

Impact of Digital Finance on Economic Growth: Nigerian's Experience

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ABSTRACT

This study examines the impact of digital finance on economic growth in Nigeria, focusing on key payment channels such as Automated Teller Machine (ATM) transactions, Point of Sale (POS) systems, mobile money, web platforms, and cheque transactions. Using time-series data from 2012 to 2023, the analysis employs Ordinary Least Squares (OLS) regression to evaluate the relationship between these digital payment channels and Nigeria's Real Gross Domestic Product (RGDP). Results indicate a positive and significant influence of digital finance variables on economic growth, with POS transactions showing the strongest impact. The findings suggest that the adoption of digital financial systems enhances financial inclusion, reduces inefficiencies in banking operations, and fosters economic growth by integrating technology into financial transactions. This study underscores the need for policies that promote digital finance, lower transaction costs, and extend banking services to rural areas. Recommendations include improving digital infrastructure, encouraging usage through reduced charges, and developing financial instruments to support economic growth.

Introduction

The prevalence of cash transactions in Nigeria has contributed to incidents of armed robbery and corruption, particularly through the practice commonly referred to as the "cash and carry syndrome" and the swift movement of "Ghana-must-go" bags prior to the implementation of internet banking. To address these issues, financial institutions have advocated for a shift from physical cash to more flexible, efficient, and cost-effective banking operations. However, in a country where a significant portion of the population resides in rural areas, various seminars, workshops, and conferences have been organized to educate citizens on the benefits of cashless and chequeless financial systems. Internet banking is expected to assist customers, companies, and financial institutions in addressing the challenges that existed before its adoption (Ighoroje & Okoroyibo, 2020).

As noted by Amaduche et al.(2020), banking operations included electronic and telecommunication networks for the delivery of a wide range of value-added services. Bank managers now recognize that information and communication technology (ICT) systems are indispensable in facilitating cash flow operations. In recent years, there has been substantial global advancement in ICT, enhancing communication between banks and customers, and promoting service excellence (Morufu, 2016). In efforts to alleviate poverty and broaden economic opportunities especially in low-income and developing countries global initiatives have emphasized the significance of financial inclusion. This has become a vital component of economic growth, as many individuals lack access to formal financial services. Notable efforts include the World Bank's Global Fintex Database, which tracks global progress in financial inclusion, and the United Nations Sustainable Development Goal (SDG) . (World Bank, 2018; United Nations, 2015).

Research indicates that digital payment systems enhance productivity and reduce costs (Berger, 2003). Humphrey (2006) highlighted that increased use of electronic payments contributes significantly to bank profitability. Efficient payment frameworks support trade and resource movement, boosting economic activity by minimizing transaction expenses (Ravikumar et al., 2019). Globally, card-based spending credit, debit, and prepaid continues to rise (Zandi et al., 2013). According to Moody's Analytics (2010), digital payments have contributed to a steady annual increase in global GDP, with noticeable effects on the U.S. economy as well. It was reported that two-thirds of the global population has engaged with digital payments, with user numbers projected to hit 6.6 billion by 2030. The digital payment market, valued at \$3.885 billion, is expected to grow to \$8.266 billion by 2025, maintaining a compound annual growth rate (CAGR) of 13.7% from 2020 to 2025. Despite this digital surge, cash transactions remain relevant, though their role is being gradually minimized (Afaha, 2019).

Before Nigeria embraced digital payment systems, over 95% of transactions relied heavily on cash. Nearly all banking activities 99% involved physical money, and many cash transactions exceeded ₦150,000. The burden of handling cash was enormous: in 2009 alone, banks spent billions ₦27.5 billion on moving cash, ₦69.1 billion on processing it, and ₦100 billion managing vaults. These growing costs pushed banks to rethink cash-based operations. To address these challenges, the Central Bank of Nigeria (CBN, 2011) began laying the groundwork in 2002 with the Nigeria Automated Clearing System, followed by initiatives like the Cheque Standard and Cheque Printers Accreditation Scheme, Real Time Gross Settlement systems, and secure teller machines. By 2010, the push for a cashless economy gained momentum with the launch of automated deposit ATMs, paving the way for a more transparent, efficient, and digitally driven financial system.

In December 2011, the Federal Government announced plans to transition to a digital economy, officially launching the initiative in January 2012 under the National Payment System Vision 2020 (NPSV 2020). The goal was to establish a secure, efficient, and convenient system for making and receiving payments across Nigeria. This digital shift brought about various tools and technologies ATMs, NEFT, NIP, POS terminals, smart cards, smartphone-based payments, e-cheques, and NIBSS Automated Payment Services (NAPS). The rollout began in key cities like Port Harcourt, Abuja, Kano, and Lagos. These modern payment channels played a critical role in improving financial stability, guiding monetary policy, and supporting broader economic development, as emphasized by the Central Bank of Nigeria in 2011(CBN,2011).

In Nigeria, approximately 21.3 million women and 17 million men totalling 38.3 million adults remain financially excluded according to the World Bank (2014), financial exclusion can be classified as either voluntary or involuntary. Voluntary exclusion occurs when individuals opt out of financial services due to personal or cultural reasons, while involuntary exclusion stems from market failures and income limitations, preventing access to financial services. Many individuals, especially in rural communities and among women, lack access to formal banking services due to infrastructural limitations, high transaction costs, low digital literacy, and market failures. This exclusion hinders broader economic participation and slows down development efforts. (Park & Mercado, 2015).

Digital finance through platforms like POS systems, mobile money, ATMs, web payments, and electronic cheques offers a promising solution. By integrating technology into banking operations, these tools aim to increase access, reduce transaction barriers, and bridge the gap between underserved populations and the formal economy. Although digital payment systems have been successfully adopted and are growing in Nigeria, they still raise important concerns among researchers and policymakers. These include whether such systems can thrive in an emerging economy like Nigeria, where many people have low incomes, limited financial and digital literacy, operate in an informal sector, and rely heavily on cash transactions. Another pressing question is how much digital payments have contributed to

Nigeria's economic growth, compared to their impact in other countries. This paper sets out to examine how digital finance channels impact Nigeria's economic growth, particularly through Real Gross Domestic Product (RGDP). It aims to analyse the role of individual payment systems POS, ATM, Mobile Money, Web, and Cheque in promoting financial inclusion. It also seeks to shed light on which digital channels most significantly contribute to economic growth and how they can be optimized for policy intervention.

Digital Payment System:

The concept of digital payment systems is still evolving, with no universally agreed-upon definition (Ravikumar et al., 2019). It's closely associated with terms like electronic payments, cashless transactions, and online payments. Essentially, digital payments involve exchanging goods and services without using physical money (Paul & Friday, 2012). These transactions occur automatically over ICT networks, allowing parties in business to transfer monetary value seamlessly (Nkata, 2009; Ayo, 2010). A digital payment system includes services that utilize technologies such as cryptography and smart cards (Snellman, Vesala & Humphrey, 2001). It enables users to make payments electronically whether through smartphones or computers minimal manual effort beyond entering transaction details. It's all about transferring funds with just a tap or click (Asaolu et al., 2011).

A digital payment system fundamentally operates through electronic fund transfers (Ravikumar et al., 2019). It begins when an account holder authorizes or instructs their bank to move money either by crediting or debiting an account via electronic means. These methods include ATMs, PoS machines, mobile phones, debit/credit cards, internet-based tools, prepaid cards, e-wallets, mobile wallets, and even cheque clearing. Various studies have explored how digital payments relate to economic growth, using different platforms. This particular study focuses on:

-Automated Teller Machines (ATM): Electronic banking points that let users perform transactions without human assistance, connecting via ATM networks.

- Point of Sale (PoS) Terminals: Devices that facilitate cashless payments for goods and services, often through bank-issued Visa or MasterCard cards.

- E-payments: Internet-enabled payments that allow customers to pay for online purchases directly from their bank accounts.

- Mobile Payments: Transactions made using mobile phones, either through USSD codes or banking apps.

Economic Growth

Economic growth is commonly used to assess the overall health of a nation's economy. It reflects an increase in a country's income or its Gross Domestic Product (GDP). GDP can be measured by the monetary value of goods and services produced within the nation's borders, by the income earned including salaries, rents, revenues, and interest from various production factors, or by the total spending of all economic agents in the country. This growth directly affects the quality of life and progress of society. As highlighted by Medbbie (2004), and Iram and Nishal (2009), capital plays a vital role it's a key element that supports and enhances a country's economic development.

Theoretical Review

Diffusion of Innovations Theory

Originally developed by Everett Rogers, this theory explores how new ideas and technologies are adopted and spread over time. It highlights five key attributes that influence adoption: relative advantage, compatibility, complexity, trialability, and observability. Additionally, it classifies adopters into five categories based on their readiness: innovators, early adopters, early majority, late majority, and laggards (Rogers, Singhal, & Quinlan, 2014).

Technology Acceptance Model (TAM)

Proposed by Fred Davis, TAM focuses on two main factors that drive the adoption of technology: perceived usefulness and ease of use. The model suggests that when users find a technology both beneficial and user-friendly, they are more inclined to embrace and utilize it. TAM has been extensively applied to predict user behaviour and acceptance across various technological platforms (Davis, 1989).

Schumpeter's Finance and Development Theory

Developed by Joseph Schumpeter in 1911, this theory establishes a strong connection between financial systems and economic development. Schumpeter posited that financial and technological innovations significantly influence the level of economic advancement by reducing uncertainty in the economy. In the context of digital currency, this theory implies that financial sector stakeholders must be encouraged to adopt innovative technologies and financial services. Furthermore, it supports the role of financial intermediaries in evaluating investment projects and managing business risks.

Theory of Finance and Growth

This theory emphasizes the critical role of the financial sector in promoting economic growth and development. It asserts that unlocking economic growth requires a well-developed financial sector. As noted by Levine (2005), the presence of financial instruments and markets can reduce information and transaction costs. Consequently, the long-run growth rate of an economy is affected by factors such as interest rates, savings behaviour, investment decisions, and technological innovations, all of which respond to changing incentive structures encountered by economic agents.

New Growth Theory

New Growth Theory posits that economic growth stems from the limitless wants and ambitions of individuals. According to Hodagho (2016), individuals' continuous pursuit of profits fosters innovation and entrepreneurship. This theory highlights the importance of knowledge, innovation, and technology as key drivers of gross domestic product (GDP) growth. It argues that knowledge does not experience diminishing returns but instead leads to continued growth. Innovations and new technologies emerge from the desire for improved knowledge and human capital development. Therefore, economic expansion via e-payment platforms is considered an endogenous source of growth within the economy (Saidi, 2018).

Empirical Review

Iwedi et al. (2023) conducted a study on the relationship between financial inclusion and financial technology in Nigeria, using time series data spanning from 2009 to 2019. The analysis employed both univariate and multivariate techniques. Findings from the study revealed that digital finance variables have a positive and significant impact on financial inclusion in the country. The authors concluded that digital finance can effectively enhance the level of financial inclusion in Nigeria.

Similarly, Afaha (2019) examined the link between electronic payment systems and economic growth in Nigeria using data from 2012 to 2017. The Autoregressive Distributed Lag (ARDL) model was employed for analysis. The results indicated a statistically significant positive relationship between Automated Teller Machine (ATM) transactions and real Gross Domestic Product (GDP), suggesting that e-payment systems contribute to economic growth.

Olubukola et al. (2023) investigated the impact of digital finance on the Nigerian economy using time series data from 2009 to 2017, sourced from the Central Bank of Nigeria's Statistical Bulletin. Univariate and multivariate analyses were conducted, and the Ordinary Least Squares (OLS) method was used for estimation. Results showed that Point of Sale (POS) and ATM transactions significantly and positively influenced GDP. Additionally, mobile banking transaction volume was also found to significantly affect GDP. The study recommended that digital finance instruments could play a crucial role in enhancing national economic performance.

Saidi (2018) analysed the effects of electronic payment technology on bank performance in emerging economies using a random panel regression model. The results demonstrated that bank performance did not follow autoregressive or random walk processes. The study concluded that investors should focus on current bank resources rather than past performance indicators.

Yusuf (2016) explored the relationship between Nigeria's cashless policy and economic growth from 2008 to 2015, applying the OLS method for statistical analysis. The results revealed that POS, web-based payments, and mobile money services have a positive and significant influence on economic growth. The study concluded that the adoption of cashless policies can increase government revenue and reduce unemployment, thus fostering economic development. Nwankwo et al. (2022) examined the effects of various channels of a cashless economy on entrepreneurship development. Using multiple regression analysis, the study found that internet banking services, ATM usage, and crowdfunding platforms positively influenced entrepreneurial activities in Nigeria.

In contrast, Chiejina (2021) assessed the impact of electronic payment systems on the operational efficiency of Nigerian banks using regression analysis. The results revealed no significant effect, suggesting that the adoption of electronic payment systems does not necessarily translate into improved banking efficiency.

Finally, Appah et al. (2023) analysed the relationship between digital financial services and economic growth in Nigeria from 2006 to 2021, using quarterly data and univariate, bivariate, and multivariate analytical methods. The findings showed that both ATM and POS transactions significantly and positively influenced real GDP. The study concluded that digital financial services are instrumental in promoting economic growth and recommended the implementation of supportive policies to enhance their accessibility and usage.

Method

The research adopts the new growth theory as a desire of man on the fact that economic growth arises due to human needs and wants in society. The use of electronic payment channels will increase profit and later lead to an increase in real gross domestic product. This study employed the use of a time series data for testing the relationship among the variables in the predicting relationship. Time series data were collected from 2012 to 2023. The study employed time series econometric model to examine the effects of digital financing on economic growth in Nigeria. The selected mode of digital payments was volume of Automated Teller Machine (ATM) transactions, the volume of Point of Sales (POS) transactions, the volume of WEB Platform, volume of Mobile Money (MOB) transactions and the volume of Cheque (CHEQ) transactions were all regressed against Real Gross Domestic Product (GDP) of Nigeria.

Model Specification

The structural forms of the model in equation form are stated below:

$$RGDP = a_0 + a_1VATMT + a_2VPOST + a_3VWeb + a_4VMOB + a_5VCHEQ + e \dots \quad (1)$$

Where:

RGDP= Value of Real Gross Domestic Product in Nigeria

VATMT= Volume of Automated Teller Machine Transactions.

VPOST= Volume of Point on Sales Transactions.

VWeb = Volume of Web transactions.

VMOB = Volume of mobile money transactions.

VCHEQ = Volume of cheque transactions.

a_0 =interpret a_1 - a_2 =Coefficient of the explanatory variables

U_1 =error terms of the model.

Data analysis and discussion of findings.

Table 1 : Descriptive Statistic .

Variables	GDP	ATM	CHEQ	MOB	POS	WEB
Mean	2.5957	5.9218	5.7822	6.6428	2.4596	1.3769
Median	2.75500	6.4588	6.0125	4.7137	1.8964	6.8105
Maximum	6.67000	9.8890	7.7771	1.5674	6.5540	4.7810
Minimum	-1.7900	1.9843	4.8741	1.0848	4.8462	3.1578
Std.Dev	2.6195	2.4676	1.9664	5.5553	2.2387	1.4909
Skewness	-0.2147	-0.04643	-1.6313	0.5022	0.4977	1.5389
Kurtosis	2.4657	1.9506	5.4772	1.6652	1.8075	3.8031
Jarque- B	0.2349	0.5548	8.3910	1.3953	1.1666	5.0590
Prob	0.8891	0.7577	0.06503	0.5977	0.5580	0.0796
Sum	31.1500	71.0622	69.3896	79.7145	29.5152	16.5239
Sum Sq.Dev	75.4798	66.9799	42.5349	33.4562	57.5624	24.4534
Observation	12	12	12	12	12	12

Source : Author’s Computation (2024) .

The table1 summarizes the key statistics for the variables used in the study, including Real GDP (RGDP), ATM, POS, mobile money (MOB), web, and cheque (CHEQ) transactions.

Mean and Median: Represent the central tendency of each variable. For example, RGDP has a mean of 2.595 and ranges from -1.79 to 6.67.

Standard Deviation: It shows the variability of the variables. MOB transactions have the highest variability 5.5553, indicating fluctuations.

Skewness: Indicates the symmetry of the data. Negative skewness for RGDP, ATM, and CHEQ means a longer tail on the left, while positive skewness for MOB and POS indicates a longer right tail.

Kurtosis: This determine the peakiness of the distribution. CHEQ is leptokurtic (kurtosis > 3), meaning it has a sharper peak, while others are platykurtic (kurtosis < 3), implying flatter distributions.

Jarque-Bera Test: It show the position of normality of the variables in the test. Variables with p-values > 0.05 are normally distributed (e.g., RGDP and ATM).

Table 2 : Unit Root Test

Variables	T-Stat	CriticalValue at 5%	Order of Integration	Prob	Remarks
RGDP	-2.1286	-29055	1(0)	0.2344	Stationary
VATM	-1.4252	-2.9044	1(0)	0.5649	Stationary
VPOS	-1.2850	-2.9234	1(0)	0.6317	Stationary
VWEB	-0.7345	-2.8134	1(0)	0.8309	Stationary
VMOB	-1.8766	-2.9514	1(0)	0.7811	Stationary
VCHEQ	-2.311	-2.8324	1(0)	0.6891	Stationary

Source : Author’s Computation (2024) .

The table 2 checks for stationary in the variables using their T-statistics and critical values. On the stationary level , all variables (RGDP, VATM, VPOS, VWEB, VMOB, and VCHEQ) are stationary at level (1(0)), as their T-statistics are above the critical values , the stationary of variables indicates the data is suitable for regression analysis without differencing.

Table 3 :Ordinary Least Square (OLS) Regression

Variables	Coefficient	Stad –Dev	t - Stat	Prob
VATM	0.03496	0.0784	0.3885	0.7078
VPOS	0.01631	0.0374	4.3624	0.0024
VWEB	0.0597	0.0367	0.2415	0.6058
VMOB	0.1321	0.0351	3.2615	0.0356
VCHEQ	0.0432	0.0153	3.2415	0.2678
C	4.4417	0.1876	23.666	0.2678

R - Squared	0.96685	Mean dependent var	4.9254
Adjusted R-Squared	0.95835	S.Dependent var	0.1598
1. E of regression	0.03262	Akaike info Criterion	-3.7804
Sum of square resid	0.008515	Schward Criterion	-3.6719
Log Likelihood	23.7924	Hannan - Quinn Criterion	-3.8488
F- Statistic	0.23059	Durbin - Watson stat	1.585163
Prob (F- Sta)	0.00001		

Source : Author’s Computation (2024) .

Table 3 presents the regression results, evaluating the relationship between digital finance variables and RGDP. Coefficient of Determination (R²) result with value 0.96685 , indicating 96.6% of the variation in RGDP is explained by the independent variables. While the Adjusted R² value 0.95835, confirming the model’s strong explanatory power even after adjusting for the number of predictors coefficients:

VATM (ATM Transactions): Positive coefficient 0.03496 suggests a positive relationship with RGDP but is statistically insignificant since $p > 0.05$.

VPOS (POS Transactions): With positive coefficient value of 0.01631 indicates a significant positive effect on RGDP when $p = 0.0024$.

VWEB, VMOB, and VCHEQ: These variables have positive but varying levels of significance in their relationship with RGDP.

F-Statistic 0.00001 indicates the overall model is statistically significant. The outcome of Durbin-Watson Statistic with 1.585 value suggests no severe autocorrelation in the residuals.

Table 4: Pairwise Granger Causality Test

Null Hypothesis	Obs	F-Stat	Prob
RGDP does not Granger cause ATM	10	0.1250	0.885
ATM does not Granger cause RGDP		1.0475	0.4169
RGDP does not Granger cause CHEQ	10	0.08969	0.9157

CHEQ does not Granger cause RGDP		6.6622	0.0389
MOB does not Granger cause RGDP	10	0.6782	0.5488
RGDP does not Granger cause MOB		1.2892	0.3536
POS does not Granger cause RGDP	10	0.0199	0.9803
RGDP does not Granger cause POS		1.0036	0.4301
WEB does not Granger cause RGDP	10	1.2405	0.3652
RGDP does not Granger cause MOB		1.0863	0.4057

Source : Author's Computation (2024) .

The Granger Causality table result reveals (RGDP) does not causality ATM in Nigeria likewise, ATM does not causality RGDP in Nigeria based on the P-value (0.88 and $0.42 > 0.05$). Secondly, the result revealed RGDP does not causality cheque value (CHEQ) but the cheque value does causality to (RGDP) based on the P -Value ($0.91 > 0.05$ and $0.03 < 0.05$). Thirdly, MOB does not causality RGDP in the country while RGDP does not causality to MOB based on the P- Value (0.54 and $0.35 > 0.05$). Fourthly, POS does not causality to RGDP and RGDP does not have causality to POS based on the P -Value (0.98 and $0.4 > 0.05$). Lastly, WEB does not causality to GDP and the P-value (0.36 and $0.41 > 0.05$) in Nigeria.

Discussion of Findings

The results from the Ordinary Least Squares (OLS) regression model revealed that digital finance variables specifically POS and mobile money (MOB) transactions exert a statistically significant and positive impact on Nigeria's real gross domestic product (RGDP). This suggests that as the usage of POS terminals and mobile money platforms increases, there is a corresponding improvement in economic growth. The significance of these two variables indicates that technological innovations in financial services, especially those easily accessible to the population, can serve as effective channels for driving economic activity.

Although the volume of ATM, WEB, and cheque transactions also showed positive coefficients, they were statistically insignificant, implying that their individual contribution to GDP growth may be marginal or influenced by other external factors such as usage preference, infrastructural limitations, or digital literacy.

Furthermore, the Granger causality tests revealed that only cheque transactions (VCHEQ) Granger-cause RGDP, indicating a unidirectional causal relationship from cheque usage to economic growth. Other digital payment channels (ATM, POS, MOB, and WEB) did not exhibit any significant causality with RGDP. This finding may reflect the transition phase of Nigeria's digital finance ecosystem, where newer platforms are still gaining traction and their macroeconomic effects may not yet be fully realized.

Overall, the high R-squared value (96.6%) underscores the explanatory strength of the model, affirming that digital finance variables collectively explain a large portion of the variance in Nigeria's economic output.

Conclusion:

This study empirically examined the impact of digital finance on Nigeria's economic growth using time series data from 2012 to 2023. The analysis confirmed that digital financial services—especially point-of-sale and mobile money transactions positively and significantly influence real GDP. This aligns with the theoretical framework of New Growth Theory, which emphasizes innovation and technology as internal drivers of economic performance. While other digital channels such as ATM, WEB, and cheque transactions did not exhibit statistically significant effects individually, their collective inclusion enhances the model's robustness. The findings highlight the evolving role of digital finance in supporting economic development in Nigeria, particularly through inclusive and accessible platforms.

Recommendations:

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1. Promote Widespread Adoption of Mobile and POS Payments

Given their significant impact on economic growth, policies should aim to incentivize the use of mobile money and POS services, especially among micro, small, and medium-sized enterprises (MSMEs) and in rural areas.

2. Invest in Digital Infrastructure and Connectivity

Government and private sector stakeholders should collaborate to improve internet connectivity, mobile network coverage, and POS terminal availability, which are critical for efficient digital financial operations.

3. Enhance Digital Financial Literacy

There is a need for nationwide campaigns and training programs to increase public awareness and user capability in adopting digital financial tools. Targeting women and rural populations may help bridge the financial inclusion gap.

4. Encourage Innovation through Fintech Regulation and Support

Supportive regulatory frameworks and incentives should be implemented to encourage fintech startups and innovations in the digital payment space.

5. Strengthen Data Collection and Research

Policymakers should support periodic, granular data collection on digital financial usage and its economic implications, which would facilitate more accurate policy formulation and impact assessment.

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