Cashless Policy, Financial Inclusion, and Economic Growth in Nigeria

Segun Amos Adewale[1], Bakare Aderola Toheeb[2], & Raymond Osi Alenoghena[3]

[1]Department of Economics, Caleb University, Imota Lagos

[2]Department of Economics, Caleb University, Imota Lagos

[3]Caleb University, Imota Lagos.

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ABSTRACT

Given that these measures are essential components of Nigeria's digital-finance goal, this study looks at the combined impact of the country's cashless policy and financial inclusion on economic growth. In order to provide a better understanding of how digital payment systems and inclusive finance contribute to long-term economic performance, this research integrates these factors under a single empirical framework, whereas earlier studies have mostly evaluated them independently. The World Bank's Development Indicators (2023) and the Central Bank of Nigeria's Annual Statistical Reports are the sources of the annual time series data used in the research, which consists of 14 observations from 2009 to 2023. To capture the combined impact of electronic payment channels, such as POS transactions, mobile transfers, and ATM usage, the study uses Principal Component Analysis to create a composite cashless-policy indicator. The Fully Modified Ordinary Least Squares (FMOLS) method is used to evaluate the long-term relationship between real GDP, cashless policy, financial inclusion, exchange rate, inflation, and interest rate after annual time-series data are analyzed using unit root and cointegration tests. The results demonstrate that the cashless-policy index significantly boosts economic development, suggesting that advancements in digital payment infrastructure and usage encourage economic activity. Growth is also positively impacted by financial inclusion, albeit this effect depends on the extent and caliber of financial participation. The control variables mostly exhibit the predicted behavior, with inflation acting as a dampening factor and mixed results from the currency rate and interest rate. Overall, the findings imply that Nigeria's growth trajectory can be strengthened by a well-coordinated strategy that promotes inclusive financial services and fortifies digital payments. To improve underprivileged populations' access to financial services, the report suggests targeted policies, increased financial literacy, and consistent investment in digital finance infrastructure.

Keywords: Exchange rate, Cashless-policy, Financial inclusion, Inflation rate, Interest rate.

INTRODUCTION

Nigeria’s transition from a largely cash-driven economy to one supported by digital payment systems has become one of the most influential policy shifts in its financial sector over the last decade. For many years, economic transactions in Nigeria were dominated by physical cash, and this pattern created several inefficiencies in the financial system. High costs of printing and handling cash, the risks associated with transporting money, widespread informal payments and limited financial access prevented the financial sector from performing its growth-enhancing role effectively. As part of efforts to address these challenges, the Central Bank of Nigeria (CBN) introduced the cashless policy in 2012, beginning with a pilot phase in Lagos before expanding nationwide. According to Ojo (2019), the introduction of the cashless policy aimed to reduce excessive reliance on cash, promote electronic payment channels and strengthen the overall efficiency of financial transactions in the economy.

The idea behind Nigeria's cashless policy is not an attempt to eliminate cash entirely. Rather, it seeks to discourage heavy cash usage by promoting alternative channels such as Point-of-Sale terminals, automated teller machines, web-based payments, mobile banking platforms and NIBSS Instant Payment systems. The CBN notes that these channels lower transaction costs, improve security, enhance transparency and support a more modernized financial ecosystem (Central Bank of Nigeria, 2020). Beyond reducing the operational burden of managing large volumes of physical currency, the cashless system is also associated with broader developmental ambitions, including reducing corruption risks, supporting financial deepening and enhancing monetary policy effectiveness. Evidence from Adegboye and Ojo (2021) shows that improvements in digital payment adoption tend to stimulate economic activity by increasing transaction speed, creating formal financial footprints and boosting consumer spending.

At the same time, Nigeria has pursued an equally important national agenda of expanding financial inclusion. The National Financial Inclusion Strategy (NFIS), launched in 2012, set ambitious targets to bring more adults into the formal financial system. Access to savings, credit, insurance and digital financial services was highlighted as a pathway for empowering individuals, especially those excluded from the formal economy. As reported in the revised NFIS document (CBN, 2018), the goal was to raise the percentage of financially included adults to 80 percent by 2020. While significant progress has been recorded, financial inclusion remains uneven across regions and demographic groups. Studies such as Nwosu and Okafor (2020) emphasise that although urban areas have witnessed noticeable adoption of formal financial services, rural populations still face challenges such as poor digital literacy, limited access to banking infrastructure and unreliable internet connectivity.

Financial inclusion is a critical ingredient in economic development. The broader financial development literature highlights how inclusive financial systems help households save securely, access credit, manage risks and invest in human and physical capital. Mbutor and Uba (2013) show that when individuals are financially included, they participate more actively in economic activities, which in turn supports aggregate growth. Similarly, Demirgüç-Kunt et al. (2018) argue that financial inclusion enables small businesses to expand and encourages long-term investment, both of which are essential for sustaining economic growth. These perspectives align with financial intermediation theory, which emphasises the role of the financial system in mobilising savings and channeling funds to productive investments.

When viewed together, cashless policy and financial inclusion represent two complementary aspects of Nigeria's digital-finance evolution. While the cashless policy focuses on reducing excessive cash usage and strengthening digital payment infrastructure, financial inclusion concentrates on ensuring that all segments of society, including low-income and rural populations, have access to financial services. In principle, both reforms are expected to support economic growth. Improved digital payment systems reduce transaction costs and enhance efficiency, while financial inclusion promotes wider participation in the economy. Empirical evidence reinforces these relationships. For instance, Adebayo and Adegbite (2022) find that electronic payment systems, particularly POS and mobile transfers, have a positive relationship with real GDP in Nigeria. Likewise, Okoye and Eze (2021) show that broader financial inclusion indicators such as credit access and deposit penetration contribute significantly to Nigeria's economic performance.

However, the literature also reveals some complexities. Adoption of cashless channels has not been uniform, and the reliability of digital infrastructure remains a concern. Studies such as Adesina (2020) highlight issues such as network failures, fraud risks and high transaction charges as factors that weaken public confidence in digital payments. Similarly, despite ongoing reforms, financial inclusion levels have not fully met policy expectations. Research by Acha and Ukpong (2020) notes that while financial inclusion has improved in Nigeria, many rural dwellers, informal workers and women still rely heavily on cash-based transactions. These gaps raise important questions about whether the expected economic benefits of digital finance are fully realized.

Another gap in the existing literature is the limited number of studies that jointly examine the role of cashless policy and financial inclusion in driving economic growth. Much of the available research considers these variables separately. One strand focuses on how electronic payment channels influence GDP, while another examines how access to financial services affects output. Only a small number of studies integrate both aspects into a single empirical framework. A study by Emecheta and Ibe (2016) acknowledges that digital payments may

enhance inclusion by lowering entry barriers, yet empirical work on this linkage in Nigeria remains fragmented. This lack of integrated analysis is important because cashless systems and financial inclusion interact in meaningful ways. A robust cashless environment can promote inclusion by making financial services cheaper and more accessible, while greater inclusion can enhance the spread and effectiveness of cashless tools.

Given Nigeria's substantial investment in digital financial infrastructure, regulatory reforms and financial-inclusion strategies, it becomes essential to examine the broader economic implications of these efforts. The economy continues to face structural challenges such as high unemployment, regional disparity and a large informal sector. Understanding whether cashless reforms and inclusion targets translate into tangible economic gains will help guide policy decisions, refine implementation strategies and identify areas where further interventions are needed. If digital payments grow rapidly without corresponding gains in inclusion, economic benefits may remain concentrated among already-served groups. On the other hand, if both initiatives work in harmony, they hold the potential to stimulate broad-based growth, deepen the financial system and enhance Nigeria's overall development trajectory.

In light of these considerations, the present study seeks to contribute to the empirical understanding of Nigeria's evolving financial landscape by examining the impact of cashless policy and financial inclusion on economic growth. Specifically, the study focuses on how cashless payment indicators influence economic performance and how financial inclusion contributes to growth outcomes over time. This dual emphasis provides a more holistic view of Nigeria's experience with digital finance and offers insights that can inform ongoing reforms within the financial sector.

The study examined the impact of the cashless policy and financial inclusion on economic growth in Nigeria. These objectives reflect the need to understand both the direct influence of digital payment systems and the broader contribution of inclusive financial services to macroeconomic performance. By addressing these issues within a unified framework, the study provides evidence that can be used by policymakers, financial institutions and development stakeholders working to strengthen Nigeria's financial ecosystem.

LITERATURE REVIEW

To strengthen the study on the subject matter, the researchers examine the significance of Cashless Policy, Financial Inclusion, and Economic Growth in Nigeria. This is achieved through a comprehensive literature review, which encompasses conceptual, theoretical, and empirical analyses.

Conceptual Review

Cashless Policy

Cashless policy refers to a deliberate shift from heavy reliance on physical cash toward electronic forms of payment. In Nigeria, the policy emerged from the Central Bank of Nigeria's reform agenda aimed at modernising the financial system and improving the efficiency of transactions. The CBN introduced the cashless policy in 2012 to lower the costs of cash management, reduce risks associated with carrying cash and promote the use of POS terminals, ATMs, mobile banking and internet-based payments (Central Bank of Nigeria, 2012). Moreover, Ovat (2013) explains that the purpose of the policy was not to eliminate cash entirely, but to encourage individuals and firms to adopt safer and faster electronic channels. Over time, improvements in digital infrastructure have expanded electronic transactions across the country, with POS and mobile transfers becoming dominant payment methods. Adesina (2020) notes that the growth of digital payments reflects a broader transformation in Nigeria's financial landscape, although challenges such as network failures and fraud concern still limit full adoption.

From a conceptual point of view, the cashless policy represents a technological and regulatory framework designed to strengthen the payment system. It supports transparency, reduces transaction costs and encourages formalisation of economic activities, all of which have implications for economic growth (Ojo, 2019). In empirical studies, cashless policy is often measured through indicators such as POS volume, ATM usage, mobile banking transactions and web payments (Adegboye & Ojo, 2021; Adebayo & Adegbite, 2022).

Financial Inclusion

Financial inclusion is widely understood as the ability of individuals and businesses to access and use affordable financial services such as payments, savings, credit and insurance. The World Bank defines it as ensuring that people have access to financial products that meet their needs in a sustainable and responsible way (Demirgüç-Kunt et al., 2018). In Nigeria, the pursuit of financial inclusion has been driven by the National Financial Inclusion Strategy, which aims to integrate more adults especially low-income earners, women and rural residents into the formal financial system (Central Bank of Nigeria, 2018). Nwosu and Okafor (2020) observe that financial inclusion allows people to save securely, borrow for business purposes and insure against risk. These capacities help households stabilise their income and enable firms to expand productive activities.

Financial inclusion has three dimensions: access, usage and quality. Access refers to the availability of financial services; usage captures the frequency and meaningful use of those services; and quality reflects how well the services meet customer needs (Mbutor & Uba, 2013). Studies such as Acha and Ukpong (2020) and Okoye and Eze (2021) highlight that when inclusion expands, economic participation increases, and this contributes to higher output and better living standards.

Cashless Policy and Economic Growth

The link between cashless policy and economic growth is grounded in financial intermediation theory, which emphasises the role of efficient payment systems in supporting productive activity. When payments become faster and cheaper, businesses transact more easily, investment decisions are simplified and the overall pace of economic activity accelerates (Ojo, 2019). Empirical studies provide useful insights into this relationship. Adebayo and Adegbite (2022) find that electronic payment channels such as POS and mobile transfers have a significant positive effect on Nigeria's GDP, suggesting that the cashless policy stimulates consumption and business transactions. Similarly, Adegboye and Ojo (2021) report that digital financial innovation supports long-term growth through improved financial efficiency.

However, the impact is not uniform across all channels. Adesina (2020) notes that ATM usage and certain electronic platforms sometimes show insignificant effects due to infrastructure weaknesses, network limitations and low trust among users. These mixed outcomes show that the cashless policy's effect on growth depends on the reliability, accessibility and adoption of digital payment systems. Conceptually, therefore, cashless policy influences economic growth by improving transaction efficiency, expanding formal financial footprints and encouraging a shift from informal cash-based transactions to recorded, traceable economic activities.

Financial Inclusion and Economic Growth

Financial inclusion contributes to economic growth by mobilising savings, supporting investments, allowing households to manage risk and improving resource allocation. Beck et al. (2007) argue that when more people can access affordable financial services, their ability to invest in health, education and entrepreneurship increases, which enhances productivity. In Nigeria, several studies support this view. Mbutor and Uba (2013) find that financial inclusion increases the volume of deposits and credit in the financial system, enabling banks to channel more funds into productive sectors. Okoye and Eze (2021) also report a positive relationship between inclusion indicators and GDP, suggesting that inclusive finance enhances macroeconomic performance.

Nevertheless, some studies show that the impact may be weak or inconsistent when large groups remain excluded or when financial services do not translate into meaningful economic participation (Acha & Ukpong, 2020; NDIC, 2022). These findings highlight that financial inclusion contributes to growth only when people not only gain access to accounts but also use them actively and productively.

Overall, the conceptual connection lies in the idea that broad access to financial services empowers individuals and firms, increases capital formation and supports a more dynamic and resilient economy.

Cashless Policy and Financial Inclusion

Cashless policy and financial inclusion are closely connected. The CBN designed the cashless policy partly to encourage greater use of formal financial services by making digital transactions easier, safer and more convenient (Central Bank of Nigeria, 2018). Owolabi and Afolayan (2020) note that electronic channels such as POS terminals, mobile money platforms and agent networks have widened access points, especially in locations where bank branches are scarce. As digital payment systems spread, individuals who were previously excluded can open accounts, conduct transactions and build digital financial histories that may qualify them for credit or savings products (Mbon, 2021).

However, the connection is not automatic. Challenges such as low digital literacy, limited internet access, high transaction costs and trust concerns continue to hinder the inclusive effect of cashless reforms (Ozor & Okafor, 2019). As a result, scholars such as Ewah (2025) argue that cashless policy can promote inclusion only when accompanied by deliberate efforts to address infrastructure gaps and target underserved populations. Conceptually, the cashless policy supports financial inclusion by lowering barriers to entry, reducing dependence on physical branches and expanding the reach of the financial system. In turn, expanding inclusion strengthens the effectiveness of the cashless system and contributes to economic growth. This interaction forms a key part of the logic for examining both concepts within a single empirical framework.

THEORETICAL REVIEW

Financial Intermediation Theory

Financial intermediation theory emphasises the role of financial institutions in mobilising savings, reducing transaction costs and allocating funds efficiently to productive sectors of the economy. Beck, Demirgüç-Kunt and Levine (2007) argue that well-functioning financial intermediaries, such as banks and fintech institutions, move funds from surplus units (savers) to deficit units (borrowers), thereby supporting investment and output growth.

This theory is closely connected to financial inclusion. When more individuals and businesses gain access to savings accounts, credit, insurance and digital payment channels, the pool of mobilised savings expands. Financial institutions can then allocate more capital to productive ventures, enabling entrepreneurship and long-run economic expansion (Mbutor & Uba, 2013).

The theory also links naturally to cashless policy. Cashless systems through POS, mobile banking, online transactions and ATMs improve the efficiency of financial intermediation by lowering the cost of transactions and enabling banks to reach more customers at lower operational costs. Adesina (2020) notes that electronic payment channels reduce bottlenecks associated with physical cash and enhance the speed and reliability of financial transactions. As a result, the financial system becomes more effective in mobilising funds and supporting economic activity.

In summary, financial intermediation theory suggests that both cashless policy (as a mechanism for efficient transactions) and financial inclusion (as a platform for increased participation) contribute to economic growth by strengthening the role of financial institutions in the economy.

Neoclassical Growth Theory

Neoclassical growth theory, particularly the Solow growth model, emphasises capital accumulation, labour and technology as key drivers of economic growth. Although the model treats technological progress as exogenous, it offers a useful framework for explaining how financial systems influence capital accumulation.

Financial inclusion contributes to capital accumulation by enabling more people to save and invest. Increased access to credit also allows firms to acquire capital and expand production (Okoye & Eze, 2021). Cashless policy supports this process by modernising financial transactions and reducing inefficiencies, thereby increasing the productivity of both households and firms.

While neoclassical theory places limits on long-run growth through diminishing returns, the role of technology-enabled finance within the model highlights how digital innovations can shift economies toward higher steady-state levels.

Technology Acceptance and Innovation Diffusion Perspectives

Although not traditional economic-growth theories, the Technology Acceptance Model (TAM) and Diffusion of Innovation Theory provide important conceptual insights for understanding cashless policy and financial inclusion.

Technology Acceptance Perspective

This perspective emphasizes that individuals adopt new technology when they perceive it to be useful and easy to use. In Nigeria's context, the success of cashless policy depends on whether people believe that POS terminals, mobile banking and digital transfers improve their transaction experience. Adesina (2020) notes that factors such as trust, network reliability and ease of use play determining roles in the adoption of digital financial services.

Innovation Diffusion Theory

This theory, originally proposed by Rogers, suggests that innovations spread gradually from early adopters to the wider population. Cashless tools mobile transfers, USSD banking, POS agents follow this diffusion pattern. As more people adopt digital payments, social acceptance grows, infrastructure expands and the cost of adoption decreases. Owolabi and Afolayan (2020) highlight that the expansion of mobile money agents in rural areas has accelerated the spread of financial services.

Empirical Literature Reviews

The review of empirical literature has been conducted in line with the broad variable relationships conducted in this study.

Cashless Policy and Economic Growth

Some studies reporting positive or significant effects and a number of studies find that Nigeria's cashless policy measured through POS transactions, mobile banking, ATM usage and electronic fund transfers has contributed positively to economic activity.

Adebayo and Adegbite (2022), using an ARDL model for Nigeria, report that POS and mobile transfers significantly increase real GDP. Their study suggests that electronic payments speed up transactions, support consumer spending and help formalise parts of the economy that previously operated in cash. Similarly, Adegboye and Ojo (2021) examine digital financial innovation and conclude that innovations in payment systems, particularly mobile banking, have a long-run positive effect on economic output. Their findings support the argument that improvements in the efficiency of financial transactions can stimulate broader economic activity. Moreover, Ojo (2019) also finds that modernising the payment system improves financial-sector efficiency, and this translates into higher productivity and growth. In his study, increases in POS usage and ATM transactions are associated with improved economic performance.

Several other authors report comparable outcomes. Studies focusing on the digital payments ecosystem frequently show that increased use of electronic channels reduces transaction costs and expands the scope of market participation. These studies generally agree that the cashless policy has supported growth by making payments quicker, safer and more reliable.

Other researchers find that Cashless Policy and Economic Growth have a negative or insignificant Effects. Not all studies find favourable outcomes. Some researchers argue that the economic impact of Nigeria's cashless policy is limited by infrastructure weaknesses, low digital literacy and inconsistent adoption. Adesina (2020), for example, reports that while electronic payments have grown rapidly, the effect on GDP is sometimes weak

or statistically insignificant. His findings point to issues such as network failures, fraud risks and uneven distribution of POS terminals as factors that constrain the policy's potential.

In rural areas, low internet access and mistrust of digital channels reduce adoption, which in turn weakens the broader macroeconomic impact. Studies with these outcomes often conclude that the cashless policy is conceptually strong but has not yet fully translated into consistent, economy-wide benefits.

Financial Inclusion and Economic Growth

Some studies reporting positive or significant effects, many empirical studies support the argument that financial inclusion enhances economic growth by expanding savings, facilitating credit access and improving financial participation.

Mbutor and Uba (2013) find that increased financial inclusion, measured through deposit and credit penetration, significantly improves Nigeria's economic performance. Their results show that when more people save and borrow through formal channels, investment and output rise. Moreover, Okoye and Eze (2021) also report a positive relationship between financial inclusion indicators and real GDP. They argue that inclusive finance helps individuals and firms manage risk, invest in businesses and participate more effectively in the economy. Similarly, Nwosu and Okafor (2020) provide evidence that financial inclusion promotes inclusive growth by integrating low-income households into the formal financial system. Their findings indicate that access to accounts, credit and insurance supports both consumption smoothing and long-term investment. Other studies echo this position, noting that increased access to finance expands opportunities for micro, small and medium enterprises, which are central to Nigeria's employment and productivity base. These studies generally conclude that financial inclusion supports economic growth through higher capital formation and improved resource allocation.

On the other hand, several authors report weak or mixed findings, especially when financial inclusion is measured through simple indicators such as the number of accounts or branches. Acha and Ukpong (2020) show that although financial inclusion has expanded in Nigeria, its effect on growth is sometimes insignificant. They argue that many newly opened accounts remain dormant, meaning that inclusion does not always translate into meaningful financial activity.

Some authors note that, in a few cases, financial inclusion indicators have shown negative signs, especially during periods when the financial system faces shocks or when credit is poorly allocated. In such situations, rapid expansion of financial services without adequate regulation may lead to poor-quality lending, which can dampen economic performance. These findings suggest that financial inclusion contributes to economic growth only when access is accompanied by effective usage, availability of productive credit and supportive financial infrastructure.

Cashless policy, Financial Inclusion and Economic Growth

Although several researchers have examined the individual effects of cashless policy and financial inclusion on Nigeria's economic performance, the existing studies generally treat these variables in isolation. This fragmented approach makes it difficult to understand how both reforms operate together within the broader digital-finance ecosystem. The present study addresses this limitation by analysing cashless policy and financial inclusion jointly, recognising that they are closely connected components of Nigeria's financial-sector transformation.

To strengthen the empirical contribution, this study adopts Principal Component Analysis (PCA) to integrate the various proxies of the cashless policy into a single composite indicator. This approach reduces multicollinearity, enhances measurement accuracy and provides a more robust representation of the cashless environment. By combining the two policy pillars within a unified analytical framework and employing PCA for dimensional reduction, the study offers a more comprehensive and methodologically refined assessment of how Nigeria's evolving digital-finance landscape influences economic growth.

METHODOLOGY

Research Design

This study employed ex-post facto research design using secondary data. The ex-post facto is appropriate for this study because of the nature of the panel data to be adopted by this study and availability of data obtained from annual reports and accounts. This study used a correlational and descriptive design as part of the non-experimental research design, because it does not involve manipulating the variable of interest. The correlation design simply aimed to determine the effects between two variables, as well as how strongly these variables relate to one another (Kazdin, 2012). As well as descriptive design used to describe the words. Furthermore, the research design is chosen because data is attained from the international statistical publications in reports and world economic outlook were used as data sources.

Source of Data Collection

Specifically, data were obtained from Thus, the data's primary sources are the Nigerian Central Bank's statistics report and the World Bank Development Indicators, 2023. This study employs the use of secondary data between (2009 – 2023) and it is time series in nature. The choice of this time chosen is informed by the fact that the 13 years' time lag will allow this research cover more comprehensive examination, the variables to be consider to measure the nexus between cashless policy and economic growth are indicator for cashless banking is between variables such as ATM Transaction Intensity (ATM), POS Transaction Intensity (POS), Internet Transaction Intensity (INT), Mobile banking Intensity (MOB) and Real GDP Growth

Model Specification

For the variables used as an indicator for cashless banking is between variables such as ATM Transaction Intensity (ATM), POS Transaction Intensity (POS), Internet Transaction Intensity (INT), Mobile banking Intensity (MOB)and Real GDP Growth which is

CASHLESS = *f* (ATM, POS, INT, MOB) ---------- (1)

RGDP = *f* (CASHLESS, FINACC, EXCHR, INFL, INTR) ----------(2)

Where,

RGDP = Real Gross Domestic Product

ATM = Automated Teller Machine

POS = Point of Sale

INT = Web / Internet Transfers Payment

MOB = Mobile Payment

FINACC= Financial Inclusion

EXCHR= Exchange rate

INFL= Inflation rate

INTR= Interest rate

Equation (3) can further be expressed in the econometric model as:

Let the long-run relationship be specified as:

$$RGDP_t = \beta_0 + \beta_1 CASHLESS_t + \beta_2 FINACC_t + \beta_3 EXCHR_t + \beta_4 INFL_t + \beta_5 INTR_t + \varepsilon_t \quad (3)$$

Equation (3) can further be expressed in the econometric model as:

Since the data are time series datasets, the lagged values of the data can be introduced as possible instruments because lagged values are less likely to be influenced by current shocks

RESULTS AND DISCUSSION

Descriptive Statistics

In order to effectively perform the analysis in this results and discussion, various instruments are adopted to present the relevant aspects of the empirical analysis. In particular, the analysis involves two sets of procedures including statistical analysis and econometric analysis. The statistical analysis involves the use of descriptive statistics of the main variables used in the analysis thereby presenting the background characterization of the data used in the analysis. The econometric analysis is essentially the estimation and analysis of the models specified in the previous Chapter. Essentially, the impact of cashless policy and financial inclusion on economic growth in Nigeria could present more than one round of effect in the economy. However, Augmented Dickey Fuller (ADF) is used to test the unit root test.

The summary statistics of all variables used in this study are show in Table 4.1. The mean, standard deviation, minimum and maximum values of each variable are display.

Table 4.1: Descriptive Statistics

	RGDP	FINACC	CASHLESS	EXCHR	INFL	INTR
Mean	2356.236	0.124878	1.18E 16	262.637	13.61846	15.84531
Median	2218.068	0.127	0.92369	253.492	12.53783	16.7225
Maximum	3200.953	0.137	5.63237	462.4824	24.65955	18.99083
Minimum	1883.887	0.108833	1.16035	148.88	8.047411	11.48313
Std. Dev.	384.9531	0.00703	1.993051	112.1702	4.390279	2.087323
Skewness	0.877345	0.66909	1.911182	0.427171	0.972804	0.78647
Kurtosis	2.741614	3.30353	5.48634	1.752441	3.711894	2.699241
Jarque Bera	1.966064	1.176773	12.99522	1.42894	2.682617	1.602889
Probability	0.374175	0.555223	0.001507	0.489452	0.261503	0.44868
Sum	35343.53	1.873167	2.66E 15	3939.556	204.2768	237.6796
Sum Sq. Dev.	2074645	0.000692	55.61151	176150.2	269.8437	60.99683
Observations	15	15	15	15	15	15

Source: Author`s Computation 2025

The key variables used in analyzing the impact of cashless policy and financial inclusion on economic growth in Nigeria are characterized by their distributional properties, as indicated by the preliminary descriptive statistics. The average GDP per capita (RGDP) is ₦2,356.236, which exceeds its median value of ₦2,218.068.

This divergence indicates that the distribution of RGDP is likely positively skewed, influenced by high value outliers that may result from variations in oil revenue, changes in exchange rate policy, or structural economic reforms during the study period.

The median value of 0.127 for financial inclusion, as indicated by Financial Access (FINACC), is slightly above the mean of 0.1248, suggesting a left skewed (negatively skewed) distribution. This suggests that during the majority of the observed period, financial access in Nigeria was relatively low, with only a few years showing significant improvements in inclusion indicators like account ownership and banking outreach.

The cashless policy CASHLESS (CASHLESS), developed through Principal Component Analysis (PCA) of electronic payment methods ATM usage, POS transactions, Web payments, and Mobile payment systems (MOP) has a minimum value of 1.16035 and a maximum value of 5.63237. This broad dispersion illustrates the dynamic development and increasing acceptance of cashless instruments in Nigeria, although this varies across different years and technological platforms.

The interest rate variable (INTR) shows considerable variation, with a range from 11.48% to 18.99%. This indicates that the cost of capital and borrowing during the review period has been affected by changes in monetary policy and economic conditions. The normality of the dataset was evaluated using the Jarque Bera (JB) statistic. The findings show that all variables, with the exception of the CASHLESS, have JB probability values exceeding 0.05. This suggests that their distributions do not significantly differ from normality. Consequently, we do not reject the null hypothesis of normal distribution for most variables, which confirms that the dataset is statistically appropriate for further regression based econometric modeling.

CASHLESS is the exception, having a JB probability value below 0.05. This indicates a non-normal distribution, which may be due to the characteristics of PCA derived variables or structural changes in cashless transactions during the study period.

Principal component analysis of cashless policy

The principal component analysis in this study is conducted to estimate a composite CASHLESS that incorporates the features of the four selected cashless policy measures adopted in this study. The measures are defined as shown:

i. Automated Teller Machine (ATM)

ii. Point Of Sales (POS)

iii. Mobile Pay (MOP)

iv. Web Pay (WEP)

Table 4.2 Ordinary Correlation of cashless policy Variables

	ATM	POS	WEB_PAY	MOBILE_PAY
ATM	1			
POS	0.775721	1		
WEB_PAY	0.947581	0.915318	1	
MOBILE_PAY	0.832009	0.992468	0.946506	1

Source: Author`s Computation 2025

The average correlation among all the variables is estimated at 0.927, as shown in the principal component. The high correlation among the variables justifies the computation of a composite proxy for the variables with the method of principal component analysis

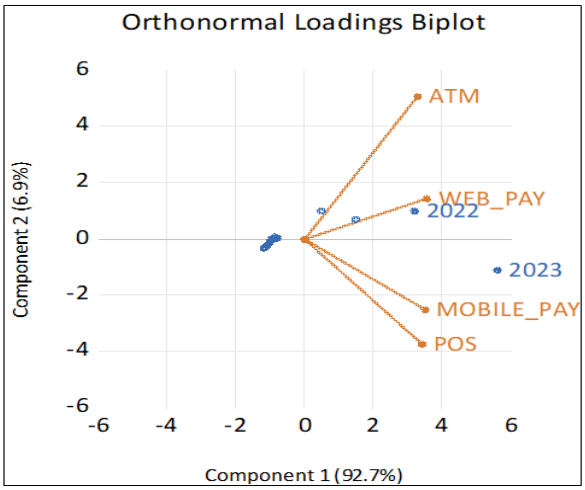

Table 3 gives the basis for the generation of the PCA variable data. The principal component one (PC1) equation is generated from the Eigenvectors (loading) shown in equation.

PC1 = 0.4788ATM 0.4975POS 0.5137 WEP + 0.50914 MOP

Further observation reveals reveal that PC1 alone comprises 0.927 proportions of the total PCA components. This is over 92.7% of the total proportion of all the PCs. Therefore, PC1 is conveniently adopted as the variable for the PCA of this study.

Table 3 Eigenvectors (loadings) of cashless policy Variables

Eigenvectors (loadings):				
Variable	PC 1	PC 2	PC 3	PC 4
ATM	0.478829	0.730014	0.471468	0.124579
POS	0.497524	0.54115	0.158443	0.65918
WEB_PAY	0.51378	0.204357	0.832993	0.01979
MOBILE_PAY	0.50914	0.36397	0.242356	0.74133

Source: Author`s Computation 2025

Unit Root Test

The unit root test result is shown in table 3.

Table 4: Augmented Dickey Fuller Unit Root Test Results

	LEVEL			**FIRST DIFFERENCE**			
Variables	**T Stat**	**Critical Values 5%**	**P Values**	**T Stat**	**Critical Values 5%**	**P Values**	**Order of Integration**
RGDP	2.3583	3.11991	0.1703	2.8133	1.974	0.0092	I(1)

FINACC	0.9148	3.0988	0.7517	3.7722	3.11991	0.0124	I(1)
CASHLESS	0.395	1.974	0.5197	2.5082	1.97403	0.031	I(1)
EXCR	2.5736	3.82897	0.295	4.2479	3.8753	0.0292	I(1)
INFL	1.7753	3.82897	0.6573	2.4631	1.97098	0.0184	I(1)
INTR	2.5743	3.8753	0.2952	2.0855	1.97098	0.0398	I(1)

Source: Author`s Computation 2025

A unit root test was performed to confirm the validity of the regression results and to prevent the issue of spurious relationships that is frequently linked to non-stationary time series data. The objective of the test was to ascertain the stationarity characteristics of the variables utilised in the research. In particular, the Augmented Dickey Fuller (ADF) method was used due to its reliability in examining time series datasets for unit roots.

The ADF unit root test results shown in Table 4 were assessed using the corresponding critical values and probability values at a significance level of 5%. The results show that all variables examined in the research specifically GDP per capita (RGDP), Financial Access (FINACC), Cashless Policy (CASHLESS), Exchange Rate (EXCHR), Inflation Rate (INFL), and Interest Rate (INTR) are stationary following first differencing. This suggests they are integrated of order one, I(1). This conclusion is backed by the fact that: the absolute values of the 5% critical values are exceeded by the ADF test statistics, and all the associated probability values are below 0.05, thus confirming that the null hypothesis of a unit root in each series is rejected.

Since all variables are I(1) and the study focuses on cointegrated economic relationships, the Fully Modified Ordinary Least Squares (FMOLS) estimation technique was chosen. FMOLS is especially suitable for examining long run relationships among integrated variables because it addresses both serial correlation and endogeneity that can occur due to cointegration, resulting in consistent and efficient parameter estimates.

Table 5: Fully Modified Least Squares (FMOLS) on the impact of cashless policy and financial inclusion on economic growth in Nigeria

DEPENDENT VARIABLE: RGDP				
Variable	Coefficient	Std. Error	t Statistic	Prob.
FINACC	9370.564	10145.91	0.923581	0.3827
CASHLESS	250.9665	45.42045	5.525408	0.0006
EXCHR	3.28455	0.755587	4.34701	0.0025
INFL	80.2661	20.67254	3.88274	0.0047
INTR	27.5922	33.67624	0.81934	0.4363
C	3602.076	1427.098	2.524057	0.0356
R squared	0.851673	Mean dependent var		2389.975
Adjusted R squared	0.758968	S.D. dependent var		375.7654
S.E. of regression	184.482	Sum squared resid		272268.8
Long run variance	16728.32			

Source: Author`s Computation 2025

The outcomes of the Fully Modified Ordinary Least Squares (FMOLS) estimation, used to investigate the long term connection between economic growth and key explanatory variables specifically, cashless policy (CASHLESS), financial access (FINACC), exchange rate (EXCHR), inflation (INFL), and interest rate (INTR) are shown in Table 6. The empirical results indicate that three variables Cashless Policy CASHLESS (CASHLESS), Exchange Rate (EXCHR), and Inflation (INFL) are statistically significant at the 1% level, with probability values of 0.0006, 0.0025, and 0.0047, respectively. This implies that these variables significantly affect economic growth over the long term during the study period.

In particular, the CASHLESS acting as a proxy for the extent of cashless policy adoption based on principal component analysis of ATM, POS, web based, and mobile payment usage exhibits a positive and statistically significant impact on economic growth. The estimated coefficient of 250.9665 shows that a greater adoption of digital and electronic payment systems significantly boosts the growth of Nigeria's economy, underscoring the importance of financial technology and digitization in driving contemporary economic activity.

Conversely, Financial Access (FINACC) shows a statistically insignificant correlation with economic growth, indicated by a p value of 0.3827 that exceeds the conventional significance threshold of 5%. The FINACC coefficient is positive, but its lack of statistical significance suggests that enhancements in financial access during the study period may not have resulted in measurable economic growth contributions possibly due to structural obstacles like digital illiteracy, low rural penetration, or the prevalence of informal financial transactions.

Moreover, the directional influence of the control variables indicates that the Exchange Rate (EXCHR), Inflation (INFL), and Interest Rate (INTR) all have detrimental effects on economic growth. These results align with macroeconomic theory, which posits that excessive inflation, exchange rate volatility, and high interest rates often suppress productive investment and diminish overall economic performance.

The model demonstrates an R squared value of 0.7589, indicating that about 75.9% of the variation in Nigeria's economic growth (represented by GDP per capita) can be accounted for by the independent variables included in the model. Furthermore, the model’s moderate to strong explanatory power is reaffirmed by the Adjusted R squared value of 0.851673, which takes into account the degrees of freedom and the number of predictors.

The difference noted between R squared and Adjusted R squared indicates that although the main variables provide useful information, the model's effectiveness could be enhanced by adding more relevant predictors like infrastructure development, education level, foreign direct investment, or innovation indices that could more accurately reflect the wider factors influencing economic growth in a developing country context.

CONCLUSION AND RECOMMENDATIONS

The FMOLS estimation results corroborate that in Nigeria, a positive and statistically significant connection exists between economic growth and the cashless policy index. The cashless index, created through Principal Component Analysis (PCA) of ATM, POS, web, and mobile payments, indicates the extent to which digital financial services are being adopted. An increase of one unit in the index correlates with a rise exceeding ₦250 in GDP per capita, indicating that digital payment systems improve transaction efficiency, lower costs, and foster economic activity. The beneficial effect is probably focused in urban and digitally connected regions, indicating that rural inclusion can be enhanced.

Although the correlation between financial inclusion and economic growth corresponds with developmental theory, the absence of statistical significance in this study suggests that Nigeria has not yet fully reaped the benefits of financial inclusion. This highlights the necessity of concentrating not just on greater access but also on effective use and enhancement of the quality of financial services, particularly for underserved groups.

The findings indicate that policy interventions need to extend beyond account ownership metrics to tackle the wider ecosystem necessary for financial inclusion to have a meaningful impact on growth elements such as affordability, trust in financial institutions, service reliability, and financial literacy.

The general and particular findings in this study suggest some policy directions which may provide a basis for useful recommendations:

a) Enhance Cybersecurity and Consumer Protection With the increase in digital transactions, it is essential for the government to bolster cybersecurity measures and uphold data privacy laws to foster public confidence in the system. And Support for FinTech and Innovation Motivate financial technology (FinTech) firms and digital innovators with tax incentives, regulatory backing, and funding to keep creating financial solutions that are accessible, secure, and low-cost. Broaden Digital Infrastructure Across the Country To ensure that all Nigerians can benefit from the cashless economy, government and private sector actors should invest in broadband access, mobile connectivity, and power supply, particularly in rural and underserved areas.

b) Promote Financial and Digital Literacy Launch national financial and digital education initiatives aimed at the informal sector, women, and young people to ensure citizens can safely and effectively use cashless tools. Also, Enhance the Quality and Utilization of Financial Services It is essential for the government and financial institutions to prioritize improving the usefulness of financial products by offering customized, budget-friendly, and readily available services. This is particularly important for small businesses, individuals in rural poverty, and those working in the informal sector.

c) Enhance Campaigns for Financial Literacy It is essential to establish nationwide educational initiatives aimed at fostering financial and digital literacy, so that citizens can competently utilize the financial tools at their disposal for constructive ends.

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