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Effect of Information Technology on Performance of Deposit Money Banks in Nigeria

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Abstract

Research purpose: The paper empirically studied the effect of information technology (IT) on performance of DMBs in Nigeria. Specifically, it ascertained the effect of electronic payment platforms such as automated teller machine transaction, point of sales payment system, web payment and mobile payment system on profit for the year of deposit money banks in Nigeria.

Methodology: It adopted an *ex-post-facto* research design, covering a period of 14 years (2009 – 2022). Data collated from World Bank Database, CBN Statistical Bulletin and audited annual reports of the sampled banks were diagnosed and analyzed using relevant statistical tools including panel least squares, stationarity and cointegration tests.

Findings: Findings indicated that although the cumulative impact of the regressors on the dependent variable is significant (t-statistic = Wald chi^2 =14.46; p-value = p > |z| =0.0249 < 0.05), individual effect (is nonsignificant except for automatic teller machine (p-value = 0.002, t-statistic = -3.06), natural logarithm of total assets (p-value = 0.027, t-statistic = 2.20) and natural logarithm of total e-payment (p-value = 0.017, t-statistic = -2.38) that exerted very strong effects on the same regressand. In other words, the influence of the control variables is statistically relevant.

Conclusion and Recommendation: It means that use of information technology in DMBs should be encouraged.

Keywords: *Information Technology, E-Payment Systems, Profitability, DMBs*

1.0 INTRODUCTION

For a long time now, the Nigerian banking sector has advanced in the use of technology for service delivery. Adoption of information technology enrolls the banking sector into the global and digital world, and by extension, affects their operations in various aspects such as effectiveness, efficiency, competitiveness, customer base and globalization of the bank (Chukwukaelo, Onyeiwu and Amah, 2018). Incorporation of information technology in banking operations entail the use of electronic banking channels such as payment cards (debit or credit), mobile phones, online web portals, point of sales (POS) terminals, automated teller machines (ATM), point of sale (POS), mobile money transfer (MMT) and online money payment (WEB), amongst others (Mustapha, 2018). This was not only hoped to improve the banks performance, but to make banking operations easier by reducing the long queues in banks, delay in attending to customers, inability to properly sort out transactions and customer's general loss of trust in banks, thereby preparing Nigerian banks to compete favorably with other banks world over. Also, the use of information technology in the banking system makes it easy for bank managers to monitor bank activities including transactions with less stress.

Consequently, the reason for adoption of information technology in the banking system also extends to ensuring easy and cheaper communication during transaction, fostering customer-bank relationship, enhance customer satisfaction, improve operational efficiency, reduce the running cost, reduce transaction time, provide security to investors fund and promote other financial services in the bank aimed at increasing the banks' profitability (Morufu, 2016). Further, the banking industry believes that by adopting the new technology – e-banking, the banks would be able to improve customer service level and tie their customers closer to the bank (Obiekwe and Anyanwaokoro, 2017). This study is, however, focused on ascertaining the effect of information technology on DMBs performance in Nigeria.

The fact that internet banking is fast gaining acceptance in the Nigerian banking sector does not assuredly signify improved banks performance nor would conspicuous use of the internet as a delivery channel make it economically viable, productive or profitable. Recently, it was observed that adoption of the e-banking system has brought about positive as well as negative transformation into the banking sector. In

spite of the countless benefits of ICT on various sectors and sub-sectors of the Nigerian economy, consensus is still yet to be reached on whether adoption of ICT, particularly in the banking sub-sector, has translated into increased financial appreciation in the sub-sector. Researchers and bank managers/operators are worried as to whether cost and other challenges of adopting information technology can be justified by performance. As a result, some authors discovered positive effect of adoption of information technology on bank performance, while other authors provided that the influence of information technology on bank performance is negative.

Though efforts exit to ensure that customers reap benefits of e-banking, they still lament on areas like malfunctioning automated teller machines (ATMs), internet network failure, online theft and fraud, non-availability of financial service, payment of hidden cost of electronic banking like short message services (SMS), mandatory acquisition of ATM cards and non-acceptability of Nigerian cards for international transaction amongst others. Moreover, while some people advocate the benefits attached to e-banking systems, others lament that e-banking poses more dangers to their banking operations. For instance, an automated teller machine (ATM) rather than reducing the rate of carrying cash, increases the same, because with an ATM card, they have access to cash anywhere. Moreover, many believe it indulges them into engaging in extravagant spending.

Despite the adoption of e-banking, it is observed that banks are still finding it difficult to meet the expectations of their customers as regards service delivery. There are still the issues of long queues in banks, delay in attending to customers, inability to properly sort out transactions and customer's general loss of trust in banks. With all these challenges, the question has remained, how and to what extent has information technology influenced banks performance in Nigeria? It provides answers to this question by empirically investigating the effect of information technology (IT) on performance of banks in Nigeria.

2.0 REVIEW OF RELATED LITERATURE

2.1 Conceptual Review

Information Technology in Electronic Banking: The newest information technology in the banking sector is electronic banking (e-banking). Electronic banking, otherwise called e-banking for short, is the use of electronic means to deliver banking services (Okoro, 2014), mainly through the internet. It is the best innovation that has happened in the banking industry in the 21st Century. This innovation has made banking possible even outside banking premises. With e-banking method, different banking transactions such as purchase of airtime, account opening, transfer and receipts of funds, balance enquiry and payment of bills can be completed or initiated anywhere by the use of various electronic devices like mobile phones, automated teller machines, point-of-sale systems, smart televisions, computers, tablets, among others (Ene, Abba and Fatokun, 2019). This present study utilized Automated Teller Machine (ATM) payment method, Point-of-Sale (POS) payment method, Web Based Transactions (WBT) and Mobile Banking (MoB) electronic banking methods.

Automated Teller Machine (ATM): Automated Teller Machine (ATM) is a machine where cash withdrawal can be made over the machine without going into the banking hall. According to Orji, Ogbuabor, Okon and Anthony-Orji (2018), Automated Teller Machine (ATM) are computer-enhanced telecommunication machines that permit bank customers to have accessibility to cash and perform financial transactions, usually situated in public places and in the enclosure of banks. Particularly the most prominent form of e-payment system in Nigeria is the Automated Teller Machine (ATM) card. An increase in the number of ATMs leads to an increase in the volume and value of transactions. The increase in the volume and value of ATM transactions enhances the payment system in turn, which leads to banking sector performance. Some of the services offered by an ATM include withdrawal of funds, account balance inquiry, transfer of funds, and top-up on airtime for mobile phones etc.

Point-of-Sale (POS): It is a form of e-payment that handles balance inquiry, payment for goods and services, and electronic fund transfer at a specific point of sale. It allows customers to make payment for goods and services to clients known as merchants, in the premises of the merchants (Okechi and Kepeghom, 2013). It is sometimes referred to as point of purchase (POP) or checkout as the location where a transaction occurs. A 'checkout' refers to a POS terminal or more generally to the hardware and software used for checkouts, the equivalent of an electronic cash register. According to

InterSwitch Ltd (2011), the POS terminal is a machine that has a display screen, a barcode scanner, and a card reader. It is a portable device that allows customers with cards (such as ATM cards) to carry out banking transactions outside the bank's environment.

Web Payment System: According to Mamudu and Gayovwi (2019), the Web (E-transfers) refers to electronic transfers which can be affected via the internet on Personal Computers (PCs), laptops and other devices. The web payment system provides the individual with the opportunity of paying bills and performing transactions of any kind through personal electronic devices. In the work of Worku, Tilahun and Tafa (2016), the web banking allows customers of a financial institution to conduct financial transactions on a secure website operated by the institution, which can be a retail or virtual bank, credit union or society. It may include any transactions related to online usage. Banks increasingly operate websites through which customers are able not only to inquire about account balances, interest and exchange rates but also to conduct a range of transactions.

Mobile Banking (MoB): Mobile banking (also known as M-banking) is a term used for performing balance checks, account transactions, payments, credit applications and other banking transactions through a mobile device such as a mobile phone or personal digital assistant (PDA). Mobile banking (MB) is the process whereby formal banking transactions are carried out through the use of telephone and mobile phones. Mobile banking allows its customers to conduct some financial transactions remotely using a mobile device such as a mobile phone or tablet. The scope of offered services may include facilities to conduct bank and stock market transactions, to administer accounts and to access customized information (Tiwari and Buse, 2007). Mobile banking does not handle transactions involving cash, and a customer needs to visit an ATM or bank branch for cash withdrawals or deposits. Many apps now have a remote deposit option; using the device's camera to digitally transmit cheques to their financial institution.

Performance Indicator-Profit for the Year: Performance is one of the key determinant factors that are widely used in measuring the success or failure of any organization (Adebawojo, Enyi and Adebawo, 2015). Generally, performance of an organization can be categorized into: human resource which is measured in terms of turnover;

organizational category which is measured in terms of productivity, quality, customers' satisfaction and so on. The 'profit for the year', formerly referred to as 'profit after tax' is a fundamental figure that a financial analyst or value investor would consider before making an investment decision. It is the final, residual amount of profit generated by an organization. The year profit is a better indicator of the bank's annual profit, hence, adopted in this study.

2.2 Theoretical Framework

Technological Acceptance Model: The Technology Acceptance Model (TAM) was propounded by Fred Davis in 1989. The model explains how individuals accept new technology. Particularly, it argued that consumers' attitude towards using modern technology is influenced by perceived usefulness and perceived ease of use. As a result, the model is hinged on two key beliefs, perceived usefulness (U) which has to do with the extent a person believes that using a particular technology will enhance her/his job performance and perceived ease of use (EOU) which expresses the degree to which a person believes that using a technology will be free from effort. Also, the Technology Acceptance Model (TAM) proposes that external factors affect intention and actual use. Although the TAM did not consider the costs of acquiring a modern technology; that an organization may be willing to adopt a modern technology but may not have adequate resources (financial or human) to do so, it is relevant to this study as it centers on adoption and deployment of e-banking facilities in Nigeria.

Bank Focused Theory: It was propounded by Kapoor in 2010. It grows on the ground that banks use non-traditional but conventional low-cost delivery channels to provide services to its numerous customers. Such channels include the automated teller machines (ATMs), internet banking and point of sale (POS) among others. By making use of these channels, the bank offers a wide range of services to its customers not minding the location and branch where the customer is. The only thing required is to input the needed information into the system and the transaction is concluded. This theory supports this study since the emphasis here is on electronic platforms as a means of delivering services.

This study is however underpinned to the *Bank Focused Theory* which uncovers that banks use conventional low-cost delivery channels to provide services to its numerous customers.

2.3 Empirical Review

Using Panel Least Squares (PLS) estimation technique, Obiekwe and Anyanwaokoro (2017) investigated the effect of Electronic Payment Methods (EPM) on the profitability of commercial banks in Nigeria. Data was collected from the Central Bank of Nigeria (CBN) Statistical Bulletin and annual reports and statements of accounts of the five banks for the period of 2009 to 2015. The finding revealed that automated teller machines (ATM) and mobile phone payment have a significant effect on the profitability of commercial banks in Nigeria. However, point of sale (POS) has an insignificant effect on commercial banks' profitability in Nigeria. Mujuri, Kibet and Kiprop (2018) employed the autoregressive distributed lag (ARDL) technique based on the Bounds testing approach to investigate the impact of financial innovation on demand for money function in Kenya, utilizing data from 2008 to 2016. Finding showed that financial innovation impacted positively on demand for money function in Kenya. Specifically, the volume of ATMs exerted a positive and significant effect on demand for money in Kenya.

Orji, Ogbuabor, Okon and Anthony-Orji (2018) employed SURE model to investigate the impact of electronic banking innovation and selected banks performance in Nigeria using data sourced from Central Bank of Nigeria publications, National Bureau of Statistics publications and the sampled commercial banks' annual report and statement of accounts between 2007 and 2016. The result revealed that automated teller machine transactions, point of sale transactions, and mobile banking transactions are major e-banking innovations that contribute to old and new banks' performance in Nigeria. Ugbede, Yahaya and Edicha (2019) examined the effects of electronic payment on financial performance of deposit money banks in Nigeria. The study used secondary sourced data obtained from the annual reports and statistical bulletin of the Central Bank of Nigeria. Multiple regression analysis techniques were employed in the data analysis. Result provided that ATM does not contribute significantly to profitability of the sampled banks, while POS and internet banking contribute positively and significantly to bank profitability, and is also statistically significant to banks profitability in Nigeria.

Eze and Egoro (2016) carried out an empirical investigation on the impact of electronic banking on the profitability of commercial banks in Nigeria. The study regressed four

e-banking channels (automated teller machines, electronic mobile banking, internet banking transactions, and point of sales services) on profit before tax of commercial banks operating in Nigeria between 2006 and 2014. Analytical technique used was the error correction model (ECM) mechanism. Results uncovered that the overall impact of electronic banking on bank profitability was statistically significant. However, the individual estimate shows that automated teller machines and electronic mobile banking impact positively and insignificantly on profit before tax, internet banking transactions impact negatively and insignificantly on profit before tax while the impact of point of sales services on profit before tax is positive and statistically significant. Ganjikhah, Rabiee, Moghaddam and Vahdat (2016) carried out a comparative analysis of bank's ATM and POS technologies by customers. Using descriptive statistics, the study revealed that people use points of sale rather than ATMs. In most components, ATMs showed higher acceptance than points of sale. Only in self-efficacy, perceived joy and result demonstrability, points of sale were higher than ATMs. In anxiety and behavioral intention components, there was a meaningful difference between points of sale and ATMs regarding acceptance.

An empirical investigation carried out by Chukwukaelo, Onyeiwu and Amah (2018) regressed performance of Deposit Money Banks (proxy by return on equity) on electronic banking (e-banking) channels: automatic teller machines, point of sales, internet banking transactions and electronic mobile banking for the period of 2006-2016. Outcome of the panel generalized method of moment (GMM) regression technique exposed that ATM, POS, WBT and internet banking (INTBANK) have positive and significant influence on the profitability (proxy by ROE) of deposit money banks in Nigeria; thus, the need for optimal deployment of these services to customers. Covering the period from 2009 to 2018, Nwakoby, Okoye, Ezejiofor, Anukwu and Ihediwa (2020) empirically studied the link between electronic banking and profitability of deposit money banks in Nigeria. Analytical technique employed was ordinary least squares multiple regression while the findings revealed that ATM and POS payment methods have negative and insignificant effect on return on equity of deposit money banks in Nigeria, while mobile banking payment (MPAY) has positive and significant effect on return on equity of deposit money banks in Nigeria.

By adopting both inferential and descriptive design using a t-test, Dabwor, Ezie and Anyatonwu (2017) investigated the effect of ICT adoption on the competitive performance of banks in an emerging economy in Nigeria. Results revealed a positive relationship exists between ICT and banks performance in Nigeria. This implies that a marginal change in the level of the investment and adoption of ICT such as (Automated teller machine, Web based transactions, and mobile payments) in the banking industry resulted in a proportionate increase in the profit level. Nwakoby, Sidi, and Ofobruku (2018) employed a log-linear regression model to empirically investigate the impact of Information and Communication Technology (ICT) on the performance of deposit money banks in Nigeria. Proxies used for ICT were ATM, POS, mobile money (MM), web payment (WP), and interbank transfer (IBT) usages while bank performance was represented by ROE. Sample period covered was 2006-2015. However, findings uncovered that ATM, MM and WP impact negatively and insignificantly on ROE of deposit money banks while the impact of POS and IBT on ROE of deposit money banks in Nigeria was positive and statistically significant.

Saleem, Akhter, Baber, Bashir and Haider (2019) examined the impact of cashless banking on profitability in the banking industry of Pakistan from 2013- 2018. Using ratio analysis, cashless banking (point of sales transactions, mobile banking transactions and internet banking transactions) has a very significant impact on the profitability of the selected banks in the banking industry of Pakistan. Using ordinary least squares (OLS) regression as the estimation method within the cointegration, granger causality, and error correction modeling, Jonah, Egbe and Richard (2020) examined the impact of financial innovation on money demand in Nigeria. The study covered a period of 11 years (2009-2019). Finding showed that financial innovation has a mixed impact on money demand in Nigeria during the period of analysis. For instance, financial innovation has a positive impact on money demand through the value of ATM transactions in the current period, two lagged periods of mobile banking transactions, etc.

Using descriptive statistics, Bezhovski (2016) examined the future of mobile payment as electronic payment services. The study concluded that for a promising future of this industry, mobile payment systems have to be better integrated with present telecommunication and financial infrastructures. Leila, Rezaei and Razmi (2019)

investigated the effect of electronic payment systems on the performance of the financial sector in selected Islamic countries. Using panel analysis, results showed that all electronic payment indicators including mobile bank, internet bank, bank card, POS machine and ATM positively and significantly affect the financial sector performance. Also, economic growth and population have a significant positive effect on financial sector performance, while inflation and interest rate negatively and significantly affect it.

Simatele and Mbedzi (2021) employed descriptive and logit analysis to investigate consumer payment choices, costs, and risks in Zimbabwe. Finding revealed a strong preference for cash, coupled with cash shortages and inadequate infrastructure for electronic payments, has resulted in a multitiered pricing system, with significant premiums for digital payments. This perverse effect counters the heavily lauded benefits of mobile payments in developing countries. Khamees (2023) examined the effectiveness of information technology governance on improving financial performance of banks (2015-2019) in Jordan using a survey sample of 23 banks and structured questionnaires. Data analysis revealed no significant relationship exists among organizational competition, information technology governance and bank performance. Saeed and Ahmed (2023) critically explored the influence of information technology on financial performance of commercial banks via faithful representation of the accounting information system. Applying the autoregressive distributed lag (ARDL) model, results indicated a joint significant effect of both faithful representation and information technology on profitability of these banks.

3.0 METHODOLOGY

The study employed an ex-post facto research design. It was carried out in Nigeria using a 14 year (2009-2022) panel data set extracted from audited annual reports of the sampled banks, Central Bank of Nigeria Statistical Bulletin and World Bank Database. The population of the study is twenty-nine (29) deposit money banks quoted on the Nigerian Exchange Group as at December 31, 2023. The sample for study is eleven (11) out of thirteen (13) deposit money banks, a subsector in the financial services sector of the Nigerian exchange group which were purposely selected to avoid missing values in the dataset. The panel least squares regression, specifically,

Prais-Winsten regression, correlated panels corrected standard errors (PCSEs) is adopted after carrying out necessary diagnostic tests.

$Y = \beta_0 + \beta_i X_i + \mu_t$ - - - - - - - (3.1)

where,

Y = *Dependent Variable,*

β_0 = *Intercept of the regression equation,*

β_i = *Coefficient of X in the regression equation,*

X_i = *Independent variables,*

μ_t = *Disturbance and error term.*

Hence, PFTYTTA $= f(ATMTEPAY, POSTEPAY, WEBTEPAY, MOBTEPAY, \mu_t)$ - - - - (3.2)

PFTYTTA is profit for the year deflated by total assets, ATMTEPAY = ATM deflated by total e-payment, POSTEPAY = POS deflated by total e-payment and so on.
Control variables = LnTA (natural logarithm of total assets) and LnEPAY (natural logarithm of electronic payments.

4.0 RESULTS

Table 1: Descriptive Statistics and Normality Tests

Var.	*Obs.*	*Mean*	*Std. Dev.*	*Std. Err.*	*Pr (Skew)*	*Pr (Kurt)*	*Joint Pr>Chi²*	*Shapiro W Pr>Z*	*Shapiro F Pr>Z*	*Min*	*Max*
pftytta	154	.0150	.0284	.0023	.0000	.0010	.0000	.0000	.0000	-.0953	.2424
atmtepay	154	.0446	.0265	.0021	.3772	.0000	.0000	.0000	.0000	.0057	.0783
postepay	154	.0082	.0073	.0006	.0000	.2353	.0001	.0000	.0000	.0004	.0265
webtepay	154	.0610	.1493	.0120	.0000	.0000	.0000	.0000	.0000	.0003	.5054
mobtepay	154	.0127	.0182	.0015	.0000	.0000	.0000	.0000	.0000	.0000	.0717

lnta	154	14.155	1.337	.1078	.0000	.0035	.0000	.0000	.0000	
9.750	16.522									
lnepay	154	11.643	1.546	.1245	.0007	.0000	.0000	.0000	.0000	
9.910	14.329									

Source: Authors' STATA 14.2 Outputs

Table 1 above depicted the mean as a measure of the true population where extreme values are absent. Values of standard errors are very small in comparison to their respective means, given that means, standard deviations and standard errors exist in the same metrics. Specifically, the standard errors are quite small and aligned to the theory that it becomes smaller as a normal sample approximates to the true population. However, the standard deviations of the most variables are nearly equal to or even larger than their respective means, excluding the control variables. Further, the probabilities of skewness, kurtosis, joint (both moments), Shapiro-Wilk W and Shapiro-Francia W for the all entered variables are below 0.1% excluding probability of skewness for atmtepay at 0.3772 and probability of kurtosis for postepay at 0.2353. The range (.3377, .0726, .0261, .5051, .0717, 6.772, and 4.419) is undulating for the relevant period. In other words, these values are normally distributed.

The Pearson correlation coefficients measure the degree of association between the different variables (see Appendix III). Probability of each correlation coefficient is beneath each. Further, the P-values that are less than 5% show strong statistical significance. Results portray negative nonsignificant influences of all predictors excluding lnta on pftytta (roa). Further, there exist perfect relationships among explanatory variables signaling collinearity issues. Fortunately, there are no lagged values and collinearity diagnostics can apply. The Breusch-Pagan test result for heteroskedasticity for the model specification demonstrated that the variance of the error term in the model is non – constant. In other words, i.e. p-value = 0.0000 is less than 5% and signified the acceptance H_A: non-constant variance: heteroskedasticity. If this is not corrected, it leads to biased standard errors. It is adjusted through adopting the robust command while executing the regression to arrive at robust standard errors. The variance inflation factor measures the degree of (strong) linear relationship between one predictor variable and one or more explanatory variables. Montgomery and Peck (2007) hinted that when 5 < VIF < 10, the regression coefficients

are weakly estimated. The explanatory variables have resultant variance inflation factors ranging between 1.16 and 3.78 (mobtepay is removed) and a mean VIF of 2.71 < 5.0. Ramsey Reset test is used to detect if the all-inclusive model is either under-specified or over-fitted. It is done by removing one or more explanatory variables and re-running the regression. Inspecting the old and new residuals has shown that the model is not over-fitted. In other words, the P-value = 0.0753 > 0.05 connotes rejection of the alternative hypothesis (H_A) and accepting Ho i.e. the model has no omitted variables.

Table 2: Panel Data Stationarity Tests

Levin-Lin-Chu unit-root test for all the Variables based on Augmented Dickey-Fuller tests

Ho: All panels contain unit roots Number of panels (N) = 11

Ha: Panels are stationary Number of periods (T) = 14

Asymptotics: T / N 0

Var	Panel-unadjusted ADF	1%	5%	P-values	Lags
pftytta	-17.910	-3.473	-2.880	0.000	1
atmtepay	-7.253	-3.473	-2.880	0.010	1
postepay	-4.367	-3.473	-2.880	0.620	1
webtepay	-3.068	-3.473	-2.880	1.000	1
mobtepay	3.025	-3.473	-2.880	1.000	1
lnta	-0.067	-3.473	-2.880	0.879	1
lnepay	-2.720	-3.473	-2.880	0.524	1

Source: Authors' STATA 14.2 Outputs

Table 2 portrays the Levin-Lin-Chu unit-root test which assumes that the ratio T / N approaches zero given that the number of panels (DMBs) is greater than the time periods. At 95% confidence limit both the p-values and adjusted t-statistics strongly suggest presence of a unit root in five predictors excluding pftytta and atmtepay that passed the stationarity tests at 1% level of significance. That is, the all-inclusive model (is non-stationary) does not have constant mean, variance and covariance (no autocorrelation) among periods of equal distance.

Table 3: Single Equation Cointegration Tests

Series: pftytta atmtepay postepay webtepay mobtepay lnta lnepay

Sample: 1 154 Included observations: 154

Null hypothesis: Series are not cointegrated Cointegrating equation deterministics: C

Automatic lags specification based on Schwarz criterion (maxlag=13)

	tau-statisti			
dependent	c	prob.*	z-statistic	prob.*
pftytta	-10.68785	0.0000	-130.8499	0.0000
atmtepay	-1.812847	0.9950	-9.906743	0.9861
postepay	-2.166944	0.9841	-15.66389	0.8967
webtepay	-1.321421	0.9990	-4.315020	0.9996
mobtepay	-0.688502	0.9999	-1.553276	1.0000
lnta	-0.646225	0.9999	-2.250302	0.9999
lnepay	-0.940607	0.9997	-2.344167	0.9999

Source: Authors' STATA 14.2 Outputs

Table 3 portrays the values of tau-statistic, z-statistic and their p-values. Since the p-values for all entered variables (excluding pftytta) exceed $P < 0.05$, it implies that predictor variables are not cointegrated with pftytta signaling no long-run relationship existing between them. In other words, for the entered variables, it is not necessary to run an error correction model.

Test of Hypotheses (All expressed in Null Forms)

i. Automated teller machine (atmtepay) transactions value exerts nonsignificant effect on profit for the year (pftytta) of deposit money banks (DMBs) in Nigeria.

ii. Point of sales (postepay) transactions value has no significant effect on profit for the year of DMBs in Nigeria.

iii. Web payment (webtepay) transaction value has no significant effect on profit for the year of DMBs in Nigeria.

iv. Mobile (mobtepay) transactions value has no significant effect on profit for the year of DMBs in Nigeria.

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Table 4: Panel Least Squares Regressions

Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Group variable:	firm	Number of obs	= 154
Time variable:	year	Number of groups	= 11
Panels:	correlated (balanced)	Obs per group: min	= 14
Autocorrelation:	common AR(1)	avg	= 14
		max	= 14
Estimated covariances	= 66	R-squared	= 0.0650
Estimated autocorrelations	= 1	Wald chi2(6)	= 14.46
Estimated coefficients	= 7	Prob > chi2	= 0.0249

pftytta	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
atmtepay	-.4045467	.1323721	-3.06	0.002	-.6639912	-.1451022
postepay	.5978891	.7325017	0.82	0.414	-.8377879	2.033566
webtepay	-.0135472	.0429592	-0.32	0.752	-.0977456	.0706512
mobtepay	-.0409536	.4343248	-0.09	0.925	-.8922146	.8103074
lnta	.0044628	.0020242	2.20	0.027	.0004954	.0084301
lnepay	-.0070854	.0029742	-2.38	0.017	-.0129147	-.0012561
_cons	.0479808	.0433013	1.11	0.268	-.0368882	.1328498
rho	.5345913					

Durbin-Watson statistic (original) 1.16 Durbin-Watson statistic (original) 1.94

Table 4 above indicated that although the cumulative impact of the regressors on the dependent variable is significant (t-statistic = Wald chi^2 =14.46; p-value = p > |z| =0.0249 < 0.05), individual effect (is nonsignificant except for automatic teller machine (p-value = 0.002, t-statistic = -3.06), natural logarithm of total assets (p-value = 0.027, t-statistic = 2.20) and natural logarithm of total e-payment (p-value = 0.017, t-statistic = -2.38) that exerted very strong effects on the same regressand. In other words, the influence of the control variables is statistically relevant. However, the R-squared = 7% showed that movements in the targeted variable are weakly explained by these explanatory variables.

5.0 CONCLUSION

The results of this study have proven that all predictors (excluding automated teller machine transactions) exerted nonsignificant effects on profit for the year deflated by total assets (basically return on assets) of DMBs in Nigeria. Remarkably, the two control variables have statistically significant influence on the predicted variable. These results are aligned to findings of Jonah, Egbe and Richard (2020), Kibet and Kiprop (2018). These study findings are, however, opposed by those of Leila, Rezaei and Razmi (2019), Saleem, Akhter, Baber, Bashir and Haider (2019), Ugbede, Yahaya and Edicha (2019). It seems withdrawing cash from ATM and other services at lowest

costs ensured its relevance continually. Nigerians believe in cash, gold and other physical assets, not fabled secondary instruments.

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APPENDIX I: RAW / COLLATED / PROCESSED DATA

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APPEDIX III: RESULTS OF SOFTWARES

Variable	Obs	Mean	Std. Dev.	Min	Max
pftytta	154	.0149363	.028378	-.0953184	.2424154
atmtepay	154	.0445897	.0264962	.0057034	.0783445
postepay	154	.0081937	.0072845	.0003667	.0264673
webtepay	154	.0609682	.1492761	.0003245	.5054426
mobtepay	154	.0126696	.0182226	.0000422	.0716711
lnta	154	14.15501	1.337393	9.750453	16.52171
lnepay	154	11.64285	1.545541	9.909519	14.32864

Mean estimation Number of obs = 154

	Mean	Std. Err.	[95% Conf.	Interval]
pftytta	.0149363	.0022868	.0104186	.019454
atmtepay	.0445897	.0021351	.0403716	.0488078
postepay	.0081937	.000587	.007034	.0093533
webtepay	.0609682	.012029	.0372038	.0847325
mobtepay	.0126696	.0014684	.0097686	.0155706
lnta	14.15501	.1077702	13.9421	14.36792
lnepay	11.64285	.1245432	11.3968	11.8889

	pftytta	atmtepay	postepay	webtepay	mobtepay	lnta	lnepay
pftytta	1.0000						
atmtepay	-0.0713 0.3795	1.0000					
postepay	-0.0532 0.5121	-0.1462 0.0705	1.0000				
webtepay	-0.0353 0.6634	-0.4028* 0.0000	0.7490* 0.0000	1.0000			
mobtepay	-0.0405 0.6180	-0.3486* 0.0000	0.8795* 0.0000	0.9503* 0.0000	1.0000		
lnta	0.1939* 0.0160	-0.1454 0.0719	0.2966* 0.0002	0.3026* 0.0001	0.3199* 0.0001	1.0000	
lnepay	-0.0449 0.5800	-0.6334* 0.0000	0.6544* 0.0000	0.6804* 0.0000	0.7232* 0.0000	0.3449* 0.0000	1.0000

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
pftytta	154	0.0000	0.0000	.	0.0000
atmtepay	154	0.3772	.	.	.
postepay	154	0.0000	0.2353	18.56	0.0001
webtepay	154	0.0000	0.0000	57.05	0.0000
mobtepay	154	0.0000	0.0000	65.50	0.0000
lnta	154	0.0000	0.0035	23.81	0.0000
lnepay	154	0.0007	0.0000	29.15	0.0000

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
pftytta	154	0.63390	43.570	8.568	0.00000
atmtepay	154	0.85931	16.744	6.397	0.00000
postepay	154	0.89509	12.486	5.731	0.00000
webtepay	154	0.44043	66.595	9.532	0.00000
mobtepay	154	0.62307	44.859	8.635	0.00000
lnta	154	0.93223	8.066	4.739	0.00000
lnepay	154	0.87244	15.181	6.175	0.00000

Shapiro-Francia W test for normal data

Variable	Obs	W'	V'	z	Prob>z
pftytta	154	0.61569	49.633	7.509	0.00001
atmtepay	154	0.86185	17.841	5.674	0.00001
postepay	154	0.89549	13.498	5.158	0.00001
webtepay	154	0.43888	72.468	8.166	0.00001
mobtepay	154	0.62110	48.934	7.485	0.00001
lnta	154	0.93290	8.666	4.324	0.00001
lnepay	154	0.87475	16.176	5.493	0.00001

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of pftytta

chi2(1) = 23.07
Prob > chi2 = 0.0000

Ramsey RESET test using powers of the fitted values of pftytta
Ho: model has no omitted variables
F(3, 144) = 2.35
Prob > F = 0.0753

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	154	330.555	336.721	7	-659.4419	-638.1833

Note: N=154 used in calculating BIC

Variable	VIF	1/VIF
mobtepay	31.46	0.031785
webtepay	15.77	0.063401
postepay	7.91	0.126362
lnepay	3.80	0.262860
atmtepay	2.31	0.433535
lnta	1.16	0.864264
Mean VIF	10.40	

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Variable	VIF	1/VIF
lnepay	3.78	0.264684
postepay	3.41	0.293268
webtepay	2.89	0.346200
atmtepay	2.30	0.435242
lnta	1.16	0.864326
Mean VIF	2.71	

```
. xtset firm year
       panel variable:  firm (strongly balanced)
        time variable:  year, 2009 to 2022
                delta:  1 unit
```

Levin-Lin-Chu unit-root test for pftytta

Ho: Panels contain unit roots — Number of panels = 11
Ha: Panels are stationary — Number of periods = 14

AR parameter: Common — Asymptotics: N/T -> 0
Panel means: Included
Time trend: Not included

ADF regressions: 1 lag
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	-17.9099	
Adjusted t*	-12.3073	0.0000

Levin-Lin-Chu unit-root test for atmtepay

Ho: Panels contain unit roots — Number of panels = 11
Ha: Panels are stationary — Number of periods = 14

AR parameter: Common — Asymptotics: N/T -> 0
Panel means: Included
Time trend: Not included

ADF regressions: 1 lag
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	-7.2533	
Adjusted t*	-2.3180	0.0102

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Levin-Lin-Chu unit-root test for postepay

Ho: Panels contain unit roots		Number of panels =	11
Ha: Panels are stationary		Number of periods =	14
AR parameter: Common		Asymptotics: N/T -> 0	
Panel means: Included			
Time trend: Not included			
ADF regressions: 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			

	Statistic	p-value
Unadjusted t	-4.3670	
Adjusted t*	0.3064	0.6203

Levin-Lin-Chu unit-root test for webtepay

Ho: Panels contain unit roots		Number of panels =	11
Ha: Panels are stationary		Number of periods =	14
AR parameter: Common		Asymptotics: N/T -> 0	
Panel means: Included			
Time trend: Not included			
ADF regressions: 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			

	Statistic	p-value
Unadjusted t	-3.0679	
Adjusted t*	775.4297	1.0000

Levin-Lin-Chu unit-root test for mobtepay

Ho: Panels contain unit roots		Number of panels =	11
Ha: Panels are stationary		Number of periods =	14
AR parameter: Common		Asymptotics: N/T -> 0	
Panel means: Included			
Time trend: Not included			
ADF regressions: 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			

	Statistic	p-value
Unadjusted t	3.0248	
Adjusted t*	22.7896	1.0000

Levin-Lin-Chu unit-root test for lnta

Ho: Panels contain unit roots Number of panels = 11
Ha: Panels are stationary Number of periods = 14

AR parameter: Common Asymptotics: N/T -> 0
Panel means: Included
Time trend: Not included

ADF regressions: 1 lag
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	-0.0674	
Adjusted t*	1.1675	0.8785

Levin-Lin-Chu unit-root test for lnepay

Ho: Panels contain unit roots Number of panels = 11
Ha: Panels are stationary Number of periods = 14

AR parameter: Common Asymptotics: N/T -> 0
Panel means: Included
Time trend: Not included

ADF regressions: 1 lag
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	-2.7202	
Adjusted t*	0.0589	0.5235