



## Electronic Banking and Growth of Deposit Money Banks Operations: Nigeria Experience

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### Authors' contributions

*This work was carried out in collaboration among all authors. Author NJO designed the study, performed the statistical analysis and wrote the first draft of the manuscript. Author OCO wrote the protocol and generated data and managed the analyses of the study. Author VOO-N managed the literature searches. All authors read and approved the final manuscript.*

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### ABSTRACT

The study examined the Nigeria experience of the influence of electronic banking on the growth of deposit money banks in Nigeria. The research design used for the study was the ex-post-facto research design. The data used in this study were obtained from the annual reports and statements of accounts of Nigeria deposit insurance corporation. CBN annual report and account, CBN statistical bulletin; various online journals and literature. In order to achieve the objective of this study, a linear regression was adopted on both functional and statistical models. The study found that internet banking has a negative impact on growth rate of total deposit of deposit money banks in Nigeria with a regression coefficient of -10.09143. Automated Teller Machine (ATM) operation has a positive impact on asset growth of deposit money banks in Nigeria with a regression coefficient 37.13510 and Point of Sale (POS) transaction has a positive impact on asset growth of deposit money banks in Nigeria with a regression coefficient 1.334829. The study therefore recommends among others that due to the insignificant relationship that exists between internet banking and deposit growth banks that are yet to fully adopt internet banking should do so as a

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matter of urgency if they must grow, remain relevant, competitive and profitable. Banks that seek to improve their deposit growth performance and offer numerous products / services in an effective, efficient and cost effective manner. There should be increased awareness creation about the use of smart cards for banking operations and banks should also improve the number of services that ATM can offer the banking public. The Central Bank of Nigeria should ensure that guidelines with respect to POS transactions are properly adhered to.

*Keywords: Electronic banking; deposit money bank; growth.*

## 1. INTRODUCTION

The 21st century has witnessed a dramatic evolution in the financial service industry as a result of the rapid advancement in technological transformation which has become known as e-developments. These changes have engulfed all areas of financial intermediation and financial markets such as e-finance, e-money, electronic banking (e-banking), e-brokering, e-insurance, e-exchange and e-supervision. As a result of rapid advances in IT and intensive competition in the banking sector, the adoption of e-banking is being increasingly used as a channel of distribution for financial services [1] cited in [2,3].

E-banking is also known as online-banking, which is an offshoot of Personal Computer banking using the internet as the distribution line by which banking activities like paying bills, checking of account balances, and fund transfers are executed [4]. Prakash and Malik [5] defined electronic banking as “the use of technology to communicate instructions and receive information from a financial institution where an account is held”. According to them, electronic banking services include the arrangement that allows bank customers to access accounts, carry out business transactions, and receive information on financial products and services online. Electronic banking is a form of banking in which funds are transferred through an exchange of electronic signals rather than through an exchange of cash, checks, or other types of paper documents.

The evolution of electronic banking in Nigeria can be traced to 1986 when the banking sector was deregulated. The result of this deregulation brought far-reaching transformation through computerization and improved bank service delivery. This new information technology (IT) is turning into the most important factor in the future development of banking, influencing bank's marketing and business strategies. E-banking is also known as online-banking, which is an

offshoot of Personal Computer banking using the internet as the distribution line by which banking activities like paying bills, checking of account balances, and fund transfers are executed [4].

Traditional banking system was often characterized by delay and inefficiency in the delivery of financial services which led to the introduction of electronic banking. The introduction of an electronic banking system which was supposed to bring about efficiency and effectiveness in service delivery, reduce queues and cash handling, rather resulted in disappointment to customers. Most customers complain of time wasted in banks, mostly due to long queues and network downtime due to poor connectivity between central server and the branches. Bank customers still handle too much cash and rarely people discuss electronic banking products and services offered by banks.

The development of e-banking has brought a number of issues of concern to the forefront. The issues may constitute challenges to hitch-free e-banking operations in Nigeria. The challenges may relate to amongst other things: operational challenges; security challenges; credit challenges; foreign exchange challenges; manpower expertise challenges; supervisory capacity challenges; basic infrastructure challenges; reputation and legal challenges [3]. Operational challenges arise from fraud, processing errors, system disruptions, or other unanticipated issues resulting in the bank's inability to deliver products or services. Security challenges refer to the inability to maintain adequate and reliable safeguards in order to detect and contain possible security and integrity of financial transactions. Credit challenges are challenges that arise from the inadequate procedures for determining the credit worthiness of borrowers applying for credit through e-banking procedures. Foreign exchange challenges arise when a loan or portfolio of loans is denominated in a foreign currency and the transaction is facilitated through

e-banking. Manpower expertise challenges refer to the challenges that arise from adequate computer literacy to carry out e-banking transactions [4]. The fact remains that the reality of using IT in banks is necessitated by the huge amount of information being handled by these banks on a daily basis. On customer's side, cash is withdrawn or deposited, cheques are deposited or cleared, statement of accounts are provided, money transfer, bills payment facilitated at the same time, banks need up-to-date information on accounts, credit facilities and recovery, deposit, charges, income, growth indices, performance indicators and other control of financial information. In spite of the numerous challenges of the electronic banking system, there are possibilities that it has affected the operations of the money deposit bank, however, empirical evidence in research has not been sufficiently carried out to determine the veracity of the assertion. A number of research works have explored the effect of e-banking on performance generally but have not been able to narrow it down to the major aspects of bank growth which are: bank deposit and asset growth the question therefore becomes, how electronic banking has impacted on the growth in the operations of banks.

The main objective of the study is to examine the effect of electronic banking on the growth of deposit money banks operations in Nigeria. Specifically, the study objectives are to:

1. Assess the effect of internet banking on the bank deposit of deposit money banks in Nigeria.
2. Examine the influence of ATM operations asset growth of deposit money banks in Nigeria.
3. Evaluate the effect of POS transactions on the asset growth of deposit money banks in Nigeria.

## 2. REVIEW OF RELATED LITERATURE

### 2.1 Theoretical Review

This study is hinged on the technology acceptance model (TAM) which was proposed by Davis [6]. TAM primarily aims to provide an explanation of factors that contribute to the acceptance of computer applications. Added to this, the model assists researchers and

practitioners alike in determining the reason behind the unacceptability of a specific system [6]. Davis [6] found attitudes of the user towards system use and the system's perceived usefulness effect on using information systems in organization. Moreover, both attitude and perceived usefulness are influenced by the perceived ease of use. TAM posits that the greater the perceived usefulness of the system and the perceived ease of use, the more positive will be the attitude towards it. In this regard, attitude leads to higher intention towards system use, which in turn positively influences the actual system use. According to TAM, with other things remaining constant, perceived usefulness is affected by the perceived ease of use because when technology is easier to use, its usefulness increases. This research study is anchored on technology acceptance model (TAM) because this study seeks to evaluate the impact that the use of computer applications and other electronic channels had on the growth of banks. In relation to the project, it explains the reaction of bank customers and how they react when the bank introduces a new electronic banking system. Their reaction towards the use of the new system, how often they use it because the theory explains that the more the bank customers use a particular technology then there is a positive influence. Using the data generated, the theory will make one understand that when ATM, POS and internet banking were first introduced in Nigeria, there was a slow growth of transactions done with the electronic banking product but in recent years due to the acceptance of new technology device, it helps in customer understanding and accepting the product and services offered by the bank.

### 2.2 Empirical Review

Chiemeke, Evweikpaefe and Chete [7] examined the level of adoption of internet banking in Nigeria. Twelve large on-line banks that retained their brand names after the consolidation were studied in terms of the functionality and interactivity of their websites. The results revealed that Internet banking is being offered at the BASIC level of Interactivity with most of the banks having mainly information sites and providing little Internet transactional services. The level of security of the banks was also low as most of the banks have not adopted 128-bit Secure Sockets Layer (SSL) encryption security measures. Most of the banks perform extremely well in providing up-to-date information.

However, further improvements on security and provision of key ingredients of Internet banking which includes confidentiality, effective communication, integrity and availability, should be considered in order to satisfy customer's requirements.

Kehinde, [8] examined the impact of electronic banking on the operations of Nigerian banks. Five banks were randomly selected for the study. The study revealed that the adoption of electronic banking has enhanced the banks' efficiency. It has also enhanced the banks' fortunes through bank charges and withdrawal charges. It also enhanced the bank-customer relationship.

Abaenewe, Ogbulu and Ndugbu [9] investigated the profitability performance of Nigerian banks following the full adoption of the electronic banking system. Judgmental sampling method was adopted by utilizing data collected from four Nigerian banks. The profitability performance of these banks was measured in terms of returns on equity (ROE) and returns on assets (ROA). The study revealed that the adoption of electronic banking has positively and significantly improved the returns on equity (ROE) of Nigerian banks. On the other hand and on the contrary, it also revealed that e-banking has not significantly improved the returns on assets (ROA) of Nigerian banks.

Amu and Nathaniel [10] studied the relationship between electronic banking and the performance of Nigerian commercial banks. Electronic banking was measured by value of Point-of-Sale transactions while commercial banking performance was measured by customers' deposits. Engle-Granger co-integration model was used to analyse data for the sample period January 2009 to December 2013. The results showed that POS is not co-integrated with both the savings and time deposits but are co-integrated with demand deposits. It was recommended that the monetary authorities and commercial banks should embark on an all-inclusive enlightenment campaign for the banking public on the benefits, convenience and importance of adopting e-banking channels in completing their transactions.

Ajayi [11] examined the effect of cashless monetary policy on Nigerian banking industry. The data collected was analysed using frequency tables and percentages while for

non-parametric statistical tests, Chi-square was used to test the formulated hypothesis. The results of the study showed that there are significant reasons and benefits inherent in the implementation of cashless policy. It also showed that the policy has positively affected the development of banks; as it facilitates ease of operations and reduces queue and congestion in the banking hall, among others. However, inadequate technological infrastructures, high rate of cyber-crime and high rate of illiteracy, among others are hindering the full implementation and benefits of the policy.

Babatunde and Salawudeen [12] examined the impact of electronic banking in Nigerian banking industry and financial institutions. They employed both descriptive and inferential statistics to analyze the data. Simple frequency counts, percentages and the Chi-square were used in the data analysis. Findings showed that 22 credit officers or 62.9% of respondents agreed with the opinion that the electronic banking system has made banking transactions easier, 11 credit officers representing 31.45% strongly agreed, while 2 of them representing 5.7% were undecided and none of the respondents either disagreed or strongly disagreed. They concluded that the adoption of electronic banking has enhanced the bank's efficiency, making it more productive and effective. They recommended that the Nigerian banking sector must be focused in terms of their needs and using the right technology to achieve goals, rather than acquiring technology of internet banking because other banks have it.

Shilpan [13] investigated the impact of e-banking on traditional banking services. It was discovered that Internet banking is changing the banking industry, having the major effects on banking relationships. Banking is now no longer confined to the branches where one has to approach the branch in person, to withdraw cash or deposit a cheque or request a statement of accounts.

Ojokuku and Sajuyigbe [14] examined the impact of electronic banking on Human Resource (HR) performance in the Nigerian banking industry, using First Bank Plc. as a case study. Chi-square test was applied for data analysis. Results showed among other things that introduction of electronic banking has impacted positively on the bank's HR performance, in terms of improved

efficiency and effectiveness of service delivery by bank personnel. Bank-customer relationship and customers' satisfaction was also found to have been greatly enhanced. Hence, the Government should lower the tariff on information technology-aided tools and equipment imported and possibly subsidized the cost.

Abubakar, Jibrin and Kazeem [15] examined the relationship between electronic banking and liquidity of deposit money banks in Nigeria, using time series data for the period 2006- 2014. The data was analysed using both descriptive and correlation analysis to describe the data set and to identify the association between electronic banking, proxies by internet banking, mobile banking and point of sale, and liquidity, proxy by current ratio respectively. Results from the correlation analysis reveal that mobile banking and point of sale had no significant relationship with liquidity, while there is a significant negative relationship between internet banking and liquidity. The study recommends among others that mobile banking and point of sale transactions limit should be maintained, while internet banking transaction limit should be reviewed downwards since an upward review will affect liquidity of deposit money banks negatively.

The related studies that examined the relationship between electronic banking and bank growth did not view the major aspects of bank growth. Therefore, this study bridged this gap by examining the major aspects of bank growth which are: bank deposit and asset growth.

### 3. METHODOLOGY

The research design used for this study is the ex-post-facto research design which considers the past in order to produce explanations for things that had already occurred. The data used for the purpose of this research were from secondary sources. The data were sourced from the annual reports and statement of accounts of Nigeria Deposit Insurance Corporation (NDIC); CBN annual reports and accounts; CBN statistical bulletin; various on-line journals and literature. The secondary data collected were analysed using the ordinary least square regression technique to determine the relationship between the electronic banking variables and bank growth. The independent variables included in the regression model were the e-banking mechanisms: (a) Internet banking

(b) ATM operations and (c) POS transactions. The dependent variables adopted were growth measures of deposit money banks in Nigeria namely: Growth rates of Total deposits and Growth rates of Total assets.

The Ordinary Least Square (OLS) multiple regression model was used to analyse the data. The model helps us to determine the degree of relationship that exists between the independent variables and the dependent variable.

#### 3.1 Model Specification

$$GRTD = f (IB) \quad (1)$$

$$GRTA = f (ATM) \quad (2)$$

$$GRTA = f (POS) \quad (3)$$

Explicitly, it may be written as:

$$GRTD = \beta_0 + \beta_1 IB + e \quad (1)$$

$$GRTA = \beta_0 + \beta_3 ATM + e \quad (2)$$

$$GRTA = \beta_0 + \beta_4 POS + e \quad (3)$$

The regression estimate will reveal statistics that will be relevant to the proper examination of the relationships between the variables. These statistics will form the criteria for the data analysis. These criteria include.

#### 3.2 Coefficients

The coefficients are used to explain the extents of the relationship between the dependent and independent variables. A positive coefficient shows a positive relationship while a negative coefficient shows a negative relationship between the variables.

#### 3.3 P-Value

This is used to test the null hypothesis at 5% level of significance.

#### 3.4 Decision Rule

If the p-value is greater than 0.05 then we accept the null hypothesis. If the p-value is less than 0.05, the null hypothesis is rejected.

### 3.5 F-Statistic

This statistic shows the overall significance of the relationship between the dependent variables and the independent variables. The result of F-statistic greater than the probability F-statistic, represent a significant relationship between the dependent variables and the independent variable.

### 3.6 R-Squared ( $R^2$ )

The R-squared is used to explain how much of the dependent variables are explained by the independent variable. A high ratio usually suggests a good fit between the variables.

## 4. RESULTS AND DISCUSSION

The data used in this study are presented in table 1.

From Table 2, ATM operations of deposit money banks was at an average of 345.4308 between 2006 and 2018 while internet banking of deposit money banks had an average of 9.938462 between 2006 and 2018. POS transactions of deposit money banks had an average of 44.49231 respectively between 2006 and 2018.

However, total assets and total deposits of deposit money banks average 22590.31 and 13618.46 between 2006 and 2018. The Jarque – bera probability for ATM operation, total asset and total deposit are all above 0.05 which shows that all the variables are normally distributed except for internet banking and POS transactions.

From Table 3, It seems that POS transactions have a strong positive correlation coefficient with other variables. Total asset and ATM operation tend to possess the same qualities. Internet banking and total deposit also tend to match these qualities.

Table 4 reveals that internet banking has a negative impact on growth rate of total deposit of deposit money banks in Nigeria with a regression coefficient of -10.09143. The r-squared of 0.712048 shows that about 71% of the variation in total deposit in deposit money banks can be explained by internet banking. The f-statistic value of 12.36400 is greater than the probability f-statistic of 0.001980 which shows a significant relationship between the total deposit of deposit money banks and internet banking.

**Table 1. Distribution of Growth rate of total deposits, assets, ATM, Internet Banking and POS**

Year	Growth Rates of Total deposits (%)	Growth rates of Total Assets (%)	ATM	Internet Banking	POS
2006	35.19	53.52	121.5	15.3	5.2
2007	55.81	55.37	131.6	10.6	6.4
2008	62.28	46.56	399.7	25.1	16.1
2009	14.90	-3.57	548.6	84.2	11.0
2010	8.37	5.06	954	99.5	12.7
2011	13.78	17.14	1561.8	58.0	31.0
2012	16.71	10.23	1985.0	31.6	48.5
2013	16.55	15.60	2830.5	47.3	161.2
2014	7.46	13.24	3682.0	74.2	312.1
2015	-2.85	2.83	3971.7	91.6	448
2016	16.17	31.02	4988.1	132.4	759.0
2017	4.42	8.84	6437.6	184.6	1409.8
2018	12.13	9.21	6408.1	404.6	2383.1

Source: CBN Reports and accounts and researcher's computation

GTD: Growth Rates of Total Deposits (Dependent variable)

GTM: Growth Rates of Total Asset (Dependent variable)

ATM: (Independent variable)

IB: Internet banking (Independent variable)

POS: Point of sale transaction (Independent variable)

**Table 2. Descriptive statistics of the input data**

Descriptive Statistics					
	ATM	IB	POS	TA	TD
Mean	345.4308	9.938462	44.49231	22590.31	13618.46
Median	347.6000	3.600000	2.600000	20071.00	14390.00
Maximum	875.5000	50.80000	295.9000	42080.00	21730.00
Minimum	0.200000	0.500000	0.300000	6738.000	3442.000
Std. Dev.	281.7459	14.49474	86.09849	10871.56	5677.881
Skewness	0.547901	2.037202	2.218882	0.447082	-0.371722
Kurtosis	2.319874	6.033764	6.783272	2.135242	1.990885
Jarque-Bera	0.900982	13.97743	18.42040	0.838140	0.850970
Probability	0.637315	0.000922	0.000100	0.657658	0.653453
Sum	4490.600	129.2000	578.4000	293674.0	177040.0
Sum Sq. Dev.	952569.3	2521.171	88955.41	1.42E+09	3.87E+08
Observations	13	13	13	13	13

Source: Authors computation from Eviews 9

**Table 3. Correlation coefficients of the variables**

	POS	TA	ATM	IB	TD
POS	1	0.80	0.83	0.99	0.64
TA	0.80	1	0.97	0.82	0.94
ATM	0.83	0.97	1	0.85	0.91
IB	0.99	0.82	0.85	1	0.66
TD	0.64	0.94	0.91	0.66	1
MB	0.79	0.93	0.88	0.80	0.84

Source: Authors computation from Eviews 9

**Table 4. Regression Output Data: Internet banking and asset growth of deposit money banks in Nigeria**

Dependent Variable: TD  
 Method: Least Squares  
 Date: 11/28/19 Time: 15:04  
 Sample: 2006 2018  
 Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IB	-10.09143	111.7318	-0.090318	0.9298
C	9496.745	1242.558	7.642898	0.0000
R-squared	0.712048	Mean dependent var		13618.46
Adjusted R-squared	0.654457	S.D. dependent var		5677.881
S.E. of regression	3337.621	Akaike info criterion		19.26308
Sum squared resid	1.11E+08	Schwarz criterion		19.39345
Log likelihood	-122.2100	Hannan-Quinn criter.		19.23628
F-statistic	12.36400	Durbin-Watson stat		0.361773
Prob (F-statistic)	0.001980			

Source: Authors computation from Eviews 9

#### 4.1 Hypothesis One

**H<sub>0</sub>:** Internet banking does not significantly affect the total asset growth of deposit money banks in Nigeria.

From table 4 the p-value of 0.9298 is greater than 0.05 therefore we accept the null hypothesis.

Internet banking does not significantly affect the asset growth of deposit money banks in Nigeria. The T-statistic value of -0.090318 is less than 2, showing that the effect of internet banking on asset growth of deposit money banks in Nigeria is not significant.

Table 5 reveals that ATM operation has a positive impact on asset growth of deposit money banks in Nigeria with a regression coefficient 37.13510. It implies that increase in ATM operation would lead to increase in the asset growth of deposit money banks in Nigeria. The r-squared value 0.943205 shows that only about 94% of the variation in asset growth of deposit money banks is explained by ATM operation.

#### 4.2 Hypothesis Two

**H<sub>0</sub>:** ATM operation has no significant effect on the total deposit and asset growth of deposit money banks in Nigeria.

From Table 5 the p-value of 0.0000 is less than 0.05 therefore we reject the null hypothesis. ATM operation has a significant effect on the total deposit and asset growth of deposit money banks in Nigeria. The T-statistic value of 7.110637 is greater than 2 showing that the relationship between ATM operations and total deposit/assets growth of deposit money banks in Nigeria is significant.

Table 6 reveals that POS transactions have a positive impact on asset growth of deposit money banks in Nigeria with a regression coefficient 1.334829. It implies that increase in POS transactions would lead to increase in the asset growth of deposit money banks in Nigeria. The r-squared value 0.943205 shows that only about 94% of the variation in asset growth of deposit money banks is explained by POS transactions.

#### 4.3 Hypothesis Three

**H<sub>0</sub>:** POS Transactions have no significant influence on asset growth of deposit money banks in Nigeria.

From Table 6, the p-value of 0.9393 is greater than 0.05 therefore we accept the null hypothesis. POS Transactions have no significant influence on asset growth of deposit money banks in Nigeria. The T-statistic value 0.078107 is greater than 2 showing that the relationship between POS transactions and total deposit of deposit money banks in Nigeria is insignificant.

#### 4.4 Discussion of Findings

The findings of the study revealed that internet banking has a negative and statistically insignificant effect on asset growth and total deposit of deposit money banks. However, the findings tend to disagree with researcher priori expectation. It is also not in consonance with the work of Abubakar, [15] who found a statistically significant relationship between internet banking and liquidity of deposit money banks in Nigeria. However, it aligns with a more recent work by Babatunde and Salawudeen [12], who found an insignificant relationship between e-banking and security of financial transactions of the banking industry in Nigeria. ATM transactions were seen to have a positive and significant influence on asset growth of deposit money banks in Nigeria. The finding tend to disagree with the researcher's priori expectation of the study.

**Table 5. Regression Output Data: ATM operation and asset growth of deposit money banks in Nigeria**

Dependent Variable: TA  
 Method: Least Squares  
 Date: 11/28/19 Time: 15:07  
 Sample: 2006 2018  
 Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<b>ATM</b>	<b>37.13510</b>	<b>5.222471</b>	<b>7.110637</b>	<b>0.0000</b>
POS	1.334829	17.08985	0.078107	0.9393
C	9703.313	1474.258	6.581828	0.0001
R-squared	0.943205	Mean dependent var		22590.31
Adjusted R-squared	0.931846	S.D. dependent var		10871.56
S.E. of regression	2838.157	Akaike info criterion		18.93887
Sum squared resid	80551378	Schwarz criterion		19.06924
Log likelihood	-120.1027	Hannan-Quinn criter.		18.91207
F-statistic	83.03627	Durbin-Watson stat		1.366130
Prob(F-statistic)	0.000001			

Source: Authors computation from Eviews 9



**Table 6. Regression Output Data: POS transaction and asset growth of deposit money banks in Nigeria**

Dependent Variable: TA  
 Method: Least Squares  
 Date: 11/28/19 Time: 15:07  
 Sample: 2006 2018  
 Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	37.13510	5.222471	7.110637	0.0000
<b>POS</b>	<b>1.334829</b>	<b>17.08985</b>	<b>0.078107</b>	<b>0.9393</b>
C	9703.313	1474.258	6.581828	0.0001
R-squared	0.943205	Mean dependent var		22590.31
Adjusted R-squared	0.931846	S.D. dependent var		10871.56
S.E. of regression	2838.157	Akaike info criterion		18.93887
Sum squared resid	80551378	Schwarz criterion		19.06924
Log likelihood	-120.1027	Hannan-Quinn criter.		18.91207
F-statistic	83.03627	Durbin-Watson stat		1.366130
Prob(F-statistic)	0.000001			

Source: Authors computation from Eviews 9

However, the finding tends to agree with the findings of Kehinde [8], who found that electronic banking has a significant relationship with operations of banks in Nigeria. The finding disagrees with that of Abaenewe et al [9] who found an insignificant relationship between e-banking and return on asset of deposit money banks in Nigeria.

The finding also revealed that point of sale has a positive and insignificant influence on the asset growth of deposit money banks. The findings tend to be out of line with the researchers' priori expectation. However, the findings tend to match with the findings of Babatunde and Salawudeen, [12], who found that e-banking has a positive relationship with customers' satisfaction. The finding also disagrees with Abubakar, [15] who found a negative relationship between point of sale and liquidity of deposit money banks in Nigeria.

## 5. CONCLUSION

This research was undertaken to show the influence of electronic banking on the growth of deposit money banks operations in Nigeria. This study was anchored on the technology acceptance model (TAM). The growth rates of total deposits and total assets of DMBs were used as the dependent variables while internet banking, ATM operations and POS transactions stood as the independent variables. Secondary data relating to the variables were sourced from the CBN annual reports and accounts and CBN

statistical bulletin. The ordinary least square (OLS) regression model was adopted for the empirical analysis. The study showed that internet banking does not significantly affect deposit growth of deposit money banks. The study further revealed a significant influence of ATM operations and POS transactions on the asset growth of deposit money banks.

## 6. RECOMMENDATIONS

Based on the conclusions of the study, the following recommendations are made for consideration by deposit money banks and regulatory bodies:

1. Banks that are yet to fully adopt internet banking should do so as a matter of urgency if they must grow, remain relevant, competitive and profitable.
2. Banks that seek to improve their deposit growth performance must offer numerous products/services through mobile phones in an effective, efficient and cost effective manner. They should also make mobile banking applications applicable to all mobile phones so that those customers who cannot afford Java enabled mobile phones and smart phones can also use the product.
3. There should be aggressive awareness about the use of smart cards for banking operations and banks should also improve

the number of services that ATM can offer the banking public.

4. The Central Bank of Nigeria should ensure that guidelines in respect of POS transactions are properly adhered to.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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## APPENDICES

Table A1. Deposits and assets of DMBS

Year	Total deposits of DMBS (TD)	Total assets of DMBS (TA)
	(₦' B)	(₦' B)
2000	859	1,748
2001	1,000	2,031
2002	1,281	2,479
2003	1,409	2,768
2004	1,797	3,393
2005	2,546	4,389
2006	3,442	6,738
2007	5,363	10,469
2008	8,703	15,343
2009	10,000	14,795
2010	10,837	15,544
2011	12,330	18,208
2012	14,390	20,071
2013	16,772	23,202
2014	18,023	26,275
2015	17,510	27,019
2016	18,560	35,400
2017	19,380	38,530
2018	21,730	42,080

Source: CBN banking supervision annual accounts and NDIC reports

Table A2. Volume of e-transactions

Year	Internet banking (WEB)	Mobile banking	ATM	POS
	(₦' m)	(₦' m)	(₦' m)	(₦' m)
2006	0.5	0.4	0.2	0.3
2007	0.9	0.7	15.7	0.4
2008	1.6	3.2	60.1	1.2
2009	2.7	1.8	109.6	0.9
2010	7.2	1.2	186.2	1.1
2011	3.6	1.9	347.6	2.1
2012	2.3	1.5	375.5	2.6
2013	2.9	15.8	295.4	9.4
2014	5.6	27.7	400.3	20.8
2015	8.0	43.9	433.7	33.7
2016	14.1	47.1	590.2	63.7
2017	29.0	47.8	800.6	146.3
2018	50.8	59.9	875.5	295.9

Source: CBN reports and account

**Table A3. Value of e-transactions**

<b>Year</b>	<b>ATM (₦' B)</b>	<b>Internet banking (WEB) (₦' B)</b>	<b>POS (₦' B)</b>	<b>Mobile Banking (₦' B)</b>
2006	121.5	15.3	5.2	0.1
2007	131.6	10.6	6.4	0.01
2008	399.7	25.1	16.1	0.7
2009	548.6	84.2	11.0	1.3
2010	954.0	99.5	12.7	6.7
2011	1,561.8	58.0	31.0	20.5
2012	1,985.0	31.6	48.5	31.5
2013	2,830.5	47.3	161.2	142.8
2014	3,682.0	74.2	312.1	339.2
2015	3,971.7	91.6	448.5	442.4
2016	4,988.1	132.4	759.0	756.9
2017	6,437.6	184.6	1,409.8	1,102.0
2018	6,480.1	404.6	2,383.1	1,236.1

*Source: CBN reports and accounts*

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