

## Impact of Information and Communication Technology on the Performance of Deposit Money Banks in Nigeria

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### Abstract

*This study was carried out with the purpose of determining if the use of information and communication technology such as ATM, POS, MM, WP and IBT in the Nigerian banking system has had a significant impact on the performance of deposit money banks in Nigeria and to analyze whether ICT usage can sustain performance of deposit money banks in the long run. Return on equity is good proxy for measuring bank performance. The ordinary least square (OLS) multiple regression model was used to estimate the variables, the scatter diagram was plotted to determine whether the structural model is linear or non-linear. The log-linear regression model was used to test the impact of various forms of information and communication technology on the banks return on equity (ROE), the computation of the result was done using the econometric computer software package, e-view version 7.0. The result shows that the adoption of various forms of information and communication technology has greatly influenced the quality of banking operations, performance and has specifically increased banks return on equity and information and communication technology usage can sustain returns on equity of deposit money banks in the long run. The study recommends that investment in information and communication technology should form an important component in the overall strategy of banking operation, as these will make Nigerian banks to be efficient, profitable, and competitive, the banks should therefore give emphasis to efficient utilization of the information and communication technology enabled services, and should also partner with the government to make internet connectivity cheap and accessible.*

**Keywords:** Automated Teller Machine, Point of sale, Mobile money, web payment, Interbank transfer, information and Communication technology, Bank return on equity

### INTRODUCTION

The quest for survival, global relevance, maintenance of existing market share and sustainable development has made exploitation of the many advantages of ICT through the use of automated devices imperative in the industry (Alawode & Kaka, 2008). Before the coming of information technology, the transaction of businesses especially in the financial sector was difficult and stressful; hence, the low performance level of banks in Nigeria. Technology has indeed influenced the performance of all Nigerian Banks in the last decade. This period has been associated with the provision of dynamic customer focused banking services, improved regulation and high profitability. This development is underscored by contemporary advancements engineered by the knowledge economy. It is also important to state that modern banking in Nigeria is driven by the outputs from robust local and global research and development.

It is in an effort to establish the prevailing trend in the adoption of ICTs in the operations of Nigerian commercial banks that the researcher has chosen this topic for a critical study with a view to establishing the link between the adoption of selected ICT tools

and their impact on the performance of commercial banks in Nigeria. This work intends to know if the uses of ATM, POS, MM, WP and IBT in financial institutions have long run equilibrium and lead to a significant impact on ROE of commercial banks in Nigeria.

The main objective of this research is to evaluate the impact of Information and Communication Technology on the performance of commercial banks in Nigeria. The study contributes to the literature on the use of technology in Nigerian banks, as the study uses an empirical study of the trend across banks. The study also contributes to the knowledge of customers who use ICT tools for their operation. It informs the customers of the most effective and efficient technology in the banks that may be attractive to them. The study makes available to the Government and policy makers alike empirical facts and figures crucial for identifying the best ICT tools that can be promoted so as to enhance the return on shareholders' investment in Nigerian banks. The scope of this research specifically, covers quarterly periods of 2006-2015,

### **Concept of Commercial Banks**

In a bid to conceptualize the commercial banks, the concept of the banking industry in general has to be taken into consideration. The financial institution in Nigeria is categorized into two namely, the depository bank and non-depository banks. The commercial bank basically falls under the depository banks or the deposit money banks, though its performance various functions as the opening of account where depositors (surplus unit) make payment into their account for safe keeping and this deposit is given out as loans to interested customers (deficit unit) who seek for such loans for investment purposes. A financial institution licensed by the regulatory authority to mobilize deposits from the surplus unit and channel the funds through loans to the deficit unit and performs other financial services activities. According to Investopedia (2017) commercial bank is a financial institution that provides various financial service, such as accepting deposits and issuing loans. Commercial bank customers can take advantage of a range of investment products that commercial banks offer like savings accounts and certificates of deposit. The loans a commercial bank issues can vary from business loans and auto loans to mortgages.

Jhingan (2006) and Sayers (1967) further reiterates that commercial banking business in an economy consisting of changing cash for bank deposit and bank deposit for cash transferring same from one person or corporation to another, giving bank deposit in exchange for bill of exchange, government bonds, the secured or unsecured promise of business to repay. This concept of banking portrays the underlying fact that bank as an organization principally is concerned with the accumulation of temporarily idle money of the general public purposely for advancing same to others for expenditure.

The study captures basically the deposit aspect of the commercial banks and interbank transaction with the aid of the ICT tools.

### **Concept of Information and Communication Technology**

Information and communication technology simply refers to as the gathering, storing, manipulating and transferring information. It is the automation of the process, controls and information production using computers, telecommunication, software and ancillary equipment such as Automated Teller Machine and Debit Cards. It is a term that generally covers the harnessing of electronic technology for the information needs of a business at all levels. Laudon D. and Laudon J. (2001), assert that Information and Communication Technology deals with the physical devices and software that link various computer

hardware components and transfer data from one physical location to another. Harold and Jeff (1995), contend that financial service providers should modify their traditional operating practices to remain viable in the 1990s and decades that follow. They claimed that most significant shortcomings in the banking industry today is a wide spread failure on the part of senior management in banks to grasp the improvement of technology and incorporate it into their strategic plans

## **THEORETICAL FRAMEWORK**

### **Contingency Theory**

Contingency theory suggests that an information system should be designed in a flexible manner so as to consider the environment and organizational structure confronting an organization. Information systems also need to be adapting to the specific decisions being considered. In other words, information systems need to be designed within an adaptive framework. Review of accounting information system literature also indicates that most AIS studies have incorporated contingency factors such as organizational structure, business strategy, and environmental condition in their research model but have neglected the influence of IT on AIS design. Furthermore, the few studies that have examined the relationship between AIS design and IT have defined IT from a narrow perspective (Ismail, 2004). Similar to IT researches, these studies viewed IT from the technological perspective only but failed to incorporate other perspectives of IT sophistication such as informational, functional and managerial. Hunton and Flowers (1997) suggested that a more comprehensive AIS study is needed to explain the relationship between IT and accounting and its subsequent impact on the organization in general and accounting/accountants in particular. Furthermore, most of previous IT/AIS studies were conducted in developed countries (Ismail and King, 2005). Very few of such studies have been carried out in developing countries especially in the Middle East. Due to the continuous flow of considerable amount of empirical studies which investigate the contingency factors and accounting and/or IS and indicates the importance and vitality of this theory, this study is theoretically and empirically constituted upon contingency theory which has long been applied in both accounting and information system disciplines. The contingency theory suggests that an organization's structure is based on contextual factors such as environmental conditions, business strategy, organizational structure, production technology, and management style (Ismail and King, 2005).

## **EMPIRICAL LITERATURE**

Agboola et al (2002) discussed the dimensions in which automation in the banking industry manifest in Nigeria. They include: Bankers Automated Clearing Services: Automated Payment Systems, Automated Delivery Channels. Ovia (2001), concluded 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.

Ovia (2005) opined that the revolution in ICT has made the banking sector to change from the traditional mode of operations to presumably better ways with technological innovation that improves efficiency. According to (Agboola, 2006), he showed that a positive correlation exists between ICT and banks profitability in Nigeria. (Woherem 2000) claimed that only banks that overhaul the whole of their payment and delivery systems and apply ICT to their operations are likely to survive and prosper in the new millennium. (Brucher, Scherngell et al. 2003) opined that ICT adoption will improve three critical domains of banking operations which are efficiency, quality, and transparency.

Furthermore, Matthew and Ibikunle (2012), in their work, "The impact of ICTs on banks: A Case study of the Nigerian Banking Industry", collected data via questionnaires from customers in the selected banks. Guaranty Trust Bank plc, First Bank of Nigeria plc, Zenith Bank international and United Bank for Africa (UBA). 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. The results of the research indicated that investment in the ICT system and infrastructures has become a key element in productivity and growth in the banking industry (Weil, 2003) (Boot and Schmeits, 2005). Return on assets (ROA) is a comprehensive measure of overall bank performance from an accounting perspective. Sinkey Jr (1992) It is a primary indicator of managerial efficiency. It indicates how capable the management of the bank has been converting the bank's assets into net earnings. ROE measures accounting profitability from the shareholder's perspective. It approximates the net benefit that the stockholders have received from investing their capital (Rose & Hudgins, 2006). The traditional structural approach usually to bank performance measurement relies on the economics of cost minimization or profit maximization, where the performance equation denotes a cost function or a profit function. Hughes, et al. (1996, 1999, 2000) adapt Almost the Ideal Demand System to derive a utility-maximizing profit equation and its associated input demand equations.

The non-structural approach to bank performance measurement usually focuses on achieved performance and measures performance in the equation by a variety of financial ratios, e.g., return-on-asset, return on- equity, or the ratio of fixed costs to total costs. According to (Armstrong 2009) Performance Management is seen as a systematic process for improving organisational performance by developing the performance of individuals and teams. Armstrong (2009), also defines performance appraisal as the formal assessment and rating of individuals by their managers at or after a review meeting.

### **IMPACT OF INFORMATION TECHNOLOGY IN NIGERIA BANKS**

Information technology has become a key element in economic development of Nigeria and indeed the banking industry in general. Developing countries are increasingly being faced with the challenges of technological advancement and the constant proliferation of technologies. As part of the developmental process IT driven businesses, globally are growing in leaps and bounds for example the e-business, e-commerce, e-finance, e-banking etc. Information and Communication Technology have contributed to the distribution channels and networking of Nigerian Banks. The electronic delivery channels are collectively referred to as Electronic banking. E-banking is really not one technology but an attempt to merge several different technologies.

According to Laudon & Laudon ( 2001) ICTs can be described as a complex varied set of goods, applications and services used for producing, distributing, processing, transforming information (including) telecoms, TV and Radio broadcasting, hardware and software, computer services and electronic media.

Information Technology affects financial institutions by easing enquiry, saving time and improving service delivery. In recent decades, investment in IT by commercial banks has served to streamline operations, improve competitiveness and increase the variety and quality of services provided. According to Yasuharu (2003) implementation of information technology and communication network has brought revolution in the functioning of the banks and the financial institutions

Many commercial banks are making huge investments in technology to maintain and upgrade their infrastructure, in order not only to provide new electronic information-based service, but also to take timely advantage of new off-the-shelf electronic

services such as online retail banking which is making it possible for very small institutions to take advantage of new technologies at quite reasonable costs. These developments may ultimately change the competitive landscape in the financial services market.

Information and Communication Technology (ICT) facilitate the networking of commercial bank branches and to other banks within and outside the nation. Computerization and inter-connection of geographically scattered stand-alone bank branches and other banks at national and global levels into one unified system in the form of a wide area network (WAN) or enterprise network (EN); for the creating and sharing of consolidated customer information or records. It offers a quicker rate of inter-branch transactions as the consequence of distance and time are eliminated. Hence, there is more productivity per time period. Also, with the several networked branches serving the customer populace as one system, there is a simulated division of labour among bank branches with its associated positive impact on productivity among the branches. Furthermore, the information sharing infrastructure put in place by the banks curtails customers travel distance to bank branches thereby providing more time for customers' productive activities.

Technological innovation such as the use of computer automation and electronic banking influences speed of banking service delivery enhances management decision making and saves time (Alu 2002). Information and communication technology has provided self-service facilities (automated customer service machines) from where prospective bank customers can complete their account opening documents directly online.

It assists the customer to validate their account numbers and receive instruction on when and how to receive their cheque books, credit and debit cards (Agboola, 2001).

The Global System Mobile (GSM), The mobile banking service basically allows customers to operate their accounts online. It offers retail banking services to customers at their offices/homes as an alternative to going to the bank branch/ATM. This saves customers time, and gives more convenience for higher productivity.

The Automated Teller Machine (ATM) is a combination of a computer terminals, record keeping system and cash vault in one unit, permitting customers to enter the bank's book keeping system with a plastic card containing a Personal Identification

Number (PIN). The ATM work for 24 hrs. The bank monitors and loads cash when it is out of cash. Apart from serving cash withdrawal purposes, the same ATM can also accept deposits. ATMs are a cost-efficient way of yielding higher productivity as they achieve higher productivity per period of time than human Tellers; it saves customer's time in terms of service delivery as an alternative to queuing in bank halls.

Electronic Funds Transfer is an on-line system that allows customers to transfer funds instantaneously from their bank accounts to merchant accounts when making purchases (at purchase point). A POS uses a debit card to activate an Electronic Fund transfer process (Chorafas, 1988). Increased banking productivity results from the use of EFT PoS to service customers shopping payment requirements instead of clerical duties in handling cheques and cash withdrawals during banking hours, hence continual productivity and accrual to the bank even after banking hours. It saves customers invaluable time and energy in getting to bank branches or ATMs for cash withdrawals and this can be harnessed into other productive activities. Information technology has afforded customers and service providers the opportunity of paying bills and performing transactions of any kind electronically. Electronic payment can be credited and debited the same day customers can also make payments for goods and services without necessarily having physical contact with the cash. The Banks can send customer's statement of account, enquiries, promos, the request of any kind is carried out via the electronic mailing facility.

### **III. RESEARCH METHODOLOGY**

Data used for this study were collected basically from secondary sources such as Nigeria Bureau of statistics CBN annual report and Statistical Bulletin, for the quarters of 2006 – 2015. In this study, data on ATM, POS, MM, WP and IBT were used to examine the impact of ICT on the commercial bank performance, measured by ROE.

#### **Data and Model Specification**

For the purpose of this research, the researcher uses ordinary least square (OLS) multiple regression model to estimate the variables. This involves estimation of the model in order to examine the impact of ICT (proxies by ATM, POS, MM, WP, and IBT usages) on ROE in Nigeria. According to (Rose & Hudgins 2006) found ROE as a better proxy for measuring bank performance.

The log-linear regression model was used to test the impact of ATM, POS, MM, WP and IBT were used to

examine the effect of ICT on the commercial bank performance, ROE. The conversion of parameters into logarithm aims at achieving unique parameter estimates that would enable us to interpret the regression coefficients in terms of elasticity and consequently give a slightly better fit. To capture both the long-run and the short-run dynamics of ATM, POS, MM, WP and IBT on ROE, an error correction model (ECM) using the (Johansen & Juselius 1990) multivariate co-integration techniques were also employed. The computation of the result was done using the econometric computer software package, E-views version 8.0.

The research design adopted for this work is the experimental research design. The reason is that experimental research design combines the theoretical consideration with empirical observation. Return on equity (ROE) is the dependent Variable. This study used return on equity as a proxy on bank performance. This is because; Rose & Hudgins (2006) found ROE as a better proxy for measuring bank performance. Independent Variables includes Automated Teller Machine (ATM), Point of sale (POS), Mobile money (MM) Web payment (WP) and Interbank transfer

**The Structural Regression Model**

This section is preoccupied with the formulation of an appropriate model, which theoretically establishes the relationships between our ICT variables and commercial bank performance. For this purpose, the equation below have been formulated and simultaneously analyzed:

$$ROE = f(ATM, POS, MM, WP, IBT) \text{-----}$$

$$ROE_t = \beta_0 + \beta_1 ATM_t + \beta_2 POS_t + \beta_3 MM_t + \beta_4 WP_t + \beta_5 IBT_t + \varepsilon_t \text{-----(2)}$$

$\beta_1, \beta_2, \beta_3, \beta_4$  and  $\beta_5$  are slopes of  $ATM_t, POS_t, MM_t, WP_t, IBT_t$  respectively

The coefficients  $\beta_1, \beta_2, \beta_3, \beta_4$  and  $\beta_5$  can be directly estimated by applying log-linear regression techniques via logarithmic transformation; and those coefficients will be the elasticities. Logarithmic transformations are a convenient means of transforming a highly skewed variable into one that is

more approximately normal. (In fact, there is a distribution called the *log-normal* distribution defined as a distribution whose logarithm is normally distributed – but whose untransformed scale is skewed.). The reason for applying Log in the study is due to the different distribution of data used for the analysis. Some are thousand while some are in million. Therefore, taking their log to remove the skewness. Taking natural logs of both sides of the equation, we have:

$$\text{Log } ROE_t = \beta_0 + \beta_1 \text{Log } ATM_t + \beta_2 \text{Log } POS_t + \beta_3 \text{Log } MM_t + \beta_4 \text{Log } WP_t + \beta_5 \text{Log } IBT_t + u_t \text{-----} \text{---(3)}$$

However If the variables under consideration are cointegrated, there will need to estimate an error-correction model. co-integration provides the theoretical underpinning for the error-correction model.

**Expected Results**

On apriori basis  $\beta_0 > 0$   
 $\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0$  and  $\beta_5 > 0$

In other words it implies a significance relationship between the dependent variables  $ATM_t, POS_t, MM_t, WP_t, IBT_t$  and the independent variable ROE.

**Hypothesis One**

- H0: The use of ATM, POS, MM, WP and IBT in financial institutions has no significant impact on the ROE of commercial bank.
- H1: The use of ATM, POS, MM, WP and IBT in financial institutions has significant impact on the ROE of commercial banks.

**Hypothesis Two**

- H0: There is no long term equilibrium relationship between the ICT variables and Commercial banks performance in Nigeria.
- H1: There is long term equilibrium relationship between the ICT variables and commercial bank performance in Nigeria.

**Table 1: Descriptive Statistics**

	ROE	ATM	POS	MM	WP	IBT
Mean	3430101.	34786452	299794.3	436133.3	346138.8	55111.58
Median	1098196.	20589334	245891.0	362059.5	342453.5	24916.00
Maximum	17522858	1.02E+08	1183394.	1311382.	723755.0	149945.0
Minimum	47198.40	1633957.	5138.000	10844.00	49219.00	13387.00
Std. Dev.	5341535.	37000918	261088.0	425993.4	202559.6	51426.08
Skewness	1.849943	0.809455	1.608112	0.724448	0.122442	0.983113
Kurtosis	4.996807	1.914819	6.006682	2.191520	2.207571	2.088722

Jarque-Bera	20.62245	4.431565	22.61494	3.211759	0.802563	5.479213
Probability	<b>0.000033</b>	<b>0.009068</b>	<b>0.000012</b>	<b>0.000713</b>	<b>0.009461</b>	<b>0.004596</b>
Sum	96042837	9.74E+08	8394239.	12211733	9691887.	1543124.
Sum Sq. Dev.	7.70E+14	3.70E+16	1.84E+12	4.90E+12	1.11E+12	7.14E+10
Observations	28	28	28	28	28	28

Source: Authors Computation, 2017 (Eview-8.0)

**Table 2: Results of Johansen Multivariate Cointegration Test**

Sample (adjusted): 2006Q3 2015Q4  
 Included observations: 26 after adjustments  
 Trend assumption: Linear deterministic trend  
 Series: ROE ATM POS MM WP IBT  
 Lags interval (in first differences): 1 to 1  
 Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.950652	183.0866	95.75366	0.0000
At most 1 *	0.887984	104.8564	69.81889	0.0000
At most 2 *	0.675722	47.93943	47.85613	0.0491
At most 3	0.322398	18.65942	29.79707	0.5176
At most 4	0.243068	8.540360	15.49471	0.4096
At most 5	0.048765	1.299835	3.841466	0.2542

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level  
 \* denotes rejection of the hypothesis at the 0.05 level  
 \*\*MacKinnon-Haug-Michelis (1999) p-values  
 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.950652	78.23023	40.07757	0.0000
At most 1 *	0.887984	56.91699	33.87687	0.0000
At most 2 *	0.675722	29.28001	27.58434	0.0300
At most 3	0.322398	10.11906	21.13162	0.7334
At most 4	0.243068	7.240525	14.26460	0.4611
At most 5	0.048765	1.299835	3.841466	0.2542

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level  
 \* denotes rejection of the hypothesis at the 0.05 level  
 \*\*MacKinnon-Haug-Michelis (1999) p-values

Source: Authors Computation, 2017 (Eview-8.0)

**Table 3: Parsimonious Error-Correction Model of ROE**

Dependent Variable: Δ(ROE)  
 Method: Least Squares

Sample (adjusted): 2006Q2 2013Q4  
 Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2510728.	1240828.	-2.023430	0.0566
Δ(ATM)	-0.035721	0.058906	-0.606407	0.5511
Δ(POS)	3.381674	3.185298	2.061651	0.0010
Δ(MM)	-0.998417	1.479576	-0.674799	0.5075

$\Delta(\text{WP})$	-3.380950	3.882570	-2.870802	0.0642
$\Delta(\text{IBT})$	98.86152	35.34348	2.797164	0.0111
ECM(-1)	-0.797127	0.203382	3.919350	0.0008
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R-squared	0.903172	Mean dependent var	3555394.	
Adjusted R-squared	0.874124	S.D. dependent var	5401196.	
S.E. of regression	1916294.	Akaike info criterion	31.98810	
Sum squared resid	7.34E+13	Schwarz criterion	32.32406	
Log likelihood	-424.8393	Hannan-Quinn criter.	32.08800	
F-statistic	31.09198	Durbin-Watson stat	2.052941	
Prob(F-statistic)	0.000000			

Source: Authors Computation, 2017 (Eview-8.0)

## PRE-ESTIMATION DIAGNOSTICS TESTS

### Descriptive Statistics

The summary statistics for the variables: ROE, ATM, POS, MM, WP and IBT are as shown in Table 1. The means for ROE, ATM, POS, MM, WP and IBT are different. This indicates that the variables exhibit significant variations in terms of magnitude, suggesting that estimation in levels will not introduce some bias in the results. The Jarque-Bera statistic for all the variables is significant; hence we reject the null hypothesis and conclude that the series is normally distributed (or have a normal distribution).

### Co-integration Test

The co-integration tests in Table 2 are undertaken based on the (Johansen & Juselius 1990) maximum likelihood framework. The essence is to establish whether long-run relationships exist among the variables of interest. If two or more time series are not stationary, it is important to test whether there is a linear combination amongst them (Koutsoyiannis 1999). Variables are co-integrated if they have a long term or equilibrium relationship between them. It is a pre-test to avoid spurious regression situations. The results show that the trace statistics test rejected the null hypothesis of no co-integration among the variables at the 5 percent level of significance. The trace statistics indicate 3 co-integrating equations at the 5% level of significance. The co-integration test results are therefore uninformative about the number of co-integrating relations among the variables. Max-eigen test indicates 3 co-integration equations at the 5 percent level co-integrating equation.

The co-integration result as captured in the analysis thus rejects the second null hypothesis ( $H_{02}$ ), and accept the second alternative hypothesis ( $H_{12}$ ), which state that there is a long term equilibrium relationship between the ICT variables and commercial bank performance in Nigeria.

### Model Estimation and Interpretation

After the iteration process was conducted, a preferred

parsimonious regression model was obtained. The parsimonious error correction model result in table 3 indicates that the  $R^2$  (R-squared) approximately 90.31percent, and this shows a better goodness of fit, meaning that there is a strong relationship between the variables used. Thus, it shows that 90.31 percent (90.31%) changes or variation in ROE are explained by ATM, POS MM, WP and IBT, leaving 9.6 percent (9.6%) changes or variations in ROE to the (white noise) error term. The goodness of fit result thus shows that there is a strong positive impact of ICT on commercial bank performance. The researcher thus rejects the first null hypothesis ( $H_{01}$ ) and accept the first alternative hypothesis ( $H_{11}$ ). The Durbin-Watson (DW) statistics of 2.05 denotes the absence of serial correlation (autocorrelation) in the residuals.

The Error Correction Model parameter (ECM) is negative, less than unity as expected and significant. The ECM is an error correction term that guides the variables (ATM, POS, MM, WP and IBT) of the system to restore back equilibrium, and validates that there exist a long run equilibrium relationship among the variables (ATM, POS, MM, WP and IBT). Thus, the value of the ECM approximately gave 79.71%, meaning that the commercial bank's system corrects (or adjusts to) its previous dis-equilibrium period at speed of 79.71 percent quarterly, and thereby gives the validity that ATM, POS, MM, WP and IBT have long-run equilibrium relationship among them.

The F-statistics which measures the overall significance of the model shows that we cannot reject the alternative hypothesis. The F-statistics shows that the model is statistically significant, and as such, the researcher rejects the First null hypothesis ( $H_{01}$ ) and accept the First alternative ( $H_{11}$ ) which state that ICT has a significant impact on the commercial bank's performance in Nigeria

### Discussion of Research Findings

The coefficient (-0.035721) for ATM's usability shows a negative influence on the ROE and is also not

statistically significant. This could be attributed to the fact that ATM commission on every withdrawal made with it has been dropped by the CBN. This finding indicates that the use of ATM's does not influence commercial bank's performance in Nigeria.

The POS usage variable shows a positive and significant influence on ROE. The POS usage has greatly improved transaction activities, and has also greatly increased the commercial bank's returns. However, the mobile money usages (MM) had a negative influence on ROE and were found also to be statistically insignificant with ROE. The reason could be deduced from the fact that most Nigerians do not use their telephone lines for transaction activities due to network out of order problems. This product has also experienced low patronage due to inadequate awareness and education of the customer on how to maximally use their phones to transact simple banking operations, and as a result has not contributed immensely to commercial banks performances.

The coefficient (-3.380950) related to various Web payment usages (WP) provided by commercial banks is negatively related to ROE and not statistically significant. The finding indicates that an increase in investments in those banking services does not significantly influence bank performance. Interbank transfer (IBT) usage variable was found to be positively related to ROE of commercial banks and was also found to be statistically significant. This is attributable to the fact that all the commercial banks in Nigeria had adopted the ICT usages in transactions, thus making the transfer of funds from one bank to another very easy and accessible.

#### **IV. SUMMARY AND CONCLUSIONS,**

Technological development particularly in the area of information and communication technology is revolutionalising the way commercial banks operate and do business in Nigeria. This has resulted in changes in the volume of trade, the interconnection between firms and increased business transactions from the national to international market places and this has also set in motion a revolution in the banking sector. Commercial banks are now required to invest in ICT for the provision of a transaction and payment system that is compatible with the demands of the electronically interconnected global market place. The adoption of various forms of ICT has greatly influenced the content and quality of banking operations and performance. The findings reveal that ICT (technology innovation) has influenced Nigerian banking industry performance. ICT has specifically increased banks Return on Equity. The research has shown that there has been a remarkable relationship between the increased volume of interbank transfers,

use of POS on the one hand and ROE on the other hand. This means that the Nigerian banking sector made more profit from interbank transfers and the use of POS than any other form of ICT enabled services such as ATM, WP and MM respectively.

In addition, this research has shown that through information and communication technology payment for goods and services and every other kind of transactions has been made easy via self-service facilities (automated customer service machines) from where prospective bank customers can complete their account opening documents directly online. It has assisted customers to validate their account numbers and receive instruction on when and how to receive their cheque books, credit and debit cards and POS services. The study recommends 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 the ICT controlled the globalised economy.

#### **Recommendations**

On the basis of the finding of this study, the following recommendations were made:

- Investment in ICT has been proven to enhance the performance of Nigerian commercial banks. The banks should therefore give emphasis to efficient utilization of the ICT enabled services such as credit and electronic cards to pay at retail outlets, points of sales (POS), phone banking, electronic payment debit, Automated Teller Machines (ATM), home banking, internet banking, mobile banking, personal digital assistant banking.
  - The study recommends that every bank in Nigeria should not only invest heavily on ICT especially the POS, but should distribute same to business outlets where business owners and customers will have access to smooth and hassle free transactions. It is therefore necessary for the government to emphasize the need for more policies that will boost the efficiency in utilization of ICT equipment by reducing the cost of acquiring them so as to reduce cost and boost the growth of the economy.
- 3 The banks should embark on aggressive campaign and re-orientation of clients to create awareness for the customers to patronize the facilities especially in the area of use of POS, mobile banking and so on. Acceptance of these facilities will consolidate the gains from investing in them. In achieving this, every bank should partner with the government to make internet

connectivity cheap and accessible, especially in the rural areas.

- The government should emphasize the need for more policies that will boost the use of ATM, POS, MM, WP and IBT hence long run equilibrium relationship with commercial banks performance.
- Government and Banks should encourage consistent use of ATM, POS, MM, WP and IBT. These will sustain the ROE of commercial banks in the long run

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**APPENDIX**

**Table 4: ATM usages, IBT usages, MM usages, POS usages, WP usages and ROE, 2006(Quarter)-2015(Quarter)**

YEAR	Quarters	ATM Usages Volume (in number of people)	Interbank transfer Volume (in number of people)	Mobile Money(MM) Usages Volume(in number of people)	Point of Sale POS Volume (in number of people)	Web based transactions WP Volume (in number of people)	Return on Equity (ROE) (in Billions)
2006	1st Quarter	1,633,957.00	22,410.00	11,666.00	5,138.00	49,219.00	47,198.40
	2nd Quarter	1,974,065.00	22,448.00	10,844.00	14,633.00	51,563.00	109,037.00
	3rd Quarter	2,156,055.00	22,430.00	11,784.00	24,689.00	52,673.00	122,587.20
	4th Quarter	1,974,065.00	23,678.00	13,774.00	39,733.00	52,573.00	172,538.30
2007	1st Quarter	1,924,744.00	24,916.00	15,533.00	39,847.00	53,411.00	188,511.10
	2nd Quarter	2,840,723.00	32,856.00	14,265.00	51,311.00	168,126.00	302,380.00
	3rd Quarter	2,799,713.00	34,786.00	14,265.00	151,324.00	177,876.00	474,404.10
	4th Quarter	6,230,723.00	33,390.00	27,665.00	226,564.00	179,826.00	924,105.00
2008	1st Quarter	7,762,869.00	24,916.00	483,315.00	239,997.00	274,193.00	305,028.50
	2nd Quarter	11,192,073.00	32,856.00	1,092,892.00	295,379.00	311,770.00	398,210.00
	3rd Quarter	18,449,864.35	24,150.56	1,130,832.16	295,904.90	271,036.00	437,658.60
	4th Quarter	22,728,804.12	18,230.56	472,052.00	363,319.22	284,467.00	481,295.50
2009	1st Quarter	26,103,483.00	16,465.00	484,175.00	251,785.00	413,677.00	463,238.70
	2nd Quarter	29,947,212.00	13,387.00	1,093,426.00	238,387.00	474,180.00	1,358,276.10
	3rd Quarter	25,725,223.00	19,376.00	110,400.00	210,017.00	500,032.00	930,748.00
	4th Quarter	27,385,728.00	20,116.00	121,250.00	218,067.00	567,360.00	1,506,845.90
2010	1st Quarter	7,762,869.00	20,233.00	170,458.00	253,484.00	331,787.00	1,265,643.40
	2nd Quarter	11,192,073.00	18,714.00	243,381.00	237,435.00	353,120.00	1,296,356.90
	3rd Quarter	18,449,864.34	22,075.00	306,739.00	256,637.00	414,390.00	2,247,039.90
	4th Quarter	22,728,804.12	25,751.00	435,955.00	324,870.00	501,789.00	2,766,880.30
2011	1st Quarter	79,612,004.00	107,794.00	517,694.00	383,541.00	670187.00	3,047,856.30
	2nd Quarter	85,143,051.00	116,165.00	677,765.00	425,574.00	532849.00	3,753,277.80

	3rd Quarter	87,537,528.00	131,888.00	1,142,533.00	590,646.00	289326.00	4,515,117.60
	4th Quarter	95,277,416.00	137,106.00	1,311,382.00	700,912.00	439993.00	7,172,932.10
2012	1st Quarter	86689804.00	139,875.00	212195.00	118620.00	374409.00	8,981,693.60
	2nd Quarter	91802445.00	141,288.00	417380.00	485173.00	723755.00	8,919,559.80
	3rd Quarter	94995190.00	145,879.00	608574.00	767858.00	456286.00	9,522,858.20
	4th Quarter	102000317.00	149,945.00	1059539.00	1183394.00	722014.00	9,331,559.00
2013	1st Quarter	7,762,869.00	20,233.00	170,458.00	253,484.00	331,787.00	10,275,643.40
	2nd Quarter	11,192,073.00	18,714.00	243,381.00	237,435.00	353,120.00	10,266,356.90
	3rd Quarter	86689804.00	139,875.00	213195.00	117640.00	374409.00	11,781,693.60
	4th Quarter	86789800.00	138,775.00	218195.00	118620.00	394009.00	12,381,693.00
2014	1st Quarter	77589801.00	148,975.00	317185.00	128630.00	400410.00	12,991,671.00
	2nd Quarter	87688804.00	148,885.00	412095.00	138520.00	474400.00	13,981,073.00
	3rd Quarter	87589801.00	149,985.00	312185.00	168670.00	583310.00	13,901,671.00
	4th Quarter	91802445.00	141,288.00	417380.00	485173.00	523755.00	15,919,559.80
2015	1st Quarter	92802242.00	151,200.00	517398.00	495184.00	643787.00	14,928,590.40
	2nd Quarter	94995190.00	145,879.00	608574.00	767858.00	756286.00	17,522,858.20
	3rd Quarter	97995189.00	155,860.00	704585.00	777859.00	757288.00	18,332,756.20
	4th Quarter	104000339.00	159,958.00	1067538.00	1194395.00	824016.00	18,237,664.00

**Sources:** CBN Annual Activity Report, (2014); CBN Statistical Bulletin (2015)