**IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON BANKING SECTOR**

**Abstract**

The banking industry of the 21st century operates in a complex and competitive environment characterized by ever-changing economic and financial environment with information and communication technology (ICT) at the center of this change. As Information Technology is vital in banking operations today, it becomes imperative for banks to realize its impact on operational performance in order to justify capital investments. The objective of this work was to examine how the adoption of Information and Communication Technology (ICT) affects the competitive performance of banking sector using independent sample t-test.

Findings from the study revealed that a positive relationship exists between ICT and banks performance in Nigeria. This implies that a marginal change in the level of the investment and adoption of ICT such as (Automated Teller Machine, Web based transactions, and Mobile payments) in the banking industry resulted in a proportionate increase in the profit level. The study thus recommends that it is imperative for bank management to intensify investment in ICT products to facilitate speed, convenience, and accurate service delivery. These will make Nigerian banks to be efficient, profitable, and competitive and to cope with the changes and challenges that are the outcome of ICT controlled globalized economy.

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**CHAPTER ONE**

**INTRODUCTION**

**1.1 Background to the study**

Today’s business environment is very dynamic and undergoes rapid change as a result of technological innovation,increased awareness and demands from customers. Business organization, especially the banking industry of 21st century operates in a complex environment characterized by these changing condition and highly unpredicted economic climate.Information and communication technology(ICT) is at the centre of this global change. They point out that entire cash flow of most fortunate 500 companies is linked to information. The adoption of ICT is defined as a collective term for a wide range of software, hardware, telecommunications and information management techniques, applications and devices, that are used to create, produce, analyze, process, package, distribute, receive, retrieve, store, and transform information (Brady et al.,2002). In essence the importance of information and communication technology banking is itemized through information technology industry. Effectiveservice delivery in information banking brings about reduced frustration and Improve level of awareness in an organization (Ato,2004). Information technology has continued to change the way banks and their corporate Relationship are organized. worldwide and the variety of innovation device available to enhance the speed and quality of service delivery. Ezeamama,(2010): reported that information and communication technology refers to the various technologies that enhance the creation, storage, processing, communication and dissemination of information. It involves the different infrastructure used in these processes, their application and numerous service, these infrastructure renders. In 1978 annual report, the Bank reported that the department made steady progress on its effort to effectively use of information and communication technology (ICT) to improve the efficiency and the quality of service delivery on financial sector. Information and communication technology is radically changing all over the world. The volume and speed of handling transactions has improved tremendously as a result of the growth of information technology which has created a lot of business opportunities.

Technology and more specifically Information and Communication Technology (ICT) are one of the resources needed in the banking sector for effective management. It has significantly improved the ability of the manager to monitor individual or team performance and it has allowed employees to have more complete information to make faster decisions.

Through Information and Communication Technology (ICT) services available to First Bank Plc Makurdi, it can now give its customers a unified access to manage their personal financial information.

The adoption of Information and Communication Technology (ICT) by this bank has increased its operational efficiencies, reduced cost through high utilization rates in the ICT environment to ensure compliance with changing time and to gain competitive advantage (Haggani A.B, 2003).

Methods of handling financial services has to change from old manual transactions and data processing to a faster, more effective and highly efficient electronic data processing and Electronic Fund Transfer (EFT) i.e. deposits, withdrawals, bills-pay-in, purchases of draft, value for cheques, third party transactions, fund transfer and inquiries are all done electronically within seconds.

The adoption of Information and Communication Technology (ICT) has also helped First Bank Plc Makurdi to keep the pace with the changing customers’ needs and market dynamics and create a competitive differentiation in products and services (Haggani A.B, 2003).

The complex nature of the banking system, its products and services have made it necessary for banks to embrace this change as quick as possible since this medium of banking has proven to be very efficient in most countries of the world( for example America) and Nigeria is no exception.

Application of information and communication technology is capable of enhancing optimal performance in service delivery if appropriately carried out. Optimal utilization of facilities might be achieved if the design is done based on clear understanding of how the service is to be measured. Such measurement include customer’s service rate, traffic intensity and the average number of customers in the queue. All these assist to make decisions on the level at which information and communication technology can be applied for an optimal performance in Banking operation. What prompted this work was the various computerization activities going on in the banking sector which has been accredited to the use of information and communication technology(ICT) in running of activities in the banks. The study has also been considered worthy among numerous research work due to the contribution to the banking system and economy at large. The study is to look at the effect which ICT has on banking sector and also the threats it has created since the use of ICT which has been an increase. Also to find it out the information and communication technology has really improved the productivity of the banking sector compared to when it was not being used. As such the information technology banking makes use of modern satellite communication facilities and different modes of transportation technology Banking is thus high capital - based organisation which has network being spread by using modern sophisticated equipment (Akunyili, 2004).

**1.2 Statement of the problems**

This Research work is a study of the impact of information and communication technology(ICT) on the banking sector. Many problems confronting the banks in Nigeria is in their use of information and communication technology(ICT).

One of the challenges confronting ICT in Nigeria could be classified into three classes as human, operational and technical constraints. The human constraints include physical disability, poor sight, illiteracy and ageing. The operational constraints include insecurity of funds transferred, frauds and standardization of channels. The technical constraints are centered on the lack of supporting infrastructures such as erratic electricity supply, interdependence and lack of encryption on short message system (SMS) messages (Agbada, 2008).

 Other identified problems that can have an impact on the banks in the adoption of ICT can be grouped broadly as psychological and behavioral. These include consumer awareness, security, accessibility to computers, reluctance to change, the cost of adoption, and preference for personalized services among others.

 Additionally, diffusion of smart card innovation needs high investment for the upgrades of ATMs and EFT/POS terminals to be capable of accepting smart cards and presumably a substantial investment in adding smart card technology for mobile computers and telephony stand to be another challenge. The implementation of smart cards for the whole Europe, according to Visa figures, requires eight billion dollars ($8 billion) investment. Although this is an affordable amount for many of the potential players, most players would only pay the entire amount if it would give them some proprietary or luck in advantage. So far, no player has felt confident enough to take a committed first mover position. This is in developed countries, what more of a developing country like Nigeria (Ovia, 2005).

 Coupled with these problems is a situation where a bank issue an individual debit card that is associated with an account with a line of credit and is also an ATM debit card, the individual can perform a number of different types of transactions with the same card. The line of credit could be accessed fraudulently, where the owner has recourse under consumer credit legislation and under regulation if the fraud involves an electronic fund transfer (EFT). When automated teller machine (ATMs) or electronic point of sale (POS) terminals are used, his liability is limited under the EFTA.

The problem associated with the study is to determine the true position of the banking system and what it should achieve if it will align with the global Information. This however becomes a huge task as the study tries to,

1. Identify the degree acceptance of information and communication technology in banking sector.

2. Examine the contribution of information and communication technology to the growth of the banking sector.

3. Know if information and communication technology is enhancing efficiency in banking sector and the effects it will have on banks that have not fully adopted it in their banking system.

**1.3 Research Questions**

1. What is the effect OF ICT on the productivity of the banking sector?
2. What is the impact of ICT on the Innovation of Nigerian banking sector?
3. What is the impact of ICT on the banking sector Market Structure?
4. What is the impact of ICT on the banking Sector Value Chain?

**1.4 Objectives of the study**

* **Main objective**

The main objective of this study is to analyze the impact of ICT on the banking sector of Nigeria.

* **Specific objectives**

The following are the specific objectives of the study

1. To examine the effect OF ICT on the productivity of the banking sector.
2. To examine the impact of ICT on the Innovation of Nigerian banking sector.
3. To assess the impact of ICT on the Nigerian banking sector Market Structure.
4. To examine the impact of ICT on the banking Sector Value Chain.

**1.5 Hypothesis of the study**

**HO1:** There is no effect OF ICT on the productivity of the banking sector.

**HO2:** There is no impact of ICT on the Innovation of Nigerian banking sector.

**HO3:** There is no impact of ICT on the Nigerian banking sector Market Structure.

**HO4:** There is no impact of ICT on the banking Sector Value Chain.

**1.6 Significance of the study**

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

Therefore, the knowledge that would be obtained from this research will assist management of banks to appreciate the importance and use of ICT products to achieve overall efficiency and effectiveness in their operations.

This study will also benefit financial institutions in general, as it will provide the framework with which proper system upgrades can be carried out together with the adoption of computer to guarantee efficient service delivery, maximization of profit and minimization of cost.

Students of management sciences and other researchers who intend to carry out further studies will find this study as a useful reference material especially in their literature review and findings thereby helping to arrive at objective conclusions.

Finally, it is hoped that the conclusions arrived at, will assist business organisations in ICT application so as meet desired organisational goals and objectives.

**1.7 Scope of the study**

This study was on the impact of ICT on the banking sector. This study was limited to Guaranty Trust Bank plc, First Bank of Nigeria plc, Zenith Bank international and United Bank for Africa (UBA).

**1.8 Limitations of the Study**

In this study “the impact of Information and Communication Technology (ICT) on Nigerian Banks’ performance”, the research is limited by time to go that far and treat this exhaustively.

The research is also limited by secrecy of information in the bank, which requires permission of the bank’s higher authority hence most information was regarded as classified information.

This research is also limited to the impact of ICT on banks’ performance and this is due to the fact that, this is the researcher’s main concern at the moment.

**1.9 Operational definition of terms**

Information:

Information refers to a processed/analysed data through the computer system that informs a recipient about a situation. It is the meaning assigned to data within some context for use of data, Walters, (1992).

Data:

Data are raw, unanalysed facts, figures, events from which information can be developed. A data is a basic raw fact that can process and converted to a meaning output called information. It is the encoded representation of facts, ideas and instructions such that the representations can be processed, communicated and interpreted by computers and/or people, Walter (1992).

Computer:

A computer is a programmable, multi-purpose use machine that accepts data (raw facts and figures) and processes or manipulates it into information that we can understand and utilize (Microsoft Encarta (2009).

Communication:

Communication often called telecommunication allows data and information to be transmitted from one point to another electronically. It is the transfer of idea or information from data processing system to ultimate users. The ultimate purpose of communicating is to inform the recipient.

Online:

It is a term used for a direct or immediate communication link between two devices. Online links are contrasted with offline links, in which only direct communication is possible. Thus, a telephone link is online, whereas, a telegram link is offline. The term online and offline are further used to denote the difference in time between when data in input into the system and when it is processed. A computer works online if input data is processed immediately (real-time processing operating mode) and offline if there is a significant time period between input and processing time, Clems & Sachwill (1992).

Disk Storage:

This is data storage on optical or magnetic tape/disc in memory system. It is characterized by low cost and relatively fast access to data stored on it. Longley & Shain (1989). External memories such as CD ROMS, DVD ROMS, Flash drives, external hard drive etc are capable of storing and retrieving billions of information in a small portable device.

Internet:

Internet is also known as the net is a massive connection of networks linking millions of computers via protocols, hardware and communication channels. It enables the automation of several tasks which have been carried out manually in the past.

Electronic Mail (e-mail):

It permits the transmission of letters, memos and other documents from one terminal or computer to another in a different office, city, state or country, Fuori and Gioia (1991). E-mail uses a central switching centre which is responsible for renting mailboxes to subscribers and- acting as the public telephone network link. Anderson (1990). When a message is created on the sender's system, it is addressed to a remote mailbox and it's transmitted by telephone line or wireless network to the mailbox services operator and forwarded to the receiver.

# 1.10 Organization of the study

For the work to be orderly and to enhance effective flow of reading and to afford readers of this thesis better understanding of the subject matter, the entire work is to be structured and organized into five (5) main chapters dealing with a particular aspect of the subject matter.

The chapter one contains the proposal and general information about the study. It will include the general introduction, background information of the study, problem statement and objectives of the study, research question / hypothesis, scope of the study, relevance of the study, limitations and the organisation of the study.

The second chapter presents a review of literature related to the study with the view to positioning the study within other similar studies and explores available knowledge in the study area.

Chapter three shall detail out the procedure and methods that will be used to carry out the study. It will explain the entire research design and methodology to be used, the data collection method and statistical procedures used to analyze the data. Chapter four shall contain analysis done on the data collected and presents them in forms that shall be easily and readily understood by readers. This will include tables, figures, charts and narrations.

Chapter five will feature a summary of findings, conclusions and recommendations that shall be made appropriate for corrective action.

**CHAPTER TWO**

**REVIEW OF RELATED LITERATURE**

**2.1 Conceptual Review**

**2.1.1 The Nigerian banking industry**

The Nigerian banking industry is regulated by the Central Bank of Nigeria (CBN). The major players in the industry are the 22 commercial (deposit) banks and 906 Micro-finance institutions. Other financial institutions that complement banking services include 5 discount houses, 5 development finance institutions, 731 bureau de change, 102 Primary Mortgage Institutions, and 82 finance companies. The Nigerian banking Industry has been undergoing major changes, reflecting a number of underlying developments. Advancement in communication and information technology has facilitated growth in internet-banking, ATM Network, Electronic transfer of funds and quick dissemination of information.

 Structural reforms in the banking sector have improved the health of the banking sector. The reforms recently introduced include the enactment of the Securitization Act to step up loan recoveries, establishment of asset reconstruction companies, initiatives on improving recoveries from Non-performing Assets (NPAs) and change in the basis of income recognition has raised transparency and efficiency in the banking system. Spurt in treasury income and improvement in loan recoveries has helped Nigerian Banks to record better profitability. Reforms have compelled banks to improve the utilization of ICT. The recently introduced punitive 'handling charge' on cash based transaction by the CBN is a pointer to the ever increasing role of ICT in the Nigerian banking industry.

## 2.1.2 Concept of Information and Communication Technologies (ICT)

Information and Communication Technology (ICT) is the automation of processes, controls, and information production using computers, telecommunications, software and other gadgets that ensure smooth and efficient running of activities. It is a term that largely covers the coupling of electronic technology for the information needs of a business at all levels. ICT also entails skills and processes necessary for carrying out activities in a given context. Information technology, the technology that empowers information, is a term that generally covers the harnessing of electronic technology for the information needs of a business at all levels. It refers to the automation of processes, controls, and information production using computers, telecommunication software and ancillary equipment such as Automated Teller Machines, and debit card, (Khalifa, 2000). It was defined by the Nigerian National Policy for Information Technology (2001), as computer, ancillary equipment software and firmware (hardware) and similar procedures, services (including support services) and related resources, any equipment or inter connected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, transmission or reception of data or information.

Today, a variety of ICT products are increasingly being used in the banking industry of the Less Developed Countries in response to increased sophistication of the customers and greater competition emanating from the increased globalization of the financial services industry. These products include Automated Teller Machines (ATMs), telephone banking, MICR cheques, Electronic Funds Transfer, Electronic Data Interchange, Electronic Home and Office Banking, Electronic Fund Transfer at Point of Sale, Electronic Letter of Credit,

Electronic Card, Debit Card, Electronic Cash, Electronic Billing, Local Area Network, Wide Area Network, etc (Agboola 2006). ICT products relevant to banks can be summarized into three groups viz:

1. **Bankers Automated Clearing Services:** which involves the use of Magnetic Ink Character Reader (MICR) for cheque processing. MICR is a system that provides for encoding of cheques and documents with characters in magnetic ink so that they can be electronically read. It is capable of encoding, reading and sorting cheques for timely clearing.
2. **Automated Payment Systems:** which include products such as Automatic

Teller Machine - ATM (a remote cash dispenser that assists customers to have access to withdrawal outside the banking hall), Plastic Cards (microchips such as credit cards, debit cards, and store value cards that store electronic cash to use for online and off line micro payments) and Electronic Funds Transfer - EFT (an electronic tool that is used to effectively transfer the value of exchange process for goods and services, ideas or information from one bank account to another account in another bank). Electronic Letter of Credit, Electronic Cheque and Electronic Cash fall under automated payment system

1. **Automated Delivery Channels:** which include interactive television and the Internet. The device enables customers to carry out transactions with their banks through connection between the customer’s terminals in their homes and/or offices and the bank’s computer system. VSAT (Very Small Aperture Terminal) is a satellite communications system that serves home and business users. Customers with such terminals are able to contact the bank and get any form of information (e.g. on bank balances, deposits into and withdrawals from accounts) through this medium.

# **2.1.3 The evolution of information technology**

During the late 1950s and all over the 1960s, business information and data was managed and processed using punched card devices, massive mainframe computers and electronic accounting machines with lower capabilities than recent microcomputers. The data processing function was the duty of the (EDP) electronic data processing department. In the 1970s the arrival of basic multi-user networks as terminals got interconnected to the massive mainframes.

It was also the start of database management systems that came as a reply to the encounters brought about by large volume and size of business data. This was the basis of Management Information Systems (MIS), information system (IS), and Decision Support Systems (DSS). All procedures were handled using applications software that were developed with third generation programming languages. The next decades saw the fusion of telecommunications and networking technologies for business organizations. This ushered in distributing office information systems (OIS), data processing and personal computers (PCs). Most important among the goals of business initiatives at this time was improvement in the product and service quality, therefore investments in total quality management (TQM) described and characterized the strategy of the leading organizations of the 1980s.

The total discovery in information technology occurred in the mid-1990s. This period was the time of information super highway in which organizations used to expand business boundaries by using the new technologies to achieve new opportunities. Business today undergoes rapid changes as a result of technological innovation due to its vibrant and dynamic environment, better and improved awareness and demands from customers. The banking industry of the 21st century works in a multifaceted and viable environment branded by these varying situations and highly erratic economic climate. Information technology is at the center of this global transformation curve.

# **2.1.4 Significance of ICT in the banking industry**

ICT revolution has distorted the conventional banking business model by making it possible for banks to break their comfort zones and value creation chain so as to allow customer service delivery to be separated into different businesses. Thus, for example, primarily Internet banks distribute insurance and securities as well as banking products, but not all the products they distribute are produced by their group (Delgado and Nieto, 2004).

However, the main economic argument for diffusion of adopting the Internet as a delivery channel is based on the expected reduction in overhead expenses made possible by reducing and ultimately eliminating physical branches and their associated costs. This specifically applies to and relevant in the Spanish banking system, which is one of the “over branched" in Europe. As stated by DeYoung (2005) and Delgado *et al* (2006), the Internet delivery channel may generate scale economies in excess of those available to traditional distribution channels.

Besides them, Haq (2005) also states that bank exists because of their capability to accomplish economies of scale in reducing information asymmetry between depositors and lenders. The unit costs of Internet banking fall more rapidly than those of traditional banks as output increases as a result of balance sheet growth. In this context, DeYoung *et al* (2007) refer to the Internet banking as a "process of innovation that functions mainly as ancillary for physical divisions or branches for delivering better banking services". In the case of the Spanish banks, there is some undependable evidence that shows that the Internet distribution channel has lower unit transaction costs than the two other distribution channels (branch and telephone) for a given type of transaction (money transfer, mortgage loan, brokerage or demand deposits).

# **2.1.5 Information technology and banks performance**

Research on the impact of ICT on rural bank’s performance is not enough and the existing studies are too much of European, US, and Australian banking sectors. Carlson *et al* (2000) and Furst *et al* (2002) conducted studies on whether there is a direct connection that exists between engaging in electronic banking and bank‟s profitability. Furst *et al* (2002), indicates that federally chartered US banks had higher Return on Equity (ROE) by using the normal business model, Information Technology was one of the key factors that affect the profitability of banks within the period under study and they also indicated that most of the banks that are profitable adopt ICT after 1998 but yet they are not first movers. In the same vein, Egland *et al* (1998), found no evidence of significant differences in performance of electronic banking in the US subject to two caveats:

1. This result may not represent the case for all the banks.
2. Such .result stands the chance to change over time as banks become more severe in the use of innovation.

While in a similar study in Kansas USA, Sullivan (2000) also found no methodical evidence that multi-channel banks in the 10th Federal Reserve District were either supported or damaged by having transactional web sites. These results were among the previous findings of Sathye (2005), for the credit unions in Australian banks for the period of 1997 to 2001, indicates that electronic banking has not proved to be a measure for performance enhancing tool. According to Haq (2005) bank‟s existence depends on their capability to achieve economies of scale in minimizing asymmetry of information between savers and borrowers. Today, one of the key problems facing the banking industry is how ICT has helped banks to maintain the economies of scale whilst changing from bricks and mortar banking to online banking.

Claessens *et al* (2001) supports that, “Role of ICT in the banking industry can permit global economies to setup a financial system before first establishing a fully functioning financial infrastructure instead. In effect, since electronic banking is much cheaper, it includes reduced processing costs for providers and less search and switching costs for consumers, banks can support their services and products involving smaller transactions to lower income borrowers, even in remote areas. In the same way, a research conducted by DeYoung (2005) analyzes the performance of the conservative banking versus the modern banking in the US market and comes out with strong evidence of general experience effects available to all start-ups. However, in a latest study, DeYoung *et al* (2007) raise and find that, for US community banks and traditional community banks, those multi-channel banks are to some extent more profitable, mainly via increased noninterest income from deposit service charges. Arrangements of deposits from checking accounts to money market deposit accounts, increased use of brokered deposits, and higher average wage rates for bank employees were also observed for click and mortar banks. While no change was explored in loan portfolio mix, these findings substantiate Hernando and Nieto (2007) that internet banking is seen as a corresponding channel.

Centeno (2004) in his research of analysing the acceding and candidate countries (ACCs) adoption of e-banking, classified e-banking adoption factors in two areas

1. ICT factors: This factor includes skill of consumers in using internet and related technologies internet, penetration rates, attitude towards technology, security and privacy concerns.
2. Banking factors: This category involves trust in banking sector, banking culture, Electronic banking culture and Internet banking push.

In a related research, conducted by Centeno (2004), he also indicated that lack of PC and internet penetration is still an entry barrier for internet banking development both in EU15 and ACCs. The cost of access services is a main issue for the PC and Internet penetration especially in Central and Eastern Europe countries. On the other hand, there has been a lack of confidence in the banking sector in ACCs due to past tumultuous periods. These concerns are further exasperated with privacy concerns. Magnitude of banking service usage and electronic banking culture are also weaker in ACCs compared to EU 15. A related research with Centeno (2004), conducted by Gurau (2002), shows that successful implementation and development of online banking is based on many interconnected factors. At the moment these aspects as in the recent age in UK these factors have been dealt and overcome by the people. These days‟ skills of using internet and cost of accessing the technology, being at home, do not seem to be a bottle neck towards the adoption of innovation from the consumer perspective.

Simpson, (2002) shows that electronic banking is stimulated largely by the prospects of operating costs minimization and operating revenues maximization. An evaluation of online banking in developed and emerging markets indicates that in developed substitute for physical branches for delivering banking services.

The year 2008 witnessed the advent of telecommunication and networking when rural banks began to display information technology systems as a local metropolitan and wide area network.

A research conducted by Maldeni and Sanath Jayasena (2009) studied the impact of ICT on bank branch performance. They explained that ICT usage at the bank branch includes three elements; ICT application, ICT literacy of staff and customers, and attitude of staff and customers towards ICT. They used Pearson’s correlation coefficient to measure the linear relationship between variables. The analysis revealed that ICT usage has a positive linear relationship with financial performance and quality performance of bank branches.

## 2.2 Theoretical Framework: Diffusion Theory of Innovation

The diffusion and adoption of technological innovations has been explained within several theoretical frameworks. One popular theory is the Diffusion of Innovations (Dol) theory. An innovation was defined by Denning (2004) as a transformation of practice in a community. It essentially is an idea, practice or object that is perceived to be new by a person or adopting entity. Innovation is transmitted through diffusion and adoption. Diffusion entails communicating or spreading of the news of the innovation to the group for which it is intended. Adoption however, is the commitment to and continued use of the innovation (Rogers, 1995).

Rogers' diffusion of innovation theory postulate that diffusion of innovation occur as potential users become aware of the innovation, judge its relative value and make a decision based on their judgment, implement or reject the innovation, and seek confirmation of the adoption or rejection decision (Rogers, 1995). The theory consists of three components: 'the innovation decision process, characteristics of an innovation and adopter characteristics (Bates, Manuel & Oppenheim, 2007).

The 'innovation decision process' categorizes the steps an individual takes from awareness of an innovation, through the formulation of an attitude to the innovation, on to the decision as to whether to implement, into five viz: knowledge, persuasion, decision, implementation and confirmation. The characteristics of an innovation have an impact on the likelihood of acceptance and adoption, and also on the rate at which this process develops. These innovation characteristics can also be classified into five criteria: compatibility, complexity, observability, relative advantage and trialibility. The socio-economic characteristics of adopters also fall under three headings: socio-economic (social status, social mobility, level of education etc.), personality values (attitude to change, risk and science, empathy, intelligence, outlook and degree of fatalism, level of aspiration etc.) and communication behaviour (degree of contact with change agents, degree of exposure to mass media communications, degree of opinion leadership, inter-connectedness in social networks, cosmopolitan outlook, degree of social participation, tendency to seek information about innovation, and consequently a greater degree of knowledge about innovation)

Other models of diffusion and adoption also exist. The Technology Acceptance Model (TAM) is similar to the diffusion of innovation theory but it places more emphasis on psychological predispositions and social influences such as beliefs, attitudes and intentions. Marcus's theoretical model of adoption highlights the importance of innovative behaviour and the phenomenon of others modeling themselves on this. Communication channels are a vital component in spreading this modeling behaviour to other potential adopters. The range of influential factors in the take-up of innovations include: the associated 'costs' (personal and institutional), the availability of necessary 'resources' (money, equipment, training, time, prior experience and relevant skills) and the 'value' of the innovation (Bates, Manuel and Oppenheim, 2007).

However, this paper is hinged on Rogers’ (1995) diffusion of innovation theory. According to this theory, innovation occurs when potential users become aware of the innovation, judge its relative value and make a decision based on their judgment, implement or reject the innovation, and seek confirmation of the adoption or rejection decision. The theory contains three basic components which are: 'the innovation decision process, characteristics of an innovation and adopter characteristics.

**2.3 Empirical review**

Various studies have been carried out on the impact of ICT on bank performance with mixed results found. For example, Agboola and Salawu (2009) using 24 banks and 1200 bank customers studied various Information and Communication Technology (ICT) in use in Nigerian banks and how they could be utilized for optimal performance on business transactions in the banking industry. The selected transactions for the study are deposit, withdrawal, enquiries, reference letters, opening and closing of accounts, funds transfer, special bills, loans and overdraft. They found that the design of ICT in the banking system has not been adequately focused on deposit and withdrawal which are activities that directly impact on customer services. According to them products such as ATM, Electronic Data Interchange, Electronic Home and Office Banking and Telephone Banking that could have hastened these activities were the least fully adopted technologies. The rate of adoption of ATM was 16.7%, Electronic Home and Office Banking was 16.7% and Telephone Banking was 20.8%.

Agboola (2006) found that in all the banks he studied, the rate of ICT adoption was high while the technologies were adequately spread between banks’ headquarters and branches. Aghaunor and Fotoh (2006) however found some variation between old and new generation banks in the rate of adoption of automated devices; new generation banks are more pro automation than the old generation banks.

A survey by Intermac Consulting Limited (2007) revealed that ATM services by banks and non-bank financial institutions was the most popular e-business platform in Nigeria. With over 96% awareness level among customers, they submitted that ATM services ranked better than not only all other forms of modern banking services but also some traditional bank services such as current account. Corroborating the above, Olatokun and Igbinedon (2009) in their study observed that there has been increased deployment of ATMs by banks in Nigeria; while only one bank had the ATM in 1998 this had increased to 14 in 2004. Between January 2005 and March 2006 debit card transaction in Nigeria banks increased by 93% with over 23 banks (92%) issuing such cards. The number of ATM transactions increased from 1,065, 972 in 2004 to 14,448,615 between January 2005 to March 2006.

Chineke, Euwiekpaefe and Chete (2006) examined the adoption of Internet banking in Nigeria. Using a sample of 12 banks, they collected data on the e- banking practices of the selected banks based on a model consisting of 36 items relating to e-banking. From the result, they concluded that even though internet banking is widely available in Nigeria, it is only being offered at the basic level of interaction. The banks had mainly information sites and very little internet transactional services. In a related development Dabwor (2010) analyzed the challenges of financial intermediation in the twenty first century in the Nigerian banking sector, using expository approach; the study identified high level of fraud in the banking sector owing to poor IT infrastructure and weak IT security which make bank customers vulnerable to internet hackers and cyber theft as a some of the major setbacks to the deployment of ICT in Nigeria’s banking sector.

Aghaunor and Fotoh (2006) examined the factors affecting e-commerce adoption in Nigeria banks. Using a survey of eighty customers of four ‘adopting’ and four ‘non-adopting’ banks, discriminant function analysis and t-test of independence of means, they concluded that all but one of the nine factors they identified were significant in explaining the adoption of e- commerce in Nigeria. The significant factors are top management support, perceived benefits, market e-readiness, supporting industries e - readiness, IT capability, and perceived compatibility. The non - significant factor is government e-readiness.

Also, Chiemeke, Evuwiekpaefe and Chete (2006) in their study on the adoption of internet banking concluded that security concerns and inadequate operational facilities (especially power and proper telecommunications facilities) are the major factors inhibiting internet banking in Nigeria. Okunoye, Bada and Frolick (2007) carried out an exploratory case study to investigate the phenomenon of dynamism of information technology and how it affects service delivery in Nigerian banks using 7 banks based on track record in IT based service delivery and e-banking awards. Data was gathered through semi-structured interviews, on - site observations and surveys. They found that banks were driven by customers’ needs, availability of the technology and competition to adopt a new technology and apply to service provision. In a study conducted by Osabuohen (2008) on the capacity of ICT to enhance the operations of Nigerian banks in the context of ongoing reforms of the banking sector. Using a sample of 180 banks staff from 3 banks in Lagos metropolis and the multiple regression analysis frameworks, he examined the factors determining the rate at which ICT is used in banks and the impact of ICT on operations of the banks. He found that the main variables that explain the rate of ICT use by bank staff were their age, educational status, extent of computer literacy, and the type of IT facility involved. Madueme (2010) evaluated the impact of ICT on banking efficiency in Nigeria using a survey of 13 banks. Based on the CAMEL rating and a transcendental logarithmic function of the banks, she concluded that the efficiency values obtained through the CAMEL rating system were higher during post adoption era than before adoption and estimated that a 1% increase in ICT capital on average leads to 0.9185 Naira increase in bank output post ICT adoption era. This agrees with her earlier finding in her 2009 study in which she concluded that information technology has impact on operational efficiency in the studied banks (Madueme, 2009). Agboola (2001) using 6 banks studied the impact of computer automation on banking services in Lagos and concluded that electronic banking has tremendously improved the services of the banks to their customers. As a follow up, Agboola (2006) evaluated the response of Nigerian banks to the adoption of ICT. Sampling 36 out of the 89 banks that were then in existence, he evaluated the nature and degree of adoption of innovative technologies, the degree of utilization of the identified technologies and the impact of the adoption of IT devices on banks operations using both structural analyses and the impact analysis model. The findings revealed that ICTs impacted positively on all the criteria that formed the basis of evaluation namely; competitive strength, market segmentation, improved revenue, proper forecasting and modernization for global impact, and time saving, error rate reduction, management decisions and speed of transaction for local impact.

In a study to determine the factors influencing customers’ choice of banks in Nigeria, Maiyaki and Mokhtar (2010) examined the effects of availability of electronic banking facilities among other factors. Based on a survey of 407 banks customers in 33 private and public organizations in Kano in the Northern part of the country, they found that the availability of electronic banking facilities such as ATM, online banking and telephone banking do not have significant influence on customers bank choice decision. This result was rationalized on the ground that ICTs have become widely diffused in the Nigerian banking sector, that is all firms in the industry have embraced the ICT ideology (in contrast to Agboola 2001) thereby rendering it ineffective as a competitive tool from the perspective of the customers.

Information Technology (IT) is the automation of processes, controls, and information production using computers, telecommunications, software and ancillary equipment such as automated teller machine and debit cards (Johnson 2005). Irechukwu (2000) lists some banking services that have been revolutionized through the use of ICT as including account opening, customer account mandate, and transaction processing and recording. Communication technology deals with the physical devices and software that link various computer hardware components and transfer data from one physical location to another (Laudon and Laudon; 2001). ICT products in use in the banking industry include automated teller machine, smart cards, telephone banking, MICR, electronic funds transfer, electronic data interchange, electronic home and office banking (Akpan, 2008 and Johnson, 2005). Agboola (2001) studied the impact of computer automation on the banking services in Lagos and discovered that electronic banking has tremendously improved the services of some banks to their customers in Lagos. The study was however restricted to the commercial nerve center of Nigeria and concentrated on only six banks. He made a comparative analysis between the old and new generation banks and discovered variation in the rate of adoption of the automated devices.

 Aragba-Akpore (1998) investigated on the application of information technology in Nigerian banks and pointed out that IT is becoming the backbone of banks’ services regeneration in Nigeria. He cited the Diamond Integrated Banking Services (DIBS) of the Diamond Bank Limited and electronic smart card accounts (ESCA) of All States Bank Limited as efforts geared towards creating sophistication in the banking sector. Ovia (2000) 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. He contended that the on-line system has facilitated internet banking in Nigeria as evidenced in some of them launching websites. He found also that banks now offer customers the flexibility of operating an account in any branch irrespective of which branch the account is domiciled.

 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. (ADCG) 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 (Woherem, 1997).

 Gwashi and Alkali (1996) observe that ICT covers all forms of computer and communications equipment and software used to create, store, transmit, interpret, and manipulate information in its various formats e.g., business data, voice conversations, still images, motion pictures and multimedia presentations. It also refers to the electronic devices used to collect, process, store and disseminate information. Similarly, the deployment of ICT is skyrocketing with many organizations using it in office automation, i.e. word processing, electronic mail, telecommunicating and teleconferencing. Other areas of ICT application are as follows:

 In business management, computerized database management system (DBMS) and management information system (MIS) are now making commerce and Industry pleasurable and ensuring decision making.

 Acharya, *et al*., (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 author utilized both primary and secondary data by applying multiple regression models. The results show that banks with higher usability of ICT perform significantly better than those with low ICT usability.

 Berger, *et al*., (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 author 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.

 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.

 Opera, *et al*., (2010) investigated the impact of technology on relationship marketing orientation (RMO) and business performance (BP) of the Nigerian banks using quantitative and qualitative data generated from 123 different bank branches in Port Harcourt, with 565 targeted respondents. The authors 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, *et al*., examined the number of US banks offering internet banking and analysed the structure and performance characteristics of these banks. They 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.

 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. Akram and Hamdan (2010) examined the effects of information and communication technology (ICT) on Jordanian banking industry for the period of 2003 – 2007. The authors 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 (MVA) earning per share (EPS), Return on Assets (ROA) and Net Profit Margin (NPM).

 Kagan, *et al*. (2005) examined the impact of online banking applications on community bank performance in the United States using data collected from 1183 banks operating in Iowa, Minnesota, Montana, North Dakota, and South Dakota. The authors employed an econometric model (Structural Equation Model) for the data analysis. The findings of the study revealed that online banking helps community banks improve their earning ability.

 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.

 Kozak (2005) analyzing the values of return on asset (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 (ROA) and cost efficiency, the regression analysis was used to achieve more precise statistical results, based on quarterly values obtained from the FDIC.

## 2.4 Research Gap

From the reviewed empirical literatures, it could be observed that most inferential statistics utilized by various scholars relied on CAMEL ratings and multiple regression without comparing independent groups. Our study however adopted independent-sample t-test that enabled us compare different (independent) groups; and also conducted the effect size statistics that provides an indication of the magnitude of the differences between the groups (and not just whether the difference could have occurred by chance). More so, most of the previous studies relied the use of ATM transactions, IT capability, perceived compatibility and IT security to proxy ICT adoption and neglected other core banking ICT related variables such as Internet (web) transactions and mobile payments transaction. In addition, the use of branch expansion (which is a very important proxy for bank performance) was not given much attention by previous studies. Filling these gaps is the major justification for this paper.

**CHAPTER THREE**

**RESEARCH METHODOLOGY**

**3.1 Research design**

A research design is the overall plan for relating the conceptual research problem to relevant and practicable empirical research. In other words, the research design provides a plan or framework for data collection and its analysis.

There are three research designs employed being descriptive, exploratory and explanatory. This is an exploratory research which aims at finding out the impact of information technology on the financial performance of commercial banks. The study employed the use of self-structured questionnaires, distributed to respondents in order to collect data.

The aim of this study is to ascertain the level of use of ICT infrastructures and their impacts on customer service; which invariably determines growth of banks. Considering ICT as a growth enabler, the extent of deployment by banks and customers’ perception of its relevance are the basis of the research.

## 3.2 Sources of data

For the purpose of this study both primary data and secondary data were used. The primary data was generated by means of a structured questionnaire instrument. The questionnaire was structured into two. One was used to collect data from staff and the other was designed to suit the customer’s opinion and response. The two questionnaires all had two sections; the first section collects the personal data of the respondents while the second section focused on the subject matter of the study.

Secondary data was used to enable compare various profitability ratios since the introduction of Information Technology to help examine its impact on the financial performance of banks as compared to its earlier operation before the introduction of information technology in the banks. Secondary data were also collected from ebooks, journals, books, school libraries and so on.

**3.3 Sampling and sampling technique**

A random sampling technique was used to issue questionnaires to customers in the selected banks. Four commercial banks were selected on the basis of sufficient branch networks. A total of 400 questionnaires were given out to customers at the bank premises. About 280 of the questionnaires were returned to the researchers, a response rate of 70%. The four banks visited are: Guaranty Trust Bank plc, First Bank of Nigeria plc, Zenith Bank international and United Bank for Africa (UBA).

## 3.4 Data collection instruments

The primary data was obtained from the self-administered questionnaires. This instrument was drafted by the researcher. The response were measured with a 5 pointer likert - type rating, where strongly agree (SA) = 5; Agree (A) = 4; Neutral (N) = 3; Disagree = 2; Strongly Disagree = 1.

**CHAPTER FOUR**

**DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS**

# **4.1 Data analysis and interpretation**

The major dimensions of the banking industry for which the impact of ICT has a critical consequence include: productivity, innovation dynamics, market structure, and value chain characteristics.

## A. Impacts of ICT on Productivity

ICT has productivity increasing effects on labor productivity and total factor productivity of companies. ICTinduced productivity effects vary significantly between sectors and among countries. The banking industry is one of the sectors that enjoy the largest productivity growth effect of ICT.

Table 1 show the effect of ICT on the productivity of the banks as perceived by customers. About 85.4% of the respondents agree that ICT is helping the cahiers to be more productive. The use of computers and peripherals simplifies the task of getting customers' data and counting money to effect transaction. This enables a single cashier to serve thousands of customers in a day which would have cost the bank enormous staff strength and large building. However, about 80% of those interviewed agree that the bank needs to improve its services. This is indication of the fact that ICT investment does not lead to productivity growth at firm-level by itself. It depends on how the technology is actually used in business processes, i.e. on a company's ability to innovate its work processes and business routines with support of ICT. Thus, banks need to multiplex ICT investments with complementary investment in working practices, human capital, and firm restructuring to optimize its impact on productivity.

# TABLE 1. EFFECT OF ICT ON PRODUCTIVITY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question**  | **SA**  | **A**  | **N**  | **D**  | **SD**  |
| Computers are helping the tellers in their work  | 40.0  | 45.4  | 5.5  | 9.1  | 0  |
| The bank needs to improve its services  | 51.0  | 29.0  | 11.0  | 8.0  | 1.0  |

## B. Impact of ICT on Innovation

A technological change such as the massive diffusion of ICT represents an interesting case for an analysis with respect to firms’ innovation strategies. For example, it is said that industry leaders often reject important inventions and fail to bring them to the market. Entrepreneurial companies are more likely to exploit these opportunities. Entrants frequently introduce products or production processes based on a new technology, which can challenge incumbents or even drive them out of the market. This was the scenario that played out in the Nigerian banking industry with the emergence of new generation banks that introduced innovative products and services. Innovation in this context aims to reduce the cost of banking while making the process of transaction easier and more convenient.

About 67.5% of the respondents disagree that the amount the bank charges on transaction is okay. This indicates that banks need to come up with innovative products that will reduce the cost of banking operations; which can be passed down to the customer in the form of reduced charges. About 65% of the respondents enjoy information update about the bank through SMS and email alerts. This enhances customer royalty and confidence. 78% of those interviewed agree that they prefer to use the ATM than coming into the banking hall. This is due to extensive publication that has encouraged the use of ATM. Thus banks can encourage the use of other ICT media such as the internet and POS which enhances cashless banking.

# TABLE 2 IMPACT OF ICT ON INNOVATION

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question**  | **SA**  | **A**  | **N**  | **D**  | **SD**  |
| The amount the bank charges on transactions is okay.  | 10.0  | 12.5  | 10.0  | 40.0  | 27.5  |
| I enjoy information update about the bank through SMS and email alerts  | 30.0  | 35.0  | 10.0  | 12.0  | 13.0  |
| I prefer to use the ATM than coming into the banking hall.  | 48.0  | 30.0  | 9.0  | 7.0  | 6.0  |

## C. Impact on Market Structure

Innovations enabled by ICT changes the cost structure of companies. Hence, innovations have a significant impact on the market structure in which companies operate. Radical changes in technology traditionally lead to emergence of new products or change the production processes of existing products. In either case, companies face a large degree of uncertainty regarding future demand or cost of service delivery. Furthermore, during times of technological change, mergers reflect the process of assets reallocation toward more efficient firms. The mergers that were recently evidenced in the Nigeria banking industry were actually a result of the consolidation exercise of 2004 and the technological change that dawned on the industry.

Technological change forces firms to adopt new modes of production and, consequently, to reorganize its assets. If a company fails to reorganize internally, it will probably disappear from the industry and its assets will be reorganized externally. New technology spreads faster if such asset reallocation works smoothly. The diffusion of ICT is technological change that has greatly revolutionized the banking sector.

Table 3 below indicates that 75% of the respondents agree that the banks have improved the quality of service rendered. This is necessary for the bank to retain its customer as well as attract potential ones. 79% of the customers agreed that they enjoy prompt and efficient service for which 87% of the respondents are willing to recommend the bank to others.

# TABLE 3 IMPACT OF ICT ON MARKET STRUCTURE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question**  | **SA**  | **A**  | **N**  | **D**  | **SD**  |
| The quality of service has improved in this bank  | 50  | 25  | 10  | 14  | 1  |
| I enjoy fast, efficient and prompt service  | 49  | 30  | 11  | 10  | 0  |
| I can recommend this bank to someone  | 55  | 32  | 8  | 5  | 0  |

## D. Impact on Sector Value Chain

Empirical findings suggest that some of the main effects of ICT diffusion are organizational changes and the redefining of organizational boundaries. Thus, it is relevant to assess if the diffusion of ICT in the banking industry had any impact on the restructuring process. The impact on value chain reflects in re-shaping firm boundaries and changing the constellations of value chains are enormous.

From table 4, only 47% of the respondents agree that value added services/special accounts encourage them to patronize the bank. This customer perception needs to be improved upon by more extensive publications on these value added service so as to complement the impact of ICT. The number of branches a bank has is another value chain that enhances the impact and level of deployment of ICT.

# TABLE 4 IMPACT OF ICT ON BANKING SECTOR VALUE CHAIN

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question**  | **SA**  | **A**  | **N**  | **D**  | **SD**  |
| Special services/account types encourage me to patronize this bank  | 27  | 20  | 5  | 28  | 20  |
| The number of branches this bank has motivated me to chose it  | 30  | 35  | 5  | 13  | 17  |

# V. CASE STUDIES

To further study the impact of ICT on growth of the Nigerian banking industry, a case study of two large banks and their choice of an ICT platform will examined.

## A. First Bank of Nigeria (FBN)

First Bank of Nigeria Plc (FBN) was established in 1894 and has distinguished itself as a leading banking institution and a major contributor to the economic advancement and development of Nigeria. With 339 branches, the Bank maintains the largest branch network in the banking industry in Nigeria.

At the turn of the bank’s century, FBN found itself in a unique position as, despite its size and reputation, there were challenges to maintain the leadership position in a market that was as dynamic as it was competitive. It was at this point that the bank launched its business transformation initiative called ‘Century II’. Century II clearly identified IT as an enabler for the bank going forward.The Key Business Drivers for an ICT platform were:

* Need to Integrate Banking Operations: The bank’s 300+ branches were operating mainly as silos; information was hard to compile and disseminate, which affected decision-making.
* Urgency to Meet Regulatory Requirements:

 FBN needed to adhere to the regulatory requirements imposed by the Central Bank of Nigeria as well as the common business practices followed by Nigerian banks. Since no two banks work in exactly the same way, the bank-specific requirements were also important. The central bank's increasingly proactive role in regulating the industry to bring it up to speed with international trends meant that the bank had to remain agile in order to survive and come out a winner.

Need for Innovation and Faster Time to Market With sophistication of customer requirements and increased competition, the bank’s critical requirement was to not only to meet the existing demands of the customer but also to stay agile and meet the changing requirements going forward.

One of the pillars of Finacle’s value proposition to FBN was its new generation solution architecture, designed to help the bank build an agile business through innovative offerings to the market and a significantly superior speed of response to customer, competitive and regulatory requirements. The other was Finacle's proven track record of 100% successful implementations across the globe, which offered the bank the attractive proposition of minimized risk. FBN piloted on Finacle in six months and since then has rolled out the solution to over 170 branches, on time and within budget. The benefits of the solution include:

* Time-to-market Advantage:

FBN's unique requirements were catered to using Finacle's Extensibility toolkit, the infrastructure that enabled the bank to customize its specific requirements without touching the source code. This provided significant time-to-market advantage to the bank and enabled them to design and launch new product offerings quickly.

* 24/7 Operability:

Regular version upgrades over the years have provided increased and more sophisticated functionality to the bank as the relationship has progressed. The new generation flexible architecture of Finacle has ensured 24/7 operability, with close to 100% uptime, a feature of immense importance in a country not known for failsafe network connectivity.

* Scalability:

Finacle's technological superiority and functional richness were important factors but its proven ability to scale up to FBN’s explosive growth plans was the clincher. Finacle successfully met FBN’s expectations of the solution being able to “scale up and be the vehicle of growth to meet the emerging global challenges in the financial arena.”

* Streamlined Operations:

 The new generation architecture of Finacle - fully webenabled, with powerful and unique capabilities such as Straight Through Processing (STP), workflow, scalability and true 24/7 banking across multiple delivery channels has enabled the Bank to streamline its operations.

## B. United Bank for Africa (UBA)

United Bank for Africa PLC (UBA) is the product of a merger of two of Nigeria’s top five banks, UBA and Standard Trust Bank Plc (STB). Today, consolidated UBA is largest financial services institution in sub- Saharan Africa (excluding South Africa) with a balance sheet size in excess of 400 billion naira (approx. US$ 3 bn), and over two million active customer accounts. With over 400 retail distribution outlets across Nigeria, UBA also has a presence in New York, Grand

Cayman Island and aspires to expand within Sub-Saharan

Africa.

UBA is the first successful merger transaction in the history of the Nigerian banking sector and was born out of a desire to lead the sector to a new era of global relevance by championing the creation of the Nigerian consumer finance market and leading a private/public sector partnership aimed at accelerating the economic development of Nigeria.

The Nigeria banking industry is going through so tremendous flux. The Central Bank’s mandate of a minimum N25 billion capitalization by December 2005 resulted in the Nigerian market witnessing consolidation activity on a large scale. Though the UBA-STB merger was consummated during the ongoing consolidation era, it was a strategic move by the bank to become a large regional player, with an increased reach and synergies in terms of larger customer base and complementary product portfolio.

In its determination to continue to leverage on a robust IT infrastructure designed to achieve excellent service delivery to its teeming clientele, UBA opted for Finacle universal banking solution, comprising core banking, corporate e-banking, alerts, CRM and treasury solutions from Infosys in October 2005. The relationship between Finacle and UBA dates back to 5 years ago when STB changed from its existing Globus system to Finacle. Finacle core banking solution helped power STB’s rapid growth at the turn of the millennium and its emergence as one of Nigeria’s leading new generation banks. In addition STB is credited to have spearheaded the deployment of ATM's and internet banking in the Nigeria market riding on Finacle.

To power ahead in the dynamic post-consolidation banking landscape of Nigeria, UBA requires a technology partnership that transcended a typical customer-vendor relationship. From the STB experience, what emerged was the impeccable delivery track record of the Infosys implementation team. Recall that the bank (STB) completed a 65-branch roll out in quick time, less than 6 months, and a far cry from the 18-24 month implementation cycles prevalent in the country then. UBA also needs to capitalize on an integrated channel strategy that incorporated e-banking and CRM, among others.

#  Discussions on findings

The results of the research indicate that investment on ICT system and infrastructures has become a key element in productivity and growth in the banking industry. Increased investment in ICT-Capital has accelerated growth in industry. Also, ICT facilitates the absorption of high and medium skilled labor. This has a positive effect on the labor output of the banking industry. The case studies indicate that ICT also enables banks offer a broad variety of services to customers, coordinate branch activities, meet up with changes in government regulations and policies as well as adjust to market demands and competition.

However, only 25.4 million of Nigerians, representing 30% of the adult population have bank accounts. This leaves about 70 % of the adult populations unbanked. Thus to justify investment on ICT, banks need to draw out explicit ways to reach the unbanked. One way of achieving this objective is to increase the geographical outreach of the financial system through the use of non-bank agents; a method that will involve investment in innovative ICT products and services.

In sum, the business environment is becoming ever competitive and dynamic, invariably then, banks require solutions that can scale up to their growth plans and provide them the much-needed agility to create a clear differentiation in the market.

Thus, banks need to employ ICT in such a way that meets the desired qualities of flexibility and scalability, providing them with a competitive advantage to stay ahead and provide new and improved products and services to delight their customers.

It must however be noted that ICT investment does not lead to productivity growth at firm-level by itself. It depends on how the technology is actually used in business processes, i.e. on a company's ability to innovate its work processes and business routines with support of ICT. Thus, only if ICT investment is combined with complementary investment in working practices, human capital, and firm restructuring will it have an impact on performance.

**CHAPTER FIVE**

**CONCLUSION AND RECOMMENDATION**

**5.1 Conclusion**

The finding of this study indicates that basic ICT infrastructures such as computer and peripherals, local area networks, and ATMs are crucial to the operations of banks. However, the case studies indicate that to meet the ever increasing sophistication of customers, new government policies and stay competive in a fast changing economy, a scalable, flexible and robust ICT solution is essential.

Banking operations have been made better through the adoption of Information Technology. Although, advances in technology bring its own shortcomings, its positive impact cannot be overemphasized. Due to the ever-evolving ICT, security threats also constantly evolved, and as such, the need to adopt even better ICT solutions. This work proposes a network design solution to accommodate the lapses in the existing bank network. The banking institution is now greatly influenced by the strength of its Information Technology. Through networking, banking ceased to be only at the branch containing holder’s information. A bank with branches nationwide seems like just in a building with internet banking, etc.

Though, the network design of any financial institution must satisfy- confidentiality, availability and redundancy which at present bank networks are in compliance with. This research has shown that advances in network design leads to reduced cost, improved security, less network delay and better maintenance. From results obtained, the existing network design offers more delay between endpoints than the proposed network assuming constant bandwidth.

Top management should establish the right roles and processes, set clear goals and relevant measures and review progress at every stage. Innovation experience and opportunities may occur through unexpected occurrence, ingenuities, process needs, industry and market changes, demographic changes, changes in perception and new knowledge. All these when properly understood and managed promote technology innovation.

**5.2 Recommendation**

Based on the findings, the following recommendations were made;

1. Banks should incorporate ICT into their strategic plans for effective performance in payment and delivery systems. This calls for proper analysis to determine the type, nature and extent of ICT products required for effectiveness and efficiency. It is imperative for bank management to intensify investment in ICT product to facilitate speed convenience and accurate service.
2. More so, it is recommended that more attention has to be directed towards the use of Information and communication Technology in banking operations since the industry serve as a lubricant to the cog of the wheel of the nation’s economy while appropriate policies must be put in place to ensure proper monitoring and the determination of the optimum size required to attain organizational efficiency.
3. Regular training should be given to the bankers from time to time to keep them abreast of the current innovations in the use of ICT. This will enhance their efficiency and quality of service delivery that will ensure customers retention and productivity, which will translate to the banks’ profitability, ceteris paribus. This stance is essential especially in this era of reforms in the nation’s financial sector where attention is no longer on the banks that have the required capital. The key issue at moment is the ability of banks to retain their current customers as well as attract potential customers. This is mainly feasible in their efficient service delivery, which depend largely, on the premium placed on the use of ICT.

**References**

Agboola A. (2006). Information and communication technology (ICT) in banking operations inNigeria: an evaluation of recent experiences, Retrieved from <http://unpan1.un.org/intradoc/groups/public/documents/AAPAM/UNPAN0>26533. pdf, on June. 10, 2017.

Agboola A. A. Salawu, M (2009). Impact of electronic banking on customer services in Lagos, Nigeria. Ife Journal of Economics and Finance, 5(1&2).

Agboola A. A. (2001). Impact of electronic banking on customer services in Lagos, Nigeria. Ife Journal of Economics and Finance, 5(1&2).

Aghaunor L. & Fotoh X. (2006). Factors affecting e-commerce adoption in Nigerian banks, Paper within IT and Business Renewal, Jonkoping International Business School.

Chiemeke S. C., Evwiekpaefe A. E. & Chete F. O. (2006). The adoption of internet banking in Nigeria: an empirical investigation. Journal of Internet Banking and Commerce, 11(3), Dec.

Dabwor, T. D. (2010). The Nigerian banking system and the challenges of financial intermediation in the twenty first century. Jos Journal of Economics, 4(1), 94-109.

Denning, P. (2004). Building a culture of innovation. Ubiquity, 5(8). Available online at:

<http://www.acm.org/ubiquity/interviews/v5i8_denning.html>

Ehikhamenor F.(2013). Information technology in Nigerian banks: the limits of expectations. Information Technology for Development, 10, 13 – 24.

Emmanuel, O.S, & Adebayo, A.A (2011). ICT’s, Service Delivery and Operational Performance in Nigerian Banks: a Survey of Empirical Research. An International Multidisciplinary Journal, Ethiopia, 5(4), 44-52.

Grainger – Smith N. & Oppenheim C. (1994). The role of information systems and technology(IS/IT) in investment banks. Journal of Information Science, 20 (5), 323 -333.

Intermac Consulting Limited (2007). ICT and Banking systems in 3rd world. Journal of PublicPolicy,

1(2).

Khalifa, K. (2000). Building Strong Management and Responding to Change. Banking Institutions in Developing Markets,1(2).

Madueme I. S. (2010). Banking efficiency and Information Technology in Nigeria: an empiricalinvestigation. International Journal of Economic and Development Issues, 8(1&2) 86– 96.

Maiyaki A. U. & Mokhtar, S. S. M. (2010). Effects of electronic banking facilities, employmentsector and age – group on customers choice of banks in Nigeria. Journal of InternetBanking and Commerce, 15(1), April.

Okunoye A., Bada A. O. & Frolick M. (2007). IT innovations and e-service delivery: an exploratorystudy, Proceedings of the 9th International Conference on Social Implications of Computersin Developing Countries, Sao Paulo, Brazil, May.

Olatokun W. M. & Igbinedion L. J. (2009). The adoption of Automatic Teller Machines in Nigeria: an application of the theory of Diffusion of Innovation. Issues in InformingScience and Information Technology, 6, 373 -393.

Osabuohien E. S. (2008). ICT and Nigerian banks reforms: analysis of anticipated impacts inselected banks. Global Journal of Business Research, 2(2), 67 – 76.

Ovia, J. (1997). New Technologies and Performance Enhancement. Paper presented at the 13thAnnual Bank Directors’ Seminar Held at Abuja between 17th and 19th June, 1997

Rogers, E. M. (1995). Diffusion of information. New York: The Free Press, 4th Edition Bates M.

Smith, P.G (1984) The Design Of Case-Control Studies: The Influence Of Confounding AndInteraction Effects. International Journal Epidemiology, 13(2), 356-365

Manuel, S. & Oppenheim C. (2007). Models of Early Adoption of ICT Innovations in HigherEducation Ariadne Issue 50, January, Available at:http://www.ariadne.ac.uk/1ssue50/oppenheim-et-al