Impact of Technological Innovation on Delivery of Banking Services in Nigeria

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Abstract**—**The study was carried out in Lagos with the population of interest in this study which is made up of 1912 questionnaires were shared to customers out of which only 1634 questionnaire responded, also 1458 questionnaires were distributed to banks employees for second hypothesis test, only 1223 questionnaires were returned for analysis, the duration study is from 2008 to 2013. The data analysis involved frequency distribution, Data collected was analyzed using Pearson Correlation Statistics that were adopted in Statistical Package for Social Science (SPSS), the first analysis to find the relationship between technological innovations and Nigeria banks performance and there are relationship between adoption of ICT and customers satisfaction.

The first findings showed that positive relationship exists between technology innovation and banks employee's performance also second findings showed that introduction of ICT improves customer satisfaction and retention, these reveals that there is a significant relationship between technology innovations in service delivery.

Keywords**—**Information Technology, E-banking Service, Nigerian Commercial Banks, Technological Innovation.

I. Introduction

INNOVATIONSIN information processing, telecommunications, and related technologies known collectively as "Information and Communication Technology" are often credited with helping fuel strong growth in many economies (Owusu, 1997). It seems that, technological innovation affects not just banking and financial services, but also the direction of an economy and its capacity for continuous growth.

Banking industry has been chosen because of several reasons. Most importantly, the banking and financial industry is a competitive economic sector in Nigerian business environment. The sector is a major driver in Nigerian economy that contributed over 6.4% against a target of 10% of total gross domestic products (CBN. 2008).

The possession and the management of information is a key activity in banking. The influence of process re-engineering and innovations through IT is likely to be bigger in banking than in other industries (David-West, 2005).

Information technology (IT) is perceived as a necessity to pursue the rationalization and cost management due to intensified competition in the financial sector (DeBandt and Davis, 2000). Information technology has helped Nigerian banks to streamline the back office operations by improving both efficiency and cost reduction.

Technological developments, particularly in the area of telecommunication and information technology are impacting significantly on businesses. To make a prompt, reliable and detailed information empowers business to make the right decision at the right time. Increasing customer service delivery, market share, becoming the high quality or low cost producer, developing new products and increasing workers productivity depend more on the kind and quality of the development of IT are in organization. E-banking concept becomes popular when banking activities and information technology are merged. The banking transaction becomes easy after the introduction of computers in banking sector. The banks are enables to automate the accounting process and back office function like maintenance of deposits, calculation of interest and maintenance of general ledgers. The automation of front office function improves the customer service with reduction in processing time, hence improving the overall performance of Nigeria banks.

Many Nigerian Banks have over the years streamlined their organizations, tailored their products and services delivery and automated their operations to enhance their performances and capture the market. As the struggle to enhance performance by the deposit money banks, the focus is moving to the complete automation of all their operation and services. The system or industry is highly competitive and competition is expected to motivate new players of local and global scope enters the market. As the competitive terrain becomes more challenging, banks need to maintain their competitive edge, and to do this; they have to adopt new technology (Abdullahi, 2012).

This study investigates the impact of technological innovation on the performance of Nigerian banks based customers' satisfaction and banks employees' performance. The study covers a period of twelve (5) years (2008-2013).

The objectives of this study are as follows

i. To explore the impact of technological innovation adoption in Nigerian banking sector

ii. To determine the adoption of IT on the customer satisfaction.

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II. LITERATURE REVIEW

Innovation is described as any good, service or idea that is perceived by someone as new (Kotler, 2003). According to Rogers (1995), innovation takes time to spread through the social system and innovation diffusion process is a new idea's becoming widespread from its source of invention or creation to its ultimate users or adopters. Baker (2002) posits that the primary drivers of innovation include, financial pressures to decrease costs and increase efficiency, increased competition, shorter product life cycles, value migration, stricter regulations, industry and community needs for sustainable development, increased demand for accountability, community and social expectations and pressures, demographic, social and market changes, rising customer expectations regarding service and quality, greater availability of potentially useful new technologies coupled with the need to keep up or exceed the competition in applying these new technologies, and the changing economy.

An innovation is an idea, practice, or object that is perceived to be new by a person or adopting entity. When an innovation emerges, diffusion unfolds which entails communicating or spreading of the news of the innovation to the group for which it is intended (Rogers, 1995). Adoption however is the commitment to and continued use of the innovation. The diffusion of innovations theory provide explanations for when and how a new idea, practice

or newly introduced information and communication medium is adopted or rejected over time in a given society (Rogers, 1995).

The first stage of information technology in banks started with an attempt to automate the banking process through mechanization. It was by the use of note counters and accounting calculators to speed up basic transactions. Another stage of information technology was in the storage and retrieval of information. Then in the late 1950s and 1960s, business data processing was through punched card equipment. The 1970s saw the introduction of Information Technology Management System (MIS) and Decision Support System (DSS). The 1980s saw the fusion of telecommunications and networking technologies for business deployment. It also saw to the emergence of data processing, Office Information System (OIS) and personal computers (Ibikunle, F.& James,O. 2012).

Gilaninia et al (2011) in their work, the impact of information technology application on supply chain performance, found that information technology impacts supply chain strategy and information technology has more relationship with responsiveness of supply chain, meaning IT impacts supply chain performance in an organization. Melville et al (2004) in there study suggested that IT and the complementary resources of the firm affected the effectiveness of business processes with consequently improved organizational performance. Karimi et al (2010) in their study revealed that good IT planning and integration are more effective at improving customer service.

The use of information and communication technology in banking operations is called electronic banking. Ovia, (2001) argued that Electronic banking is a product of e-commerce in the field of banking and financial services. In what can be describe as Business-to-consumer (B2C) domain for balance enquiry, request for cheque books, recording stop payment instruction, balance transfer instruction, account opening and other forms of traditional banking services. Banks are also offering payment services on behalf of their customer who shop in different e-shops. The use of ICT has delivered a wide range of value added products and services to bank customers (Ojokuku and Sajuyigbe, 2012). The use of information technology in banking operations is called electronic banking. Josiah and Nancy, (2012) observed that there are positive impacts of e-banking on bank turnover and profitability and to a lesser extent on employment, most notably when e-commerce is part of larger business strategies of bank. The use of e-banking can contribute to improved bank performance, in terms of increased market share, expanded product range, customized products and better response to client demand.

Only banks that use their technology resources effectively have the opportunity to secure real competitive advantage in this fast changing industry through real product or service differentiation.

ICT 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.

(Amaoko, 2012) in his research on the impact of ICT on banking operations in Ghana, ICT has contributed positively to the provision of banking services and the growth of the Ghanaian banking industry. Internet banking and on-line banking is not yet developed in Ghana. The study recommended that banks should develop user friendly systems and applications for general population, Government and banks should play a key role in enhancing ICT infrastructure, put in place incentives like tax reduction, make PC available and affordable for regards to ICT through sensitization, workshops and support the skills development among bank personnel, there should be a central monitoring unit permanently manned by personnel downs, seizure of electronic cards etc. are handled with dispatch. Lastly the banking institutions should also come out with more electronic products and services to reduce the turnaround time of customers. Such products will give them the opportunity to sit at the comfort of their homes, workplaces and transact business with the banks.

Madueme, (2010) researched on evaluating banking productivity and ICT using Translog production function in Nigeria, the results showed that bank output such as loans and other assets increased significantly to charges in expenditure on Information communication technology. ICT labor expenses impacted more on bank output more than capital expenditure on ICT gadgets. The study recommended on the need to increase investments in information technology in order to increase productivity of banks.

Irechukwu (2000) itemized some bank services that have been revolutionized through the use of ICT as including account opening, customer account mandate, and transaction processing and recording. Information and Communication Technology has provided self-service facilities (automated customer service machines) from where prospective customers can complete their account opening documents direct online. It assists customers to validate their account numbers and receive instruction on when and how to receive their cheque books, credit and debit cards. ICT products in use in the banking industry include Automated Teller Machine, Smart Cards, Telephone Banking, Electronic Funds Transfer, Electronic Data Interchange, Electronic Home and Office Banking.

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).

III. Methodology

Data and methodology of the studyFifteen Nigerian major banks were selected for the study.1634 questionnaire were tabulated for customers' and 1224 questionnaires were tabulated for banks employees.They are: Guaranty Trust Bank PLC, First Bank Nigeria PLC, Zenith Bank PLC, United Bank for Africa PLC, Skye Bank PLC, Stanbic-IBTC Bank PLC, Sterling Bank PLC, Fidelity Bank PLC, Eco Bank PLC, Diamond Bank PLC, First City Monument Bank PLC, Citi Bank PLc, Access Bank of Nigeria PLC, Equitorial Trust Bank PLC and Standard Chartered Bank PLC. All of them have their headquarters in Lagos, the economic capital of Nigeria. Samplings were collected from the major branches of these banks in Lagos, Abuja, Kano and Port-Harcourt. Customers' of these banks were use as respondent and were randomly selected and they have equal numbers to make the sampling representative.

IV. Sampling Procedure & Analytical Technique

Primary data were collected through administration of questionnaires following random sampling procedure. Questionnaires were administered using trained research assistants. The data analysis involved frequencydistribution estimation. The first analysis sought to establish the relationship between technological innovations and Nigeria banks performance. Also, we tested the relationship between adoption of ICT and customers satisfaction. In testing the hypotheses, Pearson Correlation Statistics were adopted using statistical package for social sciences (SPSS).

The correlation coefficient expresses the strength of the relationship on a scale, ranging from –1 to +1. A positive value close to + 1 indicates a strong positive relationship, in which an increase in one variable implies an increase in the value of the second variables; while a strong negative relationship close to-1 indicates that an increase in one variable leads to a decrease in the other. The extent of correlation is considered at 0.01 levels of significance. The null hypotheses were tested at 5% level of significance in all cases. The heuristic evaluation method adopted, ensures validity of the instrument, thus responses were obtained.

V. Result and Discussions

All the Respondents across thebanks selected for the study that adopted and utilized information and communication technologywere 3135 questionnaires for both customers' and bank employees' test. 1912 questionnaires were distributed to customers to test the first hypothesis out of which 1634 were collected which is 85% of the distributed questionnaires, 1458 questionnaires were distributed to selected banks employees to test the second hypothesis, 1223 questionnaires were collected which is 84% of the distributed questionnaires. Pearson correlation co-efficient was used to analyse the two hypotheses.

Out of the total respondents, 58% were female, and 42% were male. Also, 12% of the respondents were first degree holder and above, 18% of the respondents possess OND and NCE, while the remaining 70% were school certificate holder and below. Also, more than 59% of the respondents are between the age of 40years and above and 41% were below the age of 40 years. 64% of the respondents were married while the rest were single. Large percentages of the latter were students of Nigerian tertiary institutions. And about 80% of the respondents have spent more than four years with their banks as customer.

(Yunus and Waidi, 2011).

Hypothesis One:

There is no significant relationship between the use of the ICT and customers satisfaction.

TABLE IA
INTRODUCTION OF ICT IMPROVES CUSTOMER'S SATISFACTION AND RETENTION

Response	Number of Respondents	Percentage
Strongly Agree	708	43
Agree	926	57
Undecided	-	-
Disagreed	-	-
Strongly Disagreed	-	-
Total	1634	100

Source: Field survey

TABLE 1B
CORRELATION'S BETWEEN ICT AND CUSTOMER SATISFACTION

		ICT	Customers' Satisfaction
ICT	Pearson Correlation Sig. (2 – tailed) N	1.00 - 1634	.786** - 1634
Customers' Satisfaction	Pearson Correlation Sig. (2- tailed) N	.786** .000 1634	1.000 - 1634

**correlation is significant at the level 0.01 level (2-tailed)

As shown in table 1a above, introduction of ICT improves customer satisfaction and retention.

From the table above, it is clear that there is an association between the use of ICT and customers satisfaction. Banks investments on ATM money dispenser, telephone banking, internet banking, personal computer banking, branch networking and electronic bank transfer, have improved customers satisfaction. The banks acquire more customers through the use of ICT. The Pearson's correlation coefficient is 0.786 or 78.6%, therefore null hypothesis is rejected and alternative hypothesis is accepted. The study concludes that there is a significant relationship between the use of the ICT and customer's satisfaction.

Figure 2 shows the Business Day Research and Marketing Services RMS (2010) which rated four banks as best deposit money banks (DMB). A survey conducted to show these banks satisfaction of their customers in relation to their performance revealed that most of their customers were satisfied with their performance in terms of their service delivery. The perception survey was based on the bank's strong capital base, excellent customer service and branch network. The first post bank's stress test saw First Bank, GT Bank, Zenith and UBA scoring 28 percent, 15 percent, 11 percent and 10 percent respectively to take the top four positions in that order.

Survey conducted by Business Day Research and Marketing Services between September and October, 2010, in the four major Nigerian cities of Lagos, Kano Abuja and Port-Harcourt, also showed that majority of Nigerians approved the Central Bank of Nigeria's (CBN'S) intervention, and said that it has to a large extent prevented systemic collapse, helped to retain affected bank's customers confidence and protect the banking industry.

The results indicate that internet and telephone banking have impact on banks customer satisfaction. Laudon and Laudon (2001 & 2010) confirmed that the world largest and most widely used network is the Internet. Internet offers an excellent environment for banks to experiment with the delivery of home banking (Bill, 1996). Internet banking link banks with customers and provide secure technology for safety of account data transferred.

Hypothesis Two:
There is no significant relationship between technology innovation and Nigeria banks employee's performance.

TABLE 2A
THE USE OF NEW TECHNOLOGY HAS INCREASED THE PERFORMANCE OF BANKS EMPLOYEES WHICH IN TURN LEADS TO MORE RETURN ON INVESTMENTS

Response	Number of Respondents	Percentage
Strongly Agree	552	45
Agree	502	41
Undecided	169	14
Disagreed	-	-
Strongly Disagreed	-	-
Total	1223	100

Source: Field survey, 2010

TABLE 2B
CORRELATION'S BETWEEN TECHNOLOGY INNOVATION AND NIGERIA BANKS EMPLOYEE'S PERFORMANCE

		Technology	Banks Performance
Technology Innovation	Pearson Correlation Sig. (2-tailed) N	1.00 - 1223	.713** .000 1223
Banks Employees' Performance	Pearson Correlation Sig. (2-tailed) N	.713** .000 1223	1.000 - 1223

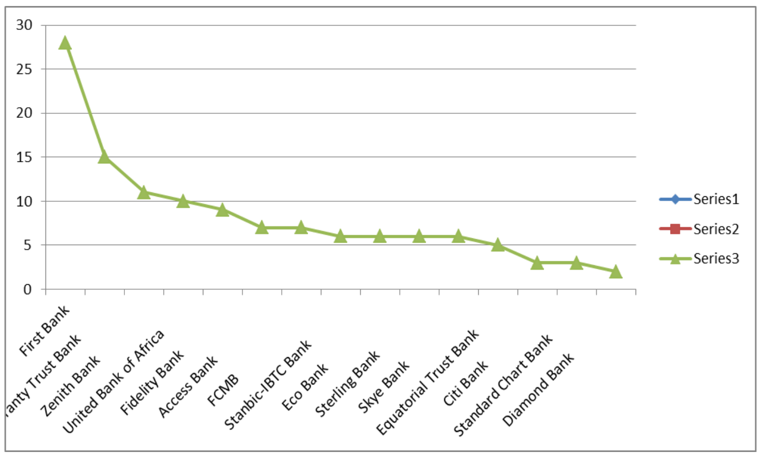
**Correlation is significant at the level 0.01 level (2-tailed)

From tables 1b, there is evidence that a significant and positive relationship exist between technology innovation and banks employee's performance. Investments on technology offers several retail banking services to customers, saves customer's time and improves banks service delivery which leads to high profitability and efficient performance. The Pearson's coefficient is 0.713 or 71.3%, therefore the null hypothesis is rejected. The study shows that there is significant relationship between technology innovation and Nigeria banks employees' performance. This is because most of the banks surveyed have ATM money dispenser, telephone banking, internet banking, personal computer banking, branch networking and electronic bank transfer have facilitated improved service delivery by employees, promotes customers retention and customers satisfaction and leads to high returns on investment. It is easier for employees to perform all these functions as a result of impact of technological innovation on them. Employees are the life wire of these banks. Employee is the most potent and central, contributing significantly to corporate bottom line and competitiveness (Inyang, 2010). The banks therefore gains sustained competitive advantage through people, the banks workforce. According to Porter (1985), the unique talents among employees, including flexibility, innovation, superior performance, high productivity and personal customer service are ways employees provide a critical ingredient in developing a firm's competitive position(Yunus&Waidi, 2011).

VI. Limitations

Despite the contributions of ICT to banking operations in Nigeria, ICT has not been fully explored in all dimensions. Most banks still operate liquid cash, because credit card has not been fully programmed by Nigeria banks. Also many banks have not fully integrated some aspect of their operations to their ICT network. For example loan facility, human resources and marketing. It is not yet clear whether all banks in Nigeria have sufficiently benefited from their investment in ICT.

Many banks in Nigeria still face the problems of poor performance. Loans are giving to customer without following the normal procedure and this result to non performing portfolio as experienced by many Nigeria banks. Figure 2 in appendix shows Nigeria banks with non performing portfolio in billions of Naira, despite the fact that most of them have invested heavily in ICT. The application of ICT required high degree of knowledge, expertise and skills by all categories of employees. Training of employees takes huge amount of money and time to implement, and most employees have not really mastered all aspect of ICT necessary for their effective performance.



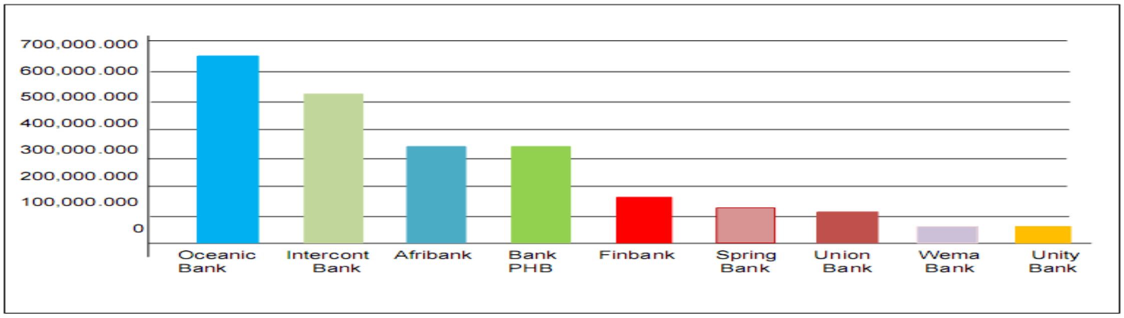
Source: Business Day (2010)

Fig. 1 Nigerians' perception of banks' performance

Errors are committed by employees with serious financial implications on the banks. ICT could also be manipulated to commit fraud. Fraudulent practices such as money laundering, illegal withdrawal, and all other forms of manipulation could take place. ICT is capital intensive and depend on constant power supply which is epileptic in Nigeria. Large amount of money is presently being spent by most banks on power supply and electricity generation. ICT has also lead to reduction in the number of employees as most bank transactions have been taken over by the computer.

ICT improved most banks performance in Nigeria in terms of improved customers, satisfaction, networking, service delivery and profitability. But nine of the major banks are not performing based on the Central Bank of Nigeria (CBN) assessments of the portfolio and capital base. The central banks have to inject billion dollars to save them from total collapse. Executives of these banks engage in reckless spending of customer's savings by given loans to their cronies and other business and political elites without collaterals and through other shady methods. Many microfinance banks were also closed down by the CBN for the same reasons (Yunus & Waidi, 2011).

Figure 2 shows the amount that the CBN injected in these failed banks to save them from total collapse. This shows that behind their improved performance and customers satisfaction through ICT are the unethical practices and corruption that have created more problems for the customers and undermine the successes achieved through technology innovation.



(Yunus&Waidi,2011).

Fig. 2 Non performing portfolio of the nine rescued banks in billions of Naira

VII. Recommendations

The Nigerian bank management should improve upon their IT flexibility, by regularly training and retraining their IT personnel with the aim of being responsive to customers. Banks Chief Executives should invest more onhuman resource management in practical terms for better banks innovative products for money deposit banks.Foreign and local expert on latest banking technology products should be employed in helping to reposition the bank in a better position for global relevant and competition. Constant training and retraining both home and abroad are necessary for sustainable relevant in global banking industry. There should be reward for workers that have distinguished themselves as a means to motivate, increase their efficiency, and make them more effective in other to bring out more innovation.

VIII. Summary

Technological developments particularly in the area of information and communication technology are revolutionalizing the way business is done in Nigeria. This has resulted to changes in trade, interconnection and business transaction in the national and international market places and set in motion a revolution in the banking sector. Banks are now required to invest in ICT for the provision of a transaction and payment systems that is compatible with the demands of the electronically interconnected global market place. The adoption of various forms of innovation has greatly influenced the content and quality of banking operations. The findings reveal that technology innovation has influenced Nigerian banking industry performance. The introduction of ICT has influenced customer satisfactions. ICT has increased banks return on equity and profitability. It is therefore recommended that investment in ICT should form an important component in the overall strategy of banking operation. It is imperative for bank management to intensify investment in ICT products to facilitate speed, convenience, and accurate services. 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 globalised economy.

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