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EFFECT OF FINTECH EXPENDITURE ON RETURN ON ASSET OF NIGERIAN DEPOSIT MONEY BANKS

AKINTUNDE H. A.; OLADEJO M. O.; AZEEZ J. A.; & OYELEYE K. W.

Department of Accounting, Ladoke Akintola University of Technology, Ogbomoso Oyo State

Corresponding Author:

mooladejo@lautech.edu.ng

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Abstract

In the last decades, financial markets and the economy have been experiencing an explosion of innovation and technologies modifying financial services and products, especially banking services. In the context of Nigeria's banking sector, previous studies centered around financial technology (FinTech) deployment whereas the current study focused on the critical issues surrounding the determinants of fintech expenditure and its consequential impact on the profitability listed deposit money banks (NDMBs). Primary and secondary data were used for the study. Primary data were collected through a well-structured questionnaire. Secondary data were extracted from abridge annual reports of selected NDMBs for the period 2008 to 2023. The population of the study according to the Nigerian Exchange Group (NGX) 2023 consists of 14 NDMBs out of which 9 were selected. Data collected were analyzed using descriptive, inferential statistics, Analysis of Variance (ANOVA) and panel

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regression analysis. Descriptive statistics of frequency and percentage were used to analyse the socio-economic characteristics of the respondents while inferential statistics such as ANOVA was used to evaluate factors influencing fintech expenditure in NDMBs. Result of regression analysis on the extent to which fintech expenditure affect return on asset showed that there is a significant relationship between CoS and ROA (p = 0.0208). It is therefore concluded there is significant relationship between fintech expenditure and return on asset of Nigerian deposit money banks. The study recommends that Nigerian deposit money banks should leverage scalable solutions and negotiate better terms with vendors to enhance the cost-effectiveness of their technology investments.

Introduction

In recent decades, financial markets and economies have witnessed a surge in innovation and technological advancements that have significantly transformed financial services, particularly in banking. Financial technology (fintech), as noted by Song et al. (2021), initially referred to computer technology used in the back offices of banks or trading firms. However, it now relies on modern information technologies such as blockchain, artificial intelligence (AI), big data, and the Internet of Things (IoT) to shape its business models. Fintech facilitates the seamless transfer of information, enhances processing speed, reduces costs, and continuously improves transactional lending (Cenni et al., 2015; Liberti & Peterson, 2019).

According to Verhoef et al. (2021), the rise of the e-commerce sector, along with emerging digital technologies like big data, AI, cloud computing, and robotics, has spurred the adoption of new technologies across organizations. Similarly, Papagiannidis and Marikyan (2020) argued that these technologies have redefined both inter- and intra-organizational communication, streamlined business processes, and brought benefits such as increased productivity, employee well-being, and customer satisfaction. To achieve these advantages, some companies have made substantial investments in

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technology, as suggested by Marikyan and Papagiannidis (2023). In the same context, Edo, Etu, Tenebe, Oladele, and colleagues (2023) highlighted that the COVID-19 pandemic led to a shift in lifestyle, with offsite financial transactions gaining traction in the fintech sector. Despite this, mobile financial transactions remain relatively low, and financial institutions are working to enhance the acceptance of financial digitalization (Edo et al., 2023).

The majority of past studies on the adoption of FinTech have concentrated on technological variables (Hu *et al*. 2019; Senyo and Osabutey 2020; Shaikh, *et al*. 2020). For instance, the TAM was extensively used in the research on the adoption of mobile services (Arias-Oliva, *et al*. 2019; Z. Hu et al. 2019; Patil, *et al*. 2018; Senyo and Osabutey 2020; Slade *et al*. 2015). According to Frost, (2020) in other economies, adoption can be related to the high cost of traditional finance, a supportive regulatory environment, and other macroeconomic factors. Finally, demographics play an important role, as younger cohorts are more likely to trust and adopt fintech services.

Studies exploring fintech impact on banks performance in developing economies like Nigeria are few and considered inadequate looking at the sensitive nature of banking services and centrality to nation's economy. Also, majority of the researchers employed theoretical approach and conclusions were made without quantitative technique. Furthermore, the empirical reviews showed that studies on fintech impact only considered the technology deployment with inadequate consideration on the related expenditure that exert influence on performance. More so the impact of fintech expenditure on banks profitability had received less attention in the Nigerian context. Other important proxies for financial technology deployment such as cost and risk element were neglected in previous studies. Therefore, this study will use a unique combination to proxy fintech expenditure which includes technical proficiency, cost of software acquisition, training cost, maintenance cost and leverage and bank size with percentage of usage of existing fintech in Nigeria to explain observed variation in banks return on assest proxies from 2007 to 2022.

Literature review

Financial Technology (FinTech)

Fin-tech is the abbreviation of financial technology interpreted as a combination of technology and financial services (www.bi.go.id). Hsueh and Kuo (2017) stated that financial technology could be referred to as Fin-tech, a new financial service model developed with IT innovation. Also, Dorfleitner, Hornuf, Schmitt, and Weber (2017) defined Fintech as a fast-moving industry with many different business models. It is an innovation that refers to modern technology to introduce practicality to facilitate access, convenience, and more economical costs (Ansori, 2019). Automated Teller Machines (ATMs) (Keuangan, 2017) are terminals or computers connected to the bank's communication network. They allow customers to conduct financial transactions independently without assistance from tellers or other bank staff. Technological developments have enabled banks to introduce ATMs that serve non-cash transactions, cash deposit transactions, and non-cash and cash deposit transactions

Nangin, *et al*. (2020) have noted that FinTech is closely linked to innovation in financial service delivery and the evolution of financial business models. Additionally, FinTech firms are more focused on technology than traditional financial institutions. Information technology allows consumers to access financial services quickly, conveniently, and at a lower cost. Furthermore, the study of Romanova and Kudinska (2016) suggests that FinTech is being adopted by both innovative IT firms and the traditional financial sector. The former includes firms that provide new financial services utilizing technology, while the latter includes insurance companies, banks, and brokerage firms. Both groups use technology to enhance their service offerings.

Fintech expenditure

Information systems technology can be viewed as a factor of production that can be substituted for traditional capital and labour, as the cost of information decreases, if substituted for labour, which historically has been a rising cost,

the IT substitutes for labour (Laudon and Laudon 1990) as the cost of IT decreases. ICT as a great investment involves investing money, time, intellect and others. There is a cost on acquiring the components such as the hardware, and setting up the software. Cost is incurred on maintenance of such components and elements. Additional cost is incurred on hiring of IT specialists and training of staff. As the technology continues to advance and with a reduction in the cost to build a FinTech app, the potential for further disruption in the Fintech sector is rather extensive. The FinTech marketspace is expected to reach $699.50 billion by 2030 while the number of digital banking users is projected to rise from $197 million in 2021 to $217 million in 2025 (Srivastava, 2023).

Furthermore, when an organization has most of its activities taken over by computers and other electronics, the number of staff needed may be reduced. This is a possible cost to the workers of such organizations and may lead to resistance to change, low job security and morale, thereby causing a high level of lack of productivity and inefficiency. The inefficiency of these kinds of workers can influence the overall success of the organization. Adoption and implementation of IT may not only affect the business and staff, but also the economy. If workers are laid off from their work places due to being replaced by machines, this leaves them jobless and so increases the number of unemployed people in the economy.

Kagan, (2023) observed that when fintech emerged in the 21st century, the term was initially applied to the technology employed at the backend systems of established financial institutions, such as banks. From 2018 or so to 2022, there was a shift to consumer-oriented services. Fintech now includes different sectors and industries such as education, retail banking, fundraising and nonprofit, and investment management, to name a few. Fintech also includes the development and use of cryptocurrencies, such as Bitcoin. While that segment of fintech may see the most headlines, the big money still lies in the traditional global banking industry and its multitrillion-dollar market capitalization. Examples of fintech applications include robo-advisors, payment

apps, peer-to-peer (P2P) lending apps, investment apps, and crypto apps, among others.

According to Uña, Verma, Bazarbash and Griffin, (2023) fintech payment models are primarily developed to fill gaps in the traditional payment system. For example, mobile money could reach users in remote areas where access to bank branches is difficult. Internet-based payment models could automate payments and facilitate large transactions outside traditional working hours. In general, fintech could contribute to the payment system in several ways. First, fintech firms play the role of aggregator by developing digital payment platforms with access to a large user base that will enable users to transact with various counterparts. The network effect crucially depends on the quality of service and adoption rate by the population. Second, as money can be accessed digitally through fintech platforms, customers could hold digital money balances to store value, especially when the value of digital money is linked to strong currencies such as the U.S. dollar and the euro. Third, fintech firms provide digital wallet accounts that function as a one-stop account for providing a whole slew of payment services to users. Finally, building on the transaction activity and digital footprints of the users of digital payment platforms, fintech firms provide data services and facilitate customer due diligence, as well as business, industry, and market analysis. Such data services could be used to offer more advanced financial services.

Banks Performance

Bank financial performance is a description of the bank's financial condition in a certain period, both in terms of raising funds and channeling funds, which are usually measured by indicators of capital adequacy, liquidity, and bank profitability. Performance in a company is an indicator of a company is working well or not, as well as banking. In the performance, there are many factors and indicators whether the company is said to be healthy or not so that many companies are active in analyzing, evaluating, and arranging strategies in the hope of improving the company's performance (Indriastuti and Muharam,

2020). Bank performance is influenced by internal and external factors. Internal factors is a condition under the control of bank management, meanwhile external factors are outside the control of bank management. In measuring bank performance, the most appropriate measure is to measure the ability of banks to generate profits or profits from various activities carried out. Indriastuti and Muharam, 2020 measured the dimension of bank performance as the increase in profitability.

According to Indriastuti and Muharam, (2020) in measuring bank performance, the most appropriate measure is to measure the ability of banks to generate profits or profits from various activities carried out. In this paper, the dimension of bank performance that will be discussed more frequently is the increase in profitability. Profitability itself is the main defense to be able to face losses that can occur at any time in a bank. Profitability has a measure that is used as a proxy, namely RoA (Return on Assets) which is a measure of how effective a bank is to generate profits with existing assets, and RoE (Return on Equity) is a measure of the return obtained from investments of ordinary shareholders in a company.

RoA (Return on Assets) is the ability of a company to manage its assets to generate profits by prioritizing the level of effectiveness and efficiency of their use. RoA (Return on Assets) was chosen as an indicator for measuring financial performance because the RoA increases, the company's profitability also increases, so it can be said that the bank's financial performance is successful following the wishes and goals of shareholders and the company, namely increasing profitability (Indriastuti and Muharam, 2020). RoE (Return on Equity) according to Gitman and Zutter, (2012) profitability is a measurement of the return obtained on the investment of ordinary shareholders in the company.

Empirical Review

The usage of information and communication technology in industries and manufacturing enterprises in developed countries and countries whose

industries have grown significantly, since the 1990s have caused significant changes in improving product quality, increasing productivity and reducing time in the manufacturing sector. At the same time, they could overcome their weaknesses with the benefits of ICT and stand in the right place in the economy (Voghouei, Jamali and Sharifi, 2021). According to Odunfunwa (2008), information technology is a body of tools, with the convergence of communication and computer. Goldberg (2008) describes information technology as series of machine, which can execute sequences of instructions. Ibtihaj Yaqoub, *et al.* (2021) aimed to employ the most important strategies for recovery from the crisis of the Covid 19 pandemic that ravaged the economies of the world in its various sectors, including the banking sector, through financial technology that is based on digital transformation to achieve financial sustainability. The research reached a set of results, the most prominent of which is that it is possible to shift towards financial technology in the Iraqi environment due to the availability of infrastructure and human and material capabilities for financial technology.

Akinboade, (2020), investigated the impact of the usage of ICT on financial performance of manufacturing companies in Lagos State, Nigeria. Survey design was adopted in conducting this study using primary and secondary data. Primary data was collected via interview and questionnaire, while secondary data for 10 years was retrieved from the published annual reports of the companies. In all, 44 companies were sampled in this study. Although 44 companies were sampled, questionnaires from only 31 of the companies were returned. Data collected from the questionnaire was analyzed, using a calculating device. Using the device, Pearson Correlation, Paired Sample T- Test and Linear Regression Analysis were used to test the hypotheses at 0.05 level of significance. Data from interviews were analyzed by transcribing and grouping similar responses. Finding showed that investment in ICT had positive relationship with financial performance. Also, it has been empirically established that the use of ICT has brought about a significant difference in the

sales turnover, profit before tax, profit after tax and net asset/shareholder's fund.

Methodology

The study employed survey design using well-structured questionnaire. The population of the study will consist of fourteen (14) NDMBs registered and listed on the floor of the Nigerian Exchange Group (NXG) while the sample of ten (10) Nigerian Deposit Money Banks operating on the floor of Nigeria Exchange Group (NXG) was selected using purposive sampling technique. Three hundred and ninety four (394) copies of questionnaire were administered out of which two hundred and sixty (260) copies of questionnaire were returned for data analysis. Both descriptive and inferential statistics were employed for the purpose of the data analyse. Descriptive statistics involved the use of frequencies, tables, figure and percentage to analysis the socio-economic characteristics of the respondents while inferential statistics of panel regression analysis was used to examine the effect of fintech expenditure on return on asset of Nigerian deposit money banks

Results and Discussion

Pool regression analysis of the extent to which fintech expenditure affect return on asset of selected deposit money banks in Nigeria

Result of pool regression analysis of the extent to which fintech expenditure affect return on asset showed that there was a significant negative relationship between CoS and ROA (p-value = 0.0208). For every ₦1 increase in CoS, ROA decreased by approximately ₦1,551,685. CoF and ROA also showed a negative relationship with marginal significance (p-value = 0.0666). An increase in CoF by ₦1 resulted in a decrease in ROA by approximately ₦133,000,000. The effect of MC on ROA was negligible and not statistically significant (p-value = 0.5886). RDC showed a positive but very small and statistically insignificant impact on ROA (p-value = 0.8547). There is a significant negative relationship between BS

and ROA (p-value = 0.0029). Larger banks tend to have lower ROA, decreasing by approximately ₦225,000,000 for every ₦1 increase in bank size.

Also, the model fit and statistical significance showed that the R-squared (0.513762) indicated that around 51.38% of the variability in ROA was explained by the model. This is a moderate level of explanatory power. Adjusted R-squared (0.503101) slightly lower than R-squared, indicating the model remained moderately explanatory even after adjusting for the number of predictors. F-statistic (5.014936) and Prob(F-statistic) (0.000298) showed that the overall model was statistically significant, indicating that the independent variables collectively influenced ROA. Durbin-Watson stat (0.572884): Suggested positive autocorrelation in the residuals, implying potential issues with the model's assumptions.

Significant negative coefficients for CoS and CoF implied that higher investments in these areas were associated with lower ROA in the short term. This might be due to the high initial costs of fintech investments that did not immediately translate into returns. The negative coefficient for BS suggests that larger banks faced challenges in maintaining high ROA, possibly due to inefficiencies or higher operational costs.

Table 1: Pool regression analysis of the extent to which fintech expenditure affect return on asset of selected deposit money banks in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AC	3.96E+08	93399920	4.237808	0.0000
COS	-1551685.	663714.3	-2.337880	0.0208**
COF	-1.33E+08	72045383	-1.849152	0.0666*
MC	-0.160773	0.296591	-0.542069	0.5886
RDC	0.036810	0.200647	0.183458	0.8547
BS	-2.25E+08	74452137	-3.028376	0.0029***
R-squared	0.513762	Mean dependent var		57089200
Adjusted R-squared	0.503101	S.D. dependent var		85588471

S.E. of regression	80147506	Akaike info criterion	39.27741
Sum squared resid	8.86E+17	Schwarz criterion	39.40115
Log likelihood	-2821.973	Hannan-Quinn criter.	39.32769
F-statistic	5.014936	Durbin-Watson stat	0.572884
Prob(F-statistic)	0.000298		

Source: Researcher's Computation, 2024

Random effect regression analysis of the extent to which fintech expenditure affect return on asset of selected deposit money banks in Nigeria

Findings from the random effect regression analysis of the extent to which fintech expenditure affect return on asset in Table 4.8 showed that the coefficient for the intercept was 2.08008. This suggests that when all independent variables were zero, the estimated value of the dependent variable was approximately 2.08E+08. However, the p-value (0.0618) indicated that the intercept was not statistically significant at the conventional 5% level. The coefficient for the variable COS was -1983251. This suggests that for a one-unit increase in COS, the dependent variable decreased by approximately 1,983,251 units. The negative coefficient indicated an inverse relationship between COS and the dependent variable. The t-statistic (-2.676029) and the low p-value (0.0084) suggested that COS was statistically significant at the 1% level, meaning it likely had a significant impact on the dependent variable. The coefficient for the variable COF was -1.20E+08. This suggests that for a one-unit increase in COF, the dependent variable decreased by approximately 120,000,000 units. Similar to COS, COF also had a negative coefficient, indicating an inverse relationship. However, the p-value (0.0892) suggested that COF is not statistically significant at the conventional 5% level. For the variables MC, RDC, and BS, the coefficients were very small and had relatively high p-values. This suggests that these variables might not have a significant impact on the dependent variable.

R-squared and Adjusted R-squared: The R-squared value of 0.612188 indicated that approximately 61.2% of the variability in the dependent variable was explained by the independent variables in the model. The adjusted R-squared (0.500384) adjusted for the number of predictors in the model and was slightly lower than R-squared, indicating that some of the included variables might not be contributing much to the model's explanatory power.

The F-statistic tested the overall significance of the regression model. With a p-value of 0.002732, the F-statistic was statistically significant at the conventional 5% level, indicating that the overall model was significant and at least one independent variable had a non-zero coefficient. The Durbin-Watson statistic tested for autocorrelation in the residuals. A value close to 2 (the value ranged from 0 to 4) suggested no autocorrelation. In this case, the value of 0.811030 indicated the presence of positive autocorrelation in the residuals, though it was quite low, suggesting minor autocorrelation.

Table 2: Random effect regression analysis of the extent to which fintech expenditure affect return on asset of selected deposit money banks in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.080008	1.11E+08	1.882713	0.0618
COS	-1.983251	741117.3	-2.676029	0.0084***
COF	-1.20E+08	70220207	-1.711520	0.0892*
MC	-0.042190	0.264651	-0.159417	0.8736
RDC	-0.061936	0.186595	-0.331929	0.7404
BS	-1.354953	90421350	-0.149849	0.8811
R-squared	0.612188	Mean dependent var		16090812
Adjusted R-squared	0.500384	S.D. dependent var		70916383
S.E. of regression	67635661	Sum squared resid		6.31E+17
F-statistic	3.841822	Durbin-Watson stat		0.811030
Prob(F-statistic)	0.002732			

Source: Researcher's Computation, 2024

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Fixed effect regression analysis of the extent to which fintech expenditure affect return on asset of selected deposit money banks in Nigeria

Findings from the fixed effect regression analysis of the extent to which fintech expenditure affect return on asset in Table 4.9 showed that the coefficient for the intercept was 1.67E+08. This suggests that when all independent variables were zero, the estimated value of the dependent variable was approximately 1.67E+08. However, the p-value (0.1472) indicated that the intercept was not statistically significant at the conventional 5% level. The coefficient for the variable COS was -2000497. This suggests that for a one-unit increase in COS, the dependent variable decreased by approximately 2,000,497 units. The negative coefficient indicated an inverse relationship between COS and the dependent variable. The t-statistic (-2.605667) and the low p-value (0.0102) suggested that COS was statistically significant at the 1% level, indicating it likely had a significant impact on the dependent variable. The coefficient for the variable COF was -1.13E+08. This suggests that for a one-unit increase in COF, the dependent variable decreased by approximately 113,000,000 units. However, the p-value (0.1153) suggested that COF was not statistically significant at the conventional 5% level. MC, RDC, BS Coefficients: For the variables MC, RDC, and BS, the coefficients were small and had relatively high p-values. This suggests that these variables might not have a significant impact on the dependent variable.

R-squared and Adjusted R-squared: The R-squared value of 0.424475 indicated that approximately 42.5% of the variability in the dependent variable was explained by the independent variables in the model. The adjusted R-squared (0.366923) adjusted for the number of predictors in the model and was slightly lower than R-squared, suggesting that some of the included variables might not be contributing much to the model's explanatory power. The F-statistic tested the overall significance of the regression model. With a p-value of 0.000000 (essentially zero), the F-statistic was statistically significant at any conventional significance level, indicating that the overall model was

significant and at least one independent variable had a non-zero coefficient. The Durbin-Watson statistic tested for autocorrelation in the residuals. A value close to 2 (the value ranges from 0 to 4) suggested no autocorrelation. In this case, the value of 0.852924 indicates the presence of positive autocorrelation in the residuals, though it was relatively low, suggesting minor autocorrelation.

Table 3: Fixed effect regression analysis of the extent to which fintech expenditure affect return on asset of selected deposit money banks in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.67E+08	1.14E+08	1.458305	0.1472
COS	-2000497.	767748.4	-2.605667	0.0102**
COF	-1.13E+08	71506843	-1.585245	0.1153
MC	-0.019248	0.266225	-0.072298	0.9425
RDC	-0.084873	0.189023	-0.449011	0.6542
BS	28962088	95252387	0.304056	0.7616
R-squared	0.424475	Mean dependent var		57089200
Adjusted R-squared	0.366923	S.D. dependent var		85588471
S.E. of regression	68099440	Akaike info criterion		39.00300
Sum squared resid	6.03E+17	Schwarz criterion		39.29173
Log likelihood	-2794.216	Hannan-Quinn criter.		39.12033
F-statistic	7.375453	Durbin-Watson stat		0.852924
Prob(F-statistic)	0.000000			

Source: Researcher's Computation, 2024

Conclusion and Recommendations

It is therefore concluded there is significant relationship between fintech expenditure and return on asset of Nigerian deposit money banks. The study recommends that Nigerian deposit money banks should leverage scalable solutions and negotiate better terms with vendors to enhance the cost-effectiveness of their technology investments.

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