



Financial Technology versus Financial Performance: Empirical Evidence from the Nigerian Banking Sub-Sector

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ABSTRACT

The Nigerian Banking Industry has witnessed series of revolution as a result of technological innovations which has become a common feature of banking in the contemporary business environment. Critical test for the banking sub-sector has been on how to profitably formulate a new and efficient service delivery means in such a way that its clients will enthusiastically learn to use and trust. On the above premise therefore, the study critically examines the relationship between financial technology and financial performance in Nigeria from 2011Q1 – 2018Q4. Using the Vector Error Correction test approach, this study finds a positive long run relationship between financial technology and financial performance in Nigeria. Automated Teller machines (ATM) exert significant positive effect on Return on Equity while internet banking exerts significant effect on financial performance, however, negatively related. Furthermore, analysis of the short-run dynamics reveals that 40% of the resulting disequilibrium is captured at each period, indicating minimal deviations from the equilibrium. In this regard, it was recommended that appropriate regulatory and macroeconomic policies that will foster the development of the Nigerian banking sub-sector should be pursued by the relevant authority.

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INTRODUCTION

The effectiveness of a bank's organization as provider of financial services cannot be underestimated in a competitive environment like the Nigeria business environment. Business operation and decision making in the financial industry has been highly challenging before the advent of information technology (Berger, 2013). The performance of all Nigerian Banks in the last decade has been greatly influenced by technology. This recent development is emphasized by contemporary advancements engineered by the knowledge economy. It is also worthy of note to point out that modern banking in Nigeria is determined by the outputs of robust local and global research and development. Recently, the world is undergoing a major revolution in the financial system and this has brought about a revolution in the financial

industry. Financial technology, in the Financial Services (FS) industry is regarded as a technology innovation process of designing and distribution of financial services through transformation of the banking sector leading to artificial acumen, e-banking, USSD codes, peer to peer borrowing, block-chain, crowd-funding, crypto-currencies and so on (Kshitika, Meena, Vinutha, and Kavitha, 2019).

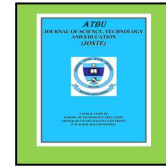
FinTech also comprise of a combination of financial service companies or representatives of companies with modern financial technologies and applications (Dorfleitner, Hornuf, Schmitt & Weber, 2017). IOSCO (2017) describes Fintech has within its threshold a range of technological innovative business models having potentiality to transform the financial industry in terms of their services delivery. Similarly, (FSB, 2017) opined that 'financial technology enhances efficient

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service delivery, in the form of new business simulations such as the loan application process, with its material effect associated with the provision of products' (FSB, 2017).

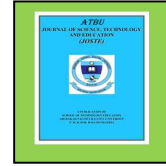
Today banks operate in a complicated and competitive environment due to the nature of Nigeria's highly unpredictable economy. The use of Fintech in banks brought competition, flexibility, efficiency, amongst others, to the banking business and has also offered effective and efficient in service delivery in the banking industry (Ovia, 2015). Banks have employed Fintech deployment based on products and services carried out in the banking sector such as Automated Teller Machine (ATM), e-electronic payment, mobile-banking system, Point of Sale Terminals (POS). For example, the use of ATM now allows bank users to carry out their various banking transactions beyond banking hours. It allows customers to withdraw money without going inside the bank. The use of mobile banking allows the customer to do any transaction and check their balances without stress. This has created a cashless economy where there is no need for carrying cash around; transactions are done through the internet. The use of computers, points of sale, smartcards and internets have subsequently resulted in bank's efficiency. The use of Fintech aids the banking industry in improving their financial performance as well as their services delivery. With Fintech, information is accessible by customers and employees safe in controlled means (Steinumueller, 2011).

However, four major indicators are used to measure the performance of firms; these include customer-oriented performance, organisational effectiveness, human resource performance as well as their financial performance. Financial performance can be seen as a mathematical means of ascertaining whether a firm is making profit or not (Farlex Financial Dictionary, 2012). It also defines as a measurement of how well an organization is generating value for its stakeholders. This is through analysis of combination of financial ratios of the banks in the banking industry (Ahmad & Hassan, 2007). Also, financial performance helps in evaluating the operation and characteristics of

organization financial in a bid to determine the accomplishment and efficiency of the organization's administration with reference to its financial reports and reports and records (Amalend, 2012).

However, among the major objectives of banks, one is to make a profit. Financial performance shows the bank's capability in generating income; maintain stability and generating of revenue. Secondly, financial performance through asset return ratio demonstrates the ability to generate income through its fixed asset in the banking sector. Asset Return Ratio also shows how the bank's management is able to utilize available assets to generate revenue (Khrawish, 2011). Financial performance is measured through analysis ratios. These ratios include profit tax after, return on equity, return on asset, per-share earnings as well as any other market valuation used. Profit after tax has in the past been widely used to measure banking institutions financial performance. Financial interrelation ratio, total loans to total deposits, bank portfolio composition, per capita Gross Domestic Product, customer satisfaction and market size are other ratios that have been (Khrawish, 2011).

The frenetic pace at which the industry is evolving, and the amount of infringement and disruption unleashed upon it by the emergence of financial technology has prompted a clear recognition by industry players that only those who understand what the future holds will invariably prepare for it, so as to be at the top of the food chain as regards the issue of competitiveness (Venkatesh & Davis, 2010). Some of the key considerations that the banks will need to embrace full digital services, classic banking activities e.g. loans (both borrowing and repayment), account and funds management, account opening, and customer on boarding are now all possible in customer self-service mode via electronic channels. Further, Venkatesh & Davis (2010) argued that innovation creates monopoly temporarily, thereafter giving way to increasing returns to scales. Hence, if banks are to take advantage of financial technology and are the same time create a hedge over other financial



institutions with the adoption of innovative products and services, its impact on financial performance will be enhanced.

LITERATURE REVIEW

Conceptual Issues

There is a vast array of Fintech in the banking sector which includes; financial mastery, wealth management, lend and borrow, trade banking, fund-raising, transferring of money, online payments, management of investment, insurance of digital and crypto currency. At this era, improvement in technology influences businesses to reinforce the development life of product life cycle in the financial industry. Whereas, currently, the need for speed in delivery of product or services included in financial services especially the Financial Services is very important (Shofawati, 2019). However "FinTech" is a representation of companies which comprises of startups and the establishing of monetary and high-tech companies as well as institutions in replacing or enhancing the provision and usage of financial services delivery through surviving financial companies and uses technological tools in the improvement of financial activities (Schüffel, 2016; Dorfleitner, Hornuf, Schmitt & Weber, 2017).

NATURE OF BANK FINTECH PRODUCTS

Internet Banking

Banks ever so often depend on the internet to convey information about financial products and services to the general public, replace business conducted at the branch offices, which do away with the need to put up new branches, and to serve clients more efficiently. Internet banking makes it easy for such activities as online payment of bills, getting information about loan or auto loans and applying for credit cards.

E-Zwich

E-zwich is referred to a brand name for switch and Smart card payment scheme nationwide which is regarded as banking procedure making common e-platform involving the payment systems of all authorized banks and non-bank

financial organizations undertaken available by the Bank (Issahaku, 2012), in connotation with other banks to bring the payment schemes internationally and entail of an innovative method for accessibility improvement to the banking and retail services.

Telephone Banking

This can be said to be an innovation that is referred as a type of cybernetic banking which enables clients of a bank to undertake banking actions via the telephone. Basically, bank activities via the process of cable devices can commence retail banking business through the connection between telephone or mobile statement unit and the scheme of the bank by Automated Voice Response (ABR) knowledge.

Automatic Teller Machines (ATMs)

ATMs are referred to as e-apparatus that contract bank customers at virtually almost any time, to cash withdrawing, depositing and checking of account balance or making of transfer fund between accounts. In this case, the user is obliged to simply insert an ATM card and enter the pin. ATMs are the most innovative in terms of electronics in this country and the world over which are mostly placed in the exterior of the banking halls, and could also be located in different places such as Shoprite's, hotels, shopping malls, airports mall, supermarkets and places not within walking distance from the branches of a bank.

Mobile Banking

Mobile banking is generally referred to as application of banking activities through wireless internet involving working together of internet and mobile phone communication for banking activities such as sending of SMS that provides prompt notification about transaction. This helps to keep a watch on personal accounts with rounding clock services and to-ups of mobile phone credits. Also, through the mobile banking, customers are able to carry out other services.



Electronic Fund Transfer at Point Of Sale (EFTPOS)

Through the EFTPOS, clients are allowed to transfer money straight from their bank accounts to dealer's account after a business transaction (at procurement points). An EFTPOS is an on-line procedure in which there is immediate debiting of customer's bank account (Oyetade & Ofoelue, 2012) for value of purchases made or services for the improvement of banking activities resulting from the use of EFTPOS to clients shopping service payment and conditions as an alternative to the book-keeping obligations in handling cheque and cash withdrawals for purchases.

Cash Smart Cards

E-banking is a means whereby there is a financial exchange between buyers and sellers and it is facilitated by means of e-communications which are rooted through the process of microchip that enables the storing of data on cards. This application is also to store information of customer's account as well as their identification and value of their accounts which electronically transfer customer's account.

The Electronic Funds Transfer System (EFTS)

The EFTS is regarded as a network of communication allowing swift flow of information from one point to another without assistance via the internet on (Personal Computers) PCs, laptops and other devices. Also, bank customers who have subscribed to internet banking can do basic banking transactions via the web.

The Nigerian Interbank Settlement Scheme (NIBSS Fund Transfers)

This refers to a virtual platform involving exchange of banks value thereby enabling the performance of interbank transfer such as NEFT and NIBSS and the instant transfer of funds must be between banks for single or multiple recipients for individual amounts not exceeding N10million. This NEFT transfers (National Electronic Funds Transfer), if affected will work hand in hand with available clearing session of CBN which will be

received in the recipient's account same day or in the next working day.

Financial Performance

Financial performance is the manifestation of revenues with respect to resources which are usually expressed as function of internal and external elements, which is a function of different externalities operating within the banks setting (Athanasoglou, Brissimis & Delis, 2008). The external parties normally assess a firm's capability based on its routine implying why performance is like a competition to firms. However, the level of goal achievement generally defines a firm's performance (Achrol & Etzel, 2003).

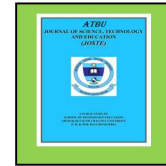
FINANCIAL FINTECHS AND FINANCIAL PERFORMANCE OF BANKS

The improvement of income according to Alam et al (2011) is one of the generic goals of profit oriented organization in that they ensure that they survive and grow over a period of time which leads to improvement of products and product delivery in the banking sector. The commercial banks usually have capital in terms of share capital which are invested in assets and thus expect returns on the same which may improve the performance of institutions and it is important for commercial banks to venture into financial innovations in order to increase their profitability (Boot & Thakar, 2007).

Theoretical Review

Technology-Acceptance Model

The Technology acceptance theory suggests that there are several issues determine the decision about how and when the technology will be used. These issues include the apparent convenience and the perceived user- friendliness of a particular technology (Davis, 1989). Legris, Ingham and Collerette (2003) argued that they proved that TAM is a theoretical model that can help clarify and envisage customer actions of IT. Sabi (2014) described TAM theory as the most relied on and applied theory, as proven by thirty one papers, or sixteen percent of the 188 articles he reviewed. In this study, the theory is relevant because it is a factor by which the adaptation of



FinTech by commercial banks can be rationalized. How the users react to the newly introduced technology is a key factor in its adaptation. In this study we shall conduct a research to find out the percentages of customers enrolled for online banking in Kenya. This determined the association between the usefulness of FinTech and the users' perceptions.

Innovation Diffusion Theory

This stipulation was introduced in 1962 and modified by Rogers (1995) and it aims on considering how, why and at what rate inventive thoughts as well as technologies extend in a collective organization (Rogers, 1962). (Fichman, 2000) explains diffusion as the means in which know-how stretches within the industry. The notion of innovation diffusion habitually relates to idea spread from one community to another or from an entity in the public to other regions of that community (Rogers, 1962). In line with this theory, the decision to take up innovations is determined by five issues regarding the features of the innovation. These are the perceived usefulness, matching needs, intricacy, testability and visibility with the social system adopting the technology.

The theory also holds that the acceptors can be clustered into several groups namely inventors, early acceptors, early common, late majority and laggards. Importantly, the theory holds that customers in the innovation adoption phases differ dramatically in their features (Fichman, 2000) In Kenyan commercial banks, not all banks adopt the financial technologies and those that adopt do not adopt at the same time as per the theory. The categorization of the adopters as per the theory are the innovators, fast adopters, earlier mainstream, late mainstream and the laggards and that would be used to prove or explain why some banks adopt financial technology before others.

Resource Based Theory

An organization can develop competitive advantage over its rivals when it has a strategic resource. These organizations can enjoy strong profits through these competitive advantages (Barney, 1991). Wernerfelt (1984)

described tactical resource as a venture that is rare, valuable, hard to copy, and no substitutes. It can help firms to create strategies to capitalize on opportunities. Strategic resources give organization a competitive edge against their companies by aligning the resources, skills and expertise in core competence. In this case, core competence is what puts the organization a better place than its competitors (Chi, 1994). Strategy is a plan and arrangement of actions that ensures the firm's objectives, policies and all of its activities are designed towards achieving the vision of the organization (Barney & Clark, 2009) A plan that is soundly connected with the company's objectives as well as aims take a critical part of gathering and also distribution of the company's finances into a practical background founded on the firm's potentials, external environmental set along with reliant shifts by their competitors. Mintzberg (1994) defines a strategy as a plan of actions that is designed to achieve certain goals and objectives.

Theoretical Framework

The research is based on the theory of Financial Intermediation. This theory was established by Gurley and Shaw in 1960 which is based on agency theory and information asymmetry. This theory explains the importance of financial intermediaries in the economy. In this regard, the economic agents invest the funds in productive economic activities which yield returns and boost economic growth. According to Scholtens and Wensveen (2003), financial Intermediation in the banking industry is the process where banks takes depositors money from those with surplus and lend them out to borrowers with deficits. Scholtens and Wensveen (2003) argue that a well-functioning intermediary is necessary for the creation of financial of goods and services. Intermediary presence is key in pricing and covering of all direct and indirect cost. Market imperfections such as information asymmetry, regulations, high transaction costs, and transport costs necessitate the existence of intermediaries. Entrepreneurs have information on the projects they want financed, however banks does not have full information on the same.

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The transferability of market information is hampered by moral hazards existing in the market. Goldsmith (1969), McKinnon (1973), and Shaw (1973), in their works, financial intermediation theory was first formalized and was perceived as financial markets, both capital markets and money playing a fundamental role in economic growth and development, assigning in transforming the economic development and growth across countries to the quantity and quality of services provided by financial institutions. This theory is significant to this study as financial technology facilitates service delivery and operations of banks in which banks utilize fintech in enhancing efficiency and effectiveness in its operations. These financial technologies eliminate information asymmetry by providing data analytics software which can lead to increase in trust and confidence by both the banks and its clients due to transparency and free flow of information. This has also enhanced reduction of costs, customer retention and given banks a competitive edge

EMPIRICAL REVIEW

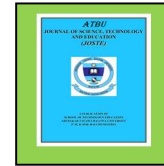
Empirical studies on the impact of fintech on the performance of banks that have embraced technology exist. Nigerian financial industry has been impacted by information technology. The result shows that deployments of information technology facilities have fundamentally transformed the content and quality of banking business in Nigeria (Oluwagbemi, Abah & Achimugu, 2011).

De Young (2015) studied the influence of internet on output and functioning at community banks in Oslo, Norway. The study used the descriptive research design to conduct a survey of 29 banks in the years 2006 to 2010. The variables included use of online accounts, debit and credit facilities. The study used online questionnaires to collect data. Secondary facts were gathered from the banks' yearly financial reports. According to the study, traditional community banks had lesser profits than internet banks due to lower business volumes (in terms of deposits and non-interest income), as well as high labor costs. Mabrouk and Mamoghli (2010) examined financial innovation and the operation of Malaysian financial

institutions. Explanatory research methods were used to assess the impact of financial innovation adoption among banks in Kuala Lumpur between 2002 and 2009. The study variables were two distinct adoption behaviors: first, the movers in the acceptance of the fiscal invention, and second, the copycat of the initial movers. Using interview guides, data was collected from 32 bank executives. The Spearman rank order correlation coefficient was used to analyze the data. They discovered that the first mover in product innovation enhances earnings, whereas process innovation benefits both profits and makes banks more efficient. When compared to the first movers, the institutions that followed did not make as much money.

Worku, Tilahun and Tafa (2016) examined how electronic banking impacts customer's satisfaction. Data gathered were examined using chi-square test. The study shows that e-banking led to an improvement in customer satisfaction. Obikeze, Okolo, Okolo, Mmamel, and Okonkwo (2017) studied the relationship between technology-based financial services and customers' perceptions of the quality of service delivery using a sample of 499 respondents chosen from five DMBs. In the research conducted by Isibor, Omankhanlen, Okoye, Achugamonu, Adebayo, Afolabi and Ayodeji (2018), the impact of electronic banking technology on customers' satisfaction and economic growth in Nigeria was investigated using a sample of 100 bank customers selected from four DMBs in Ota, Ogun State-Nigeria. In this study, Non-probability purposive sampling technique was used for the study. The result of the study of paired-sample t-test shows that electronic banking improved customer satisfaction and enhanced GDP growth.

Okoye, Omankhanlen, Okoh and Isibor (2018) assessed technological based financial services delivery and customer's satisfaction using the Nigerian banking Sectors. All of the above service features had a significant positive influence on customer satisfaction, indicating that electronic-based banking has improved customer satisfaction in Nigeria. Usman, Alimi, and Onayemi (2018) also investigated the impact of



bank intermediation operations on economic development in Nigeria using secondary data gathered from Central Bank of Nigeria Statistical Bulletins between 1983 and 2014. OLS regression analysis shows advances in loan and money supply as it has positive impact on the economic growth which indicates existence of long-run relationship between variables.

METHODOLOGY

Nature and Sources of Data

The study adopted a descriptive design. The design is deemed appropriate simply because the main interest is to determine the effects of Fintech firms on the banking sector's financial performance in Nigeria and describes how the factors support matters under investigation. This research design has been adopted due to its ability to provide further insight into the research problem by describing the variables of interest. The research design used secondary data derived from the World Bank and National Bureau of Statistics.

The population of interest comprised aggregate values of all 24 deposit money banks operating in Nigeria, as at 31st December 2019 covering the period 2011Q1-2018Q4. The data collected is quantitative in nature on variables to include financial performance measured by Return on Equity (ROE), while financial technology is measured by number of internet web transactions, number of mobile payment transactions and ATM usage

Model Specification

Multiple regression models were used in this study as it allows simultaneous investigation of the effect of two or more variables (Zikmund, Babin, Carr & Griffin, 2010). The essence of regression is to use a mathematical equation to express the nature of the relationship existing between the dependent variable (financial technology) changes when the independent variables are varied. Consequently, having this in mind, the regression analysis was used as the most convenient approach to analyze the collected data. The models were specified in their econometric forms. In analyzing the data, the

simple regression model was in generic form as follows:

$$ROE = f(INTBK, MOBK, ATM) \dots\dots\dots(3.1)$$

Re-writing equation 3.1 in its explicit form;

$$ROE = \beta_0 + \beta_1 INTBK + \beta_2 MOBK + \beta_3 ATM + \varepsilon_t \dots\dots\dots(3.2)$$

Where

ROE = Return on Equity

INTBK = Number of Internet (Web) Transactions

MOBK = Number of Mobile Payment Transactions

ATM = Automated teller machines (ATMs) (per 100,000 adults)

ε_t = Error Term

Estimation Technique

The collected data through secondary sources were analysed using a simple regression analysis and correlation analysis. This technique is used in order to test or determine the relationship between independent variable and dependent variable. The study adopts the Vector Error Correction (VECM) estimation technique in estimating the relationship among the variables. Thereafter, other diagnostic tests are employed in the study to ascertain the reliability of the outcome. Autocorrelation and Multicollinearity tests are mainly to be diagnosed. The autocorrelation test is the measure of the similarity over successive time intervals between the time series and the lag value of the same time series. It was tested using Durbin-Watson.

This test reports a test statistic with a value of 0 to 4 where 2 is no autocorrelation, where the statistic is less than two there is positive autocorrelation and where greater than two there is negative autocorrelation (Khan et. al 2008). Multicollinearity Test to ensure the data collected is free from biasness and one variable data is not

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related to another variable data, the study conducted a multicollinearity test. It occurs when there is nearly exact or exact linear relation among two or more of the independent variables. Heteroscedasticity test the study applied Breusch Pagan to determine the consistency of the variance across the observation. Heteroscedasticity occurs in cases in which

variance is different across the observation. This may lead to a biased estimation.

Description/Nomenclature of Variables

The variables of the study were classified into independent and dependent variables.

Table 3.1: Summary Description of Variables

Variables	Category of Variable	Description
Return on Equity (ROE)	Dependent Variable	The profitability of a company in relation to equity is a measure of its profitability. It quantifies the rate of return earned on the shareholdings by the owners of a common stock and overall shows how well the company generates revenues on its shareholders' investment.
Number of Internet (Web) Transactions	Independent variable	An internet transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, governments and other public or private organizations, conducted over the internet.
Number of Mobile Payment Transactions	Independent Variable	Mobile payment (also referred to as mobile money, mobile money transfer, and mobile wallet) generally refer to payment services operated under financial regulation and performed from or via a mobile device
Mobile Phone Penetration rate	Independent Variable	Mobile Phone Penetration refers to the number of SIM cards or mobile phone number in a certain country; it does not refer to the number of mobile phone devices.
Automated teller machines	Independent Variable	Automated teller machines are computerized telecommunications devices that provide clients of a financial institution with access to financial transactions in a public place.

RESULTS

Descriptive Statistics

Descriptive Statistics explains the qualities of each variable in the form of the

minimum, maximum, mean, standard deviation, skewness and kurtosis. Table 4.1 shows these qualities as follows.

Table 4.1: Descriptive Statistics

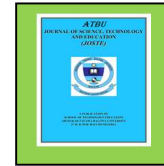
	ROE	ATM	INTBK	MOBK
Mean	1.867	14.889	406985.2	1509045
Maximum	3.229	17.369	1725033	4697335
Minimum	0.041	11.305	96442	36800.00
Std. Dev.	0.801	2.175	370108.4	1591586
Skewness	-0.703	-0.631	1.823	0.694

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	ROE	ATM	INTBK	MOBK
Kurtosis	3.313	1.648	6.388	1.997
Jarque-Bera	2.773	4.558	33.041	3.913
Probability	0.249	0.102	0.000	0.141
Observation	32	32	32	32

Note: ROE – Return on Equity; ATM – Automated Teller Machines; INTBK - Number of Internet Transactions; MOBK – Mobile Phone Penetration Rate; Std. Dev = Standard Deviation

The dependent variable was measured by return on equity of commercial banks. The data collected for the eight years shows that the bank that had attained the highest ROA and arguably the highest performance had 3.22% while it recorded the least in the period of 0.04%. The mean for all the banks was 1.86 with a standard deviation of 0.80. The series was negatively skewed with a relative high kurtosis that explains the sharpness or flatness of the distribution. The independent measured by the number of ATM transaction undertaken through ATM machines reveals that it recorded a highest value was 17 users while the least recorded a value of 11 users for the period under study. The average was 14 users with a standard deviation of 2.17. This series is negatively skewed with a kurtosis of 1.64. The series is thus scaled in form of per 100,000 adults. The number on internet (web) transaction reveals that the annual mean value for the entire period was 12.59% (406,985), with the maximum

value of 14.36% and minimum value of 11.47. The series is said to be positively skewed at 1.82 with a kurtosis of 6.38. In conclusion, the mean value recorded for the number of mobile payments for the period of study was 13.30% (1,509,045), with maximum value of (15.36%) and minimum value of (10.51%).

Correlation Analysis

Correlation analysis measures the relationship that exists between the variables. The study undertakes a Pearson correlation that measures the linear relationship of variables. A correlation of 1 shows a perfect positive correlation while correlation of 0 or value close to zero shows no relationship or weak relationship respectively. -1 value, shows a negative perfect relationship and values close to it have strong negative relationship. The table 4.2 shows the value of Pearson correlations for the variables.

Table 4.2: Pearson’s Correlation Result

	ROE	ATM	INTBK	MOBK
ROE	1			
ATM	0.084	1		
INTBK	0.111	0.552	1	
MOBK	0.186	0.695	0.582	1

Note: ROE – Return on Equity; ATM – Automated Teller Machines; INTBK - Number of Internet Transactions; MOBK – Mobile Phone Penetration Rate; Std.

In the table 4.2, the correlation of return on equity against ATM transactions is about 0.084 while correlation of internet (web) banking transaction against return on equity is about 0.111. Furthermore, the correlation of mobile banking transaction against the return on equity is about 0.186. The aforementioned correlations are positive though they are weak as they are closer to zero than they are closer to one. The

relationship of financial technology on financial performance is therefore found to be a positive relationship.

Unit Root Test

To test for the stationarity of the variables to ascertain their order of integration, the Augmented Dickey Fuller (ADF) test was carried out on each of the variables. The results of the ADF test is shown table 4.3

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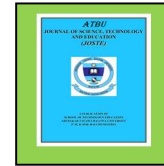


Table 4.3 ADF unit root test results

Variable	ADF levels	ADF Difference	1 st Order Integration	of Included in the model	McKinnon critical values
ATM	-2.238	-2.683***	I(1)	Intercept	1% = -3.670 5% = -2.963 10% = -2.621
INTBK	1.297	-3.684**	I(1)	Trend and Intercept	1% = -4.296 5% = -3.568 10% = -3.218
MOBK	-2.350	-5.798**	I(1)	None	1% = -4.296 5% = -3.568 10% = -3.218
ROE	-2.399	-3.823**	I(1)	Trend and Intercept	1% = -4.296 5% = -3.568 10% = -3.218

N.B: (**/*** significant at 5%/10%); **Note:** ROE – Return on Equity; ATM – Automated Teller Machines; INTBK – Number of Internet Transactions; MOBK – Mobile Phone Penetration Rate; Std.

The results of the ADF unit root test tend to ascertain the presence of a unit root (non-stationary) tested against alternative hypothesis of the absence of a unit root (stationary). On the application of the ADF for the variable to be stationary, the ADF statistic (in absolute terms) must be greater than the standard critical value at the levels of significance: 1%, 5%, or 10%. The ADF result shows that all variables (Number of ATM transactions, Number of Internet Transactions, Number of Mobile Payment Transactions and Return on Equity) were non-stationary at level, which implies that the aforementioned variables have random walk. This further implies the presence of unit root. With

further differencing, the aforementioned variable became stationary at first difference. This implies that the variables are integrated of order one, I (1). The implication thus connotes that the variables have long run relationship which is then tested by the Johansen cointegration test.

Cointegration Test

We estimated the long run relationship adopting the Johansen cointegration test to ascertain the long run relationship among the variables in the equation. The result is thus represented in table 4.4

Table 4.4: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen-value	Trace Statistics	0.05 value	Critical	Prob. (**)
None*	0.827	73.501	47.856		0.000
At most 1	0.387	20.744	29.797		0.3738
At most 2	0.147	6.037	15.494		0.691
At most 3	0.041	1.259	3.841		0.261

Unrestricted Cointegration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigen-value	Trace Statistics	0.05 value	Critical	Prob. (**)
None*	0.827	52.757	27.584		0.000

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At most 1	0.387	14.707	21.131	0.310
At most 2	0.147	4.778	14.264	0.769
At most 3	0.041	1.259	3.841	0.261

From the Johansen co-integration analysis in table 4.4, given the appropriate lag selection criteria to be 1, there exists a long run relationship between firms' financial technology and financial performance of banks in Nigeria. From the unrestricted cointegration rank test; using the trace statistics, there exist just one (1) cointegrating equation, with the probability value less than 0.05 confidence level. The maximum Eigen value on the other hand indicates also one (1) cointegrating equation, implying that using

both criteria; there exist a long run relationship between firm's financial technology and financial performance of banks in Nigeria. Since a long run relationship exists, the vector error correction is conducted to determine the long run and short run association and thus the corresponding speed of adjustment.

Vector Error Correction (VEC) Estimation

Table 4.5: Vector Error Correction (VEC) Summary Analysis

Cointegrating Equation	CointEq1
LNROE(-1)	1.000
LNATM(-1)	0.953
	(1.331)
LNINTBK	-0.066
	(-0.343)
LNMOBK	-0.087
	(-0.809)
C	-0.966

$$ECT = 1.000 + 0.952ATM_{t-1} - 0.066INTBK_{t-1} - 0.087MOBK_{t-1} - 0.966$$

Error Correction	D(ROE)	D(ATM)	D(INTBK)	D(MOBK)
CointEq1	-0.407	0.0001	0.070	0.382
	(-9.013)**	(0.036)	(0.905)	(2.617)**
D(LNROE(-1))	0.523	0.002	-0.552	0.247
	(9.402)**	(0.406)	(-5.743)**	(1.373)
D(LNATM(-1))	0.913	0.707	-3.302	-4.223
	(0.601)	(3.909)**	(-1.258)	(0.859)
D(LNINTBK(-1))	0.215	0.001	-0.571	-0.045
	(2.461)**	(0.157)	(-3.788)**	(-0.160)
D(LNMOBK(-1))	-0.080	0.006	-0.242	-0.315
	(-1.333)	(0.874)	(-2.321)**	(-1.612)
C	0.077	0.004	0.227	0.148
	(2.078)	(0.924)	(3.534)**	(1.229)

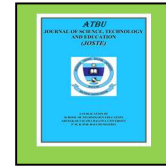
$$ROE = 0.077 + 0.913ATM_{t-1} + 0.215INTBK_{t-1}^{**} - 0.080MOBK_{t-1}$$

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N.B: (**/** significant at 5%/10%); **Note:** ROE – Return on Equity; ATM – Automated Teller Machines; INTBK – Number of Internet Transactions; MOBK – Mobile Phone Penetration Rate; Std.

The results reported in Table 4.5 reveal that the null hypothesis of a positive and insignificant short run relationship between number of Automated Teller Machine transactions and return on equity is accepted which can be seen from the coefficient value of (0.523) with its corresponding t-statistic value (0.601) at 5 percent level of significance. Similarly, the number of mobile payment transactions with coefficient value (-0.080) signifies that a negative relationship exist between number of mobile payment transactions and return on equity, and at the same time statistically insignificant at 5 percent level of confidence. On the other hand, number of internet transactions with coefficient values (0.215) is positively and statistically significant to the return on equity.

This implies that an increase in the number of internet (web) based transactions, increase the financial sectors' return on equity in the short run. Invariably, in the short run, a 1 percent change in the number of mobile banking transactions will result in a decline in the return on equity. A change in the number of ATM transactions will result in a 91 percent increase in the return on equity. From the adjustment coefficient with coefficient value (-0.407), it implies that the previous period deviation from the long run equilibrium is corrected in the current period at an adjustment speed of 40.7 percent, which implies that the time frame for the convergence of the long and short run periods economic policies is moderate.

The long run results reveal that the previous period change in the number of ATM transactions will lead to 0.953 percent increase in the return to equity, howbeit, statistically significant. It is worthy of note that both in the short and long run, the number of ATM transactions exert positive effect on ROE. This further implies that a causal relationship exists between the number of ATM transaction and ROE. In the long run, a negative relationship exists between the number of internet (web) based transactions and ROE. This implies that a 1 percent change in the

number of internet based transactions will result in a 0.6 percent decline in ROE. Similarly, a negative and insignificant relationship is found to exist between the number of mobile payment transactions and ROE. This implies that a 1 percent change in the number of mobile payment transaction will result in a 0.8 percent decline in ROE, *ceteris paribus*.

DISCUSSION OF FINDINGS

The study undertook a linear regression model on data collected to determine the effect of firms' financial technology on financial performance in Nigeria's banking industry. The descriptive and correlation statistics were first conducted in order to determine their association between and among each other. Based on the summary statistics, it was revealed that a positive correlation existed between firms Fintech variables and financial performance of the banking sub-sector. Furthermore, the Correlation analysis revealed that ATM transactions, mobile banking transactions and transactions from internet banking (which denote financial technology) had a positive though relatively weak relationship with financial performance. This means that increase in financial technology would result to increase in financial performance of the banking sector in Nigeria.

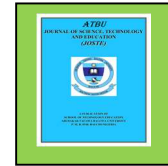
The VECM regression analysis undertaken showed that the speed of adjustment for the short run to equilibrate with the long run is moderately high (approximately 40 percent). Also, the coefficient of number of ATM transactions both in the long and short run is an indication that there is increased innovation in that dimension of financial activities. This implies that technological advancement in transaction via ATM contributes more than 90 percent to firm's returns on equity. Thus in the long run, the hypothesis of a significant effect of ATM transaction is accepted as the *p-value* is greater than 5 percent level. But in the short run, the null hypothesis of no significant relationship is rejected, as its *p-value* is less than 5 percent level. The findings of the study support theories such as innovation diffusion theory,

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where financial technology as a new innovation is spread throughout the banks in Nigeria, in order to achieve better financial performance. Findings from the VECM show that the number of mobile banking shows a negative and insignificant relationship to ROE, both in the short and long run periods. This implies that the null hypothesis of no significant relationship is accepted as their *p-values* are greater than 5 percent level.

The result of the study is in contrast to various studies previously been conducted. Nyanga (2013) agreed that mobile money improved performance of SMEs in various towns in Nigeria and Kenya. Gitau (2011) and Kilonzi (2015) all indicates that mobile banking technology creates competitive advantage that leads to improved performance of various companies in various industries. However, not all empirical studies agree with the findings of this study. In a recent study conducted by De Young et. al (2015) suggested that use of internet on undertaking transactions in community bank decreased the output as the volume of transactions decreased. This is a study that draws much attention as it suggests that before implementation of finance technology a conclusive research needs to be undertaken in order to determine the level of compliance with new technology. Factors such as perceived usefulness, ease of use and risk are important in determining whether the concept shall be adopted by the target market.

CONCLUSION AND RECOMMENDATIONS

From the findings of the study, various conclusions are reached. The correlation analysis showed a positive correlation between financial technology and financial performance. This implies that the explanatory variables contributes positively to financial performance though internet banking having a stronger correlation than mobile banking. It therefore follows that increasing financial technology would lead to increase in financial performance of banks in Nigeria. Increasing number of ATM transactions would result to a higher increase in financial performance than increase in mobile banking, both in the long and short run periods. The regression model had

a coefficient of determination (R Squared) of 0.923%, which means that the model could explain up to 92.3% of the variations in financial performance. Other variations in the financial performance represented by 7.7% are explained by other factors outside the model. We can therefore conclude that the model is fairly good in predicting financial performance. Commercial bank that intends to increase its financial performance could invest in improving its use of financial technology since it would result in an increase in financial performance.

From conclusions emanating from the study, there are various recommendations that the study suggests.

- i. The commercial banks should sensitize more use of internet banking as increase in internet banking results to higher financial performance of commercial bank, more than mobile banking. In general sense the commercial bank should work on improving financial technology as the technology leads to increased financial performance in commercial banks.
- ii. The study established that the use of internet banking increased accuracy and efficiency, reliability and speed which give them competitive advantage. It is recommended that banks adopt internet banking to increase their competitiveness and service quality. The use of agent banking is mainly clustered among the banks in Nigeria. Those banks which are in the rural areas do not have enough agent banks. It is recommended that banks increase the agent banks across the country to make available the banking services to the people.

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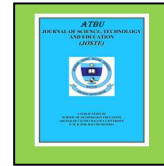
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