IMPACT OF DIGITAL FINANCE ON BANKS' CREDIT ALLOCATION IN NIGERIA

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BABARINDE Gbenga Festus
Department of Banking and Finance, Modibbo Adama University, Yola, Nigeria;
liftedfgb@gmail.com

Abstract: *Using Vector autoregression (VAR), variance decomposition and Pearson correlation techniques, this study investigates the impact of digital finance on banks' credit allocation in Nigeria between 2009Q1 and 2019Q4. The study specifically aims to examine the impact of digital finance (proxied with value of Automated Teller Machine (ATM), Point of Sales (POS) and web payment (WEBPAY) transactions) on total sectorial credit allocation of deposit money banks in Nigeria. This study finds no long-run relationship between digital finance and credit allocation of deposit of money banks in Nigeria. Furthermore, digital finance and banks' credit allocation were found to have strong and positive correlation in Nigeria. It is also unveiled that, unlike the value of POS transactions which have negative and non-significant impact, the value of ATM and WEBPAY transactions have positive but non-significant impacts on banks' credit allocation in Nigeria. It can therefore be concluded that, though, a strong and positive correlation exists between digital finance and banks' credit allocation but the former (digital finance) does not exert significant impact on the latter (credit allocation function of deposit money banks) in Nigeria in the period of study. There is therefore the need for the current pace of digital finance adoption in Nigeria be intensified in order for it to achieve the desirable impact on banks' credit allocation function in the country.*
Keywords: *ATM, credit allocation, deposit money banks, digital finance, POS, web payment, VAR.*

Introduction

The fulcrum upon which modern commerce rides is credit and banks as credit extending institutions are expected to perform this important function using all legally permissible and available facilities, resources including technologies. The function of banks, particularly, deposit money banks in the allocation of credit to different sectors of the economy is vital to enhancing economic growth (John & Lawal, 2019; Uzah & Agbugba, 2021). This implies that sectoral commercial bank credit has long-run implications on real sector output performance (Nnenna, & Ezeude, 2018) in that commercial bank credit allocation to the real sector constitutes a booster to real sector output and performance (Onyia, 2019). Banks' credit allocation involves the distribution of banks' credits to different sectors of the economy. Statistics reveals that, with an average of 12022.04 billion Naira, total sectorial credit allocation of deposit money banks in Nigeria in 2009 was 8,912.14 billion Naira and in year 2019 it rose to 17,187.77 billion Naira (Central Bank of Nigeria [CBN], 2021). The advances in information and communication technology have brought to the fore the importance of internet and other digital channels and technologies in the provision of banking and financial services. One of the relatively young financial innovations in the Nigerian financial system is the application of financial technology in the provision of banking and financial services to customers without the need for physical contact between the providers and the consumers of the financial services. In Nigeria, the formal launch of the CBN's National Financial Inclusion Strategy (NFIS) in 2012 (CBN, 2018) gave impetus to the digitalization of the banking and financial service provision in the country with more emphasis on digital payment systems. According to the 2018 revised NFIS, the NFIS was built on four strategic areas of agency banking, mobile banking/mobile payments, linkage models and client empowerment (CBN,2018).

Since agency banking, and mobile banking/mobile payments are key aspects of digital financial services, it implies that digital finance is at the heart of the NFIS for the strategy to achieve its targets. The provision of financial services like insurance, payments, remittance, savings, credit, pension, capital market products and services, and other financial products and services to customers using digital channels, is termed digital finance. Particularly, digital financial service in form of digital/electronic payments involve the use of digital banking and finance solutions like the point-of-sales (POS), automated teller machine (ATM), mobile banking, web/online banking, Remita, etc.

Currently in Nigeria, digital financial services are dominated by digital/electronic payment services via POS, ATM, webpay, mobile pay, Remita, Nigerian Interbank settlement system (NIBSS) instant payment (NIP), NIBSS electronic funds transfer (NEFTS), NIBSS automated payment services (NAPS), central pay, m-cash, e-bills/pay. Statistics (CBN, 2021) reveals that in the period under review (2009 -2019), there was an annual average of 798.2773 billion Naira worth of value of POS transactions in Nigeria and the figure rose from 11.03billion Naira in 2009 to 3,204.75 billion Naira in 2019. In the same vein, posting an annual average of 3581.109 billion Naira, the value of ATM transactions expanded from 2009's 548.60 billion Naira to 6512.61 billion Naira in 2019. Further statistics shows an average of 171.3036 billion Naira for web payment transactions, and same web payment in Nigeria in 2009 and 2019 stood as 84.15 billion Naira and 478.14 billion Naira respectively (CBN, 2021).

Digital finance has come with certain benefits and in that light, Okifo and Igbunu (2015) observe that digital/electronic payment systems are convenient and safe; the system assists in mobilizing savings; aids in tracking individual spending; and reduces cash handling and printing costs. Furthermore, digital finance has the ability to provide inexpensive, convenient and safe banking services; offers greater control of personal finance for clients, aids in quick financial decision-making; facilitates payments; and promotes financial inclusion (Gujral & Kumar, 2021).

Although, the financial sector, particularly the banking sector, intermediate between the surplus unit and the deficit unit of the economy by mobilizing savings and allocating the funds to the real sector of the economy for investments (Onyia, 2019), but the increasing competition among banks; spike of new technologies as well as the need for full mainstreaming of these technological innovations into banking and financial service mechanisms, constitute big challenges to even the strongest banks. These make banks susceptible to loss of market share if the financial innovations are not well-managed and proactively handled. Empirically, past studies have focused on the influence of digital banking/digital financial services on banks performance without specificity as to credit allocation function of banks (Onyike et al., 2019; Takon et al., 2019; Boateng & Nagaraju, 2020; Chindudzi et al., 2020; Arilesere et al., 2021; Ngwengeh et al., 2021; Do et al., 2022; Isa-Olatinwo et al., 2022). Other past empirics have also established the link of digital finance/digital banking with variables like economic growth (Igoni et al., 2020; Iwedi et al., 2022); money supply (Ugwuanyi et al., 2020); financial inclusion/financial deepening (Adejoh et al., 2020; Igwemeka et al., 2020; Uzoma et al., 2020).

Although, practically, digital financial services have come to stay but empirically, the direction and extent of impact of the digital innovation on banking functions particularly credit allocation function, have not been clarified by any known study most especially in a developing economy like Nigeria. This observed empirical lacuna cries for studies on the relationship between digital finance and banks credit allocation and it is this cry that this current study attempts to attend to.

Therefore, the thrust of this study to evaluate the impact of digital financial services on banks' credit allocation in Nigeria. The three specific objectives of this study are to: examine the impact of automated teller machine transactions on banks' credit allocation in Nigeria; assess the impact of point of sales transactions on banks' credit allocation in Nigeria; and investigate the impact of webpay transactions on banks' credit allocation in Nigeria.

Literature Review

Conceptual Review

Bank Credit Allocation

Bank credits is the conglomeration of loans, overdrafts, advances and other credit facilities extended by banks in the economy. Fapetu and Obalade (2015) also describe bank credits as the amount of loan and advances to individuals and organizations from banking system. The division by banks of their financial resources to different processes, people, projects and sectors of the economy is termed credit allocation (John & Lawal, 2019). In Nigeria, sectoral distribution of commercial banks' loans and advances involves the distribution of bank credits to production activities (like agriculture, forestry and fishery; manufacturing; mining and quarrying; real estate and construction); general commercial activities (such as bills discounted; domestic trade; exports; imports); services (like public utilities; transport and communications; credit to financial institutions); oil and gas sector (that is power and energy); and other sectors (like government; personal and professional; miscellaneous activities) of the economy.

Digital Finance

Digital finance is a suit of financial services rendered via reliable digital payment system through cell phones, personal computers, the internet or cards (Gujral & Kumar, 2021). Digital finance is a set of financial services delivered over digital infrastructure platform including mobile and internet with low use of cash and traditional bank branches (Ugwuanyi et al., 2020). Furthermore, digital finance has been conceptualized as any form of financial services and products enjoyed by customers without the need to interact physically and directly with financial services providers but via either internet-mediated or non-internet-mediated digital platforms or devices (Babarinde et al., 2020). Therefore, digital finance entails the provision of banking and other financial services such as payments, shopping, savings, investments, remittances, including loan and credit facilities, using personal computers, telephones, ATM, POS, smartcards and other digital channels which are enabled essentially by the use of the internet. Digital finance though used interchangeably used with terms like digital banking, cashless banking, internet banking, online banking, virtual banking, web-based banking, phone banking, home banking, computer (PC) banking, remote/electronic banking, mobile banking; the term digital finance is a universal set containing the above and many other financial services like insurance, pension, capital market, remittance, that are carried out using digital channels.

Theoretical Review

Bank Focused Theory

The bank focused theory relates to the use by conventional banks of non-traditional but low cost delivery channels in the provision of banking services to customers (Kapoor, 2010; Nwankwo & Idachaba, 2016; Onyike et al., 2019). In other words, the bank-focused model emerges when a traditional bank uses non-traditional low-cost delivery channels to provide banking services to its existing customers (Lyman et al., 2006). This implies that the bank-focused theory of branchless banking entails among other, the use of digital channels in the provision of financial services. According to the theory, some of the channels of delivery of financial services include ATMs, internet banking, mobile/phone banking, POS.

Financial Intermediation Theory

Gurley and Shaw (1960)’s financial intermediation theory relates to the role of financial intermediaries like banks, in the creation of link between the surplus and deficit units of the economy by mobilizing deposits and savings from the former and extending the surplus resources mobilized to the latter (deficit units) in form of loans and advances and other credit facilities. The theory emphasizes the importance of the intermediation process of credit allocation in the economy as a whole. The theory is based on the assumption that financial intermediation causes more funds to be available to the productive sector of the economy which will increase production, then lead to eventual growth in the economy (John & Lawal, 2019). Therefore, this study is underpinned by

the bank focused theory in that it emphases the role of non-conventional delivery means like digital channels like ATM, POS, internet banking, mobile banking, and others, in the provision of banking and financial services to customers and how these channels affect credit allocation function of banks.

Empirical Review

Islam et al (2022) studied the impact of financial technology on financial services of deposit money banks in Nigeria from 2012 to 2021 using correlation and regression techniques. The study indicates that mobile banking, internet banking and POS banking have significant and positive effects on financial service of listed Nigerian banks. In Somalia, Abdi et al (2022) applied correlation and regression technique to the study of the effect of automated teller machines and mobile banking on financial inclusion among commercial banks in the country. From the survey, the study found that ATM banking and mobile banking significantly promote financial inclusion in Somalia. In another study, Do et al (2022) investigated the impact of digital transformation on the performance of Vietnamese commercial banks from 2011 to 2019. From the results of the generalized methods of moments (GMM) regression analysis, the study shows digital transformation to have a positive impact on the performance of the country's commercial banks.

In Nigerian context, the effect of digital banking on the performance of commercial banks, between 2010 and 2019, was examined by Chukwu and Molokwu (2022). The result of the Autoregressive Distributive Lag (ARDL) model reveals that digital banking has positive and non-significant effect on the performance of Nigerian commercial banks. Likewise, between 2012 and 2020, Isa-Olatinwo et al (2022) assessed the effect of digital financial services on the financial performance of Nigerian commercial banks. A positive association between digital financial services and bank performance in Nigeria was established by the study.

In China, Jiang et al (2022) examined the impact of digital finance on monetary policy. The study indicates the link between digital finance and monetary policy to be significant and positive. Likewise, , Wang and Ji (2022) in China, investigated the effect of digital financial development on residents' income from 2011 to 2018. Digital financial services were found to exert a significant and positive effect on citizens' income in the country.

In another study, Iwedi et al (2022) approached the study of the effect of digitalization of banking services on Nigerian economy using multiple regression technique. The study shows that web pay and mobile pay have positive and significant effect on Nigerian economic growth. Arilesere et al (2021) also analyzed the impact of digital electronic payment on banks performance in Nigeria from 2009 to 2020. From the Error Correction Model (ECM) analysis, the study established that digital payment by way of mobile banking, ATM and internet banking have significant and positive effect on bank financial performance unlike POS or debit cards which had a negative significant influence on bank performance.

Furthermore, Toda-Yamamoto causality technique was applied by Adejoh et al (2021) in the analysis of the causal relationship between digital banking and financial deepening in Nigeria from 2009 to 2019. The study found no causal relationship between digital banking and financial deepening in Nigeria. Also, the impact of digital financial services on the financial performance of commercial banks in Cameroon was empirically assessed by Ngwengeh et al (2021). In the survey, digital savings services, digital transfers services, digital withdrawals services and digital payment services were measures of digital financial services. Taylor linearise variance estimation technique was applied to the data obtained via questionnaire. The study found that except digital payment which has negative but significant influence, other measures of digital financial services have positive and significant effect on the profitability of commercial banks in Cameroon. Similar study was carried out in Ghana by Boateng and Nagaraju (2020) on the impact of digital banking on the profitability of deposit money banks from 2012 to 2018. The study proxied digital banking by cheque codeline clearing, Ghana automated clearing house, Ghana interbank settlements, Gh-Link, E-zwich, and mobile money payments in value while return on assets (ROA) was used to capture

profitability. From the Partial least squares (PLS) regression analysis, the study found that except mobile money and E-zwich, which have negative relationship with the profitability of the banks; all other indicators of digital banking examined are directly related with the Ghanaian banks' ROA. However, in a Granger causality test of the link between digital finance and Nigeria;s gross domestic product by Igoni et al (2020), the study found no causal significant impact of digital finance channels of ATM, POS and NIP on the Nigerian gross domestic product in the study period (2012 to 2017).

Furthermore, Uzoma et al (2020) analyzed the effect of digital finance on financial inclusion in Sub-Saharan Africa from 2007 to 2017 based on GMM and ECM. The study shows the existence of a positive long-run correlation between digital finance and financial inclusion. Similarly, Igwemeka et al (2020) examined the link between digital finance and financial inclusion using case study methodology which compared financial inclusion rate in India, South Africa, Kenya, Brazil and Nigeria. From the analysis, the authors observe that financial inclusion is battled with challenges not just in Nigeria but in other developing countries. Particularly mentioned is the lack of efficient use of banking agents in Nigeria occasioned by low level of innovations and excessive regulations.

Ugwuanyi et al (2020) examined the impact of digital finance on money supply in Nigeria between 2009 and 2018 using the correlation and ARDL model. The study indicates that digital finance has a positive impact on money supply in the country.

Chindudzi et al (2020) investigated the impact of digital banking on the performance of commercial banks in Zimbabwe from 2013 to 2017. From random effects panel regression and correlation technique, the study found digital banking and electronic banking usage to have positive and negative effect respectively, on the performance of commercial banks in the country. In a study based on Ordinary Least Squares (OLS) regression, Takon et al., (2019) examined the impact of the digital payment system on the efficiency of the Nigerian banking from 2009 to 2018. The study shows that digital payments ATM, POS, mobile payment and web payment transactions) have negative and significant impact on bank efficiency in Nigeria. The empirical review further exposes the dearth of study on the linkage of digital finance with banks' credit allocation most especially in a developing economy like Nigeria. Predominantly, most past studies had focused on digital finance/digital banking and its relationship with variables like banks performance, financial inclusion, economic growth, and money supply. Hence, credit extension as a key function of banks, particularly, deposit money banks, deserves proper study from the angle of digital finance as a potential predictor.

Methodology

This study aims at determining the impact of three indicators of digital finance, namely, Automated Teller Machine, Point of Sales and web payment transactions, on the total sectorial credit allocation of deposit money banks in Nigeria. The period of study was from 2009 to 2019 due to data availability. Due to small sample size of the annual data of 11 years obtained from Central Bank of Nigeria (2021)'s statistical bulletin, the study converted the annual data to quarterly data using Eviews version 10 facility for conversion of low frequency observation to high frequency data. Thus, a total of 44 data sets (observations) on quarterly basis, were eventually employed in the data analysis in this study.

This study applied the Vector Autoregression (VAR) estimation technique in determining the link between digital finance and banks' credit allocation. The flexibility of the technique as well as the result of the cointegration test suggest the amenability of the technique to the time series data used in this study. In addition, Pearson correlation technique was applied to determine the nature of relationship between digital finance and banks' credit allocation. This study is based on ex-post facto research design which entails the use of historical data in determining the relationship

between variables of interest. Hence the use of secondary data in this study. The description and measurement of these data sets are summarized in Table 1.

Table 1. Description and measurement of variables

Variables	Notation	Description	Measurement
Banks' credit allocation	BCA	Deposit money banks total sectorial credit allocation is the aggregate of loans, advances, overdraft and other credit facilities distributed to different sectors of the economy by the banks	Deposit money banks' total sectorial credit allocation. It is denominated in billion Naira.
Automated Teller Machine transactions	ATM	Automated teller machine payment system is a payment system the use either debit or credit card in the execution of financial transactions on an automated teller machine (Ugwuanyi et al., 2020).	Total amount of transactions carried out using ATM. It is denominated in billion Naira.
Point of Sales transactions	POS	Point of sales (POS) payment system is a payment system that allows for limited banking services most especially payment services via point of sales terminals and systems using card terminals (Ugwuanyi et al., 2020; Chukwu & Molokwu, 2022).	Total value of POS transactions. It is denominated in billion Naira.
Web payment transactions	WEBPAY	Web payment system allow users to make payment or financial transactions online or via internet (Ugwuanyi et al., 2020).	Total value of web payment transactions. It is denominated in billion Naira.

Source: Author's design from literature review (2022)

In specifying the model of this study (as in equation (1)), banks' credit allocation (BCA) is expressed mathematically as a function of three indicators of digital finance, namely, Automated Teller Machine (ATM), Point of Sales (POS); and web payment (WEBPAY) transactions.

$$BBBBBB_{tt} = \alpha\alpha_0 + ß_1 BBAAAA_{tt} + ß_2 PPPPPP_{tt} + ß_3 WWWWBBPPBBW_{tt} \quad [1]$$

The econometric version of equation (1) is as specified in equation (2).

$$BBBBBB_{tt} = \alpha\alpha_0 + ß_1 BBAAAA_{tt} + ß_2 PPPPPP_{tt} + ß_3 WWWWBBPPBBW_{tt} + uu_{tt} \quad [2]$$

Where BCA, ATM, POS and WEBPAY are as measured and described in Table 1. $\alpha\alpha_0$ is the intercept and uu_{tt} represents the error terms. $ß_1$, $ß_2$ and $ß_3$ are the coefficients of ATM, POS and WEBPAY respectively.

It is expected that each of the three measures of digital finance (ATM, POS WEBPAY), should have positive relationship with total sectorial credit allocation of deposit money banks (BCA). This is based on the view that the digital payment options considering its numerous benefits of simplifying banking operations, cost reduction, convenience for customers, and others, should enhance credit allocation function of deposit money banks.

Results and Discussions

Descriptive Statistics

The descriptive statistics of the quarterly data on Automated Teller Machine (ATM), Point of Sales (POS), web payment (WEBPAY) transactions, and total sectorial credit allocation of deposit money banks (BCA) in Nigeria for the period 2009Q1 to 2019Q4 are presented in Table 2.

Table 2. Descriptive statistics

	BCA	ATM	POS	WEBPAY
Mean	3005.509	895.2775	199.5693	42.82591
Maximum	4296.943	1628.153	801.1875	168.9800
Minimum	1828.183	99.92750	2.757500	6.262500
Std. Dev.	896.9777	559.3179	262.2753	50.73039
Skewness	0.017938	0.024304	1.294323	1.645101
Kurtosis	1.409428	1.616418	3.272774	4.217422
Jarque-Bera	4.640547	3.513879	12.42173	22.56383
Probability	0.098247	0.172572	0.002007	0.000013
Observations	44	44	44	44

Source: Authors' computation (2022).

According to the descriptive statistics, the average quarterly average for ATM, POS and WEBPAY over the study period stood at 895.2775 billion Naira, 199.5693 billion Naira, and 42.82591 billion Naira respectively. The quarterly average of banks' credit allocation (BCA) was 3005.509 billion Naira. The ATM transaction did not display wide dispersion from its average but the trio, POS, WEBPAY and BCA whose respective standard deviation is more than its mean value; are widely dispersed from their mean value in the study period. Further reveals by the descriptive statistics via Jarque-Bera test of normality is the normality of banks' credit allocation (BCA) and ATM transactions as against the non-normality of the other two variables (POS and WEBPAY).

Correlation Analysis

The results of the Pearson correlation analysis are reported in Table 3.

Table 3. Correlation analysis

	BCA	ATM	POS	WEBPAY
BCA	1.000000			

ATM	0.743519	1.000000		
	0.0000	-----		
POS	0.798845	0.842967	1.000000	
	0.0000	0.0000	-----	
WEBPAY	0.651042	0.732807	0.807142	1.000000
	0.0000	0.0000	0.0000	-----

Source: Authors' computation (2022).

Pearson correlation test of the nature of relationship between digital finance and banks' credit allocation (as reported in Table 3) reveals that existence of a strong and positive relationship between each of the three indicators of digital finance (ATM=0.743519; POS=0.798845; WEBPAY=0.651042) and total sectorial credit allocation by deposit money banks in Nigeria in the period of study. This suggests that digital finance and banks' credit allocation are strong correlation in Nigeria in the period of study.

Unit Root Test

The Augmented Dickey Fuller (ADF) unit root test's results are summarized in Table 4.

Table 4. Augmented Dickey-Fuller unit root test

Variables	t-Statistic	Prob.	Remarks	t-Statistic	Prob.	Remarks	I(d)

BCA	-0.245065	0.9245	Not Stationary	-6.728174	0.00000	Stationary	I(1)
ATM	-1.207373	0.6616	Not Stationary	-2.661480	0.0899	Stationary	I(1)
POS	0.901125	0.9944	Not Stationary	-3.739090	0.0326	Stationary	I(1)
WEBPAY	-0.929246	0.7693	Not Stationary	-6.406260	0.0000	Stationary	I(1)

Source: Authors' computation (2022).

The results of the ADF unit root test indicate none of the variables to be stationary in level but all of them became stationary after first difference. Thus, the variables are integrated of order one.

Cointegration Test

Cointegration test becomes necessary because the variables are non-stationary at level. Hence, since the variables are I(1) series, it is safe to apply the Johansen cointegration test in the evaluation of cointegration among the variables of study. The results of the Johansen cointegration test are presented in Table 5.

Table 5. Johansen cointegration test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.
None	0.318432	31.54931	47.85613	0.6368
At most 1	0.217682	15.44823	29.79707	0.7503
At most 2	0.089431	5.137456	15.49471	0.7941
At most 3	0.028229	1.202660	3.841466	0.2728
Trace test indicates no cointegration at the 0.05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.
None	0.318432	16.10108	27.58434	0.6572
At most 1	0.217682	10.31077	21.13162	0.7150
At most 2	0.089431	3.934796	14.26460	0.8661
At most 3	0.028229	1.202660	3.841466	0.2728
Max-eigenvalue test indicates no cointegration at the 0.05 level				

Source: Authors' computation (2022).

As indicated by both the Trace test and Max-eigenvalue test, Johansen cointegration test confirms no cointegration between digital finance and banks' credit allocation at the 0.05 level of significance. This suggests that there is no long-run relationship between digital finance and total sectorial credit allocation of deposit of money banks in Nigeria in the period under review.

Vector Autoregression Model Estimation

The Vector Autoregression (VAR) estimates of the nexus between digital finance and total sectorial credit allocation of deposit money banks in Nigeria are presented in Table 6.

Table 6. Vector autoregression estimates

	BCA	ATM	POS	WEBPAY
BCA(-1)	0.853287	0.016175	0.000768	-0.006431
	(0.10825)	(0.04992)	(0.02886)	(0.01082)

	[7.88250]	[0.32403]	[0.02660]	[-0.59460]
	{{0.0000}}*	{{0.7464}}	{{0.9788}}	{{0.5530}}
ATM(-1)	0.305398	0.999673	0.051212	0.022617
	(0.18946)	(0.08737)	(0.05052)	(0.01893)
	[1.61192]	[11.4420]	[1.01379]	[1.19470]
	{{0.1091}}	{{0.0000}}*	{{0.3123}}	{{0.2341}}
POS(-1)	-0.323645	-0.073690	0.888261	0.034694
	(0.39807)	(0.18357)	(0.10614)	(0.03977)
	[-0.81304]	[-0.40144]	[8.36910]	[0.87228]
	{{0.4175}}	{{0.6887}}	{{0.0000}}*	{{0.3844}}
WEBPAY(-1)	0.836797	-0.165337	0.293445	0.675264
	(1.56745)	(0.72282)	(0.41792)	(0.15662)
	[0.53386]	[-0.22874]	[0.70215]	[4.31153]
	{{0.5942}}	{{0.8194}}	{{0.4837}}	{{0.0000}}*
C	242.1624	7.293603	-19.99984	8.453623
	(198.359)	(91.4718)	(52.8879)	(19.8198)
	[1.22083]	[0.07974]	[-0.37816]	[0.42652]
	{{0.2240}}	{{0.9366}}	{{0.7058}}	{{0.6703}}
R-squared	0.955285	0.974884	0.962989	0.862327
Adj. R-squared	0.950579	0.972241	0.959093	0.847836
Stability	Yes	Yes	Yes	Yes
Serial correlation LM problem	No	No	No	No

Source: Authors' computation (2022).

*Note: * significant at 1%; standard errors in ( ), t-statistics in [ ] & probability values in {{ }}.*

The VAR estimates show that the value of Automated Teller Machine (ATM) transactions has positive impact on total sectorial credit allocation of deposit money banks in Nigeria but the relationship is not statistically significant. Likewise, the value of the web payment transactions exerts positive but non-significant impact on total sectorial credit allocation of deposit money banks in Nigeria. However, the value of Point-of –Sales (POS) transactions is inversely related to total sectorial credit allocation of deposit money banks in Nigeria but the connection between the two variables are not statistically significant in the study period (2009Q1-2019Q4). From the VAR analysis, it can therefore be asserted that digital finance has not made significant impact in the credit allocation function of deposit money banks in Nigeria. This may not be unconnected with the fact that digital financial services have not realized its full potential in Nigeria and this constitutes one the critical barriers to high financial inclusion in Nigeria (CBN, 2018).

Variance Decomposition Analysis of Banks' Credit allocation (BCA)

The results of the Variance decomposition analysis of banks' credit allocation (BCA) are presented in Table 7.

Table 7. Variance decomposition analysis of banks' credit allocation (BCA)

Period	S.E.	BCA	ATM	POS	WEBPAY
1	199.9547	100.0000	0.000000	0.000000	0.000000
2	268.5058	98.96539	0.712308	0.074694	0.247605
3	316.1097	97.00583	2.186616	0.301045	0.506504
4	354.2308	94.46633	4.161408	0.715535	0.656731
5	387.1897	91.60047	6.374689	1.328239	0.696605
6	417.0050	88.59635	8.610412	2.128669	0.664570

7	444.7014	85.58986	10.71487	3.093799	0.601471
8	470.8133	82.67360	12.59406	4.195159	0.537182
9	495.6187	79.90527	14.20192	5.403792	0.489020
10	519.2593	77.31585	15.52658	6.693054	0.464518

Source: Authors' computation (2022).

According to the Variation decomposition coefficients in Table 7, In period one, ATM, POS and WEBPAY contribute nothing to the variation in banks' credit allocation. This is because variation in banks' credit allocation is 100% due to own changes. In period 10, about 77.32 per cent of the variation in banks' credit allocation is accounted for by own changes while the remaining 15.53 per cent, 6.69 percent and 0.46 percent of the variation in banks' credit allocation are accounted for by changes in ATM, POS and WEBPAY transactions respectively. It can also be inferred from the variance decomposition analysis of banks credit allocation that, though the contributions of all the three indicators of digital finance (ATM, POS and WEBPAY transactions) are negligibly small, ATM transactions have the highest contribution among the three measures of digital finance. In sum, Variance decomposition analysis of banks' credit allocation also buttresses the evidence that digital finance variables of study (ATM, POS, and WEBPAY) lacks the ability to significantly explain variation in sectorial credit allocation by deposit money banks (BCA) in Nigeria in the study period (2009Q1-2012Q4).

Conclusion and Recommendations

This study, between 2009Q1 and 2012Q4, has empirically examined the impact of three indicators of digital finance, namely, Automated Teller Machine, Point of Sales and Web payment transactions on total sectorial credit allocation of deposit money banks in Nigeria through the econometric instrumentation of the Vector Autoregression (VAR), Variance Decomposition and Pearson Correlation techniques. Empirical findings of this study indicate no long-run relationship between digital finance and total sectorial credit allocation of deposit of money banks in Nigeria. Through the instrumentality of Pearson correlation test, digital finance and banks' credit allocation were found to have strong and positive correlation in Nigeria. Furthermore, from the Vector Autoregression analysis, this study found that indicators of digital finance like values of both Automated Teller Machine (ATM) and web payment (WEBPAY) transactions have positive but non-significant impact on total sectorial credit allocation of deposit money banks in Nigeria unlike the value of Point-of –Sales (POS) transaction which have negative and non-significant impact on total sectorial credit allocation of deposit money banks in Nigeria. The Variance Decomposition analysis buttresses the evidence of digital finance lacking in ability to significantly predict variations in sectorial credit allocation by deposit money banks (BCA) in Nigeria in the study period (2009Q1-2012Q4).

This study therefore concludes that, though a strong and positive correlation exists between digital financial service and banks' credit allocation but the former (digital finance) does not exert significant impact on the latter (credit allocation function of deposit money banks) in Nigeria. It is therefore recommended that the current phase of digital financial technology adoption in Nigeria be intensified and improved upon to ensure that credit allocation function of deposit money banks in Nigeria is also significantly influenced by the emergence of digital finance in the country. Intensive public awareness by government and banks and other financial institutions is therefore required to ensure mass adoption of digital financial services in Nigeria. It is suggested that future studies model the impact of other indicators of digital finance like mobile payment, instant payment, electronic funds transfer, automated payment services, on credit allocation function of deposit money banks in Nigeria. This current study could also be made cross-country research by researchers in the future.

References

1. Abdi, A. A., Hussein, F. M., & Kadir, H. B. (2022). Effect of electronic banking on financial inclusion among commercial banks in Somalia. *International Journal of Finance and Accounting, 7*(2), 43–54. https://doi.org/10.47604/ijfa.1547
2. Adejoh, M. O., Ameji, N. E., & Olorunfemi, O. (2020). Digital banking and financial deepening in Nigeria. *Confluence Journal of Economics and Allied Sciences, 3*(1), 86-97.
3. Arilesere, M. S., Olaleye, B. R., Asaolu, A. A., & Akienabor, E. (2021). Digital electronic payment and bank performance in Nigeria. *Annals of Spiru Haret University Economic Series, 21*(4), 327-340, doi: https://doi.org/10.26458/21419
4. Babarinde, G. F., Kazeem, A. B., Abdulmajeed, T. I., & Ugwuanyi, N. J. (2020). Digital finance and the performance of hotel business in Yola metropolis, Adamawa state. *ATBU Journal of Accounting and Finance, 1*(1), 119-128.
5. Boateng, K., & Nagaraju, Y. (2020). The impact of digital banking on the profitability of deposit money banks: Evidence from Ghana. *International Journal of Research in Finance and Management, 3*(1), 144-150. https://ssrn.com/abstract=3639119
6. Central Bank of Nigeria (2018). *National financial inclusion strategy (revised).*
7. Central Bank of Nigeria (2021). *Statistical bulletin.*
8. Chindudzi, G., Maradze, T. & Nyoni, T. (2020). The impact of digital banking on the performance of commercial banks in Zimbabwe. *International Journal of Advance Research and Innovative Ideas in Education, 6(6),* 1190-1219.
9. Chukwu, K. O., & Molokwu, S. R. (2022). Effects of digital banking on the performance of commercial banks in Nigeria: 2010-2019. *International Journal of Multidisciplinary Research and Analysis, 5*(1), 133-148. https://doi.org/10.47191/ijmra/v5-i1-18
10. Do, T. D., Pham, H. A. T., Thalassinos, E. I., & Le, H. A. (2022). The impact of digital transformation on performance: Evidence from Vietnamese commercial banks. *Journal of Risk and Financial Management 15*(21), 1-15. https://doi.org/10.3390/jrfm15010021
11. Fapetu, O., & Obalade, A. A. (2015). Sectoral allocation of banks' credit and economic growth in Nigeria. *International Journal of Academic Research in Business and Social Sciences, 5*(6),161-169. http://dx.doi.org/10.6007/IJARBSS/v5-i6/1666
12. Gujral, K., & Kumar, N. (2021). Digital finance and its impact on financial inclusion. *International Journal of Advanced Research in Commerce, Management & Social Science, 4*(1), 5-7.
13. Gurley, J. G., & Shaw, E. S. (1960). *Money in a theory of finance*. Brookings Institution.
14. Igoni, S., Onwumere, J. U. J., & Ogiri, I. H. (2020). The Nigerian digital finance environment and its economic growth: Pain or gain. *Asian Journal of Economics, Finance and Management, 2*(2), 1-10. https://www.globalpresshub.com/index.php/AJEFM/article/view/824
15. Igwemeka, E. C. O., Eje G. C., Okonkwo M. C., Onoselogu O. C.O., & Ojiakor I. P. (2020). Digital finance and financial inclusion in Nigeria: Lessons from other climes. *Nigerian Journal of Banking and Finance,12*(1), 97-105.
16. Isa-Olatinwo, A., Uwaleke, U., & Ibrahim, U. A. (2022). Impact of digital financial services on financial performance of commercial banks in Nigeria. *International Journal of Economics and Management Systems,7*, 300-307. http://dx.doi.org/10.37394/23207.2022.19.98
17. Islam, M.S. N., Ysuuf, A. A., & Shuaibu, H. (2022). The impact of financial technology (fintech) on financial service delivery of deposit money banks in Nigeria. *Sapientia Foundation Journal of Education, Sciences and Gender Studies, 4*(2), 83–93.
18. Iwedi, M., Kocha, C. N., & Wike, C. (2022). Effect of digitalization of banking services on the Nigeria economy. *Contemporary Journal of Banking and Finance, 2*(1), 1-10.
19. Jiang, S., Qiu, S., & Zhou, H. (2022). Will digital financial development affect the effectiveness of monetary policy in emerging market countries? *Economic Research-Ekonomska Istraživanja, 35*(1), 3437-3472. http://dx.doi.org/10.1080/1331677X.2021.1997619
20. John, S. A., & Lawal, R. Y. (2019). Impact of sectoral allocation of banks' credit on economic growth in Nigeria. *International Journal of Accounting and Finance, 8*(2), 96-113.

21. Kapoor, S. (2010). Succeeding in UK with the bank-focused model of mobile banking. Finacle Whiteboard. Http://Www.Infosysblogs.Com/Finacle/2010/03/Succeeding_With_The_ Banfoc use.Html.
22. Lyman, T., Ivatury, G., & Staschen, S. (2006). Use of agents in branchless for the poor: Rewards, risks, and regulation (Focus Note 38). *Consultative Group to Assist the Poor (CGAP).*
23. Ngwengeh, B. B., Messomo, E. S., & Mbu, S. A. (2021). The influence of digital financial services on the financial performance of commercial banks in Cameroon. *European Scientific Journal,17*(15), 448-469. https://doi.org/10.19044/esj.2021.v17n15p448
24. Nnenna, C. V., & Ezeude, C. G. (2018). Impact of commercial bank sectoral credit allocation in stimulating real sector output growth in Nigeria. *IDOSR Journal of Arts and Humanities, 3*(1), 72-87.
25. Nwankwo, O., & Idachaba O. I. (2016). Effect of agency banking on the performance of deposit money banks in Nigeria. *FUNAI Journal of Humanities and Social Sciences, 3*(1), 62-69.
26. Okifo J., & Igbunu, R. (2015). Electronic payment system in Nigeria: Its economic benefits and challenges. *Journal of Education and Practice, 6*(16), 56-62.
27. Onyia, C. C. (2019). Impact of commercial bank sectoral credit allocation to the real sector on the output growth of Nigerian economy. *IDOSR Journal of Arts and Humanities, 4*(1), 100-110.
28. Onyike, S. C., Ekeagwu, I. C., & Uche, S.D. (2019). Electronic banking and commercial banks' performance in Nigeria: An ARDL approach: *Journal of Finance and Business Policy, 4*(1), 10-27.
29. Takon, S. M., Nsofor, S. E., Ugwuegbe, S.U., Nwonye, N. G., & Ekeh, C. C. (2019). Impact of digital payment system on the efficiency of the Nigerian banking sector. *Journal of Economics, Finance and Accounting Studies, 1*(1), 19-27.
30. Uzoma, A. B., Omankhanlen, A. E., Obindah, G., Arewa, A., & Okoye, L.U. (2020). Digital finance as a mechanism for extending the boundaries of financial inclusion in Sub-Saharan Africa: A general methods of moments approach. *Cogent Arts and Humanities, 7*(1), 1-12. DOI: 10.1080/23311983.2020.1788293.
31. Wang, T., & Ji, C. (2022). How does digital finance affect people's income: Evidence from China. *Security and Communication Networks,* 1-15. https://doi.org/10.1155/2022/7025375

Appendix Table 9. Annual data on the value of automated teller machine (ATM), point of sales (POS), web payment (webpay) transactions; and total sectorial credit allocation of deposit money banks in Nigeria for the period 2009 to 2019

Years	BCA(Billion Naira)	ATM(Billion Naira)	POS (Billion Naira)	WEBPAY(Billion Naira)
2009	8,912.14	548.60	11.03	84.15
2010	7,706.43	399.71	12.72	25.05
2011	7,312.73	1,561.74	31.02	59.61
2012	8,150.03	1,984.66	48.01	31.57
2013	10,005.59	2,828.94	161.02	47.32
2014	12,889.42	3,679.88	312.07	74.04
2015	13,086.20	3,970.25	448.51	91.58
2016	16,117.29	4,988.13	759.00	132.36
2017	15,740.59	6,437.59	1,409.81	184.60
2018	15,134.20	6,480.09	2,383.11	675.92
2019	17,187.77	6,512.61	3,204.75	478.14

Source: Central Bank of Nigeria (2021)'s statistical bulletin.