E-ISSN: 1115 - 8530 P-ISSN: 3026-8958
MPRI-JFRBD | INTERNATIONAL JOURNAL OF FINANCIAL RES. AND BUSINESS DEVELOPMENT
VOL. 05 NO. 7 – JULY, 2024

FINANCIAL TECHNOLOGY AND FINANCIAL DEEPENING IN NIGERIA

***DR. AMUSA, BOLANLE OLUBUNMI; **MRS ADEDIRE, ADETUMILARA ADEPEJU; & ***MR BELLO, BOLA FATAI**

*Banking & Finance Department, School Of Financial Studies, Gateway ICT Polytechnic, Saapade Ogun State. **Fixed Asset Accountant, Bursary Unit, Gateway ICT Polytechnic, Saapade, Ogun State. ***Accountancy Department, School of Financial Studies, Gateway ICT Polytechnic, Saapade Ogun State
Corresponding Author: *bolabunmiakanni@gmail.com*

Key Words: Fintech, Financial Deepening, Digital Payment Platforms (LDPP,) Financial Technology, Broad Money Supply to GDP (RMGDP)

Abstract

The financial sector in Nigeria, has continued to witness slow development pace in recent times, albeit, the socio-economic peculiarities of the country, occasioned by weak institutional quality, poor governance, corruption and insurgency in some parts of the country, among others. The post-independence experience with financial sector development in Nigeria was characterized by weak institutions that operated under the ambit of direct control policies which negatively affected financial intermediation. Nigeria's efforts at promoting economic growth over the years have indeed highlighted the importance of financial deepening. However, the level of deepening of the financial system in Nigeria still remains low, despite government efforts. Therefore, this study examined the effect of financial technology on financial deepening in Nigeria from 2007 to 2022. Financial deepening was proxy by ratio of broad money supply to GDP (RMGDP) and the ratio of private sector credit to GDP (RPCGDP), fintech was proxied by Digital Payment Platform (LDPP), Digital Remittance (LDRR) and Digital Investment (LDIN). The studies utilized Fully Modified Least Squares (FMOLS) regression analysis, the results indicated that LDPP had a significant negative impact, LDIN had a significant positive impact, and LDRR did not have a significant impact on RMGDP. These findings suggest that while digital payment platforms may negatively affect the ratio of broad money supply to GDP, digital investment positively influences broad money supply to GDP. From the RPCGDP, the results showed that LDRR had a significant positive effect while LDPP and LDIN did not have significant effects on RPCGDP. These findings suggest that digital remittances positively affect the ratio of private sector credit to GDP in Nigeria. Based on the findings, the study recommended that the policymakers and financial institutions should focus on promoting and supporting digital remittance services. This can be achieved through partnerships with fintech companies, regulatory frameworks that facilitate cross-border remittances, and incentives for using digital remittance platforms.

Introduction

The financial sector plays a crucial role in attaining both short- and long-term economic performance through its intermediary activities in converting and directing deposits from the surplus economic units to the deficit units. Financial deepening connotes improvements in the functioning of the financial sector. According to Nkamnebe, Oladipo and Ezenwobi (2023), the key features of financial deepening include easier access to financial intermediation, a wider range of options and possibilities, higher-quality information, and stronger incentives for cautious lending and monitoring.

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

A well-developed financial system can contribute to better risk management, transparency, and corporate governance procedures as well as better financial resource allocation. Therefore, financial deepening promotes better distribution of economic possibilities among economic agents in addition to improving growth chances. This makes it possible for new companies to easily obtain funding through the financial intermediation process, including small and medium-sized firms (SMEs) and first-time or low-income borrowers with little collateral (Salami & Oluseyi, 2013).

One of the prominent features of Nigeria's economic growth initiatives is the conscious strategy to develop the financial sector. For instance, in the early 1970s, as a result of the prevailing economic arrangement at that time, the financial sector was highly regulated. The government held controlling shares in most of the financial institutions, especially banking sub-sector. In 1986, the Structural Adjustment Programme (SAP) which was put in place to drive the economy from austerity to prosperity brought about the liberalization of the banking industry. The 2004 banking industry consolidation initiative was a key element of the National Economic Empowerment and Development Strategy (NEEDS), which was implemented to further the government's economic agenda (CBN, 2016).

The global financial and economic crisis of 2009 had a negative impact on the Nigerian economy. As a part of the extensive economic responses to these effects, the Central Bank of Nigeria, acting as the country's apex bank, worked with fiscal authorities to adopt measures aimed at preventing the financial system's collapse and preserving the country's relatively robust economic growth. The momentum to build an efficient financial system was given a major boost between 1929 -1951, and that period is often seen as the first attempt at financial reform in pre-colonial Nigeria (Nkamnebe, Oladipo, & Ezenwobi, 2022). However, the severe banking crisis that occurred between 1940 and 1960 left the young financial sector prostrate with the liquidation of major banking institutions (Abdulraheem, Ogbeide & Adeboje, 2016)

In Nigeria, the financial sector has continued to witness slow development pace in recent times, albeit, the socio-economic peculiarities of the country, occasioned by weak institutional quality, poor governance, corruption and insurgency in some parts of the country, among others. The post-independence experience with financial sector development in Nigeria was characterized by weak institutions that operated under the ambit of direct control policies which negatively affected financial intermediation. Nigeria's efforts at promoting economic growth over the years have indeed highlighted the importance of financial deepening.

However, the level of deepening of the financial system in Nigeria still remains low, despite government efforts. The low values reported for the various financial deepening indices in Nigeria confirm that its financial sector is underdeveloped or developing. For instance, credit to the private sector as a percentage of GDP which reflects financial depth averaged 16.4% between 1981 and 2022 (CBN, 2022). This low value implies that the financial sector in Nigeria is yet to be developed despite government efforts. As a result of the low level of financial deepening in Nigeria and compared to what is achievable other developing countries, the Central Bank of Nigeria approved the operations of Fintech to improve financial inclusion and deepening in the economy.

This, in order to improve financial sector deepening, the Nigerian financial sector has been open to new changes in the global financial system particularly in the use of technology. The nation's digital payment industry remains under-tapped, which more Fintech companies can explore for opportunities and close the huge financial gap in the country. According to Frost and Sullivan (2018), Nigeria's Fintech industry has 250 firms and its revenue is anticipated to reach USD 600 million in 2025. As the country's mobile and internet penetration continues to climb, it had created an opportunity to support the bank's online payments, improve access to the unbanked and under-banked population and also improve the financial sector.

The growing adoption of digital transaction and payment solutions highlights the enormous opportunity to enhance financial inclusion using technology. These financial innovations have already enhanced the quality of life for millions by reducing the necessity of carrying physical money and eliminating the need for time-consuming travel to access financial services. However, it is crucial to underscore the significance of integrating individuals without access to traditional banking into the financial system and expanding their

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

financial opportunities, as there is a strong connection between finance and technology (Iwedi, Owakah & Wofuru-Nyenke, 2023).

The pursuit of financial technology aims to revamp the financial system to make it more user-friendly and inclusive, as demonstrated by Yuhelson et al. (2020). The use of Fintech, with authorized e-cash providers, has the potential to expand access and participation in financial activities across borders. This was evident in India, where, between 2014 and 2018, the percentage of formal financial users increased from 52.8% to 79.8% due to digital financial transactions (Danladi et al, 2023). Consequently, there has been a surge in interest in Fintech systems in recent years due to their perceived role in enhancing financial deepening.

According to Kuyoro and Olanrewaju (2020), Fintech has expanded significantly in Nigeria over the years, especially since the CBN upgraded the payment system in 2007 by implementing the Payment System Vision 20/20. the invigorated payment system brought about notable enhancements in the use of Cards, ATM, Point of sales (PoS) Terminals, Electronic Funds Transfers and Mobile payments. These reforms, along with other factors like a large unbanked population, a young and tech-savvy population, high mobile phone usage, and increasing broadband penetration, caused the emergence of several financial technology firms whose business models relied heavily on these technologies.

From 2011 to 2018, investment in the Fintech industry recorded more than US$200.0 million, showing that Fintech is becoming a major player in Nigeria financial sector, despite the challenging operating environment of the country. Despite these developments, sentiments concerning Fintech in Nigeria remain mixed, as adoption still remains low in the country where the informal sector is still burgeoning and more than half of the population are still unbanked or without access to financial services. In comparison to its global counterparts, the industry is relatively new, and older populations still prefer brick-and-mortar banking because they are less tech-savvy than younger ones (Anichebe, 2019).

Moreover, efforts to attain financial deepening in Nigeria are greatly hampered by the persistent problem of trust in Fintech platforms. Fintech has the ability to provide financial services to under-banked and unbanked communities, but people are reluctant to use them because of their lack of trust in new technological advancements. Their ability to save, invest, or obtain credit is subsequently hampered by limited or no access to financial services. Therefore, the trust gap acts as a barrier, preventing a sizeable portion of Nigeria's population from taking advantage of the potential financial deepening that Fintech could provide. This, in turn, hinders the country's advancement toward more extensive and equitable financial access and participation (Lukonga, 2018).

In the literature, studies on financial technology and financial deepening are observed to be scanty. The majority of the previous studies on Fintech were carried out in developed and emerging countries with only few studies considering Fintech and financial deepening in developing countries like Nigeria. Moreover, the empirical review indicated that there is yet to be a consensus on the relationship between financial technology and financial deepening. Some authors argued that financial technology disrupts the financial system by exposing the financial sector to risk and vulnerability. For example (Pollari, 2016; Ozili 2018; Romanova & Kudinska, 2017; Li, 2017; Buchak, 2018; Wolfe & Yoo, 2018; Tang 2019) noted that high-risk customers who traditional banks view as particularly dangerous are often drawn to financial technology companies, which then become alternative lenders to high-risk borrowers. Hence, in order to fill this noted gap in the literature, this study will examine the effect of financial technology on financial deepening in Nigeria.

Objectives of the study

The broad objective of the study is to investigate the effect of financial technology on financial deepening in Nigeria, the specific objectives of the study are to:

i. examine the effect of financial technology on the ratio of broad money supply to GDP in Nigeria
ii. investigate the effect of financial technology on the ratio of private sector credit to GDP in Nigeria

Research Questions

The following research questions are proposed in the study:

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

i What is the effect financial technology on the ratio of broad money supply to GDP in Nigeria?
ii What is the effect of financial technology on the ratio of private sector credit to GDP in Nigeria ?

Research Hypotheses

The following hypotheses are formulated in the study
H01: There is no significant effect of financial technology on the ratio of broad money supply to GDP in Nigeria
H02: Financial technology does not have any significant effect on the ratio of private sector credit to GDP in Nigeria

LITERATURE REVIEW

Conceptual Review

According to Gimpel (2018), the term "Fintech," denoting financial technology, is often attributed to a Citigroup initiative in the early 1990s. However, the exact definition of Fintech remains ambiguous, lacking consensus among scholars. While Kim et al. (2016) use the term to encompass the entire industry, Yáñez-Valdés and Guerrero (2023) delineate Fintech as enterprises employing cutting-edge technologies to implement a business model within the financial services sector.

Nurfadilah and Samidi (2021) characterize Fintech as a reshaping of the financial system through the integration of new technology. In contrast, digital banks, akin to traditional banks, are structured around five divisions: Retail Banking, Private and Commercial Banking, Analysis and IT, Financial Management and Operations, and Risk Management. However, the significance of these divisions varies, and the interrelationships between them differ in digital banking compared to the traditional model. Notably, Analysis and IT emerge as pivotal components in the framework of a digital bank. Li (2017) assert that the success or failure of a bank is evaluated based on adopted technologies and analytical methods rather than the breadth of its product offerings.

The financial sector provides an enabling environment for economic growth and development, productive activity, financial intermediation, capital formation and management of the payments system (CBN, 2017). The extent to which the financial sector would impact on the real sector of the economy would, however, depend on the nature and magnitude of the innovations in the financial sector. Within the context of the financial sector, these innovations can be in terms of stability in key performance indicators of the market, which play a big role in the process of financial intermediation. For example, the stability of the money, capital and foreign exchange markets, are reflective of innovations in the financial sector, and this can be measured by the key performance indicators in these markets. Capital, money and foreign exchange markets indicators like the all share index (ASI), banking system liquidity, and exchange rate volatility are suggestive of the level of financial sector deepening , which would transmit to the enhancement of financial intermediation, and consequently, economic growth

Theoretical Review

Considering financial technology and financial deepening in Nigeria, this study focused on diffusion of innovation theory and supply leading hypothesis. The diffusion of innovation theory suggests that communication channels, social systems, and perceived attributes of innovations influence the rate of adoption while the supply leading hypothesis is based on the notion that a well-developed financial intermediary facilitates the development of the economy through mobilization of savings, facilitation of trading and the diversification of risks. These important services lead to efficient allocation of resources; a more rapid accumulation of physical and human capital; and a faster technological innovation which eventually leads to a faster and long-term economic growth.

Empirical Review

Empirical studies examining the relationship between financial technology and financial deepening have been conducted in various countries. However, the research on this subject in developing nations is limited. For

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

instance, Asgari and Izawa (2023) examines FinTech's direct and conditional effects on financial development using data from emerging and developing economies. Three measures of financial development (broad money, Private credit, and bank deposits) and two conditional factors (financial performance and financial inclusion) were investigated vis-à-vis FinTech penetration. This paper demonstrates that FinTech penetration not only drives financial development but also strongly impacts the financial development of countries with weak financial sector performance and low financial inclusion

Hudaefi (2020) investigated the existing Islamic financial lending technologies in Indonesia to advance toward sustainable development goals in a local context. This work shows that FinTech companies promote the idea of financial accessibility by financing underdeveloped sectors such as agriculture and small and microenterprises. In addition, certain FinTech firms collect and distribute Islamic social funds (charitable contributions, donations), as well as initiate charitable programs for low-income segments of the population.

Chien, Cheng, and Kurniawati (2020) studied linear and non-linear effects of information and communication technology (ICT) on financial deepening in 81 countries over the period 1990–2015. A smooth non-linear impact of the spread of ICT on financial development has been determined, in which the effect of ICT diffusion on financial development is positive in the lower level of ICT diffusion but turns negative in the higher level of ICT diffusion. The growth of financial technologies supports financial development, promoting financial integration and accessibility. While this is a valid point, the introduction of financial technology also adds some risk to the financial markets.

Other authors have also identified a link between the development of technology and financial deepening in India. The research by Sinha and Shastri (2021) emphasizes that improvements in technology are critical to improving local investment in the form of domestic household savings, which ultimately contributes to the financial development of the country.

Aduba (2022) have found that financial technology penetration stimulates financial development in countries with lower financial accessibility and poorer financial development index. These results show that despite poor financial infrastructure and weak financial performance, financial development in developing countries and countries with emerging market economies can be improved by implementing appropriate policies that foster innovation in financial technology.

The article by Tran and Huynh (2022) empirically examines the impact of financial technology (ICT) on financial deepening as expressed by the domestic credit-to-GDP ratio and the money supply-to-GDP ratio in ten ASEAN countries over the period 2000–2020. It states that ICT fosters financial development on both indicators. The impact of ICT on financial development, mediated by the money supply-to-GDP ratio is stronger than the impact mediated by the domestic credit-to-GDP ratio. The results confirm the use of ICT to accelerate financial development in ASEAN countries.

Kamalu et al (2019) examined the causal linkages between financial deepeninng, financial inclusion, trade openness, foreign direct investment and economic growth in Nigeria from 1970 to 2018. Moreover, this study employed Ng Perron, Zivot Andrew unit root test; Gregory and Hansen co-integration test; and Non-Granger causality Toda and Yamamoto test. However, the results revealed that all the variables were stationary and co-integrated in the long run. Similarly, the result showed one-way causal relationship from financial inclusion to economic growth, and two-way causal relationship between financial development and economic growth. However, there is no causal relationship between trade openness and economic growth. Therefore, the study concludes that financial deepening and financial inclusion is an important determinant of economic growth.

Chukwunulu (2019) investigated the effect of financial innovations on economic growth in Nigeria. Data on the e-payment system were used as financial innovation variables spanning 2008 to 2017. The Generalised Methods of Moments (GMM) employed for data analysis revealed that transactions through ATM, Mobile Banking, Internet Banking and Point of Sale terminals have significant positive effects on economic growth. Further results from the adjusted coefficient of determination (Adj R2) showed that about 79% of changes in economic growth can be explained by financial innovations.

Comin and Nanda (2019) examined the extent to which financial market development impacts the diffusion of 16 major technologies, looking across 17 countries. The findings revealed that greater depth in financial

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

markets leads to faster technology diffusion for more capital-intensive technologies, but only in periods closer to the invention of the technology. In fact, we find no differential effect of financial depth on the diffusion of capital-intensive technologies in the late stages of diffusion or in late adopters.

Exploring the dynamics of financial technology in developing and emerging markets, Ediagbonya and Tioluwani (2023) delved into the impact of Fintech innovations on financial deepening using Nigeria as a focal point. Their investigation scrutinizes the hindrances to financial inclusion and the roles played by the government, financial institutions, and Fintech companies in facilitating access to financial services for the substantial unbanked population. Employing content analysis and a mix of primary and secondary sources such as legislation, journal articles, newspaper reports, and policy papers, the study reveals a widening financial technology gap despite concerted efforts by the government, regulators, and financial institutions. Factors contributing to this gap include illiteracy, infrastructural challenges, inconsistent power supplies, and concerns about data privacy, among other issues.

Some authors argued that financial technology disrupts the financial system by exposing the financial sector to risk and vulnerability. For example, Pollari, 2016; Ozili 2018; Romanova & Kudinska, 2017; Li et al., 2017; Buchak et al., 2018; Wolfe & Yoo, 2018; Tang 2019 noted that high-risk customers who traditional banks view as particularly dangerous are often drawn to financial technology companies, which then become alternative lenders to high-risk borrowers. This study will take into consideration the observed gap in the literature and incorporate digital payment platform, digital remittances and digital investment as a measure of financial technology while Ratio of Broad Money Supply to GDP, Ratio of private sector credit to GDP and ratio of bank deposit liabilities to GDP will serve as a proxy for financial deepening.

METHODOLOGY

This study adopted an ex-post facto research design, which is also referred to as a retrospective or causal-comparative research approach. This particular design is well-suited for exploring the connection between financial technology and financial deepening in Nigeria during a defined timeframe. This study relied on secondary data sources therefore data were sourced from the quarterly reports of the Central Bank of Nigeria (CBN), as well as the National Bureau of Statistics. Data collection and analysis encompassed the period spanning from 2007 to 2022. This specific timeframe facilitates a thorough examination of the correlation between financial technology and financial deepening in Nigeria, taking into consideration the influence of diverse economic and political occurrences throughout this duration.

The model in this study follows the work of Udo et al (2023) where they examined financial technology, financial inclusion and financial deepening in Nigeria. The authors' proxied fintech as transaction values on digital platforms, financial inclusion was measured in terms of number of bank branches while financial deepening was proxied as ratio of domestic credit to the private sector to GDP and ratio of money supply to GDP. Taking cognizance of their models, the model for this study was coined and modified with respect to the objectives of the study and given as stated below;

Model on the effect of financial technology on ratio of broad money supply to GDP in Nigeria

In order to examine the effect of financial technology on ratio of broad money supply to GDP in Nigeria, the model is specified below:

$$RMGDP_t = (DPP_t, DR_t, DIN_t)$$

The econometric model is specified in linear form as below:

$$RMGDP_t = \beta_0 + \beta_1 DPP_t + \beta_2 DR_t + \beta_3 DIN_t + \mu_t$$

Where:

RMGDP= Ratio of Money supply to GDP

DPP = Digital Payment Platform

DR = Digital Remittance

DIN = Digital investment

*l*n = Natural logarithm

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

β_0 = Intercept
$\beta_{1,2,3}$ = Parameters of the independent variables.
μ= Stochastic or error term
t = time variant

Model on the effect of financial technology on ratio of private sector credit to GDP

In order to examine the effect of financial technology on ratio of private sector credit to GDP in Nigeria, the model is economically specified below

$$RPCGDP_t = (DPP_t, DR_t, DIN_t)$$

The econometric model is specified in linear form as below:

$$RPCGDP_t = \beta_0 + \beta_1 DPP_t + \beta_2 DR_t + \beta_3 DIN_t + \mu_t$$

Where:
RPCGDP= Ratio of Private Sector Credit to GDP
DPP = Digital Payment Platform
DR = Digital Remittance
DIN = Digital investment
*l*n = Natural logarithm
β_0 = Intercept
$\beta_{1,2,3}$ = Parameters of the independent variables.
μ= Stochastic or error term
t = time variant

Estimation Techniques

The research seeks to employ a robust econometric methodology suitable for addressing practical issues. To begin with, various pre-estimation techniques were utilized. Both descriptive and inferential analyses played a crucial role in this study. Descriptive statistics, encompassing mean, median, maximum, minimum, standard deviation, Kurtosis, and Skewness, served as pre-estimation tests, while the Jarque-Bera test assesses the data's normality. Subsequently, a series of pre-tests were conducted, including correlation analysis and the examination of the variance inflation factor (VIF) to assess multicollinearity.

Additionally, unit root test was used to determine the stationarity of each variable, and lag length criteria will be applied. A co-integration test investigated potential long-term relationships. To determine the optimal lag length, the study made use of the Akaike information criterion (AIC) and the Schwartz Bayesian information criterion (SBIC). The study used the ARDL (AutoRegressive Distributed Lag) model to investigate the relationship between financial technology and financial deepening in Nigeria. ARDL is a popular econometric approach that allows for the examination of both short-run and long-run effects in a time series context, making it suitable for analyzing dynamic relationships between variables. The ARDL model allows for both I(0) (stationary) and I(1) (non-stationary) variables, making it suitable for analyzing relationships between mixed order of integration time series data. The model was formulated based on the lag structures of the variables and economic theory.

RESULTS AND DISCUSSION

Table 1: Descriptive statistics

	RMGDP	RPCGDP	LDPP	LDIN	LDRR
Mean	22.54759	18.85864	17.05918	17.15604	14.10411
Median	22.92790	18.81982	17.59818	17.96993	16.21720
Maximum	24.89526	22.75484	19.74846	19.89913	17.69669
Minimum	19.82052	15.06752	13.96094	13.73023	9.825309
Std. Dev.	1.404598	1.668606	1.754027	2.070726	3.459667
Skewness	-0.543144	0.084803	-0.512102	-0.493073	-0.351953

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

Kurtosis	2.686817	4.461519	2.119659	1.837966	1.206425
Jarque-Bera	0.798815	1.353003	1.139996	1.451754	2.320246
Probability	0.670717	0.508392	0.565527	0.483900	0.313448
Sum	338.2139	282.8796	255.8877	257.3406	211.5616
Sum Sq. Dev.	27.62053	38.97944	43.07255	60.03071	167.5702
Observations	15	15	15	15	15

Source: Authors' Computation (2024)RMGDP (Ratio of Money supply to GDP) RPCGDP (Ratio of Private Sector Credit to GDP) DPP (Digital Payment Platform), DRR (Digital Remittance), DIN (Digital investment)

Table 1 presents the descriptive statistics which gives insights into the distribution and characteristics of the variables. The ratio of money supply to GDP (RMGDP), has a mean of 22.55% and a median of 22.93%, suggesting a relatively stable distribution over the observed years. The variability around the mean is low, as indicated by a standard deviation of 1.40. This implies that the ratio of money supply to GDP has not deviated significantly from the average. Similarly, RBGDP, the ratio of private sector credit to GDP, has a mean of 18.86% and a median of 18.82%, indicating a balanced distribution. The standard deviation of 1.67 suggests non variability around the mean. This implies that the ratio of private sector credit to GDP has remained relatively consistent. LDPP, representing digital payment platform usage, has a mean of 17.06 and a median of 17.60. The standard deviation of 1.75 indicates a moderate level of variability around the mean. This suggests that while there is a relatively consistent level of digital payment platform usage, there are some fluctuations in the data.

LDIN, the variable for digital investment, has a mean of 17.16 and a median of 17.97. The standard deviation of 2.07 suggests a higher level of variability compared to the other variables. This indicates the existence of significant fluctuations in digital investment levels over time. LDRR, representing digital remittance, has a mean of 14.10 and a median of 16.22. The standard deviation of 3.46 indicates a considerable level of variability in digital remittance levels. This suggests that digital remittance levels have varied significantly over the period under consideration.

Table 2: Multicollinearity test

Variance Inflation Factors			
Sample: 1 16			
Included observations:			
	Coefficient	**Uncentered**	**Centered**
Variable	**Variance**	**VIF**	**VIF**
LDPP	0.425067	1916.561	1.72628
LDIN	0.471207	2156.729	2.93200
LDRR	0.031595	101.8424	5.15189
C	9.961241	152.8262	
	Mean		3.27006

Source: Authors' Computation (2024):
RMGDP (Ratio of Money supply to GDP) RPCGDP (Ratio of Private Sector Credit to GDP) DPP (Digital Payment Platform), DRR (Digital Remittance), DIN (Digital investment)

The mean VIF (Variance Inflation Factor) is a measure of the average multi-collinearity present in the model. In this context, the mean VIF of 3.27006 suggests that, on average, the variance of the estimated regression coefficients is inflated by a factor of approximately 3.27 due to multi=collinearity among the independent variables. A mean VIF around 1 indicates little to no multi=collinearity, while values above 5 are considered problematic, indicating high multi=collinearity. In this case, the mean VIF of 3.270 suggests a non multi-collinearity issues in the model which may affect the reliability of the regression coefficients.

Table 3: UNIT ROOT TEST

Variables	**@level**	**@ First Diff**	**Integration**
RMGDP	-1.4701	-5.0324	I(1)
RBGDP	-1.5182	-5.7513	I(1)
LDPP	-1.37886	-5.0525	I(1)
LDIN	-1.6684	-4.7642	I(1)

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

LDRR	-0.9430	-3.9105	I(1)

Source: Authors' Computation (2024):

RMGDP (Ratio of Money supply to GDP) RPCGDP (Ratio of Private Sector Credit to GDP) DPP (Digital Payment Platform), DRR (Digital Remittance), DIN (Digital investment)

Table 3 provides the unit root test conducted to ascertain the stationarity of the variables. For the variable RMGDP (Ratio of Money supply to GDP), the test yielded a statistic of -1.4701 at the level and -5.0324 at the first difference. The result indicated that RMGDP is integrated of order 1 (I(1)). Similarly, the RPCGDP (Ratio of Private Sector Credit to GDP) also showed integration of order 1 (I(1)), with a t-statistic -5.7513 at the first difference level. Similarly, LDPP (Digital Payment Platform), LDIN (Digital Investment) and LDRR (Digital Remittance) displayed a similar pattern as they exhibited integration of order 1 (I(1)). This shows that all variables exhibited stationarity at first differences, hence indicated first order integration.

Model One: Model on the effect of financial technology on ratio of broad money supply to GDP in Nigeria

Cointegration Test:
Cointegration Test - Engle-Granger
Specification: RMGDP LDPP LDRR LDIN C
Cointegrating equation deterministics: C
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=1 based on Schwarz Info Criterion, maxlag=1)

	Value	Prob.*	
Engle-Granger tau-statistic	-5.517046	0.0270	
Engle-Granger z-statistic	-51.18976	1.0000	

The Engle-Granger co-integration test results indicate the presence of cointegration among financial technology and ratio of broad money supply to GDP in Nigeria, this suggests a long-term relationship exist among the variables with the value of -5.517046 and probability values of 0.027 indicates the strength of co-integration among the variables.

Table 5: financial technology on ratio of broad money supply to GDP in Nigeria

Dependent Variable: RMGDP
Method: Fully Modified Least Squares (FMOLS)
Date: 05/11/24 Time: 13:14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LDPP	-0.511710	0.102112	-5.011268	0.0005
LDRR	0.011905	0.028004	0.425134	0.6797
LDIN	0.874205	0.111245	7.858369	0.0000
C	16.17599	0.526318	30.73427	0.0000
R-squared	0.607632	Mean dependent var		22.61290
Adjusted R-squared	0.489921	S.D. dependent var		1.433794
S.E. of regression	1.024013	Sum squared resid		10.48603
Long-run variance	0.023159			

Source: Authors' Computation (2024):

RMGDP (Ratio of Money supply to GDP) RPCGDP (Ratio of Private Sector Credit to GDP) DPP (Digital Payment Platform), DRR (Digital Remittance), DIN (Digital investment)

Table 5 presents the results of the Fully Modified Least Squares (FMOLS) to examine the impact of financial technology on the ratio of broad money supply to GDP (RMGDP) in Nigeria. LDPP (Digital Payment Platform) has a coefficient of -0.511710 indicates that a one-unit increase in LDPP is associated with a decrease of approximately 0.511710 units in RMGDP. The t-statistic of -5.011268 is statistically significant at the 0.05 level, suggesting that LDPP has a significant negative impact on RMGDP. LDRR (Digital Remittance) has a coefficient of 0.011905 suggests that a one-unit increase in LDRR is associated with a 0.011905 unit increase in RMGDP. However, the t-statistic of 0.425134 is not statistically significant at conventional levels (p-value of 0.6797), indicating that LDRR may not have a significant impact on RMGDP.

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

LDIN (Digital Investment) has a coefficient of 0.874205 indicates that a one-unit increase in LDIN is associated with a 0.874205 unit increase in RMGDP. The t-statistic of 7.858369 is highly statistically significant (p-value of 0.0000), suggesting that LDIN has a significant positive impact on RMGDP. Constant coefficient of 16.17599 represents the intercept of the regression equation. It indicates that when all independent variables are zero, the estimated value of RMGDP is 16.17599. The t-statistic of 30.73427 is highly statistically significant (p-value of 0.0000), indicating that the constant term is significant in explaining the variation in RMGDP. The adjusted R-squared value of 0.489921 indicates that approximately 48.99% of the variation in RMGDP is explained by the independent variables in the model.

Model two: Model on the effect of financial technology on ratio of private sector credit to GDP
Date: 05/11/24 Time: 13:22
Equation: UNTITLED
Specification: RBGDP LDPP LDRR LDIN C
Cointegrating equation deterministics: C
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=1 based on Schwarz Info Criterion, maxlag=1)

	Value	Prob.*	
Engle-Granger tau-statistic	-5.884602	0.0168	
Engle-Granger z-statistic	-44.85036	1.0000	

The Engle-Granger co-integration test was conducted to assess the effect of financial technology on ratio of private sector credit to GDP. Engle-Granger tau-statistic value of -5.884602 and probability value of 0.0168 indicates that there is co-integration among the variables.

Table 7: Financial technology on ratio of private sector credit to GDP
Dependent Variable: RPCGDP
Method: Fully Modified Least Squares (FMOLS)
Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LDPP	0.169503	0.888102	0.190860	0.8525
LDRR	0.552548	0.243560	2.268632	0.0467
LDIN	-1.081885	0.967537	-1.118185	0.2896
C	26.82414	4.577567	5.859912	0.0002
R-squared	0.426329	Mean dependent var		18.79351
Adjusted R-squared	0.335772	S.D. dependent var		1.711693
S.E. of regression	1.824196	Sum squared resid		33.27692
Long-run variance	1.751823			

Source: Authors' Computation (2024):
RMGDP (Ratio of Money supply to GDP) RPCGDP (Ratio of Private Sector Credit to GDP) DPP (Digital Payment Platform), DRR (Digital Remittance), DIN (Digital investment)

Table 7 presents the results of Fully Modified Least Squares (FMOLS) to examine the effect of financial technology on the ratio of private sector credit to GDP (RPCGDP) in Nigeria. LDPP (Digital Payment Platform) has a coefficient of 0.169503 suggests that a one-unit increase in LDPP is associated with a 0.169503 unit increase in RPCGDP. However, the t-statistic of 0.190860 and the high p-value of 0.8525 indicate that this relationship is not statistically significant, suggesting that LDPP may not have a significant impact on RBGDP. Also, LDRR (Digital Remittance) has a coefficient of 0.552548 indicates that a one-unit increase in LDRR is associated with a 0.552548 unit increase in RPCGDP. The t-statistic of 2.268632 and the p-value of 0.0467 suggest that this relationship is statistically significant at the 0.05 level, indicating that LDRR has a significant positive impact on RPCGDP. More so, LDIN (Digital Investment) has a coefficient of -1.081885 suggesting that a one-unit increase in LDIN is associated with a 1.081885 unit decrease in RPCGDP. However, the t-statistic of -1.118185 and the p-value of 0.2896 indicate that this effect is not statistically significant, suggesting that LDIN does not have a significant effect on RPCDP. The constant coefficient of 26.82414 represents the intercept of the regression equation. It indicates that when all independent variables are zero, the estimated value of RPCGDP is 26.82414. The t-statistic of 5.859912 and the p-value of 0.0002 suggest that the constant term is

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

statistically significant in explaining the variation in RPCGDP. Adjusted R-squared value of 0.335772 indicates that approximately 33.58% of the variation in RPCGDP can be explained by the independent variables.

Conclusion and Recommendations

The study examined the effect of financial technology on financial deepening in Nigeria between year 2007 to 2022, specifically focusing on the ratio of broad money supply to GDP (RMGDP) and the ratio of private sector credit to GDP (RPCGDP). The study utilized Fully Modified Least Squares (FMOLS) regression analysis to examine the relationships between various Fintech variables like Digital Payment Platform (LDPP), Digital Remittance (LDRR) Digital Investment (LDIN). From the RMGDP study, the results indicated that LDPP had a significant negative impact, LDIN had a significant positive impact, and LDRR did not have a significant impact on RMGDP. These findings suggest that while digital payment platforms may negatively affect the ratio of broad money supply to GDP, digital investment positively influences broad money supply to GDP. From the RPCGDP, the results showed that LDRR had a significant positive effect while LDPP and LDIN did not have significant effects on RPCGDP. These findings suggest that digital remittances positively affect the ratio of private sector credit to GDP in Nigeria.

From the result, various study aligned with the positive effect of Fintech, for example Asgari and Izawa (2023) and Aduba (2022) found that Fintech penetration positively influences financial development, especially in countries with weaker financial infrastructure and lower financial inclusion levels. This aligns with the RMGDP study's findings, which showed that digital investment (LDIN) positively influences the ratio of broad money supply to GDP. Similarly, Hudaefi (2020) and Tran and Huynh (2022) also support the positive impact of Fintech on financial development. Hudaefi's study in Indonesia demonstrated that Fintech promotes financial accessibility, particularly in underdeveloped sectors, while Tran and Huynh's study in ASEAN countries showed that ICT (a proxy for Fintech) fosters financial development, especially in terms of the money supply-to-GDP ratio.

However, some studies identified potential risks associated with Fintech adoption. Chien, Cheng, and Kurniawati (2020) found that while ICT diffusion initially has a positive impact on financial development, this impact turns negative in higher levels of ICT diffusion, suggesting risks associated with Fintech adoption. Comin and Nanda (2019) also suggested a nuanced relationship between financial market development and technology diffusion, indicating that while greater depth in financial markets initially leads to faster technology diffusion, this effect diminishes over time.

Based on the findings of the studies, the following recommendations are proposed:

1. Given that digital remittances (LDRR) were found to have a significant positive impact on the ratio of private sector credit to GDP (RBGDP), policymakers and financial institutions should focus on promoting and supporting digital remittance services. This can be achieved through partnerships with fintech companies, regulatory frameworks that facilitate cross-border remittances, and incentives for using digital remittance platforms.
2. The significant negative impact of digital payment platforms (LDPP) on the ratio of broad money supply to GDP (RMGDP) suggests the need to enhance the efficiency and effectiveness of digital payment platforms in Nigeria. This can be achieved through investments in technology infrastructure, cybersecurity measures, and consumer education to increase the adoption and use of digital payment platforms.
3. While digital investment (LDIN) did not have a significant impact on RMGDP or RBGDP in the studies, there is potential for digital investment to contribute positively to economic indicators in Nigeria. Policymakers and financial institutions should focus on encouraging and facilitating digital investment by providing incentives for investment in digital technologies, improving access to financing for digital startups, and creating a supportive regulatory environment for digital investments.

REFERENCES

Abdulraheem, A., Ogbeide, F., & Adeboje, O. (2016). Determinants of Financial Sector Development in Nigeria.*Journal of Economic and Financial Research,* 21-43

Aduba, J., (2022). Causality between financial performance, FinTech, financial inclusion, and financial development in emerging and developing economies: A cross country analysis. Fintech, Financial Inclusion, and Financial Development in Emerging and Developing Economies: A Cross Country Analysis.

Anichebe, A. S., & Aca, A. (2019). Macroeconomic determinants of Stock Price in Nigeria. *European Journal of Business and Management, 11*(21), 96-103.

Asgari, B., & Izawa, H. (2023). Does FinTech penetration drive financial development? Evidence from panel analysis of emerging and developing economies. *Borsa Istanbul Review, 23*(5), 1078-1097.

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]

Buchak, G., Matvos, G., Piskorski, T., & Seru, A. (2018). Fintech, regulatory arbitrage, and the rise of shadow banks. *Journal of financial economics, 130*(3), 453-483.

Chukwunulu, J. I. (2019). Effect of financial innovation on the Nigerian economy. World *Journal of Innovative Research, 6*(5), 15-21.

Chien, M. S., Cheng, C. Y., & Kurniawati, M. A. (2020). The non-linear relationship between ICT diffusion and financial development. *Telecommunications Policy, 44*(9), 102023.

CBN (2016). Finally technology in Nigeria. Quarterly Economic Review, 15-36.

Comin, D., & Nanda, R. (2019). Financial development and technology diffusion. *IMF Economic Review,* 67, 395-419.

Ediagbonya, V., & Tioluwani, C. (2023). The role of fintech in driving financial inclusion in developing and emerging markets: issues, challenges and prospects. *Technological Sustainability, 2*(1), 100-119.

Hudaefi, F. A. (2020). How does Islamic fintech promote the SDGs? Qualitative evidence from Indonesia. *Qualitative Research in Financial Markets, 12*(4), 353-366.

Danladi, S., Prasad, M. S. V., Modibbo, U. M., Ahmadi, S. A., & Ghasemi, P. (2023). Attaining Sustainable Development Goals through Financial Inclusion: Exploring Collaborative Approaches to Fintech Adoption in Developing Economies. *Sustainability*, *15*(17), 13039.

Frost, A., & Sullivan, C. ((2018). Fintech adoption and challenges. *Journal of Business Resarch,* 54-67.

Gimpel, H., Rau, D., & Röglinger, M. (2018). Understanding FinTech start-ups–a taxonomy of consumer-oriented service offerings. *Electronic Markets,* 28, 245-264.

Iwedi, M., Kocha, C., & Wike, C. (2022). Effect of digitalization of banking services on the Nigeria economy. *Contemporary Journal of Banking and Finance, 2*(1), 1-9.

Kamalu, K., Wan Ibrahim, W. H., Ahmad, A. U., & Mustapha, U. A. (2019). Causal link between financial developments, financial inclusion and economic growth in Nigeria. *International Journal of Scientific and Technology Research, 8*(12), 2757-2763.

Kuyoro, M., & Olanrewaju, T. (2020). Harnessing Nigeria's fintech potential.*Journal of Business Research,* 21-42.

Li, Y. (2017). The impact of FinTech start-ups on incumbent retail banks' share prices. *Financial Innovation, 3*(1), 1-16.

Lukonga, M. I. (2018). Fintech, inclusive growth and cyber risks: Focus on the MENAP and CCA regions.*Journal of Business Research,* 53-67

Nguyen, D. T., Son, T. H., & Huynh, L. T. N. (2022). Regulatory sandbox for innovation: International evidence and implications for Vietnam. *Science & Technology Development Journal: Economics-Law & Management, 6*(4), 3832-3840.

Nkamnebe Edith, O., Oladipo Abimbola, O., & Ezenwobi Florence, N. (2023). Impact of financial development on economic growth in Nigeria. *Journal of Finance,* 18-35.

Nurfadilah, D., & Samidi, S. (2021). How the COVID-19 crisis is affecting customers' intention to use Islamic fintech services: evidence from Indonesia. *Journal of Islamic Monetary Economics and Finance*, *7*, 83-114.

Ozili, P. K. (2021). Financial inclusion research around the world: A review. In Forum for social economics, 50(4), 457-479

Pollari, I. (2016). The rise of Fintech opportunities and challenges. *Jassa*, (3), 15-21.

Romānova, I., & Kudinska, M. (2017). Banking and Fintech: a challenge or opportunity? Contemporary Issues in Finance: *Current Challenges from Across Europe*, 98, 21–35.

Salami, G. O., & Oluseyi, A. A. (2013). Impact of financial sector development on the Nigerian economic growth. *American Journal of Business and Management, 2*(4), 347-356.

Sinha, N., & Shastri, S. (2023). Does financial development matter for domestic investment? Empirical evidence from India. *South Asian Journal of Business Studies, 12*(1), 104-126.

Tang, K. (2019). Perceived risk factors affect intention to use FinTech. *Journal of Accounting and Finance in Emerging Economies,* 6(2), 453-463.

Udo, E. S., Prince, A. I., Edet, I. V., Manasseh, C. O., Daniel, C. O., Okanya, O. C., Mgbobi, I. C., & Onwumere, J. U. J. (2023). Financial technology and economic growth nexus: quarterly evidence from Nigeria. *Seybold Report Journal, 18*(07), 106-129. https://doiojs.org/10-5110-779127/

Wolfe, B., & Yoo, W. (2018). The impact of fintech regulation: underpricing and secondary market flipping in marketplace lending. Unpublished working paper. Western University.

Yáñez-Valdés, C., & Guerrero, M. (2023). Assessing the organizational and ecosystem factors driving the impact of transformative FinTech platforms in emerging economies. *International Journal of Information Management,* 73, 102689.

Yuhelson, W. K., & Jaya, E. (2020). Legal protection regulations for lenders in the implementation of fintech based on peer to peer (p2p) loans. *Journal of Critical Reviews, 7*(8), 10 -21

EDITOR-IN-CHIEF
Prof. R. Rena [South Africa]