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ICT's, Service Delivery and Operational Performance in Nigerian Banks: a Survey of Empirical Research (Pp. 44-59)

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Abstract

Information and Communication Technologies (ICT) has become a major tool for gaining competitive advantage in the corporate world and as such it has become integrated into the operations of most high performing organizations. Hence, there has been increased interest to better understand the processes of how ICT diffusion is informing business practices and influencing performance in organizations. This paper examined these issues with specific focus on the Nigerian banking industry. The paper sought to answer the questions of how far are ICTs diffused in the Nigerian Banking sector, what kind of ICTs are adopted and what factors determine this, and in what ways has the adoption of ICTs influenced the operational modes and performance of the firms in the sector. The paper's methodology is an analytical assessment of about twenty empirical papers published on various aspects of diffusion and adoption of ICT in the Nigerian banking sector. The analysis showed that the Nigerian banking sector has almost entirely embraced the ICT ideology, banks have extensively applied ICT into their operations over the years and this recourse to ICT adoption has in some ways influenced the ways banks carry out their operations. The analysis also

revealed that the main factors driving the increased reliance on ICT conform to those in the global literature, and that increased adoption of ICT by banks has positive impacts on their operations and performance.

Keywords: Information and Communication Technology (ICT), Innovation, Diffusion, Adoption, Banking Sector, Empirical Research

Introduction

Information and Communication Technology (ICT) has now been accepted as one of the main driving force behind organizational competitiveness in the present day business environment. Presently, ICT is having dramatic influence on almost all areas of human activities and one of the areas of economic activities in which this influence is most manifest is the banking sector. The banking industry is one of the critical sectors of the economy which makes invaluable contributions to the pace of economic growth and development of nations.

There is no gainsaying the fact that globalization has brought about intense competition in the financial services industry and this necessitates that those firms in this industry operate at their best. To remain competitive, firms need to be flexible to be able to respond rapidly to the fast changing market environment to which they are exposed. Actually, banking environment worldwide has become transformed over the years and the banking public has become more sophisticated in their purchase decisions. To respond to increasingly sophisticated customer and market demand therefore, banks need to put in place operational processes that ensure greater customer convenience, better delivery of and increased accessibility to financial services and products.

In reality, the banking sector has traditionally been one of the main users of technological innovations. Grainger-Smith and Oppenheim (1994) aver that the banking sector is an old time beneficiary of the offerings of Information Technology (IT) and that IT has played key roles in the development of the banking industry based on the fact that the main function of banks can be viewed not really as that of money, but that of the capture, distribution, analysis and processing of financial information. They indicated that IT can enable banks to widen the range of services offered to their customer, transform their operating systems, increase the volume of their services, operate at a higher level of efficiency and realize economics of scale. In similar vein, Ehikhamenor (2003) noted the range of benefits that banks can derive from investing more in IT as time reduction, improved operations,

increased profitability, better management - customer relationship, streaming of operations, expansion of activities, improved service, minimization of exposure to risk in turbulent markets, among others.

Today's business environment is very dynamic and undergoes rapid changes due to technological innovation, increased awareness and increased demands from customers. The banking industry of the twentieth century operates in a complex and competitive environment characterized by these changing conditions and a highly volatile economic climate, and Information and Communication Technology (ICT) is at the centre of this global change curve (Agboola, 2006). Hence, the banks that will survive and compete effectively in today's business environment must necessarily integrate ICT into its operational processes.

Given this scenario, this paper attempts a synthesis of empirical facts on the extent to which Information and Communication Technology has informed innovations in the operational modalities and service delivery modes of banks in Nigeria and the impact of this on bank performance. The paper, an exploratory and confirmatory study, reviews twenty published empirical researches relating to the research objective within the context of the Nigerian banking sector. In carrying out the review, the paper essentially seeks to answer three inter - related questions viz:

- (i) to what extent has ICT diffused into the Nigerian banking industry and what factors determine the rate of diffusion,
- (ii) in what ways has the adoption of ICT informed the operations and service delivery modes of Nigerian banks, and
- (iii) what are the impacts of information and communication technologies on operational performance of Nigerian banks.

The Theoretical Background

Theories of Innovation and the Factors Affecting the Diffusion of Technologies

The diffusion and adoption of technological innovations has been explained within several theoretical frameworks. One popular theory is the Diffusion of Innovations (DoI) 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 and 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 trialability. 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, interconnectedness in social networks, cosmopolitan outlook, degree of social participation, tendency to seek information about innovation, and consequently a greater degree of knowledge about innovation) (Rogers, 1983; 1995; Fichman 1992; Bates, Manuel and Oppenheim, 2007; Olatokun and Igbiniedion, 2009).

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; Ankem,).

Kwon and Zmud (1987) define five contextual factors that may impact on any six identified stages of IT implementation namely; user community characteristic, organizational characteristics, technology characteristic, task characteristic and environmental factors. Robertson and Gatignon (1986) propose that a variety of competitive effects in the technology consumers industry (competitive intensity, demand uncertainty, professionalism and cosmopolitanism) and within the technology supplier's industry (level of competitiveness, reputation, Research and Development allocation, technology standardization) impact the rate and level of diffusion of high technology innovations.

Other models focused on the influence of culture in the diffusion and adoption process. Both personal and organisational processes influence a culture of innovation. These organisational processes include: management values, rewards, prohibitions, encouragement of new ideas, encouragement of risk-taking, services, support, communication channels and staff networks. An institution with these key components in place is better placed to ensure that innovations are facilitated, encouraged, accepted and diffused across its organisation. In this wise, the institutional environment shapes the development of the ICT initiative, its adoption and implementation. The success or failure of a new ICT innovation is thus influenced by culture (Denning, 2004; Bates, Manuel and Oppenheim, 2007).

Information and Communication Technologies and Their Use in Banks

Technology generally refers to the application of knowledge for the execution of a given task. It 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; Shokan 2005).

ICT products relevant to banks can be summarized into three groups viz (Agboola et al, 2002):

- (i) 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.
- (ii) 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
- (iii) 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.

History of the Banking Sector in Nigeria and Advent of ICT

Formal banking is a relatively old economic activity in Nigeria, dating back to before the emergence of the country itself as a distinct nation. While Nigeria emerged as a distinct country in 1914 with the merger of the Northern and Southern Protectorates with the Colony of Lagos, the first bank in the country was established in 1892. However, the industry at this time and for some time after was largely unregulated and thus a lot of instability and bank failures characterized the system. However, with political independence looming in the 1950s, the government took control of the regulation of the industry bringing stability back into the sector. This remained the situation until the late 1980s when the deregulation of the economy that accompanied the Structural Adjustment Programme the country embarked upon brought the sector back into public focus.

The Nigerian banking sector has since undergone considerable reforms over the last 25 years. The financial deregulation and economic liberalization policy of the 1980s changed the structure of the sector from an oligopolistic, financially repressive and highly regulated sector to one that is deregulated and highly competitive. In 1980, there were 20 commercial banks and 6 merchant banks in Nigeria with a network of 740 and 12 branches respectively. This rose to 30 commercial and 12 merchant banks in 1986 with 1,367 and 65 branches respectively, and in 1991 there were 65 commercial and 54 merchant banks with 2023 and 84 branches respectively. A depression in the financial system that took place in the mid 1990s reduced the number to 51 commercial and 38 merchant banks in 1999 (Tella, 2006).

Further reform of the system in the late 1990s saw the removal of the commercial/ merchant bank dichotomy in favour of the adoption of the term Universal bank. By the early 2000 therefore there were 89 Universal banks in Nigeria. Another reform of the sector in 2004 / 2005 brought the sector back under greater regulation principally in the form of a huge increase in the regulatory capital requirement from one billion Naira to twenty – five billion Naira. This led to a spate of merger and consolidation agreements among the

firms in the industry reducing the number of the Universal banks to 25. Another round of reform of the sector was commenced in 2010. This involved government bailout of 5 of the firms in the banking industry and restructuring of the top management of the affected banks. These were aimed at improving corporate governance and removing some structural deficiencies perceived to be inherent in the industry and which pose significant threat to the survival of many of the firms in the industry.

From inception up to the period of deregulation, the operation of the banks in Nigeria were characterized by paper oriented methods rather than technological based system with attendant slow down in pace of operation, employee productivity and general performance (Osabuohein, 2008). Hence, before the deregulation of the economy that took place in the 1980s, the use of ICT in the Nigerian banking system was limited. However, Idowu, Alu and Adagunodo (2002) averred that Nigerian banks have since realized that the way in which they can gain competitive advantage over their competitors is through the use of technology, and this has engendered a growing rate of technology adoption in the Nigerian banking operations (Salawu and Salawu, 2007).

Ehikhamenor (2003) noted that earlier desire for the use of ICT was characterized by long period of inertia largely attributable to the absence of an enabling policy and infrastructural environment. The decisive step in the incorporation of IT into banking operation in Nigeria actually started in 1999 being a consequence of stronger government commitment to the development of a national IT infrastructure. Banks not only became financiers of this initiative but also beneficiaries (Ehikhamenor, 2003). The formulation of a National Policy on Information Technology in 2001 created further awareness on the possibilities offered by IT and impacted positively on economic sectors with the banking sector as a pioneer.

Research Methodology

This research is largely confirmatory in nature. The descriptive design was adopted in carrying out the study. The researchers operating under the assumption that all good quality articles relating to the study will be available searched for such articles using various search words particularly: Information and Communication Technologies, Innovations, Technology diffusion and Adoption, e - banking, e - commerce, banking sector, banking service delivery, bank operations, bank performance, all within the context of

the qualifier “Nigeria”. Various combinations of this search words were also used.

The assumption that such publications will be found online is not unrealistic given the relative increase in access to the internet in Nigeria generally and among educational institutions (especially tertiary institutions) in particular in recent times. All articles obtained through this means were given preliminary review and those considered not to be directly related to the key focus of the research were eliminated. Also, articles whose authenticity could not be verified were similarly eliminated. Only articles that specifically focused on the Nigerian banking sector and that were empirical in nature were selected. Twenty empirical researches relating to the research objectives within the context of the Nigerian banking sector were eventually selected for review.

Findings and Discussion

i. Availability of ICT Policy:

Available studies suggest that ICT has become diffused into and become widely adopted in the Nigerian banking sector. Ehikhamenor surveyed 56 bank branches located in Lagos, the commercial nerve centre of Nigeria. He found that over 98% of the banks surveyed (representing about 60% of all banks in the country) had an IT policy in place with over 90% of them indicating an ultimate goal of full application of IT within the shortest time (69.3%) while others (22.7%) prefer to implement them in phased mode. Only 5.9% envisaged partial application preferring to focus on those applications they considered necessary and urgent. Nearly all the banks also have an IT department to administer their IT policy.

Agboola (2006) corroborated Ehikhamenor (2003) when he found that virtually all areas of banking operations in the country have some form of ICT applications. Agboola (2006) showed that the number of banks adopting various ICT products increased significantly across 3-year time period from 1990 – 2004 and that the number of banks adopting various ICT products increased over each period.

ii. ICT Products and Applications:

The most important ICT products identified as being adopted by the banks are Automated Teller Machines (ATMs), Electronic Fund Transfer (EFT), smart cards, telephone banking, computerized credit rating, point of sales system, electronic home and office banking and electronic data exchange (Agboola, 2006; Ehikhamenor, 2003). Ehikhamenor, (2003) found that the

most frequently reported applications were treasury operations (35.6%) human resources (35.2%), bank master (31.0%), reconciliation (29.9%), loan and deposit (25.5%), money market (24.8%), asset management (22.5%), fund transfer (22.1%), general ledger (20.3%), etc.

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%.

iii. Rate of ICT Diffusion / Adoption

The survey revealed that the rate of adoption has increased rapidly over the years in the Nigerian banking sector. From virtually non-existent in the early 1990s, ICTs had become common place by the 2000s among banks and bank customers. 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. Agboola (2001) 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) reveal 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 reveal 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 Igbiniedon (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.

iv. Factors Affecting ICT Adoption

The finding shows that in line with the literature, a variety of factors affect the adoption of ICT in the Nigerian banking sector. Olatokun and Igbinedon (2009) tested the diffusion of innovation theory in Nigeria using principal factor analysis and multiple regression analysis. With a sample of 14 banks (56% of all Universal banks) and 401 bank customers, they found that the constructs relative advantage, complexity, compatibility and triability were significant determinants of customers' attitude towards ATM and that attitude to ATM had significant effects on intention to use it.

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.

Chineke, Euwiekpaefe 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.

Osabuohen (2008) examined the capacity of ICT to enhance the operations of Nigerian banks in the context of on-going 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.

v. Impact of ICT on Banks’ Operations and Performance

The study reveals that ICT has impacted positively on service provision operations and operational performance of banks. Osabuohen (2008) using a regression technique found that ICT use positively impacted on speed of banking operations and efficiency of service delivery, workers productivity and banks’ profit level. ICT accounted for about 34.5%, 46.9% and 30.9% respectively in each of these factors.

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 Nigeria 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. He concluded 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 in 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.

Conclusion and Recommendations

Information and Communication Technology (ICT) is one of the main forces driving the present day business environment. Today, ICT is dramatically informing business practices as well as the outcome of business engagements. This influence is most manifest in the banking sector given the role that banks play in individual and national economic lives. Consequently, the issues of how and why ICT is transmitted and put to use in banks have attracted the attention of information and management researchers in recent times.

In line with this trend, this paper focused on the issue of diffusion and adoption of ICT in the Nigerian banking industry, how this is informing banking practices and outcomes. The paper assessed twenty published empirical papers on various aspects of diffusion and adoption of ICTs in the Nigerian banking sector with a view to identifying the consensus on the above issues.

The analysis showed that Nigerian banks have embraced the ICT ideology (essentially from the early 1990s) and have extensively applied ICT into their operations over the years. It further shows that most bank operations today are informed by the availability of ICTs and that increased adoption of ICT by banks has positive impacts on their operations and performance.

The uniqueness of this paper exists in two forms. Firstly, to the best of the researchers' knowledge, it is the first paper that attempts to synthesize and integrate the increasing empirical research output on the adoption of ICTs in the Nigerian banking environment. Most prior researches of this type, where available at all, had tended to be intuitive in nature relying on theoretical rather than empirical facts. Secondly, the study attempts to provide a broad outlook on the issue of ICT implementation in Nigerian banks from the perspective of the whole country. Most empirical work on the subject has tended to be limited in scope largely being restricted to a narrow locality because of the huge cost that would be involved in a nationwide survey given the large size of the country. This study thus a birds' eye view of the issues under study.

The major limitation of the study lies in the methodology. While a review of empirical studies provides insight into the issue under study, it is not a substitute for actual field study. However, given the high cost that a nationwide study will engender, this may be an issue for uptake by the government, banking firms and other similar corporate organizations with the financial capability required to successfully carry out such a study.

In line with the findings and towards further improving the state of the system, it is imperative that the banks raise the level of integration of ICT into their operation beyond the basic level of interaction. Efforts must be made to make such applications more interactive and transactional. This is possible given the improved state of ICT infrastructure that is now available in the country and higher clientele awareness about ICT. As Agboola (2006) puts it (increased) investment in ICT should form an important component of the overall strategy of banking operators to ensure effective performance.

In addition, as ICT applications become more universally available in the industry, they lose their appeal as a competition tool for attracting and retaining customers. This have the implication that those banks that will garner competitive advantage must take the additional step of further customizing their ICT applications not only to make them unique and more appealing to customers but also to make them more easily accessible and operationally more effective than those of competitors.

References

- Agboola A. A. (2001) Impact of electronic banking on customer services in Lagos, Nigeria, *Ife Journal of Economics and Finance*, Vol 5 (1 & 2)
- Agboola A. (2006) Information and communication technology (ICT) in banking operations in Nigeria: an evaluation of recent experiences, Retrieved from <http://unpan1.un.org/intradoc/groups/public/documents/AAPAM/UNPAN026533>. pdf, on Nov. 10, 2010.
- Aghaunor L. and Fotoh X. (2006) Factors affecting e-commerce adoption in Nigerian banks, Paper within *IT and Business Renewal*, Jonkoping International Business School.
- Bates M., Manuel S. and Oppenheim C. (2007) "Models of Early Adoption of ICT Innovations in Higher Education" *Ariadne Issue 50*, January, Available at: <http://www.ariadne.ac.uk/Issue50/oppenheim-et-al>
- Chiemeké S. C., Ewwiekpaefe A. E. and Chete F. O. (2006) The adoption of internet banking in Nigeria: an empirical investigation, *Journal of Internet Banking and Commerce*, Vol. 11(3), Dec.
- 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. (2003) Information technology in Nigerian banks: the limits of expectations, *Information Technology for Development*, Vol. 10, pp 13 – 24.
- Fichman R. G. (1992) Information technology diffusion: a review of empirical research,
- Grainger – Smith N. and Oppenheim C. (1994) The role of information systems and technology (IS/IT) in investment banks, *Journal of Information Science*, Vol. 20 (5) pp. 323 -333.
- Rogers E. M. (1995) *Diffusion of information*, New York, The Free Press, 4th Edition
- Rogers E. M. (1983) *Diffusion of information*, New York, The Free Press, 3th Edition
- Idowu P. A., Alu A. O. and Adagunodo E. R. (2002) The effect of Information on the growth of the banking industry in Nigeria, *The Electronic Journal on Information Systems in Developing Countries*, Vol. 10 (2) pp. 1 – 8, available on: <http://www-ejisd.org>
- Kwon T. H. and Zmud R. W. (1987) Unifying the fragmented models of information systems implementation, In Boland J. R. and Hirschheim (1987)

(eds.) *Critical Issues in Information Systems Research*, New York, John Wiley, pp 227 – 251

Madueme I. S. (2010) Evaluation of the impact of information communication technology on banking efficiency using the transcendental logarithmic production function and CAMEL rating, *International Journal of Engineering Science and Technology*, Vol 2(1) pp. 1 – 6.

Madueme I. S. (2010) Banking efficiency and Information Technology in Nigeria: an empirical investigation, *International Journal of Economic and Development Issues*, Vol. 8 (1 7 2) pp. 86 – 96.

Maiyaki A. U. and Mokhtar S. S. M (2010) Effects of electronic banking facilities, employment sector and age – group on customers choice of banks in Nigeria, *Journal of Internet Banking and Commerce*, Vol. 15(1), April.

Nigerian National Policy on Information Technology (2001)

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

Olatokun W. M. AND Igbiniedion L. J. (2009) The adoption of Automatic Teller Machines in Nigeria: an application of the theory of Diffusion of Innovation, *Issues in Informing Science and Information Technology*, Vol. 6, pp. 373 -393.

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

Salawu R. O. and Salawu M. K. (2007) The emergence of internet banking in Nigeria: an appraisal, *Information Technology Journal*, Vol. 6(4), pp 490 – 496.

Tella S. A. (2006) Financial sector reforms and management of financial institutions in Nigeria: challenges and prospects, In Somoye R. O.C. and Akinguola R.O. (eds) (2006) *Structural reforms and management of financial institutions in Nigeria*, Ago – Iwoye, Dept. of Banking and Finance, Olabisi Onabanjo University, Ago – Iwoye.