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Research Paper

Role of public administration in stimulating economic growth through infrastructure development in Nigeria

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Abstract: This study examines the role of public administration in stimulating economic growth through infrastructure development in Nigeria, focusing on government capital expenditure, infrastructure investment, and governance effectiveness. It employs an ex-post facto research design supported by descriptive and econometric approaches, using quarterly data from 1996Q1 to 2024Q4 sourced from the World Bank's World Governance Indicators. The Autoregressive Distributed Lag (ARDL) bounds testing technique was applied to examine both short-run and long-run relationships among the variables. The results reveal strong positive relationships between real gross domestic product, government capital expenditure, and infrastructure investment, while governance effectiveness shows weak associations with the other variables. The unit root tests confirm a mixed order of integration, and the bounds test establishes a long-run cointegration relationship among the variables. Long-run estimates show that government capital expenditure and infrastructure investment significantly enhance economic growth, with infrastructure having a stronger effect, while governance effectiveness has a negative long-run impact, reflecting institutional inefficiencies. In the short run, all variables positively influence economic growth, with infrastructure again exerting the strongest effect, and the error correction mechanism indicates a relatively fast adjustment toward equilibrium. Diagnostic and stability tests confirm that the model is robust and well-specified. The study concludes that public administration drives economic growth mainly through capital and infrastructure spending, while weak governance limits long-term performance. It recommends improved efficiency in public expenditure, sustained infrastructure investment, and stronger institutional reforms to enhance governance effectiveness and ensure sustainable economic growth in Nigeria.

Keywords: Economic Growth, Government Effectiveness, Infrastructure Development, Public Administration, Public Spending.

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1 | INTRODUCTION

Public Administration is widely recognized as an essential mechanism for promoting economic growth, social transformation, and sustainable national development. Effective public administration enables governments to formulate and implement policies, allocate public resources efficiently, and provide critical infrastructure necessary for economic advancement. Weber (1974) emphasized that an efficient bureaucratic system characterized by professionalism, accountability, and administrative competence is fundamental to national development. Similarly, Rostow (1960) argued that infrastructure development is a crucial stage in the process of economic modernization and growth. Infrastructure such as roads, electricity, healthcare facilities, communication systems, railways, and educational institutions provides the enabling environment for industrialization, employment generation, investment expansion, and improved productivity. According to Todaro and Smith (2020), countries with effective institutions and adequate infrastructural facilities tend to experience higher levels of economic performance and sustainable development.

In Nigeria, infrastructure development has remained a major concern despite several government reforms, development plans, and increased public expenditure aimed at accelerating economic growth. Since independence, successive administrations have invested in road construction, railway modernization, electricity generation, healthcare delivery, educational infrastructure, and telecommunications. However, the country continues to face significant infrastructural challenges, including poor road networks, unstable electricity supply, inadequate healthcare facilities, poor transportation systems, and weak maintenance culture. The Central Bank of Nigeria (2024) noted that inadequate infrastructure continues to hinder productivity, discourage private investment, and increase the cost of doing business in the country. Such as Anyanwu (2014), Iyoha (2012), and Adebayo (2021) also argued that corruption, bureaucratic inefficiency, weak institutional capacity, policy inconsistency, and poor project implementation have undermined the effectiveness of infrastructure development programmes in Nigeria. Furthermore, the World Bank (2023) maintained that government effectiveness and institutional quality are important determinants of successful infrastructure delivery and long-term economic growth. Despite the increasing government involvement and rising public spending on infrastructure development, economic growth in Nigeria has remained relatively unstable and below its developmental expectations. Although previous empirical studies examined the relationship between infrastructure expenditure and economic growth, many focused mainly on financial investment without adequately considering the influence of public administration quality, institutional effectiveness, and governance efficiency on infrastructure delivery and economic performance. Consequently, there is limited empirical evidence explaining how effective public administration can stimulate economic growth through infrastructure development in Nigeria. This gap in literature creates the need for further investigation into the extent to which governance quality, public sector efficiency, and infrastructure provision contribute to economic growth in the country. Therefore, this study seeks to examine the role of public administration in stimulating economic growth through infrastructure development in Nigeria. This study structured into five main sections: introduction, literature review, methodology, results and presentation, and conclusion and recommendations.

2 | LITERATURE REVIEW

2.1 | Public Administration

Public administration refers to the system, processes, and institutions through which government policies are formulated, implemented, and managed for the benefit of society. It involves the coordination of human, financial, and material resources to achieve public goals efficiently and effectively. According to Wilson (1887) and Weber (1947), public administration is the structured mechanism of government that ensures the efficient execution of public laws through a hierarchical bureaucratic system. In practice, public administration performs functions such as policy implementation, resource allocation, public service delivery, regulation, development planning, and coordination of government activities (Adebayo, 2018). In Nigeria, public administration operates through ministries, departments, and agencies at all levels of government and serves as the main instrument for implementing development policies, although it is often constrained by corruption, bureaucratic delays, and inefficiency (Ola & Tonwe, 2009). Overall, public administration remains central to national development by ensuring effective governance and delivery of essential public services (Okoli & Onah, 2017).

2.2 |Economic Growth

Economic growth refers to the sustained increase in the production of goods and services in an economy over time, typically measured by Gross Domestic Product (GDP), per capita income, and industrial output (Todaro & Smith, 2020). It reflects an improvement in a country's productive capacity and overall standard of living. Economic growth is influenced by several determinants, including capital formation, human capital development, technological advancement, political stability, and infrastructure development (Barro, 1991). Government activities also play a critical role in shaping economic growth through public expenditure, fiscal policies, and investment in key sectors such as transport, education, health, and energy (Musgrave & Musgrave, 1989). Effective governance enhances productivity and encourages private sector investment, while weak governance and policy inconsistency can hinder sustainable growth performance (World Bank, 2020).

2.3 |Infrastructure Development

Infrastructure development refers to the provision, expansion, and maintenance of basic physical and social facilities necessary for economic and social activities (World Bank, 1994). It includes economic infrastructure such as roads, railways, electricity, airports, seaports, and ICT facilities, as well as social infrastructure such as schools, hospitals, and water supply systems (Aschauer, 1989). Economic infrastructure enhances production and trade by reducing costs and improving efficiency, while social infrastructure improves human capital development and quality of life (Calderón & Servén, 2010). Infrastructure development is therefore a key driver of national development because it attracts investment, promotes industrialization, creates employment, and improves living standards. In developing economies like Nigeria, inadequate infrastructure remains a major constraint to growth and competitiveness (Oyedele, 2012).

2.4 |Relationship between Public Administration and Infrastructure Development

The relationship between public administration and infrastructure development lies in the role of government institutions in planning, implementing, and managing public infrastructure projects. Public administration ensures effective policy formulation, coordination, and execution of infrastructure development programmes (Olowu, 2010). It is also responsible for resource allocation, budgeting, and supervision of projects to ensure efficiency and accountability in service delivery (Okigbo, 2004). Furthermore, public administration plays a critical role in monitoring and maintaining infrastructure to ensure sustainability and value for public investment (Ake, 1996). Therefore, effective public administration is essential for achieving successful infrastructure development outcomes, particularly in developing economies like Nigeria where governance capacity significantly influences project performance.

2.5 |Infrastructure Development and Economic Growth in Nigeria

Infrastructure development plays a critical role in stimulating economic growth in Nigeria by enhancing productivity, investment, and overall economic efficiency. Transport infrastructure such as roads, railways, airports, and seaports facilitates the movement of goods and services, reduces transaction costs, and promotes trade and industrial development (World Bank, 2017). Electricity and energy infrastructure are essential for manufacturing and business operations; however, inadequate power supply in Nigeria continues to increase production costs and limit industrial performance (Adenikinju, 2005). ICT infrastructure also contributes significantly to economic growth by improving communication, financial inclusion, digital trade, and innovation (ITU, 2021). Additionally, infrastructure development generates employment opportunities and improves productivity across sectors, thereby supporting sustainable economic growth and development (Iyoha, 2014). Consequently, investment in infrastructure remains a key strategy for achieving long-term economic transformation in Nigeria.

2.6 |Theoretical Literature Review

Modernization Theory was propounded by Rostow in 1960. The theory explains how traditional societies transform into modern industrial economies through technological advancement, industrialization, urbanization, and infrastructure development. According to Rostow (1960), infrastructure such as roads, electricity, transportation, communication networks, schools, and healthcare facilities are essential for economic transformation and national development. The theory further emphasizes that effective public administration plays a significant role in planning, implementing, and managing development policies that promote modernization. In the context of Nigeria, the theory suggests that government investment in infrastructure can stimulate industrial growth, improve productivity, create employment opportunities, and enhance the overall standard of living. The theory is relevant to this study because it explains how public administration can drive economic growth through infrastructural development and modernization of the economy.

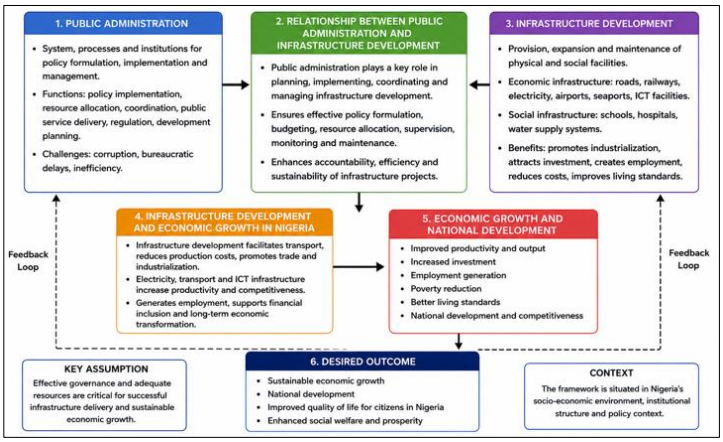

Figure 1: Conceptual Framework

Source: Author's Conceptual Framework (2026)

Keynesian Theory was developed by Keynes in 1936. The theory emphasizes the importance of government intervention in stimulating economic activities, especially during periods of economic instability and unemployment. Keynes (1936) argued that government expenditure on infrastructure such as roads, electricity, healthcare, education, and transportation increases aggregate demand, creates employment opportunities, and promotes economic growth. According to the theory, public administration is responsible for implementing fiscal policies and managing public investments that can improve economic performance. In Nigeria, increased government spending on infrastructure development can encourage private sector participation, improve productivity, and stimulate sustainable economic growth. The theory is therefore relevant to this study because it highlights the role of public administration and public expenditure in promoting economic growth through infrastructure development.

Development Administration Theory was developed by Riggs in 1961. The theory focuses on the role of public administration in promoting socio-economic development through effective policy formulation, implementation, and management of public resources. Riggs (1961) viewed public administration as an instrument for national development and social transformation. The theory emphasizes efficiency, accountability, innovation, and administrative capacity in the provision of public services and infrastructure. In developing countries such as Nigeria, public administration is expected to facilitate infrastructural development through effective planning and execution of projects in sectors such as transportation, power, health, education, and communication. The theory is relevant to this study because it explains how efficient and responsive public administration can stimulate economic growth through infrastructure development and improved public service delivery.

Endogenous Growth Theory was developed by Romer in 1986 and later expanded by Robert Lucas Jr. in 1988. The theory argues that economic growth is generated internally through investment in human capital, innovation, technology, and infrastructure. Romer (1986) and Lucas (1988) maintained that government policies and public investment can permanently influence long-run economic growth by improving productivity and efficiency within the economy. Infrastructure development such as roads, electricity, telecommunications, healthcare, and education reduces production costs, facilitates trade, and encourages industrial expansion. In Nigeria, effective public administration can stimulate sustainable economic growth by investing in critical infrastructure that enhances productivity and attracts both local and foreign investment. The theory is relevant to this study because it demonstrates that infrastructure development is a major driver of long-term economic growth and national development.

2.7 |Theoretical Framework

This study is anchored on the Development Administration Theory propounded by Riggs in 1961. The theory emphasizes the role of public administration as an instrument for promoting socio-economic development through effective policy formulation, implementation, coordination, and management of public resources. Development Administration Theory argues that government institutions are not only established to maintain law and order but also to facilitate national development through the provision of infrastructure and efficient public service delivery. According to Riggs (1961), economic growth and modernization can only be achieved when

public administration is development-oriented, efficient, accountable, and responsive to societal needs. The theory identifies infrastructure such as roads, electricity, transportation systems, healthcare facilities, communication networks, and water supply as essential components of national development because they stimulate industrialization, improve productivity, create employment opportunities, encourage investment, and enhance the standard of living of citizens. Therefore, public administration serves as the machinery through which government development policies and infrastructural projects are planned, financed, executed, monitored, and maintained to achieve economic growth and sustainable development.

The relevance of the theory is evident in the Nigerian developmental experience where public administration plays a central role in infrastructure provision and economic management. In Nigeria, ministries, departments, and government agencies are responsible for implementing infrastructure projects in sectors such as transportation, power, health, education, and communication. However, despite several government interventions, Nigeria continues to face major infrastructural challenges including poor road networks, unstable electricity supply, inadequate healthcare facilities, poor water systems, and weak maintenance culture. These challenges are often associated with corruption, bureaucratic inefficiency, poor policy implementation, inadequate funding, and weak institutional capacity, which have negatively affected economic growth and national development. Development Administration Theory therefore explains that effective and efficient public administration is necessary for proper planning, execution, monitoring, and maintenance of infrastructure projects capable of stimulating economic growth. The theory further suggests that strengthening public institutions, promoting accountability, and improving governance will enhance infrastructure development, increase productivity, attract investment, and promote sustainable economic growth in Nigeria.

2.8 |Empirical Literature Review

Bolaji (2014) investigated the effect of infrastructural financing on economic growth in Nigeria. The objective of the study was to assess how government capital expenditure influences economic performance. The study adopted an ex-post facto research design using time-series data covering 1970 to 2010. The techniques of analysis included Ordinary Least Squares (OLS) regression analysis. The findings revealed that capital expenditure on infrastructure has a significant positive effect on economic growth in Nigeria, although debt-financed expenditure may negatively affect growth due to inefficiencies and repayment burdens. Ekpung (2014) examined the relationship between public infrastructure expenditure and economic growth in Nigeria. The objective of the study was to determine whether government infrastructure spending contributes to long-run economic growth. The study employed a descriptive and econometric time-series design. The techniques of analysis included trend analysis and regression techniques. The findings showed a positive relationship between infrastructure expenditure and economic growth, but inefficiencies in implementation and poor project execution reduce its overall effectiveness. Warner (2014) examined the impact of large-scale infrastructure investment on economic growth in developing countries. The objective of the study was to determine whether infrastructure investment drives macroeconomic growth. The study used cross-country panel data from developing and emerging economies. The techniques of analysis included panel regression and comparative macroeconomic analysis. The findings showed that infrastructure investment promotes economic growth when efficiently managed; however, weak governance, corruption, and poor project selection reduce its effectiveness.

Ansar *et al.* (2016) examined whether infrastructure investment leads to economic growth or financial instability using global infrastructure data. The objective was to assess the economic returns of large infrastructure projects. The study used empirical project-level data and econometric evaluation methods. The techniques of analysis included statistical regression and risk-adjusted return analysis. The findings revealed that many large infrastructure projects fail to deliver expected economic benefits due to cost overruns, delays, and poor governance, especially in developing economies (Ayeni & Ushie, 2026; Kayani et al., 2026). Abubakar and Hassan (2020) analyzed the impact of government capital expenditure on infrastructure and economic growth in Nigeria. The objective was to evaluate both short-run and long-run effects of public infrastructure spending. The study used a time-series econometric design. The techniques of analysis included the Autoregressive Distributed Lag (ARDL) model. The findings revealed that capital expenditure on infrastructure has a significant positive long-run impact on economic growth, although short-run effects are often weak due to delays in implementation. Keji and Tosin (2022) examined public infrastructure expenditure and economic growth in Nigeria. The objective was to determine the effect of government infrastructure spending on economic performance. The study adopted a time-series econometric approach. The techniques of analysis included cointegration and regression analysis. The findings showed that infrastructure expenditure significantly promotes economic growth in Nigeria, although corruption, inefficiency, and weak implementation structures reduce its effectiveness.

Ibrahim et al. (2023) examined the role of public administration efficiency in infrastructure development and economic growth in Nigeria. The objective of the study was to determine how administrative efficiency influences infrastructure delivery and economic performance. The study adopted a mixed-method research design combining survey data and secondary macroeconomic indicators. The techniques of analysis included descriptive statistics and multiple regression analysis. The findings revealed that efficient public administration significantly enhances infrastructure delivery and stimulates economic growth, while bureaucratic bottlenecks, corruption, and weak institutional capacity negatively affect development outcomes. Okafor and Eze (2024) investigated the impact of governance quality and public administration effectiveness on economic growth in Nigeria. The objective of the study was to assess how institutional quality influences economic growth through infrastructure development. The study employed a panel data econometric design using Nigerian macroeconomic indicators. The techniques of analysis included fixed effects regression modeling. The findings showed that good governance and effective public administration significantly improve economic growth by ensuring efficient infrastructure development, while weak governance structures reduce development performance and economic efficiency.

2.9 |Gap in the Literature

Based on the reviewed empirical studies, several gaps are evident in the literature on public administration, infrastructure development, and economic growth, particularly in Nigeria. Most studies (e.g., Bolaji, 2014; Ekpung, 2014; Abubakar and Hassan, 2020; Keji and Tosin, 2022) concentrated mainly on the relationship between government infrastructure expenditure and economic growth, treating infrastructure largely as a fiscal variable without adequately examining the role of public administration in planning, implementing, and monitoring infrastructure projects. Although studies such as Ibrahim et al. (2023) and Okafor and Eze (2024) introduced governance and institutional quality, they did not sufficiently disaggregate the specific administrative functions that drive infrastructure efficiency and economic outcomes. Furthermore, cross-country studies (Warner, 2014; Ansar *et al.,* 2016; Sahoo & Dash, 2012) provide useful insights but lack contextual relevance to Nigeria's unique institutional and infrastructural challenges. In addition, many Nigerian-based studies rely heavily on macroeconomic time-series approaches with limited incorporation of institutional and administrative variables that explain implementation failures, inefficiencies, and project abandonment. There is also a theoretical gap, as most studies fail to explicitly anchor their analysis on Development Administration Theory to explain how effective public administration translates infrastructure investment into economic growth. Therefore, the existing literature does not sufficiently explain the mediating role of public administration in the infrastructure-growth relationship, which this study seeks to address.

Table 1: Summary of Literature Review

Study Areas	Key Focus of Studies	Key Authors	Major Findings	Issues / Limitations
Public Administration and Economic Growth	Relationship between governance, administrative efficiency, and economic performance	Ibrahim *et al.* (2023); Okafor and Eze (2024)	Effective public administration and good governance significantly enhance economic growth by improving infrastructure delivery and efficiency	Limited focus on specific administrative processes and weak operational detail on infrastructure management
Infrastructure and Economic Development	Link between infrastructure stock and economic growth outcomes	Abur (2019); Ebuh *et al.* (2019); Warner (2014)	Infrastructure development has strong positive impact on economic growth, employment, and productivity	Weak integration of institutional and administrative factors influencing infrastructure effectiveness
Government Expenditure on Infrastructure in Nigeria	Impact of capital expenditure on infrastructure and economic growth	Bolaji (2014); Ekpung (2014); Abubakar & Hassan (2020); Keji & Tosin (2022)	Government infrastructure spending positively affects economic growth, especially in the long run	Inefficiencies, corruption, poor implementation, and weak governance reduce effectiveness
Studies from Developing Countries (Comparative Evidence)	Infrastructure-growth relationship across countries	Ansar *et al.* (2016); Sahoo & Dash (2012)	Infrastructure investment promotes growth in developing economies when efficiently managed	Limited contextual relevance to Nigeria and weak focus on public administration

3 | METHODOLOGY

This study adopts an ex-post facto research design supported by a descriptive and econometric analytical approach. The ex-post facto design is appropriate because it relies on secondary data from already existing records on public administration, infrastructure development, and economic growth in Nigeria, meaning the variables cannot be manipulated by the researcher (Kothari, 2004). The descriptive aspect of the design is used to examine and present the historical trends and patterns in public administration performance and infrastructure development within the Nigerian economy, thereby providing a clear understanding of how these variables have evolved over time. In addition, an econometric approach is employed to empirically analyze the relationship among public administration, infrastructure development, and economic growth using statistical techniques such as regression analysis.

The study employed quarterly secondary data covering the period from 1996Q1 to 2024Q4. Data on Real Gross Domestic Product (RGDP), Government Capital Expenditure (GCEXP), and Infrastructure Development Expenditure (INFRA), and Government Effectiveness (GE) data were sourced from the World Governance Indicators (WGI) of the World Bank. Since the WGI data are annual in nature, quarterly estimates were generated through interpolation techniques to ensure consistency with the quarterly frequency of other variables.

Based on the reviewed empirical studies such as Bolaji (2014), Ekpung (2014), Warner (2014), Abubakar and Hassan (2020), Keji and Tosin (2022), Ibrahim et al. (2023), and Okafor and Eze (2024), this study specifies a model that captures the relationship between public administration, infrastructure development, and economic growth in Nigeria. The studies consistently established that government capital expenditure, infrastructure investment, and public administration effectiveness significantly influence economic growth. Therefore, the model incorporates variables reflecting public administration efficiency, infrastructure development expenditure, and governance quality. The functional model is expressed as:

$$RGDP_t = f(GCEXP_t, INFRA_t, GE_t) \quad (1)$$

Transformed equation (1) into econometric model as specified as;

$$RGDP_t = \beta_0 + \beta_1 + \beta_2 GCEXP_t + \beta_3 INFRA_t + \beta_4 GE_t + \mu_t \quad (2)$$

Where: $RGDP_t$ =Real Gross Domestic Product (Proxy for Economic Growth), $GCEXP_t$ = Government Capital Expenditure (Proxy for Public Administration), $INFRA_t$ =Infrastructure Development Expenditure, GE_t =Government Effectiveness (Proxy for Governance Quality), β_0 = constant term, $\beta_1 - \beta_4$ = Parameters of estimation, μ_t =error term.

According to the Autoregressive Distributed Lag (ARDL) approach proposed by Pesaran, Shin, and Smith (2001), the technique possesses several advantages over the traditional bivariate cointegration method developed by Engle and Granger (1987) and the multivariate cointegration technique introduced by Johansen (1988). The ARDL approach is widely preferred because it can be applied when variables are integrated at different orders, specifically I(0) and I(1), provided that none of the variables is integrated of order I(2). Furthermore, the method is suitable for small sample sizes and enables the simultaneous estimation of both short-run and long-run relationships within a single framework. Consequently, Equation 3 presents the expanded ARDL bounds testing model based on the variables specified in Equation 2.

$$\Delta \ln RGDP_t = \delta_0 + \sum_{i=0}^{p} \varphi_1 \Delta \ln RGDP_{t-1} + \sum_{i=0}^{p} \varphi_2 \Delta \ln GCEXP_{t-1} + \sum_{i=0}^{p} \varphi_3 \Delta \ln INFRA_{t-1} + \sum_{i=0}^{p} \varphi_4 \Delta GE_{t-1} + \delta_1 RGDP_{t-1} + \delta_2 GCEXP_{t-1} + \delta_3 INFRA_{t-1} + \delta_4 GE_{t-1} + \mu_t \quad (3)$$

In the model, φ_1–φ_4 represent the short-run coefficients, while $\delta_1 - \delta_4$ denote the long-run coefficients. The parameters δ_o and$\mu_t$represent the intercept term and the white-noise stochastic error term, respectively, whereas λ captures the coefficient of the Error Correction Mechanism (ECM). The notation *ln* denotes the natural logarithm of the variables, while Δ represents the difference operator. A shock or change in any of the explanatory variables may not immediately exert a long-run effect on RGDP, thereby creating temporary disequilibrium within the system. Consequently, short-run adjustments are required to restore equilibrium through the Error Correction Mechanism, represented by (ECM_{t-1}). The (ECM_{t-1}) is the one-period lagged error correction term that measures the speed at which deviations from the long-run equilibrium are corrected over time. After establishing the existence of a long-run relationship among the variables, the short-run coefficients can subsequently be derived and estimated through the Error Correction Model (ECM), which is formulated from the underlying long-run specification presented in Equation 4.

$$\Delta \ln RGDP_t = \delta_0 + \sum_{i=0}^{p} \delta_{1j} \Delta \ln RGDP_{t-j} + \sum_{i=0}^{p} \delta_{2j} \Delta \ln GCEXP_{t-j} + \sum_{i=0}^{p} \delta_{3j} \Delta \ln INFRA_{t-j} + \sum_{i=0}^{p} \delta_{4j} \Delta \ln GE_{t-j} + \delta_5 ECM_{t-1} + \mu_t \quad (4)$$

ΔY_t: First difference on the dependent variable; ECM_{t-1}: Error Correction Term (Lagged one period); $\delta_o, \delta_1 \ldots\ldots\ldots \delta_5$: represents the short-run dynamics; λ: Speed of adjustment coefficient μ_t: Error term.

3.1 | A Priori Expectation

The study expects positive relationships between the explanatory variables and economic growth:

$$\beta_1 > 0, \beta_2 > 0, \beta_3 > 0$$

This implies that increases in government capital expenditure, infrastructure development expenditure, and government effectiveness are expected to stimulate economic growth in Nigeria.

Table 2: Variable definition and measurement

Variable	Definition	Measurement/Proxy	Expected Sign
Real Gross Domestic Product (RGDP)	Refers to the total value of goods and services produced in the economy adjusted for inflation, used as an indicator of economic growth.	Real GDP at constant prices (₦ Billion)	Dependent Variable
Government Capital Expenditure (GCEXP)	Refers to government spending on long-term development projects such as roads, power, education, health, and other public investments. It serves as a proxy for public administration performance.	Federal Government Capital Expenditure (₦ Billion)	+
Infrastructure Development Expenditure (INFRA)	Refers to government expenditure on economic and social infrastructure including transportation, electricity, communication, and water resources.	Capital Expenditure on Economic Services/Infrastructure (₦ Billion)	+
Government Effectiveness (GE)	Refers to the quality of public administration, policy implementation, institutional efficiency, and public service delivery.	Government Effectiveness Index (WGI: −2.5 to +2.5)	+

Source: *Author's Compilation (2026)*

4 | RESULTS AND PRESENTATION

Table 3: Descriptive Statistics

Variable	Obs.	Mean	Median	Maximum	Minimum	Std. Dev.
RGDP	116	139.4562	137.6802	516.2420	221.4521	497.2846
GCEXP	116	345.7280	342.2084	573.0291	103.9165	135.4377
INFRA	116	290.6512	287.4290	835.3621	487.5481	122.1245
GE	116	-0.4834	-0.5064	0.1634	-1.1409	0.2918

Source: *Author's Compilation (2026)*

Table 3 presents the descriptive statistics of the variables used in the study, namely Real Gross Domestic Product (RGDP), Federal Government Capital Expenditure (GCEXP), Capital Expenditure on Economic Services/Infrastructure (INFRA), and Government Effectiveness (GE), based on 116 observations. RGDP, measured at constant prices, recorded a mean value of 139.4562 and a median of 137.6802, indicating a relatively stable central tendency, although the high standard deviation of 497.2846 suggests considerable fluctuations in economic performance over the study period. Federal Government Capital Expenditure has a mean value of 345.7280 and a median of 342.2084, showing a fairly symmetric distribution, while the

standard deviation of 135.4377 reflects moderate variability in government spending. Capital Expenditure on Economic Services/Infrastructure recorded a mean of 290.6512 and a median of 287.4290, indicating a near-normal distribution pattern, with a standard deviation of 122.1245 suggesting moderate dispersion across the period under review. Government Effectiveness (WGI index ranging from −2.5 to +2.5) has a mean value of −0.4834 and a median of −0.5064, implying generally low institutional performance during the study period, while its minimum (−1.1409) and maximum (0.1634) values reflect variations in governance quality, and the relatively small standard deviation of 0.2918 indicates limited dispersion compared to the other variables.

Table 4: Correlation Matrix

Variable	RGDP	GCEXP	INFRA	GE
lnRGDP	1.0000			
lnGCEXP	0.8923	1.0000		
lnINFRA	0.7894	0.6956	1.0000	
GE	0.2142	0.1878	0.2015	1.0000

Source: *Author's Compilation (2026)*

Table 4 presents the correlation matrix among the variables; Real Gross Domestic Product (lnRGDP), Federal Government Capital Expenditure (lnGCEXP), Infrastructure Expenditure (lnINFRA), and Government Effectiveness (GE). The results reveal a strong positive relationship between RGDP and GCEXP (0.8923), indicating that increases in government capital expenditure are strongly associated with increases in economic growth. Similarly, RGDP is positively correlated with INFRA (0.7894), suggesting that higher infrastructure spending is closely linked to improved economic performance. However, the relationship between RGDP and GE is weak and positive (0.2142), implying that government effectiveness has only a limited association with economic growth within the study period. In addition, GCEXP and INFRA exhibit a strong positive correlation (0.6956), showing that increases in capital expenditure tend to be accompanied by higher infrastructure investment. On the other hand, GE shows weak positive correlations with GCEXP (0.1878) and INFRA (0.2015), indicating a relatively weak relationship between governance effectiveness and fiscal or infrastructure spending. Overall, the correlation results suggest strong interdependence among Real Gross Domestic Product (RGDP), Federal Government Capital Expenditure (GCEXP), and Infrastructure Expenditure (INFRA), while Government Effectiveness (GE) exhibits comparatively weak associations with all the other variables in the model.

Table 5: Unit Root Test (ADF & PP)

	ADF Test			PP Test		
Variable	ADF Level	1st Diff	Order	PP Level	1st Diff	Order
RGDP	-1.8231	-6.9124***	I(1)	-1.7426	-7.0554***	I(1)
GCEXP	-2.0149	-5.8846***	I(1)	-1.9587	-6.1461***	I(1)
INFRA	-1.6709	-6.2332***	I(1)	-1.5827	-6.4226***	I(1)
GE	-4.1241***	-	I(0)	-4.3521***	-	I(0)

Note: (*), (**), (***), 10%, 5% and 1% respectively
Source: *Author's Compilation (2026)*

Table 5 depicted that the results of the unit root tests using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) approaches. The decision rule states that a variable is considered stationary when the test statistic is statistically significant at the 1%, 5%, or 10% levels and more negative than the critical values. The results show that RGDP, GCEXP, and INFRA are non-stationary at level but become stationary after first differencing under both the ADF and PP tests, indicating that they are integrated of order one, I(1). Specifically, RGDP becomes stationary after first differencing. In contrast, Government Effectiveness (GE) is stationary at level under both tests, indicating that it is integrated of order zero, I(0). The combination of I(1) and I(0) variables confirms a mixed order of integration, which satisfies the necessary condition for the application of the Autoregressive Distributed Lag (ARDL) bounds testing approach, provided that none of the variables is integrated of order I(2).

Table 6: ARDL Bounds Test for Cointegration

Test Statistic	Value	K
F-statistic	6.4238	4
	Critical Value Bounds	
Significance	Io Bound	I1 Bound
10%	3.47	4.45
5%	3.01	4.07
1%	4.17	5.36

Source: *Author's Compilation (2026)*

As present in Table 6 presents the results of the ARDL bounds test for cointegration, which is used to determine whether a long-run relationship exists among the variables in the model. The decision rule is based on comparing the computed F-statistic with the lower bound (I0) and upper bound (I1) critical values at different significance levels. The results show that the F-statistic is 6.4238, which is higher than the upper bound critical values at 10% (4.45), 5% (4.07), and 1% (5.36) significance levels. Since the F-statistic exceeds the upper bound at all conventional significance levels, the null hypothesis of no long-run relationship is rejected. This indicates that there is a stable and statistically significant long-run cointegration relationship among RGDP, GCEXP, INFRA, and GE in the model. Therefore, the study confirms the existence of a long-run equilibrium relationship among the variables.

Table 7: ARDL Long-Run and Short-run Estimation

PANEL A : Long-run estimation *Dependent Variable: RGDP*				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GCEXP	1.8243	0.3112	5.8621	0.0000***
INFRA	2.4162	0.4283	5.6401	0.0000***
GE	-0.7356	0.2412	-3.0534	0.0031***
Constant	2145.82	418.33	5.1378	0.0000***
PANEL B: Short-run estimation *Dependent Variable: D(RGDP)*				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GCEXP)	0.7422	0.1982	3.7534	0.0004***
D(INFRA)	1.2183	0.3326	3.6732	0.0005***
D(GE)	0.2866	0.1178	2.4467	0.0162**
ECM(-1)	-0.6189	0.0912	-6.7902	0.0000***
R-squared: 0.7824 Durbin-Watson statistics: 2.0417 Prob(F-statistic): 0.0000				
Adjusted R-squared: 0.7641 F-statistic: 42.3185 Selected Model: ARDL(2,1,1,1)				

Note: (*), (**), (***), 10%, 5% and 1% respectively
Source: *Author's Compilation (2026)*

Table 7 presents the ARDL long-run and short-run estimates of the relationship between government capital expenditure (GCEXP), infrastructure investment (INFRA), government effectiveness (GE), and real gross domestic product (RGDP), using quarterly data. In Panel A (long-run estimates), GCEXP has a positive and statistically significant effect on RGDP (1.8243, significant at 1 per cent, implying that a 1 billion increase in government capital expenditure leads to a 1.8243 billion increase in RGDP in the long run. Similarly, INFRA also exerts a positive and statistically significant long-run impact on RGDP 2.4162, significant at 1 per cent, meaning that a 1 billion increase in infrastructure investment increases RGDP by about 2.42 billion in the long run. This indicates that infrastructure investment contributes more strongly to long-run economic growth than general capital expenditure. These findings are consistent with Bolaji (2014), Ekpung (2014), Abubakar and Hassan (2020), and Keji and Tosin (2022), who all established that public capital and infrastructure expenditure are key drivers of long-run economic growth in Nigeria, and also align with Warner (2014) and Ansar *et al.,* (2016), who emphasized the importance of efficient infrastructure investment in promoting growth in developing economies.

However, GE has a negative and statistically significant long-run effect on RGDP -0.7356, significant at 5 per cent, implying that a one-unit increase in government effectiveness leads to a 0.7356 billion decrease in RGDP in the long run. This suggests that improvements in governance effectiveness have not yet translated into stronger economic outcomes in Nigeria. The result contrasts with Ibrahim *et al.,* (2023) and Okafor and Eze (2024), who found that better governance quality enhances economic growth through efficient resource allocation and improved institutional performance. The outcome reflects Nigeria's persistent structural challenges, including corruption, weak policy implementation, bureaucratic inefficiency, and institutional bottlenecks that continue to weaken the impact of governance reforms on long-term growth.

In Panel B (short-run estimates), GCEXP, INFRA, and GE also show positive and statistically significant effects on RGDP. Specifically, a 1 billion increase in GCEXP leads to a 0.7422 billion increase in RGDP significant at 1 per cent, while a 1 billion increase in INFRA results in a 1.2183 billion increase in RGDP (significant at 1 per cent. Likewise, a one-unit increase in GE leads to a 0.2866 billion increase in RGDP (significant at 5 per cent. This indicates that infrastructure investment has the strongest short-run effect, followed by capital expenditure, while governance effectiveness has the weakest but still positive impact. The Error Correction Mechanism (ECM(-1) = -0.6189, significant at 1 per cent shows that about 61.89 per cent of quarterly short-run deviations from equilibrium are corrected each quarter, confirming a relatively fast speed of adjustment toward long-run equilibrium. The model is statistically robust, with an R-squared of 0.7824 and adjusted R-squared of 0.7641, indicating that about 76%–78% of variations in RGDP are explained by the model. The F-statistic of 42.3185 significant at 1 per cent confirms the entire model significance, while the Durbin-Watson statistic of

2.0417 indicates no serial correlation. The selected specification is ARDL(2,1,1,1), confirming the appropriateness of the model for the quarterly analysis.

Table 8: Diagnostic Checks

Test	Statistic	Probability
Breusch-Godfrey Serial Correlation LM Test	1.284	0.281
ARCH Heteroskedasticity Test	0.947	0.436
Jarque-Bera Normality Test	1.763	0.414
Ramsey RESET Test	0.892	0.521

Source: *Author's Compilation (2026)*

As depicted in Table 8 that the diagnostic test results for the estimated ARDL model examining the relationship between Real Gross Domestic Product (RGDP), Government Capital Expenditure (GCEXP), Infrastructure Investment (INFRA), and Government Effectiveness (GE). The results of the Breusch-Godfrey Serial Correlation LM test indicate that there is no evidence of serial correlation in the residuals, confirming that the error terms are independently distributed. Similarly, the ARCH heteroskedasticity test shows that the residuals are homoskedastic, implying a constant variance of errors over time and reinforcing the stability of the model. The Jarque-Bera normality test further reveals that the residuals are normally distributed, satisfying the assumption of normality required for reliable statistical inference. In addition, the Ramsey RESET test indicates that the model is correctly specified, with no evidence of omitted variables or functional form misspecification. The diagnostic checks confirm that the ARDL model is statistically robust, well-specified, and reliable for drawing policy conclusions on the relationship between government expenditure, infrastructure development, governance effectiveness, and economic growth in Nigeria

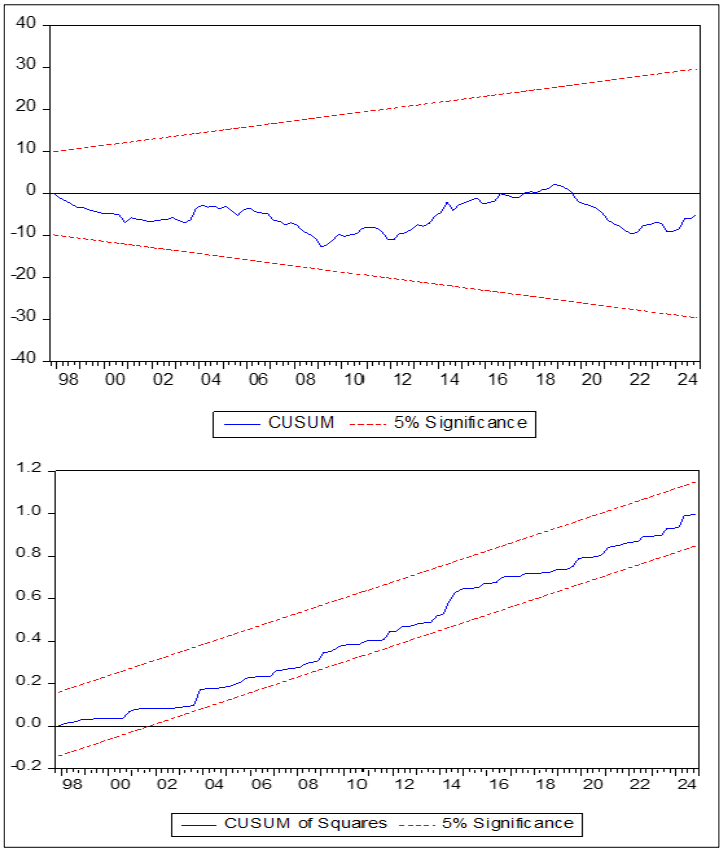

Figure 2: Model Stability Test CUSUM and CUSUM of Square
Source: *Author's Compilation (2026)*

Figure 1 illustrates the outcomes of the CUSUM and CUSUM of Squares (CUSUMSQ) tests, which were applied to evaluate the stability of the estimated model over the study period. The CUSUM graph indicates that the cumulative sum of recursive residuals stays within the 5% critical boundaries throughout the period, suggesting that there is no evidence of structural instability in the model parameters.

5 | CONCLUSION AND RECOMMENDATIONS

The study examined the relationship between government capital expenditure, infrastructure investment, government effectiveness, and economic growth in Nigeria using quarterly data and an Autoregressive Distributed Lag (ARDL) framework. The results from the descriptive and correlation analyses showed considerable variability in economic output and government spending, with strong positive associations between real gross domestic product, capital expenditure, and infrastructure investment, while government effectiveness exhibited relatively weak relationships with the other variables. The unit root tests confirmed a mixed order of integration among the variables, justifying the use of the ARDL approach, and the bounds test established a long-run equilibrium relationship among the variables. The ARDL long-run estimates revealed that both government capital expenditure and infrastructure investment have positive and statistically significant effects on economic growth, with infrastructure investment exerting a stronger influence, while government effectiveness showed a negative and significant long-run relationship with economic growth, suggesting that governance improvements have not yet translated into stronger economic performance due to institutional and implementation challenges. In the short run, all explanatory variables had positive and significant effects on economic growth, with infrastructure again showing the strongest impact, and the error correction term confirmed a relatively fast adjustment speed toward long-run equilibrium. Furthermore, diagnostic and stability tests confirmed that the model is well-specified, stable, and free from econometric problems such as serial correlation, heteroskedasticity, non-normality, and functional form misspecification. The study concludes that government expenditure and infrastructure development are key drivers of economic growth in Nigeria, while the weak and negative performance of governance effectiveness highlights the need for stronger institutional reforms to ensure that public investments translate more efficiently into sustainable economic growth. Based on the conclusion the following recommendations:

- The government should enhance the efficiency and effectiveness of capital expenditure by ensuring full budget implementation, strict monitoring, and proper evaluation of public projects. Capital spending should be prioritized toward productive sectors such as education, health, transport, and energy, where it can generate higher multiplier effects and significantly boost Real Gross Domestic Product (RGDP).
- There is a need for sustained and strategic investment in infrastructure development, particularly in critical areas such as roads, electricity, water supply, and digital infrastructure. The government should also strengthen public–private partnerships (PPPs) to address financing constraints, improve project execution, and ensure timely delivery of high-quality infrastructure that supports economic growth.
- The government should implement strong institutional reforms aimed at improving governance quality and effectiveness. This includes enhancing transparency, strengthening accountability mechanisms, reducing corruption, and improving policy implementation capacity. These reforms are necessary to ensure that public resources are efficiently utilized and that both capital expenditure and infrastructure investment translate into sustainable growth in Real Gross Domestic Product (RGDP).

Conflict of Interest
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All authors contributed significantly to the conception, design, data collection, analysis, and writing of the manuscript. All authors have read and approved the final version of the manuscript.
Informed Consent
Informed consent was obtained from all participants involved in this study prior to data collection.
Use of Generative AI
The authors confirm that generative AI tools were used only for minor language refinement and did not contribute to the intellectual content, analysis, or conclusions of the study.

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