
Effect of ICT on Financial Performance of Deposit Money Banks Listed on the Nigeria Exchange Group

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Abstract

This study considered the effect of information and communication technology utilized by deposit money banks (DMBs) in carrying out financial transactions and services. The study hinged on the technology acceptance model in explaining the effect of the selected ICT variables; Automated teller machine, point of sale and Mobile banking on performance measured by Return on asset of listed DMBs in Nigeria. The study adopted the expost facto research design utilizing the panel data. Secondary data was sourced from audited financial statements of the sampled deposit money banks from 2010-2019. OLS regression was carried out in testing the formulated hypotheses. The findings revealed that mobile banking (MB) indicated a positive effect on the performance of deposit money banks. All the explanatory variables showed insignificant effect on the performance of DMBs in Nigeria. This implies that the increase or decrease in the number of ATMs, the number of POS centres and the volume of mobile banking transaction does not significantly influence the performance of the banks in terms of returns. The study recommends that banks consider more ICT innovations that will increase its performance.

Keywords: ATM, ICT, MB, POS, Performance

1.1 Introduction

The link between Information and Communication Technology (ICT) and Innovations in banking system cannot be over emphasized. ICT innovation has become an indispensable tool to improve the human lives and connect the nations of the world. The last decade has seen ICT dramatically transforming the world, enabling banking innovations and productivity increases; connecting people and communities; improving standards of living and creating employment opportunities across the globe. Information and Communication Technology has become global tool for any Banking system to reach global markets. Thus, the banking system needs to adopt ICT in order to survive in global competitive environment. The introduction of ICT has changed manual and traditional forms of doing business. The use of sophisticated technology based on automation and interconnection of computers and other electronic devices are becoming the norm rather than exception. In light of the above established backdrop, the study examined the effect of information communication technology adopted by deposit money banks on financial performance. The continuous increase in information technology (IT) innovations in the banking has created convenience for customer in carrying out transactions and has further increased the reach of banks to the rural areas. The study evaluated if the investment in this ICTs software or

programs have any direct effect on the financial performance of banks. Before the introduction of information technology in banking in Nigeria, the transaction of financial services, especially in banks was difficult and stressful; hence, the low performance level of banks in Nigeria as compared to foreign banks (Edwin et al., 2014).

There has been a rapid adoption of information technology tools in improving banking operations through the use of Short Message Service (SMS), Internet, online banking and real time settlement. Despite the perceived benefits of ICT in the financial sector, certain challenges emanating from human, operations and technical constraints are still being experienced (Nwakoby et al., 2018).

Despite the undeniable importance of financial innovation in explaining banking performance, the impact of innovation on performance, is still misunderstood for two main reasons. Firstly, there is inadequate understanding about the drivers of innovation and secondly innovations impact on banks' performance remains largely untested. These problems are situations where a bank issues an individual debit card that is associated with an account with a line of credit and is also an ATM debit card, the individual can perform a number of different types of transactions with the same card. This is an example where the same card represents three different instruments, each of which, in the case of fraud, would require different actions by the consumer (Agbada, 2008). Thus, the present study examined how ICT infrastructures provided by banks affect the financial performance. The hypotheses are stated as:

H₀₁: Automated teller machine (ATM) operations does not significantly affect return on asset of money deposit banks in Nigeria.

H₀₂: Point of sales (POS) transactions does not significantly affect return on asset of money deposit banks.

H₀₃: Mobile banking (MB) transactions does not significantly affect return on asset of deposit money banks.

2.1 Conceptual review

Information Technology (IT) is the automation of processes, controls, and information production using computers, telecommunications, software and ancillary equipment such as automated teller machine and debit cards (Muhammad et al., 2013). Roger (2016) defines ICT as a synergy between computers and communication devices and forms an important part of the modern world. Thus, the most significant shortcomings in the banking industry today are a widespread failure on the part of senior management in banks to grasp the improvement of technology and incorporate it into their strategic plans. Information and communication technology (ICT) has become the heart of the banking sector in the contemporary economies. The banking industry is the heart of every robust economy. ICT is helping the banking sector improve its efficiency and effectiveness of services offered to customers, and enhance business processes, managerial decision making, and workgroup collaborations which strengthen their competitive positions in rapidly changing and emerging economies.

Yousafzai (2012) asserts that banks full adoption of ICT innovations is a complex and multifaceted process and joint consideration of customers' personal, social, psychological, utilitarian and behavioural aspects is more important than adoption itself and will ultimately result in the intended behaviour. It is imperative that all these innovations aimed at having a competitive edge are related to the profitability of banks.

ICT has facilitated self-services including account opening on online platform. Information communication system also informs customers on receipt of chequebooks, debit cards and credit cards. In the financial sector, ICT is viewed as a way of making known of new technologies, markets, financial tools and markets which enables accessibility of information and ways of transacting (Kariuki, 2017).

ICT application in banking activities captures the automatic teller machine which is used to refer to a computer device which has record keeping system and cash unit which allows clients to use a card and a personal identification number to gain access to bank services. The ATM offers various services to customers which include cash withdrawal, cash deposit, cash advance, payment of bills, mini-statement and others. ICT further gives room for internet banking which is seen as the usage of telecommunication and internet networks to offer products and services which have been value added to a given customer. At some cases, online banking allows aggregation of accounts to allow monitoring of accounts. Mobile banking is processing banking transactions by means of communication device such as phones (Anyasi & Otubu, 2009).

Automated Teller Machine (ATM), also known as automated banking machine (ABM) is a computerized telecommunications device that provides the clients of a financial institution with access to financial transactions in a public space without the need for a cashier, human clerk or bank teller. An ATM combines a computer terminal, 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) or by punching a special code number into the computer terminal linked to the bank's computerized records 24 hours a day". Once access is gained, it offers several retail banking services to customers. They are mostly located outside of banks, and are also found at airports, malls, and places far away from the home bank of customers. They were introduced first to function as cash dispensing machines. However, due to advancements in technology, ATMs are able to provide a wide range of services, such as making deposits, funds transfer between two or accounts and bill payments. Banks tend to utilize this electronic banking device, as all others for competitive advantage (Asante, et al., 2013).

Point of Sale is an on-line system that allows customers to transfer funds instantaneously from their bank accounts to merchant accounts when making purchases (at purchase points). A POS uses a debit card to activate an Electronic Fund Transfer Process (Asante et al 2013). 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 for shopping. Furthermore, the system continues after banking hours, hence continual productivity for the bank even after banking hours. It also saves customers time and energy in getting to bank branches or ATMs for cash withdrawals which can be harnessed into other productive activities.

According to Nader (2011) mobile banking is a service provided by financial institutions in cooperation with mobile phone operators. It is considered as a form of remote or virtual banking, which is essentially the delivery of branch financial services via telecommunication devices where the bank customers can perform retail banking transactions by dialling a touch-tone telephone or mobile communication unit, which is connected to an automated system of the bank by utilizing Automated Voice Response (AVR) technology. It allows customers with busy lives to conveniently do

their banking using their phones anytime. It is about getting banking services to the unbanked, those who do not have bank access or bank accounts, and those who are at the bottom of the economic pyramid, often living in remote areas.

Technology acceptance model (TAM) adopted for the study was originally proposed by Davies in 1986. This model was designed to forecast the user's acceptance of information technology and usage in an organizational setting. Cracknell (2004) posits that firms are adopting technology to cope with the dynamics of the external environment. This model has been tailored in a manner that can accommodate changes for improved costs reduction and efficiency. Technology Acceptance Model deals with perceptions as opposed to real usage, the model suggest that users, the key factors that influence their decision on how, where and when they will use it.

This theory is relevant to this study since it explains user 's acceptance of ICT strategies and usage in an organizational context. Acceptance is the first process in technology use and has a bipolar implication. First of all, acceptance is a precursor to adoption and hence this theory complements the preceding theories. Secondly, acceptance dictates the attitude and perception of the users which eventually affects efficiency of use and hence performance. Strategic adoption as well as operational efficiency and hence productivity of systems is a function of acceptance of the technology. It is thus plausible to conclude that without acceptance, the rest of the theories would be redundant and invalid. Though acceptance is an initial phase, it is also an attitude shaping facet that influences adoption and effectiveness of use.

3.1 Methodology

This study adopts quantitative research design other considered as expost-facto which involves the utilization of secondary data. Thus, the data for the study was obtained from corporate annual reports and NGX fact book from 2010 to 2019. The population comprised of the fourteen (14) deposit money banks (DMBs). Consequently, as a result of filtering, the sample number of deposit money banks in the population reduced to ten (10). Jaiz plc, Wema plc, Stanbic IBTC and Sterling plc were excluded. Descriptive, correlation and multiple regression techniques of data analysis was used in analyzing the data generated for the study in addition to some diagnostic tests carried out using SPSS 20. The regression model employed for this study is also in line with Abebe (2016), with some modifications for the analysis. The model for the empirical investigation was therefore given as follows:

$$ROA_{it} = \beta_1 ATM_{it} + \beta_2 POS_{it} + \beta_3 MB_{it} + \beta_4 ACD_{it} + \mu_{it}$$

Where:

ROA_{it} = Return on asset of bank_i in year t

ATM_{it} = ATM transactions of bank_i in year t

POS_{it} = POS transactions of bank_i in year t

MB_{it} = MB transactions of bank_i in business in year t

ACD_{it} = Annual cash deposit i in year t

μ = the error term

Table 1: Research variable measurement

Variables	Definition	Measurement	Priori Expectation	Author(s)
ROA	Dependent	PAT/Total asset	+/-	Abebe (2016); Olaiya and Adeleke 2019
ATM	Independent	Number of ATM's	+/-	Abebe (2016)
POS	Independent	Number of points of sale	+	Abebe (2016)
MB	Independent	Annual number of mobile banking transaction	+	Kariuki (2017)
CD	Mahboub (2018) control	Annual cash deposit	+	Abebe (2016)

4.1 Data analysis

4.1.1 Descriptive Statistics

An analysis of the descriptive statistics carried out in respect of both the dependent and independent variables as data from appendix A is presented. Table 4.4 presents the summary of the descriptive statistics of the variables. The full result is attached as appendix- A

Table 2 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic Std. Error	Statistic Std. Error
ROA	77	-.0910	.0589	.014790	.0252100	-2.322 .274	8.278 .541
ATM	77	262	157101	26163.63	54933.304	1.872 .343	1.615 .674
POS	77	80	26725	10439.52	7070.222	.720 .343	.421 .674
MB	77	1543	30000	372999.07	830803.364	2.735 .580	7.633 1.121
Cash Deposit	77	25563	2641963	21167875.82	60277624.486	3.525 .274	11.086 .541
Valid N (listwise)	77						

Source: SPSS 20

The above table indicates the mean, maximum, minimum and standard deviation values of variables. A dataset of 77 observations provides the basis for descriptive analysis. This study used three independent variables, single dependent variable and single control variable. As shown in table 4.1, the mean value of bank ROA was around .015 percent for sampled deposit money banks in Nigeria. It could be noticed that the bank ROA growth fluctuates between -.0910 and .0589 percent. DMBs achieved 1.48 percent average return on asset from ICT for the period of 2010-2019. The standard deviation among banks in terms of bank profit growth was 2.5 percent; this confirms that there were lower variations of performance growth among DMBs during the study period.

The mean value of the number of ATMs installed by DMBs within the period under study was 26163 with the maximum and minimum values 157101 and 262 in the years 2010 and 2019 respectively. There was a variation in ATM towards its mean value over the periods under study with the value of standard deviation 54933. This implies that there was competition between DMBs to attract the customers with a motive of increasing ATM points.

The mean value of POS 10439 unit; the standard deviation was 7070, while 26725 and 80 observed as maximum and minimum values, respectively, exhibits higher dispersion larger than its mean value. As shown in the result, there were higher differences among banks regarding POS. This implies that the effort of some banks to invest in POS.

The mean value of Mobile banking 372999 unit; the standard deviation was 830803, while 3000000 and 1543 observed as maximum and minimum values, respectively, this explains that DMBs USSD are highly used by its customers.

Cash deposit showed a mean value 21,167,875,000, maximum and minimum values indicated 264,196,344,000 and 25,563,000. This implies that the variation in bank deposit between the DMBs is not high.

4.1.2 Correlation Analysis

The correlation matrix in table 4.5 predicts the likely relationship among variables in the study. The P-value is listed in parenthesis that shows the correlation coefficient between the dependent variables and independent variables.

Table 3 Correlations

		ROA	ATM	POS	MB	Cash Deposit
ROA	Pearson Correlation	1	.772**	.605**	-.195	-.373**
	Sig. (2-tailed)		.000	.000	.486	.001
	N	77	48	48	15	77
ATM	Pearson Correlation	.772**	1	.479**	.275	.167
	Sig. (2-tailed)	.000		.001	.321	.256
	N	77	48	48	15	48
POS	Pearson Correlation	.605**	.479**	1	-.342	-.039
	Sig. (2-tailed)	.000	.001		.212	.794
	N	77	48	48	15	48
MB	Pearson Correlation	-.195	.275	-.342	1	.591*
	Sig. (2-tailed)	.486	.321	.212		.020
	N	77	15	15	15	15

Source: SPSS output, 2020

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.5 shows the correlation between independent variables, ATM, POS, MB. Generally, high correlation is expected between dependent and independent variables while low correlation is expected among independent variables. According to Gujarati (2004), a correlation coefficient between two independent variables above 0.80 is considered excessive and thus certain measures are required to correct that anomaly in the data. From Table 4.5, it can be seen that all the correlation coefficients among the independent variables are below 0.80. This points to the absence of possible multicollinearity though the value inflation factor (VIF) and tolerance value (TV) test is still required to confirm the assumption.

The table reveals a positive correlation between the dependent variable ROA and the explanatory variable ATM with coefficients of .772. This implies that the explanatory variable moves in the same direction with ROA, which suggest that the higher the volume of ATM, the higher the value of the ROA, and when these explanatory variables decrease its individual levels, ROA declines.

The table also reveals that POS exhibit positive correlations with ROA, with coefficients of .605. This means that POS explanatory variable and the outcome variable move in the same direction, which implies that as the volume of POS increase, ROA also increases. In addition, the table reveals that MB explanatory variable has a negative correlation with ROA, this implies that increase in mobile banking transaction does not increase ROA of DMBs. Cash deposit showed a positive correlation implying that increase in cash deposit will increase the performance of DMBs. This means that the level of correlation between and among all the independent variables is of harmless effect.

4.1.3 Diagnostic Test

The data was subjected to an OLS regression. The output generated using the SPSS software is attached as appendix A. Some checks were carried out on the result to test for multicollinearity and heteroskedasticity in order to improve the robustness of the result. These tests are important for the regression estimation to satisfy the assumptions of the ordinary least square (OLS) test of homoscedasticity, and of the absence of high correlations among the independent variables.

Table 4.6 shows the results of the value inflation factor (VIF) and tolerance value (TV). The VIF and TV are two important measures used in addition to the Pearson correlation matrix to assess the presence or absence of multicollinearity between the explanatory variables.

4.1.3.1 Test of Multicollinearity

This study correlation matrix for three of the independent variables shown below in the table had been estimated. The correlation matrix is useful to measure the propensity of how much the independent influences the dependent variable (Abebe, 2016).

Table 4 Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	ATM	.871	1.148
	POS	.283	3.528
	MB	.226	4.420
	Cash Deposit	.202	4.952

Source: SPSS output 2020

a. Dependent Variable: ROA

From Table 4, the VIF and TV are found to be consistently smaller than 10 and above 0.10 respectively indicating the absence of multicollinearity as suggested by Neter et al., (1996). The low mean VIF is also a pointer to the mild correlation among the predictive variables. This shows the appropriateness and fitness of the explanatory variables as used in the model.

4.1.3.2 Test of Normality

Table 5 Test of Normality

	N	Skewness	Kurtosis
	Statistic	Statistic	Std. Error
		Statistic	Std. Error
ATM	77	1.872	.343
POS	77	.720	.343
MB	77	2.735	.580
Cash Deposit	77	3.525	.274
Valid N (listwise)	77		

Source: SPSS output 2020

The normality of the data showed that ATM variable had a skewness value 1.872 and Kurtosis 1.615. POS had a skewness of .720 and Kurtosis .421. MB showed a skewness of 2.735 and Kurtosis 7.633. CD indicated a skewness of 3.525 and kurtosis 11.086. This indicates that the residuals are normally distributed.

4.1.3.3 Test for Heteroscedasticity Assumption

To test this assumption, both F-statistic and chi-square (χ^2) 2 tests statistic were used (Breusch-Pagan-Godfrey assumption of null hypothesis of heteroskedasticity).

In the case of the effect of ICT on the performance of DMBs both the *F*- and χ^2 -test statistic give the same conclusion that there is evidence for the absence of heteroscedasticity. Since the *p*-values in all of the cases were above 0.05, the null hypothesis of heteroscedasticity should be accepted as seen in (Appendix A). The null hypothesis of heteroscedasticity should be accepted at 5% level for the F-statistics. Generally, in all of the regression models used in this study it was proved that the variance of the error term is constant or homoscedastic.

4.1.4 Regression Analysis

The regression coefficients are analysed the independent and dependent variables identify both magnitude and the direction of impact.

Table 6 Model Summary^b

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate	Durbin-Watson
1	.756 ^a	.572	.401	.0064244	2.531

Source: SPSS output 2020

a. Predictors: (Constant), ATM, POS, MB, CD

b. Dependent Variable: ROA

Table 7 ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.001	4	.000	3.342	.055 ^b
	Residual	.000	10	.000		
	Total	.001	14			

Source: SPSS output 2020

a. Dependent Variable: ROA

b. Predictors: (Constant), ATM, POS, MB, CD

Table 8 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.006	.008		.802	.441
ATM	-1.767E-006	.000	-.219	-.989	.346
POS	9.106E-007	.000	.460	1.184	.264
MB	-2.257E-009	.000	-.226	-.519	.615
Cash Deposit	2.929E-009	.000	.420	.913	.383

Source: SPSS output 2020

a. Dependent Variable: ROA

Table 8 indicates that the aggregate influence of the explanatory variables included in the model are able to explain the dependent variable up to 40.1% as indicated by the adjusted R^2 , while the remaining 59.9% are controlled by other factors that are not included in the model. The F-statistical value of 3.34 which is significant at 1% shows that the model is fit and therefore provides substantial evidence that information and communication technology has an effect on the performance of Money deposit banks in Nigeria

The explanatory variable ATM showed a coefficient value of -1.767 and a P-value 0.346 indicating a negative and insignificant effect. This implies that a unit change in the volume of ATMs and transactions via ATM does not significantly affect ROA of DMBs in Nigeria.

POS showed a coefficient of 9.106 and a P-value 0.264 which indicates a positive but insignificant relationship. The result explains that increase in point-of-sale centres in Nigeria has a positive effect on the performance of DMBs though insignificant.

The result showed that mobile banking (MB) had a negative and insignificant effect on ROA of DMBs, with a coefficient of -2.257 and a P-value 0.615. This explains that a unit increase in MB transaction does not significantly affect the performance of DMBs in Nigeria.

The control variable cash deposit showed a coefficient value 2.929 and a P-value 0.383, indicating a positive but insignificant effect.

4.1.5 Research Hypothesis

Table 9 Summary of Hypotheses

Variables	P-value	Observation	Decision
ATM	0.346	p-value>0.05	Accept null
POS	0.264	p-value>0.05	Accept null
MB	0.615	p-value>0.05	Accept null
Cash deposit	0.383	p-value>0.05	Accept null

Source: SPSS output

Null hypothesis to be tested is that the explanatory variables (ATM, POS, MB) used in the model has no significant effect on DMBs performance. If the p-value of any explanatory variable is less than 5% significance, such variable is said to have significant effect on DMBs performance, and if otherwise it has no significant influence. As earlier observed, the F-statistic proved that variables entered have no

capacity to determine the level of performance of DMBs in Nigeria. Comparing the t-statistic value to p-value of each independent variable, it can be seen that the independent variables are not significant at 5% critical level.

4.2 Discussion of Findings

The study investigated the effect of ICT on the performance of deposit money banks in Nigeria. The study used ATM, POS and MB as independent variables and ROA as dependent variable. The reviewed related literatures and underpinned some theories to explain the relationship between the explanatory variables and the response variable. The findings based on the regression analysis showed that:

- i. Automated teller machine (ATM) and Mobile banking (MB) showed a negative effect on ROA of Deposit money banks in Nigeria. The finding explains that an increase in the number of ATM installed does not enhance financial performance of deposit banks. Also, a decrease does not determine the returns of the banks. The P-value .346 indicates an insignificant effect, which explains that the first null hypothesis is accepted.
- ii. Point of sale (POS) showed a positive effect on ROA of Deposit money banks in Nigeria. The number of POS centre indicates a positive effect on returns of the banks. This implies that a one-unit increase will lead to a 9.10 positive improvement of the bank's returns. The p-value shows that the effect is insignificant therefore the null accepted was accepted.
- iii. Mobile banking showed a positive effect on returns of DMBs. This explains that an increase in mobile banking transactions will enhance banks returns. Though the p-value showed insignificant, the third null hypothesis is therefore accepted. The implication is that a unit increase in MB carried out in a period will help the bank increase its performance.

4.3 Conclusion and recommendation

The study examined the effect of ICT on DMBs performance in Nigeria with particular Referencess the perceived effect of the number of ATMs, POS and mobile banking (MB) transactions on performance of DMBs in Nigeria. The explanatory variables ATM and MB showed a negative effect while POS showed a positive effect, all the variables showed insignificant effect on the dependent variable ROA. The OLS model was fit as indicated by the R-square and the F statistics value. The study findings contribute to policy making and research strategies on banking innovations and the utilization of ICT in improving banking and enhancing banks performance in Nigeria.

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