African Journal of Administration and Governance
Volume 4, Number 1, June 2026: 49-59
ISSN: 3043 – 5951

PUBLIC INFRASTRUCTURE, EXPENDITURE AND ECONOMIC DEVELOPMENT IN NIGERIA

Olawale Femi Kayode, PhD, CFIA
08163151261
Olawale.kayode@aaua.edu.ng, brifemi2004forever@gmail.com
Department of Finance, AdekunleAjasin University,
AkungbaAkoko, Ondo State, Nigeria

Abstract

The purpose of public spending on infrastructure is primarily for economic growth and development. However, clearly deciphering the effect of these expenditures on the real economic development and people's welfare continues to agitate researchers. This study investigated how public infrastructure in transport (GEXTR), education (GEXED), utilities (GEXUT), communication (GEXCM) and health (GEXHT) affect economic development from two perspectives: Real Gross Domestic Product (RGDP) and Per capita income (PCIN) from 1986 to 2025. The Vector Error Correction Mechanism (VECM) was used to estimate the effects of public infrastructure expenditures on RGDP and PCIN. The VECM results showed that GEXED, GEXUT and GEXCM have positive and significant effect on RGDP (coefficient 22.81004, p = 0.0353; coefficient = 34.16946, p = 0.0382 and coefficient = 3.806990, = 0.0172 respectively). However, GEXHT unexpectedly has a significant negative effect on RGDP during the second lag (coefficient = -107.6642, p = 0.0283). Public infrastructure expenditures had no significant effect on PCIN during the short or long runs. The study recommended that policy makers should prioritize investments ineducation, utility and communication as they have positive effect on RGDP..Government should address inefficiencies in healthcare system and reduce corruption.

Keywords: Expenditure, Public Infrastructure, Economic Development, Growth, VECM

Introduction

Nigeria's economy presents a complex interaction of opportunities and challenges. As the most populous country in Africa and third the largest economy by GDP after South Africa and Egypt, Nigeria has the potential to become a regional economic powerhouse (World Bank, 2025). However, despite its abundant natural resources, the country has struggled with persistent infrastructure deficits that hinder its economic performance. The World Bank (2020) ranked Nigeria 116th out of 140 countries in terms of infrastructure quality, and 88th out of 141 by World Bank logistic performance index (2025), highlighting the pressing need for improvements. The power sector, in particular, has been a significant bottleneck to industrial growth, with frequent outages and insufficient generation capacity affecting business operations across the country (Oladipo&Kazeem, 2018).

Historically, the Nigerian government has made various efforts to boost infrastructure investment, recognizing its critical role in economic development. During the post-independence era, substantial investments were directed towards building roads, ports, and energy infrastructure to support the nascent economy. However, these efforts were often marred by inefficiencies, corruption, and poor maintenance, leading to the deterioration of many public assets over time. In recent years, the Nigerian government has renewed its focus on infrastructure development through initiatives like the Economic Recovery and Growth Plan (ERGP) 2017-2020, and the current massive nationwide highway projects, including the Lagos to Calabar coastal highway, Sokoto–Badagrysuperhighway, which aimed to address key infrastructure gaps, particularly in power, roads, and rail transport (Federal Government of Nigeria, 2017; 2025).Despite these efforts, Nigeria continues to face significant infrastructure challenges. The World Bank (2020) estimated that the country requires an annual investment of $3 trillion over the next 30 years to close its infrastructure gap. This gap poses a substantial constraint on economic activities,

limiting productivity and reducing the competitiveness of Nigerian businesses in the global market. The consequences are evident in the country's economic indicators, where high unemployment rates, low industrial output, and sluggish GDP growth persist despite Nigeria's resource endowments.

While the importance of infrastructure in driving economic development is well established, the effectiveness of public infrastructure expenditure in Nigeria remains a subject of debate. Several empirical studies have examined the relationship between infrastructure spending and economic growth in Nigeria, yet their findings have often been inconclusive or contradictory. Some studies suggest that increased infrastructure spending leads to higher economic growth by enhancing productivity and creating employment opportunities (Okoye&Eze2017; Egbo&Ibe, 2019; Aninwagu et al.,2024; Yahaya, 2026). Others argue that the impact of infrastructure expenditure on growth has been limited due to inefficiencies in project implementation, corruption, and the misallocation of resources (Oluwatobi et al., 2015; Akpan&Akpan, 2017; Kupoluyi, et al.,2025).

Moreover, the composition of infrastructure expenditure whether on transport, energy, or social infrastructure may also influence its effectiveness in promoting economicdevelopment.Investments in energy infrastructure are crucial for powering industries and reducing the cost of production, while investments in transport infrastructure can facilitate trade and improve market access. However, the relative importance of different types of infrastructure and their contribution to economic growth in Nigeria remains underexplored in the literature.

The state of public infrastructure in Nigeria is widely regarded as inadequate and in need of significant improvement. Nigeria's infrastructure deficit is a major constraint on its economic development, with the country ranking low in global infrastructure indices. The World Economic Forum (2019) and Logistics Performance Index (2025), placed Nigeria very low in terms of infrastructure quality, highlighting challenges such as poor road networks, inadequate power supply, and insufficient public services. Nigeria's infrastructure challenges are multifaceted. The transportation sector is plagued by poor road conditions, limited rail connectivity, and congested ports, all of which increase the cost of doing business and hinder economic growth (Oladipo&Kazeem, 2018; Kupoluyi, et al., 2025). The power sector, which is critical for industrial development, suffers from chronic underinvestment, leading to frequent blackouts and reliance on expensive private generators (Egbetokun et al., 2019; Okoli, et al, 2023). Additionally, water supply and sanitation services are inadequate, particularly in rural areas, contributing to public health issues and reducing overall quality of life (UNCTAD. (2021).

According to Kupoluyi (2025), several factors contribute to the poor state of public infrastructure in Nigeria, including corruption, inefficiency in public spending, and weak institutional capacity. Despite substantial budget allocations for infrastructure projects, the outcomes have often been disappointing due to mismanagement and lack of accountability. As a result, there is a growing recognition of the need for reforms to improve infrastructure governance and enhance the efficiency of public investments.

This study focuses on understanding the extent to which public infrastructure expenditure in Nigeria contributes to economic development and the welfare of the people. Despite the wealth of empirical research on the topic, several gaps persist in the literature. One significant gap is the lack of consensus on the causality between infrastructure expenditure and economic development in Nigeria. While some studies have focused on the direct impact of infrastructure spending on GDP growth, others have explored the indirect effects, such as improvements in human capital and productivity (Esfahani&Ramírez, 2003; Calderón&Servén, 2010; Aninwagu et ai.,2024;). However, few studies have adequately addressed the potential bidirectional relationship between infrastructure investment and economic growth, where higher economic growth could lead to increased infrastructure spending and vice versa. Although, Ebehung and Ogar (2024) investigated causality, but it was on economic growth.

Another gap in the literature is the use of government capital expenditure as a whole as determinants of economic development or growth. This study differs from others in that it decomposes government capital expenditure into expenditure heads and assesses the effect of each of the sectoral infrastructure spending on economic development. The justification for this study lies in its potential to contribute to policy-making in Nigeria. By providing a deeper understanding of the relationship between public infrastructure expenditure and economic development on sector-by-sector basis, the study providesbasis for informed decisions on how to allocate resources more effectively. In particular, the study could help identify priority areas for infrastructure investment that yield the highest returns in terms of economic development.

Literature Review

Public Infrastructure Expenditure and Economic Development

The relationship between public infrastructure expenditure and economic development in Nigeria could be examined through key variables such as real Gross Domestic Product (GDP), Human Development Index (HDI), and per capita income. Real GDP is a fundamental indicator of economic development, reflecting the total value of goods and services produced in an economy, adjusted for inflation. Public infrastructure
expenditure can significantly influence real GDP in Nigeria through several mechanisms. Firstly, investment in infrastructure, such as roads, bridges, and ports, facilitates the efficient movement of goods and people across the country. Improved transportation networks reduce the cost and time associated with moving products to markets, thereby boosting productivity and encouraging trade. Studies have shown that public infrastructure investment in Nigeria contributes positively to real GDP growth by enhancing the efficiency of production processes and enabling economies of scale (Abada& Manasseh, 2020; Yahaya, 2026).

Moreover, the energy sector's infrastructure is critical for industrialization and economic activities. Nigeria's power sector has long been plagued by inadequate infrastructure, leading to frequent power outages and high operational costs for businesses. However, increased public expenditure on energy infrastructure has the potential to address these challenges, fostering industrial growth and, in turn, contributing to higher real GDP. As Akinwale (2021) pointed out, the expansion of electricity generation and distribution networks in Nigeria is associated with a positive impact on economic output.

The Human Development Index (HDI) is a composite index that measures a country's averageachievements in health, education, and income. Public infrastructure expenditure can have a significant impact on the HDI in Nigeria by improving access to essential services. Investment in healthcare infrastructure is a critical determinant of HDI. Public spending on healthcare facilities, such as hospitals and clinics, improves access to quality healthcare services, reducing mortality rates and increasing life expectancy. In Nigeria, where health indicators have historically been poor, increasing public expenditure on healthcare infrastructure can lead to substantial improvements in the HDI (Usman& Adebayo, 2020).

Theoretical Framework

This study adopts Endogenous Growth Theory [EGT] as its theoretical base, following the works of Romer and Lucas. The theory shifts focus from external shocks to internal drivers of growth. It argues that economies can sustain long-term growth through factors generated within the system, such as investment in knowledge, skills, and public assets like infrastructure (Romer, 1986; Lucas, 1988).

EGT is suitable for this study because it treats government spending on infrastructure as more than just expense. It views roads, electricity, and ICT as public capital that raises the efficiency of private firms. When the state invests in these assets, it creates spillover benefits: production costs drop, firms operate more efficiently, and overall output rises. EGT therefore rejects the idea of quickly diminishing returns, suggesting instead that well-targeted infrastructure spending can keep boosting productivity over time (Romer, 1986; Lucas, 1988).

For Nigeria, where erratic power supply, poor road networks, and weak digital infrastructure remain major bottlenecks, the theory offers a clear lens. It suggests that scaling up and managing infrastructural expenditures effectively can unlock productivity and drive economic development from within. The expected pathway is simple: more spending on infrastructure builds public capital, better capital improves productivity, and higher productivity translates to development outcomes like higher income and improved living standards.

Empirical Review

Yahaya (2026) investigated the relationship between government expenditure on infrastructure and Economic Growth from 1986 to 2025. With the use of Ordinary Least Square (OLS), Fully Modified Ordinary Least Square (FMOS) and Autoregressive Distributed Lag (ARDL) analytical techniques, the study found a statistically significant positive long run relationship between infrastructural spending and real Gross Domestic Product (RGDP) growth rate.

Kupoluyi et al, (2025) examined the effect of government infrastructural expenditure on economic growth (GDP) from 1990 to 2023 in Nigeria. The study dissagregated expenditure on infrastructure into; expenditure on agriculture, education, health and transport.Findings from the Autoregressive Distributed Lag analytical technique used revealed that all sectoral expenditure proxies were not statistically significant on GDP The authors concluded that government spending on those sectors did not produce significant growth on the economy.

Aninwagu et al, (2024) examined the impact of infrastructural investment on economic growth in Nigeria from 1990 to 2022. With the use of Autoregressive Distributed Lag technique, the findings showed a significant positive impact of transport/communication investment on GDP growth.

Ebehung and Ogar (2024) investigated the relationship between infrastructure and economic growth in Nigeria, using Toda-Yamamoto Causality framework and Autoregressive Distributed Lag for short run and long run effects. The findings revealed that 1% increase in telecommunication infrastructure would produce 0.17% growth in GDP. Also, transport and power sectors produced negligible long term impact on GDP growth.

Okoli, et al, (2023) assessed the impact of government infrastructure spending before, during and after the Structural Adjustment Programme (SAP) from 1970 to 2022 in Nigeria. The Autoregreessive Distributed Lag technique used revealed positive short run effect of all sectors pre-SAP and during SAP period. However, the findings further showed an insignificant positive effect during post-SAP period.

Onabote et al. (2023) conducted a study to analyze the impact of government spending across various sectors on human development in Nigeria, using annual data from 1986 to 2021. The study offers a unique contribution to existing literature by focusing on sector-specific government spending and its effect on a comprehensive human development index, which accounts for factors such as educational attainment, life expectancy, and per capita income. The findings from the Autoregressive Distributed Lag (ARDL) model showed that there was no significant relationship between government sectoral spending and human development in both the short and long term. However, results from the Error Correction Models (ECMs) suggest that sectoral spending by the government could influence human development in the long run.

Alele (2023) studied the effect of public infrastructure expenditure on economic growth in Nigeria from 2002 to 2021 using OLS and causality framework on data of government capital expenditure and Real Gross Domestic Product(RGDP). The author found that capital expenditure positively and significantly affected RGDP bi-directionally

Abada and Manasseh (2020) employed the Ordinary Least Squares (OLS) methodology to examine the impact of government spending on economic growth in Nigeria, using data from 1995 to 2018. Their findings revealed that government spending during the period had a significantly negative effect on economic growth.

Prasetyo (2020) analyzed the relationship between government expenditure and economic growth in Indonesia, with a focus on micro, small, and medium enterprises (MSMEs) using quarterly data from 2009Q3 to 2019Q3. The study concluded that while public spending generally promotes economic growth, it was statistically insignificant in the case of MSMEs in Indonesia during the sample period.

Onotaniyohwo and Iyayi (2020) explored the Big Push Theory by investigating the effect of public infrastructure expenditure on economic growth in Nigeria. They used annual data from the Central Bank of Nigeria (CBN) and World Development Indicators (WDI) from 1983 to 2018 and applied the Ordinary Least Squares (OLS) estimation method. Their empirical findings revealed that government spending on transport and communication significantly boosted economic growth.

However, government expenditures on education, healthcare, social and community services, although positive, did not have a significant impact on economic growth. This supports the Big Push Theory, which suggests that substantial government investments in development policies are necessary to achieve proportional economic growth

Olufemi and Adeleke (2019) examined the impact of public health infrastructure on economic development in Nigeria, focusing on the availability of healthcare facilities and services. The study used a panel data analysis of 36 states in Nigeria from 2000 to 2016 and found that regions with better access to healthcare infrastructure tend to have higher levels of human capital development, which in turn contributes to economic growth. The authors emphasized that investments in healthcare infrastructure are crucial for improving life expectancy, reducing child mortality, and enhancing the overall well-being of the population.

Similarly, Adeola and Adedokun (2019) investigated the relationship between educational infrastructure and economic development in Nigeria. The study employed a fixed-effects model to analyze the impact of school facilities, teacher availability, and learning resources on educational outcomes and economic growth. The results indicate that improved educational infrastructure leads to better educational attainment, which is positively correlated with economic development. The study concludes that for Nigeria to achieve its development goals, substantial investments in educational infrastructure are necessary to build a skilled and productive workforce. Furthermore, public infrastructure is instrumental in poverty reduction, as it provides access to essential services and economic opportunities.

Akinyemi and Akinpelu (2017) conducted a study on the role of public infrastructure in poverty alleviation in Nigeria, focusing on the provision of water, sanitation, and transportation services. The study used a multi-dimensional poverty index to assess the impact of infrastructure on poverty levels across different regions. The findings reveal that improved access to public infrastructure significantly reduces poverty by enhancing income-generating activities, improving health outcomes, and increasing access to education. The authors argue that addressing the infrastructure deficits in rural and underserved areas is critical for reducing poverty and achieving inclusive economic growth in Nigeria.

Adeyemi and Ogundipe (2017) examined the relationship between public infrastructure and industrial productivity in Nigeria, focusing on the manufacturing sector. The study used a panel data analysis of 30 manufacturing firms over the period 1999-2015 and found that reliable electricity supply, good road networks, and efficient telecommunications systems are key determinants of industrial productivity. The results suggest that investment in public infrastructure not only increases output but also improves the competitiveness of Nigerian industries in the global market.In a related study,Egbetokun et al. (2019) analyzed the impact of infrastructure on innovation and productivity in Nigeria's industrial sector. The authors employed a structural equation modeling approach to assess the interrelationships between infrastructure, innovation, and productivity. Their findings indicate that infrastructure investment, particularly in telecommunications and energy, significantly enhances the innovation capacity of firms, leading to higher productivity levels. The study concludes that for Nigeria to achieve industrialization and economic diversification, substantial investments in infrastructure are essential to foster innovation and productivity growth.

The importance of public infrastructure for agricultural productivity in Nigeria has also been highlighted in empirical studies. Nwosu et al. (2016) investigated the effects of rural infrastructure on agricultural productivity in southeastern Nigeria. Using a combination of household surveys and econometric analysis, the study found that access to good roads, electricity, and irrigation facilities significantly increases agricultural output and reduces post- harvest losses. The authors argued that improving rural infrastructure is critical for enhancing food security, reducing poverty, and promoting inclusive economic development in Nigeria.

Methodology

Research Design and Models

This study extracted the research data from secondary sources, namely the Central Bank of Nigeria annual Statistical Bulletins and the World Bank Development Indicators. WDI, (2025). The effect of public infrastructure expenditures on economic development was approached from two perspectives of the latter: Real GDP and standard of living measured by per capita income (PCIN). The public infrastructure expenditures used in the study include those on transportation and road, education, utilities, health and communication. Generally a linear functional relationship in the form of equation (i) is formulated between the economic development and public infrastructure expenditures, thus:

$ECODEV = f(PEXINF)$ ……..(i)

In this study, ECODEV is a vector of RGDP and PCIN, while PEXINF is a vector of GEXTR; GEXED; GEXUT; GEXCM; GEXHT, FGCE

Econometrically, the relationship in equation (i) is expressed in a two-model form as:

$RGDP=\alpha + \upsilon_1 GEXTR+ \upsilon_2 GEXED + \upsilon_3 GEXUT + \upsilon_4 GEXCM + \upsilon_5 GEXHT + \upsilon_6 GCPEX + \varepsilon$… (ii)

and,

$PCIN= \alpha + \upsilon_1 GEXTR+ \upsilon_2 GEXED + \upsilon_3 GEXUT + \upsilon_4 GEXCM + \upsilon_5 GEXHT + \upsilon_6 GCPEX + \varepsilon$ …. (iii)

Where:

ECODEV = Economic development; PEXINF = Public expenditure on infrastructure; RGPD = Real Gross Domestic Product; PCIN = Per capita income; GEXTR = Government expenditures on transportation; GEXED = Government expenditures on education; GEXUT = Government expenditures on utility; GEXCM = Government expenditures on communication; GEXHT = Government expenditures on health; GCPEX = Government capital expenditure (as control variable); α = the regression constant; $\mho_1$ …… $\mho_6$ =Coefficients of regressors and ε = Residuals.

Analytical Techniques

Several initial analyses were conducted on the study variables to assess their properties. These included descriptive statistics to summarize the data, the Augmented Dickey-Fuller (ADF) test to check for stationarity and ensure the absence of unit roots, and the Johansen co-integration test (both Trace and Max-Eigen statistics) to identify any long-term equilibrium relationships among the variables.

Majority of the variables are stationary at second difference 1(2) making the choice of econometric techniques becomes critical. Johansen (1995) and Enders (2015) posited that when variables are in this order, to avoid spurious results, they need to be differenced after which a Vector Autoregressive (VAR), Vector Error Correction Mechanism (VECM) or Auto-Regressive Distributed Lag (ARDL) can be used to analyze the variables. Differencing an order 2 variable reduces the stationarity order to one (1). In this study, GEXED, GEXCM, GEXHT and GCEXP are differenced in this study to make them be in the same order with others 1(1). Thereafter, we apply VECM to analyze the variables for inference.

Results and Discussion

The research variables are first examined on the basis of their statistical properties, stationarity and long-run relationship. Thereafter, the effect of the explanatory variables on dependent variables of the two models are estimated using the VECM.

Test of Stationarity

All the variables were tested for the presence (or absence of unit root). The results for each of the variables are presented in Table 1

Table1: Unit Root Test Summarized

Variable	ADF-Stat at 5% Level		ADF-Stat at 5% 1st Difference		ADF-Stat at 5% 2nd Difference		Stationarity Order
	Stat	Prob	Stat	Prob	Stat	Prob	
RGDP	-1.873755	0.0895	-3.678456	0.0183	-	-	I(1)
PCIN	-0.605862	0.8570	-4.105054	0.0029	-	-	I(1)
GEXTR	2.935168	1.0000	-3.086907	0.0377	-	-	I(1)
GEXED	-0.355305	0.9035	0.644579	0.9884	-7.396687	0.0000	I(2)
GEXUT	-1.277281	0.6294	-6.092396	0.0000	-	-	I(1)
GEXCM	1.090980	0.9966	-2.054121	0.2636	-6.304208	0.0000	I(2)
GEXHT	1.895292	0.9997	-0.725674	0.8252	-8.018340	0.0000	I(2)
GCPEX	3.875168	1.0000	-1.205588	0.6602	-9.218229	0.0000	I(2)

Source: Author (2026).

The ADF test results indicate that none of the variables is stationary at level but they become stationary after differencing. For instance, RGDP, PCIN and GEXTR become stationary after first differencing, indicating I(1) processes. Other variables, such as GEXED, GEXCM, and GEXHT, are stationary at second differencing, I(2). Stationarity is crucial for ensuring that the variables have a constant mean and variance over time, which is necessary for accurate modeling and inference. The mixed order of integration among the variables suggests that some variables might require transformation to achieve stationarity, which has implications for the modeling approach. This is why variables on 1(2) are differenced before the estimation of effects

Long run Co-integration Test

The test of long run relationship between the dependent and explanatory variables in the two models is based on the Johansen (Trace and Max-Eigen) co-integration test. The results are displayed in Table 4.

Table2: Co-integration Test Results

Cointegration Rank Test (Trace and Max-Eigenvalue)								
Model 1. Dependent variable = RGDP					**Model 2. Dependent variable = PCIN**			
Hypothesized No of CE(s)	**Trace test**	**Prob.**	**Max-eigen test**	**Prob.**	**Trace test**	**Prob.**	**Max-eigen test**	**Prob.**
None	338.7048	0.0000*	110.3542	0.0000*	327.5811	0.0000*	115.6950	0.0000*
At most 1	228.3506	0.0000*	89.52463	0.0000*	211.8861	0.0000*	87.20855	0.0000*
At most 2	138.8260	0.0000*	68.69963	0.0000*	124.6776	0.0000*	51.46094	0.0002*
At most 3	70.12636	0.0001*	38.46719	0.0014*	73.21665	0.0000*	43.11199	0.0002*
At most 4	31.65917	0.0302*	20.27216	0.0656	30.10466	0.0461*	20.45460	0.0620
At most 5	11.38701	0.1888	8.207155	0.3580	9.650061	0.3086	9.556698	0.2427
At most 6	3.179857	0.0745	3.179857	0.0745	0.093363	0.7599	0.093363	0.7599
Trace Test = 5 co-integrating eqs; Max-Eigen = 4 co-integrating eqs					Trace = 5 co-integrating eqs; Max-Eigen = 4 co-integration eqs			

*Co-integration exists

Source: Author Computation (2026).

From Table 2 at least 4 co-integrating equations exists between the dependent and explanatory variables. The presence of these co-integrating equations, as indicated by the trace and maximum eigenvalue tests, suggests that despite short-term fluctuations, the variables move together over the long run. This finding implies that government expenditure in sectors like education, transport, and utilities has a sustained impact on RGDP and per capita income in Nigeria

Effect of Public Infrastructure Expenditures on RGDP and PCIN

Table 3 displays the extracts from the VECM estimates of the effects of public infrastructure expenditures on RGDP and PCIN (models 1 and 2).

Table 3: Abridged VECM Results for Models 1 and 2.

Method: VECM						
Variable	**Model 1: Dependent Variable = RGDP**			**Model 2: Dependent Variable = PCIN**		
	Coefficient	**t-Statistics**	**Prob**	**Coefficient**	**t-Statistics**	**Prob**
D(GEXTR(-1)	4.366491	0.964483	0.3476	-0.685235	-0.801915	0.4331
D(GEXTR(-2)	-3.700286	-1.417379	0.1734	-0.150600	-0.363307	0.7206
D(GEXED(-1))	8.089994	0.598376	0.5570	-3.593945	-1.178492	0.2539
D(GEXED(-2))	22.81004	2.276234	0.0353*	0.470222	0.200200	0.8436
D(GEXUT(-1))	34.16946	2.236610	0.0382*	0.706000	0.195727	0.8470
D(GEXUT(-2))	10.42445	0.629803	0.5367	1.065893	0.431834	0.6710
D(GEXCM(-1))	3.806990	2.623953	0.0172*	0.044268	0.161302	0.8737
D(GEXCM(-2))	0.629440	0.488054	0.6314	0.369625	1.378815	0.1848
D(GEXHT(-1))	-26.78216	-0.554482	0.5861	8.811273	0.840034	0.4119
D(GEXHT(-2))	-107.6642	-2.384937	0.0283*	-11.04803	-0.962810	0.3484
D(GCEXP(-1))	2.674252	1.726442	0.1014	-0.073866	-0.232604	0.8187
D(GCEXP(-2))	4.136273	1.300887	0.2097	-0.593189	-1.143139	0.2680
C	-579.8376	-0.738139	0.4699	79.28098	0.867475	0.3971
CointEq (C1)	-0.108762	-1.574128	0.1329	-0.130421	-0.776185	0.4477
R^2	0.757628			0.696013		
Adj R^2	0.692319			0.576024		
F-statistic	27.12091			11.181014		
Prob(F-stat)	0.000000			0.000027		
D-W Stat	1.973190			2.089683		

*Significant

Source: Author's Computation (2026)

For the first model (RGDP), the error correction term (ECT, i.e C1) coefficient is -0.108762 with a t-statistic of -.1.5741 and a p-value of 0.1329, which is not statistically significant at conventional levels ($p > 0.05$). This suggests that deviations from the long-run equilibrium are not strongly corrected by changes in RGDP in the short run. In other words, RGDP does not significantly adjust to bring the system back to equilibrium when it is out of balance. However, the short-run dynamics show that (D(GEXED(-2) withcoefficient 22.81004 ($p = 0.0353$), indicates that a two-period lag of government expenditure on education (GEXED) has a positive and statistically significant effect on RGDP. The effect of GEXUT (coefficient = 34.16946, $p = 0.0382$) is positive and significant on RGDP in a one-period lag. GEXCM has a significant positive effect on RGDP (coefficient = 3.806990, = 0.0172). In addition, GEXHT surprisingly has a significant negative effect on RGDP during the second lag (coefficient = -107.6642, $p = 0.0283$). These findings imply that the significant positive coefficients for GEXED, GEXUT and GEXCM means that government expenditures in education, utilities and communication sectors have short-term positive effects on economic development. However, the negative effect of lagged health expenditure (GEXHT) suggests that this sector might be experiencing inefficiencies or delayed benefits.

Overall, the R-squared of 0.757628 indicates that approximately 75.76% of the variation in RGDP is explained by explanatory variables in the model, while the F-statistic and its probability(27.12091 and 0.000000 respectively) imply that themodel is statistically significant. The Durbin-Watson stat of 1.973190 (close to 2) suggests the absence of autocorrelation in the residuals.

For the second model, the VECM results show that the ECT (C1) coefficient -0.130421 is statistically insignificant ($p = 0.4477$), connoting that deviations from the long-run equilibrium are not strongly corrected by changes in per capita income in the short run. That is, when the system is out of equilibrium, per capita income does not adjust significantly to restore the long-term balance. In the short run, the results show that although two previous lags (PCIN(-2)) positively affected the current PCIN, the effect is not significant. All the effects of the remaining variables on PCIN are not statistically significant, indicating that the changes in government expenditures on transportation (GEXTR), education (GEXED), utilities (GEXUT), communication (GEXCM), health (GEXHT) and other expenditures (GCPEX) do not have a significant short-term impact on per capita income.The R-squared = 0.696013, means that approximately 69.60% of the variation in PCIN is explained by the model while the F-statistic = 11.181014 and p-value = 0.000027 imply that the overall model is statistically significant. The Durbin-Watson stat = 2.089683 (approximately 2), indicates no significant autocorrelation in the residuals.

Discussion of Findings

Effect of Public Infrastructure Expenditure on RGDP

In the first model, government infrastructure expenditures on education (GEXED), utilities (GEXUT), and communication (GEXCM), were found to have significant positive short-term effects on economic development. This reflects the vital role that targeted public spending plays in driving short-term economic activity. The significance of these expenditures can be explained by their direct impact on productivity and infrastructure, which are critical drivers of development in developing economies like Nigeria.Expenditure on education contributes to human capital development, enhancing labour productivity and fostering innovation, which leads to higher economic output. As the education sector equips the workforce with necessary skills, it creates a more competent labour market capable of boosting the country's economic output in the short and long term. Similarly, investments in utilities, such as water, electricity, and transport infrastructure, improve the efficiency of businesses and households. This infrastructure enhances productivity by reducing operational costs and increasing access to essential services, thus spurring economic growth and development as found by CalderónandServén(2010). Furthermore, communication infrastructure is essential for connecting markets, reducing transaction costs, and enabling the efficient dissemination of information, which is a key factor in modern economies.

However, the negative significant effect of health expenditure (GEXHT) on RGDP, raises concerns about inefficiencies in the healthcare system. It could suggest that despite increased spending, there is poor management of resources, corruption, or delays in realizing the benefits of healthcare improvements. According to Kupoluyiet L, (2025), healthcare spending does not always translate into better health outcomes in developing countries, often due to inefficiencies within the health sector. The

lag between expenditure and tangible economic outcomes could explain why health investments might initially burden public finances without providing immediate growth returns. In the Nigerian context, public health spending may also face challenges such as insufficient infrastructure and inadequate human resources, leading to suboptimal impacts on economic productivity.

The error correction term (ECT), which indicates the speed of adjustment towards long-term equilibrium, was not statistically significant in thE model. This suggests that real GDP does not adjust quickly to deviations from long-term equilibrium after economic shocks. A non-significant ECT might indicate structural rigidities in the economy, that prevent it from responding effectively to policy changes or economic fluctuations. In developing economies like Nigeria, slow adjustment to equilibrium is often the result of institutional weaknesses, inefficient markets, and underdeveloped infrastructure (Rodrik, 2008).

This finding suggests that Nigerian economy may struggle to recover from disruptions in its long-term growth path, such as those caused by external shocks, fiscal deficits, or inflationary pressures. The slow adjustment could also be attributed to the country's reliance on sectors with volatile outputs, like oil, which is susceptible to external price shocks (Collier &Goderis, 2012). The lack of significant long-run adjustment indicates that short-term economic measures, while helpful in the immediate term, do not quickly translate into long-lasting growth, reflecting the need for structural reforms that improve institutional efficiency and resilience to external shocks.

Effect of Public Infrastructure Expenditure on PCIN

The same scenario under RGDP exists here. The lagged PCIN had no significant effect. This finding suggests that per capita income does not persist over time, meaning that current income levels are not significantly influenced by past income levels.

None of the explanatory variables significantly affect PCIN in both short and long runs. The insignificance of government expenditures might point to inefficiencies in the way public resources are allocated and utilized. Public spending in these sectors might not be translating into direct benefits for individual income levels, which could be due to issues such as corruption, mismanagement, or delays in project implementation (Keefer & Knack, 2007). For instance, while education expenditure may boost human capital in the long run, its short-term effects on individual incomes may be muted due to the time it takes for educational improvements to materialize into higher earnings for individuals (Becker, 1964).Additionally, public investments in infrastructure, such as utilities and transportation, often have longer gestation periods before they can significantly impact individual income levels. Moreover, the informal nature of Nigeria's economy may limit the effectiveness of public spending in reaching a broad base of the population. Many people may not benefit from formal sector infrastructure improvements or public services due to their engagement in the informal economy, where incomes are typically lower and less influenced by macroeconomic policies. This could explain why government expenditures do not have an immediate, observable effect on per capita income.

Conclusion

It is hereby concluded that whereas public infrastructure expenditures significantly affected RGDP, especially in the short run, but had no significant effect on PCIN.The implication of this conclusion is that the effects of government expenditure on per capita income are not immediate or strong in the short run.These results suggest that in the short run, government expenditures in education, utilities and communication have a positive effect on Nigeria's real GDP. However, the negative effect of health expenditure indicates potential issues within this sector that might need policy intervention or further investigation. The lack of significant adjustment to long-run equilibrium suggests that short-term factors dominate the dynamics of economic growth in the analyzed period.

Recommendations

Based on the findings, this study recommends the followings:

Since there exist significant short-term effects of government expenditures on education, utilities, and communication on RGDP, policymakers should prioritize investments in those sectors. Enhancing

infrastructure and human capital development through targeted public spending would likely yield substantial short-term economic benefits and contribute to long-term development.

Given the negative effect of health expenditure on real GDP, it is crucial for government to address inefficiencies in the healthcare infrastructural development. Due to the absence of significant long-term adjustment in the RGDP, there is need for structural reforms to improve the economy's resilience to shocks. Efforts should be directed towards diversifying the economy, strengthening institutions, and enhancing the efficiency of markets to facilitate quicker recovery and sustainable growth and economic development.

Government investments should be directed towards sectors that directly impact income levels. Additionally, reducing barriers to accessing education, finance, and infrastructure in underserved regions will help ensure that the benefits of public spending reach a broader segment of the population.

References

Abada, F., & Manasseh, C. (2020). Government expenditure, savings, FDI and economic growth: An impact analysis. *Journal of Investment Management, 9*(4), 92-99. https://doi.org/10.11648/j.jim.20200904.11

Adeola, O., &Adedokun, A. (2019). Educational infrastructure and economic development in Nigeria: A panel data analysis. *Journal of Economics and Sustainable Development, 10*(10), 120-130.

Adeyemi, O., &Ogundipe, A. (2017).Public infrastructure and industrial productivity in Nigeria.*Journal of Industrial Engineering and Management, 10*(2), 345-360.

Aghion, P., &Howitt, P. (1992).A model of growth through creative destruction.*Econometrica, 60*(2), 323- 351.

Akinwale, Y. O. (2021). Energy infrastructure development and economic growth in Nigeria.*Energy Policy Journal, 49*(3), 335-347.

Akinyemi, A., &Akinpelu, S. (2017). Public infrastructure and poverty alleviation in Nigeria.*International Journal of Economics and Financial Issues, 7*(1), 122-128.

Akpan, U. F., &Akpan, G. E. (2017).Impact of government expenditure on infrastructure in Nigeria's economic growth.*Economic Journal of Development Studies, 6*(2), 15-28.

Allele, B. S. (2023).Public infrastructure expenditure and economic growth in Nigeria, International Research Journal of Modernization in Engineering Technology and Science 5(4), 4977-4984.

Ali, M., &Shen, Y. (2020).The impact of infrastructure on foreign direct investment in developing countries.*Journal of Development Economics, 37*(4), 521-535.

Aninwagu, V., Onyema, J.I., Momodu, A.A., &Amadi, S.A. (2024). Impact of infrastructural investment on Nigeria's economic growth (1990-2022) (SSRN working Paper). SSRN.

Anyanwu, J. C. (2017). Infrastructure development and economic growth in Africa: An overview. *Journal of African Economies, 26*(AERC Supplement 1), i3-i11.

Aschauer, D. A. (1989). Is public expenditure productive? *Journal of Monetary Economics, 23*(2), 177- 200.

Barro, R. J. (1990). Government spending in a simple model of endogenous growth.*Journal of Political Economy, 98*(5), S103-S125.

Becker, G. S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education*. University of Chicago Press.

Calderón, C., &Servén, L. (2010).Infrastructure and economic development in Sub-Saharan Africa.*Journal of African Economies, 19*(AERC Supplement 1), i13-i87.

Collier, P., &Goderis, B. (2012). Commodity prices and growth: An empirical investigation. *European Economic Review, 56*(6), 1241-1260.

Cornes, R., & Sandler, T. (1996).*The theory of externalities, public goods, and club goods* (2nd ed.). Cambridge University Press.

Dabla-Norris, E., Brumby, J., Kyobe, A., Mills, Z., &Papageorgiou, C. (2012).Investing in public investment: An index of public investment efficiency.*Journal of Economic Growth, 17*(3), 235- 266.

Ebehung, N., &Ogar, O.J. (2024). Foundations of growth: Evaluating the inter play between infrastructure and economic growth in Nigeria. MPR paper

Egbetokun, A. A., Osabuohien, E., &Akinbobola, T. O. (2019). Innovation, infrastructure, and industrialization in Africa: Dynamics, challenges, and prospects. *Technology in Society, 56*, 28-34.

Egbo, O. P., &Ibe, R. C. (2019). Public infrastructure and economic growth in Nigeria: An ARDL approach. *Journal of Infrastructure Development, 11*(2), 127-145.

Egwuatu, O. C. (2021). Transportation infrastructure and its impact on economic growth in Nigeria.*Journal of Development Economics, 65*(2), 221-240.

Enders, W. (2015).*Applied econometric time series* (4th ed.). Wiley.

Esfahani, H. S., &Ramírez, M. T. (2003).Institutions, infrastructure, and economic growth.*Journal of Development Economics, 70*(2), 443-477.

Estache, A., &Garsous, G. (2012).The impact of infrastructure on growth in developing countries.*World Bank Policy Research Working Paper No. 6202*.World Bank.

Eze, U., &Okoro, I. A. (2020).Public infrastructure expenditure and poverty reduction in Nigeria.*Journal of Social and Economic Development, 22*(1), 45-61.

Federal Government of Nigeria.(2017). *Economic recovery and growth plan 2017-2020*.Federal Ministry of Budget and National Planning.

Filmer, D., & Pritchett, L. (1999). The impact of public spending on health: Does money matter? *Social Science & Medicine, 49*(10), 1309-1323.

Johansen, S. (1995).*Likelihood-based inference in cointegrated vector autoregressive models*.Oxford University Press.

Keefer, P., & Knack, S. (2007). Boondoggles, rent-seeking, and political checks and balances: Public investment under unaccountable governments. *The Review of Economics and Statistics, 89*(3), 566-572.

Kupoluyi, J.O; Akinrinola, O.O., Ojomolade, D., Michael, B., &Isibor, A.A. (2025). Governmment expenditure on infrastructure development and economic growth in Nigeria. African Journal of Accounting and Financial Research, 8 (3), 149-166 dio.org.

Lucas, R. E. (1988). On the mechanics of economic development.*Journal of Monetary Economics, 22*(1), 3-42.

Musgrave, R. A. (1959). *The theory of public finance: A study in public economy*. McGraw-Hill.

Nwosu, C., Okeke, D. C., &Nduka, C. (2016).Rural infrastructure and agricultural productivity in southeastern Nigeria.*Agricultural Economics, 47*(4), 469-480.

Ogunleye, A. O. (2018). Education infrastructure and human capital development in Nigeria. *African Development Review, 30*(4), 398-409.

Okoli, U.V., M., &Ezenwobi N.F. (2023). Government expenditure and SAP in Nigeria: An empirical perspective. MPRA paper, 1970 – 2022.

Oladipo, T. A., &Kazeem, Y. (2018). Nigeria's power problem: The country's electricity crisis is much worse than its leaders admit. *Quartz Africa*. Retrieved from https://qz.com/africa

Olufemi, O., &Adeleke, O. (2019).Public health infrastructure and economic development in Nigeria.*African Development Review, 31*(1), 27-39.

Oluwatobi, S., Efobi, U., Olurinola, I., &Alege, P. (2015). Public expenditure and sustainable economic growth in Nigeria: A disaggregated analysis. *Journal of Sustainability Science and Management, 10*(2), 233-245.

Onabote, A. A., Ohwofasa, B. O., &Ogunjumo, R. A. (2023). Government sectoral spending and human development in Nigeria: Is there a link? *Heliyon, 9*(7), e17545.https://doi.org/10.1016/j.heliyon.2023.e17545

Onotaniyohwo, F. O., &Iyayi, D. (2020). Public infrastructure expenditure and economic growth in Nigeria: A test of the big push theory. *International Journal of Current Research in the Humanities, 24*, 366-380.

Perroux, F. (1955). Note sur la notion de pole de croissance. *EconomiqueAppliquée, 8*, 307-320.

Prasetyo, P. E. (2020). The role of government expenditure and investment for MSME growth: Empirical study in Indonesia. *Journal of Asian Finance, Economics and Business, 7*(10), 471-480. https://doi.org/10.13106/jafeb.2020.vol7.no10.471

Richardson, H. W. (1973). *Regional growth theory*.John Wiley & Sons.

Romer, P. M. (1986).Increasing returns and long-run growth.*Journal of Political Economy, 94*(5), 1002-1037.

Todaro, M. P., & Smith, S. C. (2015).*Economic development* (12th ed.). Pearson Education Limited.

UNCTAD. (2021). *Trade and development report 2021: From recovery to resilience: The development dimension*. United Nations Conference on Trade and Development. https://unctad.org/system/files/official-document/tdr2021_en.pdf

United Nations. (2020). *World population prospects 2019: Highlights*. United Nations Department of Economic and Social Affairs.

Usman, Z., & Adebayo, S. (2020). Infrastructure development and economic growth in West Africa.*Journal of Infrastructure Development, 12*(1), 56-76.

World Bank.(2020). *Global economic prospects, June 2020*.World Bank Publications.

World Bank.(2023). *World development indicators*. Retrieved from https://data.worldbank.org

Yahaya , O.A (2026). Government Spending on infrastructure and economic growth in Nigeria (1986-2025). Journal of Infrastructure Development and Research, 20(4), 75-102 dio.org