ICT, investment on other assets and annual operating cost. Using the Pooled regression techniques; the study revealed that there is a strong positive relationship between the banks' net income and the annual investment in ICT by the selected banks. That is, ICT has greatly impacted positively and significantly on bank operations in Nigeria given the period of study.

Witherspoon (2015) determined the effect of the ICT adopted on business performance of firms offering micro insurance in Kenya. The study adopted descriptive research design. The population of the study comprised all insurance companies providing micro insurance products in Kenya. Currently there are thirty five companies dealing with micro insurance business in Kenya acquired from the Insurance Regulatory Authority (2010). Quantitative and Qualitative data was collected; Semi-structured questionnaires were used to collect primary data at the premises of the participant insurance firms. Owing to the qualitative and quantitative nature of the information sought, both descriptive and inferential analyses were used in data analysis.

Descriptive analysis was performed in order to describe the data by showing measures of central tendencies and measures of dispersion. The study findings established that ICT adoption is very crucial for the performance of firms offering micro insurance in Kenya; the variables client appraisal, staff performance product development and firms' processes was significantly influenced by the adoption of ICT in firms offers micro insurance; ICT adoption in the firms has a significant effect on the client's appraisal. It was further revealed that ICT adoption has enhanced more client details to be captured beyond the basic "know your customer KYC" details. ICT adoption in firms offering micro insurance has a direct influence on the performance of staff and that the Processing of claims by staff is more efficient while using ICT systems than when manual system was being used.

2.3   Theoretical Framework

There are three theories that are relevant to this study, these theories are the Socio-Technical Systems Theory, Technology Acceptance Model (TAM) and Diffusion of Innovation Theory (DFI).

2.3.1 Socio-Technical Systems Theory

The term socio-technical systems was originally developed by Emery and Trist (1960) to describe systems that involve a complex interaction between humans, machines and the environmental aspects of the work system—nowadays, this interaction is true of most enterprise systems.

The socio-technical systems perspective has become influential in the analysis of the organizational impact of information technology. The theory views any organization as an open system of interdependent sub-units transforming inputs to desired outputs. The gainful employment of any technology hinges on the ability and willingness of users to employ it for worthwhile tasks (i.e., those deemed central to the organization's goals). Socio-technical

systems theory has given birth to a framework for technology design that emphasizes holistic job satisfaction (rather than just task performance) and user participation throughout the development process.

Thus, socio-technical theorists recommend the analysis of all stakeholders, not just the direct users of a technology, the formation of planning groups to oversee the design, the performance of prototyping exercises, and the analysis of likely impact the technology will have on the organization. In studying technology acceptance, socio-technical theorists conceptualize acceptance in terms of two competing forces: control and enhancement. Control factors are those that impose rules or structures upon the users, thereby removing autonomy (control over their own actions) from them. Among the control issues raised with respect to technology design are: access, reliability, confidentiality, monitoring, pacing, stress, social contact. Low or high presence of certain factors (e.g., low reliability, high pacing) with the introduction of a new technology is likely to reduce the user's perception of control and thus increase the risk of resistance (Connor, 1997).

Enhancement factors include sense of mastery, growth of knowledge, discretion, ability to act informally, requirement for certain skills, and enabling worker cooperation. A technology that is designed to support such factors is likely to increase user acceptance in an organization.

This study adopts the socio-technical systems theory to anchor the study because the theory agrees that there is need to be a synergy between those who use the technology and the environment in which the technology is being adopted for a smooth running of the technology to take place. The insurance firms need to identify the technology needs of its customers, provide the necessary technology that will suit their wants and desires thereby translating to efficiency and productivity on the part on the insurance firms.

2.3.2   Technological Diffusion Theory

This theory originated in communication to explain how an idea or product gains momentum and spreads through a specific population or social system and was developed by Rogers (1962). Technology diffusion theory is the common lens through which theorists study the adoption and development of new ideas. Diffusion is defined basically as the process by which an innovation is adopted and gains acceptance by individuals or members of a community. The Diffusion theory represents a complex number of sub-theories that collectively study the processes of adoption. The most famous account of diffusion research by Rogers (1995) where the definition of diffusion comprises of four elements which are defined as;

Innovation: an idea, practices or object perceived as new by individuals or group of adopters. Communication channels: means by innovation moves from one individual to the next or group to group. Time: the non-spatial interval through which Diffusion event takes place. The events include: innovation diffusion process, relative span of time for the individual or group to adopt the innovation and social system: a set of interrelated units that are engaged in joint problem solving activities to accomplish the goals.

Rogers (1995) also came up with the perceived attributes theory that assumes that innovation bears the following characteristics: Relative advantage: degree in which an advantage is perceived as better than the idea it supersedes, Compatibility: degree that an innovation is seen to be consistent with existing values and norms, Complexity: the degree in which an innovation is seen to be difficult or easy to understand and use, Trialability: is the degree in which an innovation may be experienced on a limited basis and observability as the degree to which the results of innovation are visible to others. The easier it is for individuals to see results of an innovation, the more likely they are to adopt it (Rogers, 1995).

Although the process is not limited to these perceived attributes, the elements are helpful in formulating questions for potential adopters in better understanding what factors make adoption

possible or desirable. Endogenous growth theory however indicates that the rate of technological progress, and hence the long-run rate of economic growth, can be influenced by economic factors which will curtail technology adoption in procurement as technology is seen as being costly. It starts from the observation that technological progress takes place through innovations, in the form of new products, processes and markets, many of which are the result of economic activities (Lieberth, 2007).

Technology revolution has impacted on purchasing; the drivers for change in purchasing function must include the objectives of eradicating paper transactions to a secure system that facilitates procure to pay as an objective of a world class procurement which is seen to enhance the performance of the procurement function (Lysons & Farrington, 2012). The Technology Diffusion theory is important in guiding the firm to initiate change and adopt technologies in procurement in the shift towards world class procurement.

2.3.3   Technological Acceptance Model

Information technology (IT) acceptance or adoption has received considerable attention in the last decade. Several theoretical models have been proposed to explain end-users' acceptance behavior. Among them, the technology acceptance model (TAM) proposed by Davis (1989) is widely applied and empirically tested. There have been tens of empirical studies conducted on TAM since its inception. Compared with its competing models, TAM is believed to be more parsimonious, predictive, and robust (Venkatesh & Davis, 2000).

Despite the plethora of literature on TAM, the empirical tests have so far produced mixed and inconclusive results, which vary considerably in terms of statistical significance, direction, or magnitude. Although they are not uncommon in social sciences where human behavior is difficult and complex to explain, the mixed findings not only undermine the precision of TAM, but also complicate efforts for IT practitioners and academicians to identify the antecedents to user acceptance behavior.

Beside its potential theoretical contributions, a meta-analysis on TAM is also significant to IT management practice. By understanding the substantive antecedents to user acceptance, IT managers can take more effective interventions to achieve greater technology acceptance or usage.

2.4   Summary

In this chapter relevant literatures on ICT investment and performance were reviewed and presented. The chapter stated with the presentation of conceptual framework of the study and then followed by empirical literature on ICT investment and performance were also presented and discussed. The chapter ended with the discussion of the theoretical framework of the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1   Research Design

Expost Facto research design is adopted for this study. It is a category of research design in which the investigation starts after the fact has occurred without interference from the researcher. This study made use of ex-post facto research design since the study relied heavily on secondary data that are quantitative in nature. These data had already been collected by the study population.

3.2   Population, Sampling Technique and Sample Size

The population of this study is made up of the 25 listed insurance companies on the Nigerian Stock Exchange from year 2012 to 2018. In this study, statistical sampling technique was not used due to the small size of the population; however listed insurance companies studied were selected based on filtering method using the criterion stated below:

i.   The insurance firm to be selected as part of the sample size must have been listed on the Nigerian stock Exchange all through the period under consideration that is, 1st January 2012 to 31st December 2018.

ii.   Insurance companies that have complete data set for the periods of 2012-2018 were selected for this study.

Given the criteria stated above only sixteen (16) listed insurance companies were able to fulfill this criterion, and were examined.

3.3 Methods of Data Collection

In this study, secondary data in the form of panels are used. The data were collected from the 16 selected insurance companies annual financial reports and Factbooks covering the period 2012–2018. The data comprises of return on assets as proxy for financial performance, investment in ICT Hardware and investment in ICT Software are proxies for ICT investment of selected quoted insurance firms.

3.4 Technique for Data Analysis and Model Specification

A panel regression analysis was used to analyze this study using the E-view econometric software version 10. In trying to adopt the most suitable for all models for the panel data, the Hausman specification test is used to determine the use of any of these models. In essence, the E-view econometric package was used to run such tests.

Model Specification

In trying to assess the impact of ICT investment on performance of quoted financial institutions in Nigeria, the following model was used:

ROA = f(IHW, ISW, FSZ)

$$ROA_{it} = \beta_0 + \beta_1 \log(IHW_{it}) + \beta_2 \log(ISW_{it}) + \beta_3 FSZ_{it} + \varepsilon_{it}$$

Where

i =   Number of Firms in the industry, Sixteen (16) insurance companies

t=   Period Covered, 7 years

ROA = Return on asset (Proxy for Financial performance).

β_0 = Constant parameter

IHW= ICT investment in Hardware

ISW = ICT investment in Software

FSZ = Firm size (log of Total Asset used as control variable)

ε = Error term

β_1- β_3= Coefficient of the explanatory variables

Hausman Specification Test for Best Model Selection

In a bid to select the use of the best model for the regression analysis, series of tests were carried out. According to Yaffee (2005) either of the fixed-effects or random-effects estimators would be the best linear unbiased estimator (BLUE). To achieve this, the Hausman specification test will be used. At the end of the test the most appropriate estimator was selected.

This study conducted robustness tests in order to improve the validity of all statistical inferences for the study. The tests include; multicollinearity test, correlation analysis, heteroscedasticity test, and the test of serial correlation.

Multicollinearity Test: This is to check whether there is a high correlation between the independent variables which will mislead the result of the study. To substantiate the lack of multicollinearity between the independent variables, colinearity diagnostics are observed and that the Variance Inflation Factors (VIF) and Tolerance Values (TV) are indicators as to whether multicollinearity exists in the variables (Field, 2013; Gujarati & Porter, 2009)

The tolerance value and the variance inflation factor (VIF) are two advanced measures of assessing multicollinearity between the independent valuables. Using eview, the variance

inflation factors and tolerance values are computed and when found to be consistently smaller than ten and one respectively it shows the absence of multicollinearity (Neter, Kutner, Nachtsheim & Wasserman, 1996).

Heteroscedasticity: This test is conducted to check whether the variability of error terms is constant or not. The presence of heteroscedasticity signifies that the variation of the residuals or error term is not constant which could affect the inferences in respect of beta coefficient, coefficient of determination (R^2) and F-statistic of the study. Eview 10 is used to check for the problem of heteroscedasticity in the analysis.

3.5   Justification of Methods

This study employed ex-post facto research design. This research design is the most suited research design as the study relied heavily on secondary data that are quantitative in nature. These data had already been collected by the study population.

The main sources of data in this study are the annual financial reports of the 16 selected insurance institutions based on the filtering technique. The annual reports are used mainly because they are considered the main source of information for different parties and are viewed as the major official and legal documents that a firm produces on a regular basis and acts as a significant forum for the presentation of the firm's communication with different stakeholders.

The study adopted Panel regression analysis because they are known as the best Linear unbiased estimator (BLUE). They also possess smallest variance. The objective of Panel Regression technique is to minimize the error term with the view of finding the model or regression equation that explains the data.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1   Data Presentation

The data on return on asset (ROA), investment in ICT hardware (IHW), investment in ICT software (ISW) and firm size (FSZ) are presented in appendix A.

4.2   Data Analysis and Results

Descriptive Statistics of Variables

Table 4.1: Descriptive Statistics

	ROA	IHW	ISW	FSZ
Mean	3.025023	38515.45	57740.96	7.092565
Median	3.134732	15535.50	28723.50	7.051817
Maximum	21.03527	253125.0	476144.0	7.727832
Minimum	-28.88107	138.0000	600.0000	6.597493
Std. Dev.	2.082480	17270.44	35971.99	0.262162

Source: Eview 10 Output, 2019

The Table 4.1 indicates that the mean value of Return on Asset (ROA), investment in ICT hardware (IHW), investment in ICT software (ISW) and Firm size are 3.02%, 38515.45 million naira, 57740.96 million naira and 7.09% respectively.

A comparison of the mean responses with the maximum values for each of the variables indicates that the insurance industry presently operates at a Return on Asset (ROA) of 3.02%, investment in ICT hardware (IHW) of 38515.45 million naira, investment in ICT software (ISW) of 57740.96 million naira and Firm size of 7.09%.

The table also shows the standard deviation of Return on Asset (ROA) to be 2.08, the minimum and maximum values of -28.88 and 21.04 respectively. This suggests that the data

are not widely dispersed from the mean because the standard deviations of all the variables are less than their mean values.

The table also indicates a minimum value of investment in ICT software (ISW) to be 600.00, and maximum value of 476144.0. However, for in investment in ICT hardware (IHW), the minimum and maximum values are 138.00 and 253125.0 respectively. This suggests that the data are not widely dispersed from the mean.

Correlation Matrix and Multicollinearity Analysis

The correlation matrix is used to determine the correlation between the dependent and independent variables of the study. The table below represents the correlation matrix for the sample observations.

Correlation Matrix

Table 4.2: Correlation Matrix

Covariance Analysis: Ordinary
Date: 09/06/19   Time: 03:07
Sample: 2012 2018
Included observations: 112

Correlation Probability	ROA	IHW	ISW	FSZ
ROA	1.000000			

IHW	-0.076165	1.000000		
	0.4248	-----		
ISW	0.086670	0.297885	1.000000	
	0.3635	0.0014	-----	
FSZ	0.047871	0.355965	0.402358	1.000000
	0.6162	0.0001	0.0000	-----

Source: Eview 10 Output, 2019

Table 4.2 presents the correlation matrix of the dependent and independents variables; it also shows the relationship among the independent variables in order to determine if there is multicollinearity. The result shows that all the independent variables such as Investment in Hardware, Investment in software and firm size, have no significant relationship with financial

performance. It is observed that the variables correlate fairly well (between - 0.07 and 0.40). There is no correlation coefficient greater than 0.8, hence there could be no problem of collinearity of data.

Post Residual Diagnostic Test

Variance Inflation Factor

Table 4.3: Variance Inflation Factor Table

Variable	VIF	1/VIF
C	NA	405.6100
ISW	1.102672	0.226830
IHW	1.195984	0.353689
FSZ	1.242252	9.824593

Source: Eview 10 Output, 2019

VIF = 1 (Not correlated)
1 < VIF < 5 (Moderately correlated)
VIF > 5 to 10   (Highly correlated)
Table above presents the variance factor (VIF) and tolerance coefficients of each of the explanatory variables. It is observed that the collinearity diagnosis revealed a VIF well below 10, a tolerance above 0.2. This shows that there is no threat of multicollinearity or independent errors. Researchers suggested that multicollinearity does not constitute a problem when the VIF does not exceed 10 and when the tolerance for each of the variable is above 0.2 (Wasserman & Kutner, 1990).

Panel Regression Analysis

H$_0$: Random effect is appropriate

H$_1$: Fixed effect is appropriate

Based on the result of the Hausman test, this study accepts null hypotheses which states that Random effect is appropriate because the probability value of Hausman test of 0.5310 is above 0.05.

Table 4.4: Random Effect Model Regression Results

Variable	Coefficient	Standard Error	t-statistics	Prob
C	-8.711926	28.54594	-0.305190	0.7608
ISW	1.090230	0.165716	6.578906	0.0000
IHW	1.147777	0.324231	3.539997	0.0033
FSZ	3.351608	4.284171	0.782324	0.4357
R^2	0.72			
Adj. R^2	0.60			
F-Statistics	4.08			
Prob(F-Statistics)	0.01			
Hausman Prob value	0.5310			
Heteroskedasticity Obs. R-Squared	0.4419			
Breusch-Godfrey serial correlation Observed R-squared	0.3414			

Dependent Variable: ROA

Source: Eview 10 Output, 2019

Table 4.4 above presents the results of Random panel multiple regressions. The result shows that the P value of F-statistics is 0.01 which is less than 5%, this shows that the model is fit and that the model is statistically significant as it implies that all the independent variables are statistically significant. The R square value of 0.72 means that the independent variable contributes 72% to the dependent variable. It also indicates that 72 percent of the variation in return on asset (ROA) can be explained by variability in investment in ICT hardware (IHW),

investment in ICT software (ISW) and Firm size. The remaining 28% are the value of other variables that are not captured in the model. The adjusted R square of 0.60 indicates that any variations that can occur as a result of the introduction of additional independent variable are being taken care of and cannot affect the R square more than 60%. Durbin-Watson value of 1.94 shows there is no serial or auto correlation. Durbin (1970), states that when the Durbin Watson statistic value is above 0.5 or 50 percent, independent observation is assumed. In other words, there is no auto correlation among the residuals of the study. The Durbin Watson statistic value of 1.94 therefore indicates that there is no autocorrelation among the residuals of this study. But the presence of serial correlation was confirmed with Breusch Godfrey LM serial correlation test.

Test of Hypotheses

Test of Hypothesis One

H_{01}: Investment in ICT Hardware has no Significant Effect on Financial Performance of Listed Insurance Companies in Nigeria.

The regression line ROA = -8.711926 + 1.147777IHW + 1.090230ISW + 3.351608FSZ shows that for every 1percent increase in Investment in ICT Hardware (IHW), ROA increases by 114%. The p-value of 0.0033 is less than the t-value of 0.05. This simply means that the alternative hypothesis is accepted that IHW has significant positive effect on financial performance of listed insurance companies in Nigeria. It indicates that an increase in Investment in ICT Hardware (IHW) also increase financial performance of listed insurance companies in Nigeria.

Test of Hypothesis Two

$H0_2$: Investment in ICT Software has no Significant effect on Financial Performance of Listed Insurance Companies in Nigeria.

The regression line ROA = -8.711926 + 1.147777IHW + 1.090230ISW + 3.351608FSZ shows that for every 1percent increase in Investment in ICT Software (ISW), ROA increases by 109%. The p-value of 0.0000 is less than t-value of 0.05. This simply means that the alternative hypothesis is accepted that ISW has a significant positive effect on financial performance of listed insurance companies in Nigeria.

4.3   Discussion of Findings

The empirical evidence derived from the Random effect regression model indicates that Investment in ICT Hardware (IHW) has significant positive effect on financial performance of listed insurance companies in Nigeria. It shows that investment in ICT hardware has enhanced their performance significantly. The significant and direct relationship between investment in ICT hardware and financial performance could be as a result of the timely and quality insurance services provided with the help of ICT. Summarily, the impact of information technology in insurance industry in Nigeria cannot be over-emphasized. It has provided flexible and convenient services to customers. Most current e-insurance applications make use of the Internet which allows customers to obtain insurance policy at any time and in any location around the world. Customers do not need to bother themselves once they want to apply for any insurance coverage as most insurance firms operate 24 hours online and real time service in Nigeria, they employ the use of short message service (SMS) to intimate customers of about their policy immediately the need for it arises.

The significant positive association between Investment in ICT Hardware (IHW) and financial performance is consistent with prior findings of Kozak (2005); Mashal (2006); Lin (2007); Casolaro and Gobbi (2007); Agbolade (2011); Dandago and Farouk (2012); Fadun (2013); Hassan (2013); Abdulrahman and Altmimi (2015). But contradicts Lingam (2004); Beccalli (2005); De Yound (2005); Hernando and Nieto (2006); Siam (2006); Ho and Mallick (2006); Singh (2009); England (2010); Stella (2010); Aregbeyen (2011); Al-Sa'di (2011); Adebayo (2011); Ugwuanyi and Ugwuanyi (2013) who found that investment in ICT hardware does not improve financial performance of corporate organizations.

This study found that Investment in ICT Software (ISW) has a significant positive effect on financial performance of listed insurance companies in Nigeria. There are indeed no doubts that majority of insurance firms have taken the advantage of IT to enhance their operations. Most of them make use of fast performing software that helps in simplifying their work and service delivery to their customers. Today most of them have website on the Internet in order to extend their services globally, provide executive services and promote quality of service delivery driven by their ambitious aspirations to dominate the African financial services landscape, and under the leadership of a dynamic and visionary management team through information technology, Nigerian insurance firms has been rapidly transformed from being just an insurance broker to a one-stop shop financial solutions provider. As the economies of Nigeria and Africa continues to improve, following the established path of other emerging markets; that is, increased political stability, improved government finances, growing domestic consumer demand, high commodity prices and significant improvement in other economic indicators, the insurance firms in Nigeria are well positioned as a warrant on the African renaissance story. It is expected that the 4G network will boost e-insurance activities in Nigeria but may require further investment in the quality of cell phones. However, there are enormous

opportunities for e-insurance implementation in Nigeria based on the rate of growth and the diffusion of mobile devices. There is prospect for patronage but may be dependent on the available services. This finding supports the empirical works of Dandago and Farouk (2012); Hassan (2013); Witherperson (2015). But contradicts the studies of Shin (2001); Adebayo (2011) who found that investment in ICT software has no influence on their financial performance.

Socio-Technical Systems Theory supports the findings of this study because the theory views organizations as an open system of interdependent sub-units transforming inputs to desired outputs. The theory believes that the gainful employment of any technology hinges on the ability and willingness of users to employ it for worthwhile tasks. Socio-technical systems theory has given birth to a framework for technology design that emphasizes holistic job satisfaction and user participation throughout the development process as it has been found by this study that investment in ICT has significant positive effect on financial performance of listed insurance companies in Nigeria.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study examined the effect of investment in ICT on financial performance of listed insurance companies in Nigeria. Specifically, the study examined the effect of investment in ICT hardware and investment in ICT Software on Return on Asset of listed insurance companies in Nigeria. Investment in ICT hardware and investment in ICT Software were used as proxy for ICT investment, while Return on asset is used to proxy financial performance of listed insurance companies in Nigeria.

In order to gain the advantage of an in-depth study and effective coverage, this study discussed the concept of ICT investment and concept of financial performance. The study reviewed prior literature on the subject of study and theory that is relevant for this study were discussed.

The study adopted expo facto research design and secondary data were collected from the financial statements of listed insurance companies in Nigeria. Panel regression analysis was employed because the study is a time series plus cross sectional analysis.

The study found that Investment in ICT Hardware (IHW) has significant positive effect on financial performance of listed insurance companies in Nigeria. The study also revealed that Investment in ICT Software (ISW) has a significant positive effect on financial performance of listed insurance companies in Nigeria.

5.2 Conclusion

The study concludes on a general note that investment in ICT improves the financial performance of listed insurance companies in Nigeria.

The study submits that investment in ICT hardware improves the financial performance of listed insurance companies in Nigeria because it was discovered by this study that investment in ICT hardware has a significant positive effect on financial performance of listed insurance companies in Nigeria.

The study also conclude that investment in ICT software increase financial performance of listed insurance companies in Nigeria, the level of investment made on ICT software by listed insurance companies in Nigeria increases their profitability.

5.3 Recommendations

Based on the conclusions of this study, the following recommendations are made:

Listed insurance companies in Nigeria should increase the level of their investment in ICT hardware as this will strengthen their financial performance as the study found that the coefficient of ICT investment in hardware is positive.

This study recommends that insurance companies should strengthen their investment in ICT software by increasing their expenditure on software components of ICT which will enhance their financial performance.

5.4   Limitations of the Study

The limitation of this study emanated from the difficulties encountered when gathering the data from different companies annual reports. This is because some annual reports online could not display information because of files that are corrupted. Also at the NSE library, difficulties

were also encountered because the listed companies submit only one copy which is kept at the library. Therefore, when a researcher is using an annual report, another person who is in need of the same copy may have to wait or made to come back another time in order to have access to the reports considering the closing time of the library. However, the NSE library official assisted me in getting the needed ones and extended the library opening time from time to time to assist me.

5.5 Suggestions for Further Studies

This work is limited to listed insurance companies in Nigeria; it is recommended that a similar study can be extended to other sectors of the economy like the banking sector. In another vein, a study of this nature can be carried out using other proxies to measure financial performance because this study used ROA, Interested researcher can also extend the scope of the study as this study only covered 2012-2018.

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Appendix A: Data Presentation

Insurance Firms	Year	ID	ROA %	IHW ₦ Million	ISW ₦ Million	Total Asset ₦ Million	FSZ (Log of Total Asset)
AFRICAN ALLIANCE	2012	1	0.244719103	30202	13331	14835785	7.171310531
	2013	1	-18.824201	37202	12002	16058408	7.205702488
	2014	1	2.717457723	43710	30296	23189358	7.365288725
	2015	1	-14.29557267	47040	33568	33278415	7.522162633
	2016	1	7.16118718	48270	28023	41133110	7.614191547
	2017	1	-8.991577575	48761	24132	41289651	7.615841212
	2018	1	-6.864716769	50,272	20,913	38727978	7.588024823
CONTINENTAL REINSURANCE PLC	2012	2	6.763434274	14164	17075	24049439	7.38110495
	2013	2	6.335110007	11985	9667	25042296	7.398674145
	2014	2	2.65837358	7542	1214	24884501	7.395928936
	2015	2	7.290914729	13306	9319	26531472	7.423761346
	2016	2	7.582817299	17308	6768	33166591	7.520700835
	2017	2	9.545496918	15471	19849	34124059	7.533060684
	2018	2	8.242849923	21436	381580	38122458	7.581180895
CORNERSTONE INSURANCE PLC	2012	3	3.675411395	29193	40186	11807685	7.072164759
	2013	3	6.674048383	40719	26333	13962425	7.144960853
	2014	3	8.609427586	66818	31027	14894672	7.173030944
	2015	3	-2.988500885	68818	36245	17919118	7.253316629
	2016	3	-10.28833561	117863	76620	18368248	7.264067734
	2017	3	-12.38913003	100556	71114	20804552	7.318158368
	2018	3	5.349326408	38,204	46,384	24091594	7.381865536
CUSTODIAN AND ALLIED INSURANCE COMPANY	2012	4	11.84755369	326	75846	17350738	7.239317952
	2013	4	10.14154579	138	81826	10711799	7.029862415
	2014	4	18.36365618	486	92095	12137877	7.084142732
	2015	4	20.06046815	485	77537	14501187	7.161403553
	2016	4	15.94465465	949	106653	15973880	7.203410418
	2017	4	21.03526584	1824	212733	18307974	7.262640287
	2018	4	19.26334878	5,273	300,338	19992012	7.300856504
GREAT NIGERIAN PLC	2012	5	10.70986654	12844	3952	8432402	6.925951303
	2013	5	0.043575203	12465	132252	10056178	7.002432952
	2014	5	-0.973283886	15600	121167	10448750	7.019064338
	2015	5	5.075233948	12219	61053	10609107	7.02567883
	2016	5	1.005914594	7794	2144	4036625	6.606018406
	2017	5	5.701478056	11871	15947	4402946	6.643743359
	2018	5	0.385401759	10377	6660	4958981	6.695392444
GUINEA INSURANCE PLC	2012	6	1.333020393	5200	40272	3958154	6.597492687
	2013	6	0.945310574	79835	64021	4213959	6.624690306

	2014	6	-1.794150095	50842	48355	4564724	6.659414524
	2015	6	-0.175578697	20802	8439	4116103	6.614486234
	2016	6	1.020058386	2147	1806	3982125	6.600114889
	2017	6	5.701478056	2424	998	4402946	6.643743359
	2018	6	-3.557780427	4,042	600	4353810	6.638869473
MANSARD INSURANCE PLC	2012	7	5.057352203	74612	96357	27288054	7.435972566
	2013	7	13.93226967	74117	82085	14931214	7.17409512
	2014	7	9.910693494	105518	80048	16327142	7.21291017
	2015	7	1.22915679	127988	239494	37920142	7.578869955
	2016	7	2.472587685	101077	229332	42076526	7.624039876
	2017	7	2.689110863	115791	218772	50865177	7.70642056
	2018	7	3.033954599	208,331	218,772	53435737	7.727831804
NEM INSURANCE PLC	2012	8	5.726472059	47471	51045	7580147	6.879677628
	2013	8	3.83166507	15068	15772	9627877	6.983530533
	2014	8	13.72995502	14381	4459	10977312	7.040496008
	2015	8	5.670738613	253125	12157	12087667	7.082342487
	2016	8	12.72102119	209883	7656	14531978	7.162324732
	2017	8	15.69430993	153850	10270	17605884	7.245657836
	2018	8	9.007734138	105,782	2,042	22432234	7.350872527
LAW UNION AND ROCK INSURANCE	2012	9	-20.53574336	20267	81273	6511476	6.813679444
	2013	9	7.026617894	11134	61763	6908473	6.839382065
	2014	9	1.719802275	7670	38802	7293571	6.862940215
	2015	9	3.395439854	6563	40369	8273420	6.917685072
	2016	9	6.547711446	11370	25523	8580876	6.933531626
	2017	9	9.078224848	11424	16623	10031774	7.00137774
	2018	9	2.350721644	11993	13399	11213280	7.049732667
PRESTIGE ASSURANCE	2012	10	6.306599907	2306	72000	9720864	6.987704867
	2013	10	-0.896305321	209	6300	10134493	7.005802027
	2014	10	0.119279169	402	5400	11893946	7.075325962
	2015	10	-1.517611213	1635	10152	10367741	7.015684139
	2016	10	-1.221950946	355	9162	9689587	6.986305266
	2017	10	4.516484279	709	44475	11775553	7.070981311
	2018	10	3.331165297	5,967	39,786	13020999	7.114644306
REGENCY ALLIANCE	2012	11	7.491651	48446	2749	5162894	6.712893209
	2013	11	6.753115722	45302	2912	5976545	6.776450194
	2014	11	4.617143652	47172	5758	6387239	6.805313167
	2015	11	4.955460014	45752	41876	6726540	6.827791729
	2016	11	6.864282535	27468	34370	6855691	6.836051235
	2017	11	2.675095356	16438	34237	7344598	6.86596803
	2018	11	2.68000624	11098	22122	7820840	6.893253401
SOVEREIGN TRUST PLC	2012	12	20.75504616	1345	17589	7113234	6.852067096

	2013	12	10.75139526	6497	6201	8649296	6.93698076
	2014	12	3.47306547	5141	25775	8492296	6.929025123
	2015	12	6.021119992	8206	29424	9264871	6.966839377
	2016	12	0.248035023	7621	20,792	9511560	6.978251752
	2017	12	1.459361647	6453	15,505	10817675	7.03413393
	2018	12	3.040570769	10,303	12,239	11321427	7.053901171
STANDARD ALLIANCE	2012	13	-20.001529	39376	18938	9130137	6.960477294
	2013	13	-10.02338068	60277	11544	8788881	6.943933584
	2014	13	-28.88106792	42383	7686	7605484	6.881126857
	2015	13	9.604958591	47517	8241	8435622	6.926117111
	2016	13	-10.3069124	44595	7230	13017167	7.114516477
	2017	13	0.447368682	24049	9789	13088310	7.116883573
	2018	13	2.33855794	6,263	6,723	13427805	7.128005026
VERITAS KAPITAL ASSURANCE PLC	2012	14	3.004830386	100398	80826	10545121	7.023051567
	2013	14	2.930892351	103460	94663	9008178	6.954636959
	2014	14	1.538676714	67804	114276	9194654	6.963535391
	2015	14	3.173900533	48038	75489	10728219	7.03052763
	2016	14	1.594702849	69467	86724	11346628	7.054866817
	2017	14	-8.422406082	34147	76780	10235828	7.01012298
	2018	14	-2.923053429	14435	34,995	11060181	7.043762234
UNIVERSAL INSURANCE PLC	2012	15	4.875360185	3502	4635	11116512	7.045968541
	2013	15	5.094118704	3773	6431	11563217	7.063078676
	2014	15	8.971902979	4488	8489	10834814	7.03482146
	2015	15	3.813308277	4070	12062	10928883	7.038575777
	2016	15	0.756917027	4655	17369	11896152	7.075406505
	2017	15	4.969448327	4352	21528	12761658	7.105907102
	2018	15	3.491390462	14,435	34,995	12735585	7.105018899
WAPIC INSURANCE PLC	2012	16	2.423949445	6114	53316	9935562	6.997192438
	2013	16	0.159939902	14748	60127	19679892	7.294022711
	2014	16	-0.026328322	57728	45835	19815163	7.296997649
	2015	16	3.095563205	61944	31844	20163859	7.304573652
	2016	16	0.446599629	129889	199170	20594061	7.313741995
	2017	16	1.479886014	110841	476144	21328940	7.328969273
	2018	16	-1.823421829	77,959	465,961	22884063	7.359533135

Appendix B: Descriptive Statistics

	ROA	IHW	ISW	FSZ
Mean	3.025023	38515.45	57740.96	7.092565
Median	3.134732	15535.50	28723.50	7.051817
Maximum	21.03527	253125.0	476144.0	7.727832
Minimum	-28.88107	138.0000	600.0000	6.597493
Std. Dev.	2.082480	17270.44	35971.99	0.262162
Skewness	-0.911107	2.073774	2.998677	0.287109
Kurtosis	5.709611	8.026249	12.90044	2.773156
Jarque-Bera	49.75812	198.1715	625.2727	1.778865
Probability	0.000000	0.000000	0.000000	0.410889
Sum	338.8026	4313730.	6466987.	794.3673
Sum Sq. Dev.	7251.239	2.48E+11	8.20E+11	7.628934
Observations	112	112	112	112

Appendix C: Fixed Effect Regression

Dependent Variable: ROA
Method: Panel Least Squares
Date: 09/06/19   Time: 02:42
Sample: 2012 2018
Periods included: 7
Cross-sections included: 16
Total panel (balanced) observations: 112

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.559227	38.76475	-0.117613	0.9066
LOG(IHW)	-0.381972	0.893476	-0.427512	0.6700
LOG(ISW)	-0.591485	0.695173	-0.850846	0.3970
FSZ	2.436260	5.746040	0.423989	0.6726

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.491014	Mean dependent var	3.025023
Adjusted R-squared	0.392501	S.D. dependent var	8.082480
S.E. of regression	6.299665	Akaike info criterion	6.672256
Sum squared resid	3690.778	Schwarz criterion	7.133430
Log likelihood	-354.6464	Hannan-Quinn criter.	6.859369
F-statistic	4.984239	Durbin-Watson stat	2.251139
Prob(F-statistic)	0.000000		

Appendix D: Random Effect Regression

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 09/06/19   Time: 02:46
Sample: 2012 2018
Periods included: 7
Cross-sections included: 16
Total panel (balanced) observations: 112
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.711926	28.54594	-0.305190	0.7608
LOG(IHW)	1.090230	0.165716	6.578906	0.0000
LOG(ISW)	1.147777	0.324231	3.539997	0.0033
FSZ	3.351608	4.284171	0.782324	0.4357

Effects Specification

	S.D.	Rho
Cross-section random	5.051770	0.3914
Idiosyncratic random	6.299665	0.6086

Weighted Statistics

R-squared	0.729240	Mean dependent var	1.289707
Adjusted R-squared	0.602275	S.D. dependent var	6.283577
S.E. of regression	6.276427	Sum squared resid	4254.502
F-statistic	4.084352	Durbin-Watson stat	1.947290
Prob(F-statistic)	0.013966		

Unweighted Statistics

R-squared	0.082302	Mean dependent var	3.025023
Sum squared resid	6654.446	Durbin-Watson stat	1.244994

Appendix E: Correlated Random Effects - Hausman Test

Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.204679	3	0.5310

Appendix F: Lagrange Multiplier Tests for Random Effects

Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided
(all others) alternatives

| | Test Hypothesis | | |
	Cross-section	Time	Both
Breusch-Pagan	33.47243	3.565762	37.03819
	(0.0000)	(0.0590)	(0.0000)
Honda	5.785536	-1.888323	2.755746
	(0.0000)	(0.9705)	(0.0029)
King-Wu	5.785536	-1.888323	1.496575
	(0.0000)	(0.9705)	(0.0673)
Standardized Honda	6.876737	-1.751699	-0.285229
	(0.0000)	(0.9601)	(0.6123)
Standardized King-Wu	6.876737	-1.751699	-1.451452
	(0.0000)	(0.9601)	(0.9267)
Gourieroux, et al.*	--	--	33.47243
			(0.0000)

Appendix G: Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.682546	Prob. F(2,106)	0.2133
Obs*R-squared	1.176532	Prob. Chi-Square(2)	0.3414

Appendix H: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F-statistic	0.885936	Prob. F(3,108)	0.4509
Obs*R-squared	2.690044	Prob. Chi-Square(3)	0.4419
Scaled explained SS	5.035966	Prob. Chi-Square(3)	0.1692