Assessment of the Impact of Financial Innovation and Its Role in Creating Financial Inclusion in Nigeria

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Abstract
The advancement in financial instrument, financial technology and payment system is what leads to the emergence of financial innovations. In this study, the aim is to assess the impact of financial innovation and its role in creating financial inclusion in Nigeria from 2009 to 2022. Data were collected from CBN statistical bulletin 2022 and macrotrend. The specific objectives of the study were to determine the impact of volume of ATM on availability of banking service; to determine the impact of Volume of POS on availability of banking service; to determine the impact of volume of MOB on availability of banking service and finally, to determine the impact of volume of WEB transactions on availability of banking service. The method of data analysis used is Autoregressive Distributed Lag model. The study found that volume of ATM has significant impact on availability of banking service at 10% significance level in the short-run but not significant in the long-run. Furthermore, volume of POS, MOB, and WEB transaction has insignificant impact on availability of banking service in the short-run and long-run. The variables exhibited negative effect which means the increase in the volume of the financial innovation products usage decrease the frequency of visit of the bank halls which cause reduction in the number of bank branches but at insignificant level. In conclusion, the study found that financial innovation has negative insignificant impact on financial inclusion in Nigeria due to poor infrastructure, and lack of financial literacy.

Keywords: Financial Innovations, Financial Technology, Financial Inclusion, Banking Service.

INTRODUCTION

Financial innovation and Financial Technology (popularly known as FINTECH) according to White (2014) are intertwined. They are only similar but not the same. They cannot be separated. It can be said that Fintech is the vehicle that drives financial innovation. While financial innovation is a subset, Fintech in the universal set. Financial Stability Board (FSB, 2019) clarified the argument that financial technology is the technology that enables innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on financial market and institutions and the provision of financial services.

Financial innovations basically are concerned with the creation or development of new financial products, processes, and institutions, which can lead to greater efficiency, productivity and competitiveness in the financial sector, (Hu et al., 2018). It can be deduced that the product can either be deposit account which allows user to easily access financial services via automated teller machine (ATM), point of sale (POS), or other electronic means such as credit card, online banking, and mobile banking, (Ogbeida and Obadeyi, 2023). The product can also be meant to access loans and make investment. Generally, the products of financial innovations include the robo-advisor, mobile wallets, peer-to-peer (P2P) lending, Crowdfunding, InsurTech, Blockchain-base Financial Product. On the hand of the financial innovation institutions going by the definition of Hu et al. (2018) can be Fintech start-ups, established financial institutions, regulatory bodies, academic institutions, investment firms, and industrial consortiums. These all work together to achieve efficiency, productivity, and competitiveness in the financial sector.

Ogbeida and Obadeyi (2023) posited that the effect of financial innovations is to develop financial products that can better meet the need of customers and business. Gomber (2018) averred that these products increase consumer spending, promote economic activities, and economics growth. The benefits of financial innovation have a long list that cannot be easily exhausted. Levine (2020) outline few to include reduction in cost of financial market friction. Factors that cause friction in the financial market that financial innovations eliminated as outlined by Levine (2020) and Rajan (2015) are transaction cost, agency cost, information asymmetry; the benefit cut across elimination of other factors to increasing the availability of credit, increasing investment, job creation, and economic progress.

In addition, De Nicolo et al. (2018) stated that financial innovation enhances resilience of the financial system, reduction of financial crises, and reduction in economic downturn. Though financial innovations have vast benefits, there are risk associated with it. Ogbeida and Obadeyi (2023) pointed that financial innovation is prone to

systemic risk and consumer protection. To make it elaborate, Haldane (2019) stated that complex financial instruments and the use of algorithms and artificial intelligence in the financial market raise a concern about potential systemic risk and effective regulatory oversight.

Having considered the benefits and the challenges that financial innovations come with, it is impossible to say financial innovations cannot be embraced dues to the challenges. Increasing the availability of credit, economic growth, and level of investment as pointed by Levine (2020) and Rajan (2015) are the objectives of financial inclusion.

Financial inclusion can be achieved when every adult has access to a broad range of formal financial service that meet their needs at affordable cost, (Nwome et al., 2024). The role of financial innovation is best fit in the view of Nwome et al. that complements that assertion of Levine (2020) and Rajan (2015) that financial innovation is instrumental in reducing financial frictions which reduction in cost is among them. National Financial Inclusion Strategy, (2018) stated that those who are financially excluded finds it difficult to access cheaper credit which makes it extremely difficult for them to grow their businesses. But the innovations in the financial industry make financial services easy and accessible. For instance, payment system which is one of the most common areas of financial innovation that can help reduce cost and create access any time anywhere.

The role of the Fintech Firms in creating financial inclusion has gone a long way. Unlike the conventional banks where a customer cannot have an account until they go through rigors of procedures, the Fintech companies can create account for a customer with just clicks on a phone of tablet. Sometimes, (i.e before the Central Bank of Nigeria (Customer Due Diligence) Regulations, (2023) and Circular to all commercial merchant, non-interest and payment service Banks; other Financial Institutions, and mobile money Operators on 1st December 2023) the Tier 1 account can be created without having a bank verification number (BVN) or National Identification Number (NIN) or with fictitious name. Another aspect of the Fintech firms (such as Kuda, Opay, PalmPay, Moniepoint among others) that make their services cost effective is that they charge zero interest on transactions. The efforts put in place by the other Fintech firms (Okash, Social Lender, GetEquity) remove the barrier of tendering collateral before accessing credit facilities and also the room to access fund at your door post.

To reach a consensus that financial inclusion is reached, CBN, (2020), Ozili (2022), Nwankwo (2014); Nair (2014) described that at that point there will be a process where all members of an economy will not have difficulty opening accounts, accessing credit and use of financial system products and facilities are conveniently, easily and consistently gotten without difficulty. With this description there is still a long way to go although significant efforts have been made. Nwome et al. (2024) supported that to achieve an adequate financial inclusion policy in Nigeria has not been an easy task when one considers the barriers such as inadequate technological development, poor

infrastructural amenities, insecurities, financial illiteracy, and partial bank plan-financial inclusion integration.

Finally, Nwome et al. (2024) concluded that the notable financial innovations that are witnessed in the financial sector that make unbanked population access financial services in Nigeria are Automated teller machines (ATM), Agency banking, internet/mobile banking, point of sales (POS), web payment transaction among others.

STATEMENT OF PROBLEM

The innovation in the financial sector have pose additional risk to users of financial services as well as the developers of the financial innovation products. Inadequate cyber security is one of the major bottlenecks to the widely acceptability of the product as identified by Nwosu et al. (2022). Though it is meant to drive financial inclusion but the threat posed by these innovations rather make users to prefer bricks and mortar banks.

Many people have no confidence in these innovations and the innovations have not or have not near the reach of its full potential due to lack of access to fund by developer of the financial innovations. Nwosu et al. (2022) further stated that the licensing requirement of N5 billion shareholders' capital has defeated the objectives of those who intended to start the financial technology firm that create financial innovations. The challenges transcend to the institutions saddled with the responsibility of regulating the Fintech companies that create the innovations. Nwosu et al. (2022) further observed that the institutions are behind in understanding the operations of the Fintech firms. Due to lack of understanding, the institutions could not properly cover all the areas of innovations in Nigeria.

With these challenges identified the researcher cannot proffer solution to all at a time. Therefore, this study focused on finding out if the innovations are creating access to financial services thereby making the unbanked people financially included. This study aimed at the assessment of the impact of financial innovation and its role in creating financial inclusion in Nigeria.

OBJECTIVES OF THE STUDY

Broadly, this study assesses the impact of financial innovation and its role in creating financial inclusion in Nigeria. Specifically, the objectives are:

i. To assess the impact of volume of Point of Sales transactions on financial inclusion in Nigeria.
ii. To assess the impact of volume of automated teller machine banking transactions on financial inclusion in Nigeria.
iii. To assess the impact of volume of web payment transactions on financial inclusion in Nigeria.
iv. To assess the impact of volume of mobile payment transactions on financial inclusion in Nigeria.

EMPIRICAL REVIEW

Haruna and Dibal (2024) studied the effect of financial technology on financial inclusion in Nigeria: Autoregressive Distributed Lag approach. Data were collected from 2009 to 2019. The study adopted an ARDL model as the method of data analysis. The study found that volume of ATM has significant impact on the number of people financially included in the short-run and long-run. But volume of POS and mobile banking has insignificant impact on financial inclusion. The study failed to distinguish whether financial technology and financial innovation are different.

Nwome et al., (2024) examined the effect of financial innovations on the financial inclusion in Nigeria from 2005 to 2021. The methodology use was Ordinary Least Square. The result of the study showed that found that the selected financial innovations services are good means of driving financial inclusion as they have positive significant impact on the number of deposits in financial institution. This further showed that the use of agency banking, point of sales, and internet or mobile banking are instrumental in granting financial access to financial users especially those in the rural areas.

In another study conducted by Iwedi et al. (2023) on the effect of financial technology on financial inclusion considered point of sale, automated teller machine, web banking technology and mobile banking technology as the proxies to measure financial technology. They employed vector auto regression (VAR) as a method of data analysis. The study found that the selected variables are not significant in achieving financial inclusion in Nigeria except web technology though they have positive effects.

In their study, Ugwuanyi and Okoro (2022) studied financial technology and financial inclusion in Nigeria. They collected primary data with the aid of 300 sampled population of rural dwellers of Ugbawka, Nara, Agbani, Nkerefi and Akpougu in Enugu. The study adopted judgmental sampling techniques. They used percentage and pie charts to analyse the data collected. They found from their study that financial technology plays it role in easing financial activities like deposit, withdrawal, account opening, savings, borrowing, bill payment. The study further discovered that financial technology has brought banking services to the doorpost of people which relieve them of the stress of going to the bank hall and they can perform financial activities anywhere anytime.

THEORETICAL REVIEW

Technology Acceptance model

Technology Acceptance Model was propounded by Fred D. Devis in 1989. This theory has two perceptions. The first is the usefulness perception and the second is the ease-of-use perception. Iwedi et al. (2023) posited that technology Acceptance Model is an information system theory that models how a user accept or use a technology. Any new technology looks like a mystery to users. So, Devis theory of TAM came in to demystify the reasons why people may choose to use a particular technology on not and how a new technology can be user friendly or easy to use. In a study assessing the effect of financial innovations which are technologies put together to enable people

who are underbanked or unbanked to be financially included, there is a need to assess how a particular technology will be accepted by the target population who are mostly aged and uneducated or undereducated and how the technology will be easy for use for them looking at their age and level of education.

The Perceived Usefulness of TAM looked at the usefulness of a technology to a user in getting the job done and the Perceived Ease of Use deals with ease of use by a particular user without the user necessarily having to study the manual of the technology, (Iwedi et al., 2023).

METHODOLOGY

Research Design

The design adopted for this study is ex post facto, research design. Ex post facto research design is a research design that is suitable for historic data.

Model Specification

The model adopted this study is from the work of Nwome et al. (2024). Nwome et al model was $FI = \beta_0 + \beta_1 AB_t + \beta_2 POS_t + \beta_3 MB_t + \mu_t$……(i)

For the purpose of this study, Nwome et al. (2024) was modified such that some variables were dropped and replaced with others. The modified model for this study is

ABS (VPoS, VATM, VMPOB, VWEB) ……..…… (ii)

$ABSt = \beta 0 + \beta_1 VP_O S_t + \beta_2 VATM_t + \beta_3 VMPOB_t + \beta_4 VWEB_t + \mu_t$ … (iii)

Where

ABS = Availability of Banking Service
VPoS = Volume of Point of Sales Transactions
VATM = Volume of Automated Teller Machine Transactions
VMOB = Volume of mobile Banking Transactions
VWEB = Volume of Web Payment Channel Transactions
B_0 = constant
$\beta_1\ \beta_2\ \beta_3\ \beta_4$ = coefficients of the independent variables
μ = *stochastic term*

METHOD OF DATA ANALYSES

The data collected for this study were subjected to the following tests: descriptive statistics, correlation analysis, Augmented Dickey Fuller Test for stationarity, Lag Structure to determine the Lag length, Autoregressive Distributed Lag Model, Long-run and Bound Test, Breusch Godfrey LM Test for Serial Correlation, CUSUM Test, CUSUM Square Test, Heteroscedasticity Test using Eviews 10.

Data Analysis and Interpretation

Table 1: Descriptive Statistics

	ABS	LVATM	LVPOS	LVMOB	LVWEB
Mean	0.0296	19.99	17.63	17.44	17.33
Median	0.0296	20.04	17.65	17.63	16.17
Maximum	0.0360	21.19	22.08	21.34	23.36
Minimum	0.0227	17.91	13.73	13.96	14.28

Source: Author's Computation

Table 1 above presented the description of the data. The means statistics depict the averages of the data, the minimum and the maximum showed the lowest and the highest value observed in each variable respectively.

Table 2: Correlation Analysis

	ABS	LVATM	LVPOS	LVMOB	LVWEB
ABS	1				
LVATM	-0.93902	1			
LVPOS	-0.97460	0.91607	1		
LVMOB	-0.96388	0.90107	0.98447	1	
LVWEB	-0.91321	0.80090	0.90955	0.89968	1

Source: Author's Computation (2024)

Table 2 above showed the direction of movement of the variables or the relationship between one variable and another. The result of the correlation table showed that ABS has a negative relationship with VATM VPOS, VMOB, and VMWEB. The relationship between VATM has a positive and very strong relationship with VPOS, VMOB, and VWEB. VPOS has a very strong relationship with VMOB and VWEB. VWEB also have the same result.

Table 3: Summary of Unit Toot Test

Var	ADF	t-statistics	Prob	Inte	Remark
ABS	-3.957	-3.875	0.0445	**I(0)**	**Stationary**

LVATM	-11.53	3.875	0.0000	**I(0)**	**Stationary**
LVPoS	-3.947	-3.828	0.0418	**I(0)**	**Stationary**
LMOB	-6.021	-3.144	0.0005	**I(1)**	**Stationary**
LVWEB	-3.993	-3.933	0.0463	**I(0)**	**Stationary**

Source: Author's Compilation (2024)

Table 3: summary the order of integration and aid the research to decide the suitable model to be used. From table 4 above it is discovered that ABS, LVATM, LVPOS, and LVWEB all integrate at level except LVMOB which integrates at first difference. The mixture of I(0) and I(1) made ARDL the most suitable mode suitable model to be adopted.

Table 4: ARDL Short-Run and Long-Run Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Short-Run				
LVATM	-0.001235	0.000635	-1.943863	0.0930
LVPOS	-0.000813	0.000578	-1.406696	0.2023
LVMOB	-0.000333	0.000563	-0.591658	0.5727
LVWEB	-0.000336	0.000195	-1.720409	0.1290
C	0.090311	0.015007	6.017983	0.0005
Long-run				
LVATM	-0.000930	0.000547	-1.698194	0.1333
LVPOS	-0.000612	0.000408	-1.501346	0.1770
LVMOB	-0.000251	0.000416	-0.601849	0.5662
LVWEB	-0.000253	0.000136	-1.861699	0.1049
C	0.067981	0.008175	8.315575	0.0001

Source: Author's Computation (2024)

Test of Hypotheses

The four hypotheses raise were tested with the use ARDL model and the result is presented in table 6 above. $H_0$1 states that volume of automated teller machine has no significant impact on availability of banking service. This hypothesis was rejected in the short-run at 10% significance level. But at 5% threshold the null hypothesis is accepted. The evidence of the result is proven by the p-value is 0.0930 and the coefficient of -0.001235. The negative coefficient implies that volume of ATM transaction has a negative effect on availability of banking service. This implies that 1% increase in the volume of ATM transaction will lead to a decrease of 0.1% in the availability of banking service. The availability of banking service represents the number of bank branches per 1000 population. In the long-run, the null hypothesis is

accepted both at 5% and 10% threshold. The p-value that denotes the acceptance of the null hypothesis one in the long-run is 0.1333 while the coefficient is -0.000930 which means there is a negative insignificant impact of the volume of ATM transaction on the availability of banking service in the long-run. This means the increase in the volume of transaction of ATM will decrease the number of bank branches by 0.09% in the long-run. because the need of visiting bank branches will reduce as most transactions will be conducted via ATM terminals.

H_{02} stated that volume of point of sales transactions has no significant impact on availability of banking service. This hypothesis is accepted in the short-run and long-run. the p-value of the hypothesis 2 in the short-run is 0.2023 while the coefficient is -0.000813. This signifies that volume of point of sale has negative insignificant impact on availability of banking service in the short-run. A 1% increase in the volume of POS transaction cause a 0.08% decrease in the availability of banking service in the short-run. in the long-run, volume of POS has a negative insignificant impact on the availability of banking service in Nigeria. Volume of POS transaction has a p-value of 0.1770 and coefficient value of -0.000612. This signifies that a 1% increase in the volume of POS will lead to a decrease in availability of banking service in Nigeria by 0.06% in the long-run. Though this is insignificant but a continuous increase in the use of POS is gradually reducing the visit to bank branches which is reducing the potential of more bank branches in the long-run.

H_{03} stated that volume of mobile banking has no significant impact on availability of banking services in Nigeria. The outcome of the ARDL estimation in the short-run and long-run confirm that this hypothesis is accepted. In the short-run volume of MOB has a p-value of 0.5727 and a coefficient value of -0.000311. The negative coefficient symbolizes a negative effect. This showed that volume of MOB is negatively insignificant on availability of banking service in the short-run. 1% increase in volume of MOB transaction will be equal to 0.03% decrease in availability of banking service. In the long-run, the p-value is 0.5662 while the coefficient is -0.000251 which means there is a negative insignificant impact of the volume of MOB on availability banking service. In the long-run 1% increase in the volume of MOB will cause a 0.03% decrease in availability of banking service in Nigeria. An increase in number of mobile banking transaction will cause a decrease in bank hall visitation and will result to gradual decrease in the number of bank branches in the long-run.

H_{04} states that volume of WEB has no significant impact on availability of banking service. This hypothesis is accepted in the short-run and in the long-run. In the short-run, the p-value of volume of WEB is 0.1290 while the coefficient is -0.000336 which signifies that volume of WEB has a negative insignificant impact on availability of banking service in Nigeria. Implication is that, 1% increase in volume of WEB can cause a 0.03% decrease in availability of banking service in the short-run. The long-run result also showed a negative insignificant impact of the volume of WEB on availability of banking service. The p-value is 0.1049 while the coefficient value is -

0.000253 which means when volume of WEB transactions increases by 1% availability of bank branches will decrease by 0.02% in the long-run.

Discussion of Finding

The objective of this study is to assess the impact of financial innovation and its role in creating financial inclusion in Nigeria. In order to achieve the objective four hypotheses were drawn. The independent variable financial innovation was proxied by volume of point of sales transactions, volume of automated teller machine transactions, volume of mobile banking transaction and volume of web pay transactions, while the availability of banking service which is the number of bank branches by 1000 population was used as the proxy for financial inclusion. The study found that all the four variables have no significant impact on financial inclusion in Nigeria except volume of ATM which showed a significant impact in the short-run at 10% significance level. The finding of this study agreed with the findings of Haruna and Dibal (2024) who conducted a study on effect of financial technology on financial inclusion in Nigeria: autoregressive distributed lag approach and found volume of ATM to be significant on financial inclusion. But there is a slight difference because the finding of this study which found volume of ATM transactions to be significant only in the short-run and has a negative effect. But Haruna and Dibal found a positive and significant impact in both short-run and long-run. Judging by the long-run result this study agreed with the work of Iwedi et al (2023) who studied financial technology on financial inclusion and found POS, ATM, MB be insignificant. Based on the direction of this study, there is a point of agreement with the work of Nwome et al. (2024) who was of the view that agency banking, point of sales, and internet or mobile banking are instrumental in granting financial access in the rural areas because those innovation can serve people at their comfort without going to the bank and this will reduce visit to bank branches.

The finding of this study which implies that as people increase the use of these financial innovations the need of going to bank hall will decrease which will eventually result to reducing the number of bank branches across the nation confirms the assertion of Ugwuanyi and Okoro (2022) that financial technology plays it role in easing financial activities like deposit, withdrawal, account opening, savings, borrowing, and bills payment.

The researcher was disturbed with result with the effect which is very insignificant, but further review of literatures brought him to the light of the challenges that financial innovation is facing in Nigeria which Ogbeida and Obadeyi (2023) which are poor infrastructure, low levels of financial literacy, and weak regulatory frameworks. Also, Caamara and Tuesta (2014) stated that it is not necessarily the volume of usage of financial service that brings financial inclusion. other factor that are responsible are level of income, level of education, and the size of household.

CONCLUSION

In conclusion the study arrived a result that volume of ATM transaction can significantly impact availability of banking access negatively in the short-run but in the

long-run it has a negative insignificant impact on availability of banking service. The finding of VPOS, VMOB, VWEB all have negative significant impact on availability of banking service both in the short-run and the long-run. the study concluded that increase in the VATM, VPOS, VMOB, and VWEB will cause a decrease in the number of bank branches. This result is very insignificant in the case of Nigeria because of challenges like poor infrastructure, low level of financial literacy whereby some of the adult population not educated or undereducated, and weak regulation. Therefore, this study found that financial innovation has a negative insignificant impact on financial inclusion in short-run and long-run.

RECOMMENDATION

The study recommended that:

i. Welfare of citizens should be raised so that their level of income will increase.
ii. Automated teller machines terminal should be easily accessible by member of the community so that they cannot spend all the time waiting on queue to carry out a single transaction.
iii. Awareness should be done to the public on the need of using point of sale and business should increase acceptance of point of sales transaction instead of majoring on cash.
iv. Service providers should ensure the remote areas have strong connectivity to aid smooth transactions.
v. Web transactions should be made secured so that users can confidently use it by increasing cyber security.

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