Economic Infrastructure and Economic Growth of Nigeria

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https://doi.org/10.56201/ijefm.v11.no11.2026.pg99.120

Abstract
This study examined the effect of economic infrastructure on economic growth in Nigeria, focusing on energy, road, digital infrastructure and ease of doing business. It was motivated by persistent infrastructure deficits and uneven investment outcomes. Specifically, it assessed the individual and joint effects of the four indicators on economic growth and investigated their causal relationships. The study was anchored on Hirschman's Unbalanced Growth Theory, which explains how investment in social overhead capital stimulates productive activities through linkage effects. It adopted a quantitative approach and used secondary data for 2000–2024 from the Central Bank of Nigeria Statistical Bulletin and World Development Indicators. Real gross domestic product served as the proxy for economic growth. Data were analysed using the Autoregressive Distributed Lag (ARDL) technique, following Augmented Dickey-Fuller unit-root and ARDL bounds cointegration tests. The findings established a long-run relationship among the variables. Energy infrastructure had a negative but statistically significant long-run relationship with economic growth, while digital infrastructure and ease of doing business had positive and significant relationships. Road infrastructure had a positive but statistically insignificant long-run relationship. The variables also had a significant joint effect, while causality tests indicated unidirectional relationships among selected variables. The study concludes that infrastructure influences Nigeria's economic growth, although outcomes differ by category. It recommends sustained investment in digital infrastructure, improved energy-sector policies, stronger business-environment reforms and increased, efficiently managed investment in road infrastructure over time.

Keywords: *Economic infrastructure, Economic growth, Energy infrastructure, Digital infrastructure, Ease of doing business.*

Section One
Introduction
1.1 Background to the study

Infrastructure development is an important tool for progress across the African continent and a critical enabler for productivity and sustainable economic growth. In fact, it contributes significantly to human development, poverty reduction and the attainment of the Millennium Development Goals (MDGs). Investment in infrastructure accounts for over half of the recent improvement in economic growth in Africa and has the potential to achieve even more (ADB Group, 2025). Infrastructure in itself can be defined broadly as government investment in physical assets and social services (Akomolehin, (2025, okoli,(2023). It represents development strategies to close gaps, enhance growth, and broaden economic participation (IMF, 2018). Infrastructure includes public goods and services that complement traditional

production factors such as capital, labor, and entrepreneurship (Anochiwa & Maduka, 2014). In simple terms, it is the spending on public goods that raises the standards of living of the citizens of that country. Infrastructure can also be seen as a determinant of economic development in addition to other general production factors such as capital and labor. Infrastructure development is believed to be the ability to move the real sector, absorb labor, increase the consumption of the people and government, and encourage productive activities. This was confirmed by Hirschman (1958) who stated that infrastructure development is part of social overhead capital, which is important and needed to drive other economic sectors..

The relationship between infrastructure investment and economic growth is well-explored in discourse on the relationship between infrastructure investment and economic growth. It is posited that increased spending on infrastructure boosts consumer demand and productivity sectors in the long run. Numerous studies (Ekeocha, 2021; Ebehung (2023), Olaniyi (2023),Ojediran (2024),Munim & Schramm, 2018; Haider , 2012) have identified infrastructure as a critical driver of productivity and economic growth. Therefore, building infrastructure at the initial stages of development is essential to meet economic demand. It is apt to say that the growth demands of Nigeria after several decades of colonial experience, forced the country on the quest for rapid economic growth and development through the instrument of investment in infrastructure (Akomolehin, 2025), EjiejI-Ezeribe, Ugorji & Uchechi, 2025). Despite decades of government efforts, Nigeria's economic infrastructural deficit persists due to financing gaps, week implementation and structural mismatches. Between 2000 and 2024, investings expanded roads to 198,000km, rail to about 4,000km, installed power to 14,146MW and internet users to over 159million. However, available electricity remained around 6,359M, rail freight stayed below 100,000 tonnes and 120 million people still lacked mobile internet access due to cost of and coverage issues (Ojediran, 2023; Akomolehin, 2025). Scholars attribute this to an unsustainable reliance on annual budgets, rather than public-private partnership (PPPs) and capital markets, with Alade and Okubio (2025) noting that financing solely through government budgets 'has proven unsustainable'. In addition, taxation has not translated into infrastructure translated into infrastructure, as Adah et al (2025) found that Capital gains Tax, withholding tax and stamp duty had positively but statistically insignificant impact on infrastructure from 2000-2024. Governance problems including uncoordinated policies, poor maintenance and regional disparities further limit outcomes, with PEBEC's 2025 report showing Lagos scoring 85.6% on ease of doing business, while Northern Eastern states averaged 28.5%. Extant literature also shows that the type and quality of infrastructure matter more than sheer spending. Empirical studies covering 1981-2022 consistently find that telecommunications infrastructure has a significant positive effect on growth, while transport and power often show weak or insignificant long run effects (Ebehung & Ogar, 2023); Akomolehin, 2025). This reflects legacy design problems, such as colonial–era rail lines and quality deficits like transmission power. Structural pressures including rapid population growth, vandalism of over 35,000 fibre cuts in 2025, and high deployment costs have further eroded gains (Federal Ministry of Communications, Innovation, and Digital economy, 2024). Thus, based on the above background, this study seeks to empirically investigate the effect of economic infrastructure and its effect on economic growth in Nigeria to contribute to the extant literature on the topic and contribute to the on-going debate among development economists on its potency for growth.

1.2 Statement of the problem.

The important place of infrastructural development cannot be over-emphasized from the development economics perspective and this is why emerging economies like Nigeria, have continued to pursue rapid infrastructural development in their economic plans. Take for

instance, Nigeria; she rapidly invested in infrastructural development in all her development plans from the 1st national development plan of 1962-1968 to the Millennium development goals and the vision 2020/2030. Historically, In 2010, government budgeted N1, 764.69 billion and spent N883.87 billion, budgeted N1, 146.75 billion and spent N713.3 billion in 2011, budgeted N1, 339.99 billion and spent N744.42 billion in 2012, budgeted N1, 621.48 billion and spent N405.37 billion in 2013 and the list continues. In 2013, power sector had about 80.17 per cent of budget releases, transportation sector had 50.49 per cent of budget releases, health sector had 79.37 per cent of budget releases and education sector had 65.37 per cent of budget releases (Budget Office of the Federation, 2013). Despite statistical evidence of the huge amounts that have been consistently spent for the development of public infrastructures in Nigeria, public infrastructure development in Nigeria still requires more to be desired.

Despite the challenges of development, Nigeria has continued to remain dodged in their quest and have even gone as far as borrowing and utilizing other economic measures to see that they develop their infrastructure. But despite these efforts, development in this regard has been slow-paced due to some factors militating against them. On one hand, it can be adduced to lop-sided growth or spending on infrastructure. The wide fluctuation in GDP growth rates recorded by the Nigerian economy over the years can be traced to the infrastructural gap that exist; hence, suggesting that huge amount of spending on economic infrastructure without recourse to institutional, social and digital infrastructure cannot guarantee the desired economic growth in the long run and this is the trend that has persisted, especially among the economy of West African states. Due to this neglected area by previous studies (Ehizuelen, 2016; Owolabi, 2015; Siyan & Adegoriola, 2017), this study seeks to adopt the unbalanced growth theoretical model frame work and adapt it to the Nigerian context as a model to incorporate and empirically examine the impact which government spending on infrastructure has helped the economy or otherwise.

1.2 Objectives of the study

The broad objective is to critically examine the impact of economic infrastructure on economic growth in Nigeria. The specific objectives of the study include:

i. To examine the effect energy infrastructure on economic growth in Nigeria;
ii. To examine the effect of road infrastructure growth on economic growth in Nigeria
iii. To examine the effect of digital infrastructure on economic growth in Nigeria; and lastly
iv. To examine the effect of ease of doing business on economic growth in Nigeria.

1.4 Research Questions

The following research questions will guide this study:

i. To what extent does energy infrastructure affect economic growth in Nigeria?
ii. In what way does road infrastructure affect economic growth in Nigeria?
iii. How does digital infrastructure affect economic growth in Nigeria?
iv. Is there any effect of ease of doing business on economic growth in Nigeria?

1.5 Research hypotheses

The following hypotheses were formulated to guide this study:

i. **H_{01}**: Energy infrastructure has no significant effect on economic growth in Nigeria.
ii. **H_{02}**: Road infrastructure has no significant effect on economic growth in Nigeria.
iii. **H_{03}**: Digital infrastructure has no significant effect on economic growth in Nigeria.
iv. **H_{04}**: Ease of doing business has no significant effect on economic growth in Nigeria.

1.6 Significance of the study

The study will be of immense benefit to policy makers and institutions as it seeks to establish the theoretical connection between economic and economic growth. Taking a cue from the Balanced-Growth model which calls for the consideration of development as a function of infrastructural development balance in the economy which provides economic spill-over effects in the long run. It is on this pivot that this study rests on as the guiding theoretical model frame work. Furthermore, it will present an opportunity to empirically assess other literatures on infrastructural development and economic growth in the economy. This will bring forth the empirical underpinning of the study and how it connects with the scope of the study. Previous studies will form the bedrock for model formulation and estimation that will aid in lending empirical evidence on the topic. Again, it will be of immense significance to the government and planning authorities as it will enlighten them on the effect of infrastructural development in emerging economies like Nigeria, thereby x-raying the key areas of the economy that requires rapid infrastructural investment and growth outcome as well as prospects; thus, providing a basis for economic planning decisions; especially the ones that concern anticipated rapid growth rates. In addition, it will be of immense enlightenment to researchers as it would broaden the view of the research subject by opening it up for criticism and further researches through identified gaps in the literature.

1.7 Scope of the study

The study is centred on infrastructural development and its effect on economic growth of selected West African countries; hence, a panel-based study. It is based on secondary data with a time period of 42 years i.e. 2000-2024. The time series period chosen for this study was adduced to adequately capture the long run effects in selected West African countries such as Nigeria, Ghana, Cameroon, Mali and Togo which are all in the same region and have similar growth/development characteristics and challenges over the years. The theoretical underpinnings for this study centres on The Balanced growth model which have correlation with economic growth in the long run. The ambit of this study is within quantitative analysis and thus, focuses on four key economic infrastructure variables being: digital, road, energy and ease of doing business infrastructure respectively which aid model formulation for econometric measurement and analysis of short run and long run effects.

Section Two
Literature Review

2.1 Conceptual Review

i. ICT Infrastructure

As far as ICT infrastructure is concerned, its diffusion on the continent dates back to the end of the 1990s and has increased significantly in recent years. Indeed, between 2000 and 2005, for example, the number of devices increased from 130 to 900 million on the continent, including 200 million smartphones. In 2016, the Sub-Saharan Africa (SSA) sub-region alone had nearly 420 million subscribers, equivalent to a penetration rate (number of internet users per 100 inhabitants) of 43% (Torsten & Jack, 2023). Moreover, with an increasing rate estimated at 6% by the Groupe Spécial Mobile association, mobile telephony is experiencing the strongest growth in Africa (GSMA, 2019). Although this dynamic is not equal across the countries of the continent, it represents a considerable market for the continental economy. By 2020, the GSMA estimates that it will account for nearly 7.7 percent of GDP in SSA; tax revenues generated by the sector are close to $13 billion; and employment was estimated at over 1.1 million in 2016. However, even though these statistics look promising for the continent, it is still ranked low in 7 the world in terms of ICT development and exploitation.

Whether in terms of fixed telephone lines, mobile cellular, mobile and fixed broadband subscriptions, and internet users, the statistics for Africa remain low compared to other developing countries and the global average.

ii. Road/Transport infrastructure

Transport infrastructure comprises physical and organizational frameworks that enable the movement of people, goods, and services. It includes roads, railways, airports, seaports, and supporting technologies that are critical to, economic development through trade facilitation and regional integration. (Onokala & Olajide, 2020). With respect to transportation infrastructure, road networks are an important part of a nation's infrastructure that promote the development of various sectors of the economy. For example, reducing the distance between markets, knowledge and people through quality infrastructure induces a cycle of growth opportunities for all sectors. Moreover, connectivity through road networks eradicates poverty by providing access to education, medical facilities, employment and various other social opportunities (Yusuf & Muhammad, 2024). According to statistics from the International Road Federation (IRF), African and specifically North African countries have the lowest road density in the world (IRF, 2019). An analysis conducted on the 2019 statistics related to the quality of the road network in different regions of the world, reveals that North Africa, with an estimated road density of 0.08km/km^2 ranks last in the regional ranking. Sub-Saharan Africa is not far behind with an average of 0.14 km/km2. On the other hand, the highest road density is observed in South Asia, which has nearly 18% of the world's road network, i.e. the highest regional road density. Water supply and sanitation infrastructure The Sustainable Development Goals (SDGs) have drawn attention to the problems related to the quality of water supply and sanitation for countries, particularly developing countries. Although many countries are on track to meet this goal, most African countries, particularly those in SSA, are still lagging behind. According to the World Bank report (2011), nearly 2.5 billion people in the world do not have access to improved sanitation. Of these, 22% live in Africa. Statistics from SDG Atlas (2018) reveal that only 58% of the population there has access to safe drinking water, with a significant gap between people in urban and rural areas.

iii. Digital infrastructure

Digital infrastructure relates to the spending by government on information, communication and technology in complete sense. It doesn't just refer to the provision of broad band services across the population, but the whole gamut of expenditure that keeps the citizenry abreast with communication tools. The expenditure on digital infrastructure is not without its motives. It is motivated by its return to the gross domestic products of the country in view. For instance, digital infrastructure has attracted heavy private investment from multi-national corporations such as MTN, AIRTEL etc in the case of Nigeria and some West African countries like South Africa, Ghana and the like. This foreign private and direct investments have contributed significantly to the growth of the national income over time and still possess the tendency for rapid increases in years to come. Furthermore, it has developed accessibility with the rest of the world and created platforms for increased trade relations and economic interconnectedness across borders of countries. Thus, digital infrastructure investment continues to thrive in this modern day and age as a result of what communication portends for domestic growth in the long run.

2.1.3 Ease of doing business (Macro-economic infrastructure)

Nigeria's ease of doing business and economic growth have been weakly linked over the past two decades. Between 2000 and 2020, Nigeria ranked very low on the World Bank Ease of

Doing Business index, bottoming out at 170th in 2015 before improving to 131st in 2019-2020 after reforms in starting a business, credit access and contract enforcement. Despite this jump, regulatory burdens, power deficits and infrastructure gaps kept Nigeria's Business Freedom score low at 43in 2024 and 39 in 2025, well below the world average of 63.Empirical studies show that while infrastructure development, especially in ICT and Telecoms has a positive and significant effect on GDP growth, overall economic growth has been constrained by poor government efficiency, weak institutions and inadequate maintenance. Recent sub-national rankings also reveal sharp disparities, with lagos leading at 85.6%, while North Eastern States by28.5%, suggesting that improvements in the business environment remain uneven and have not yet translated into broad-based growth.

2.1.5 The link between economic infrastructure and economic growth.

Infrastructure development has been extensively recognized as a fundamental driver of economic growth and development. Calderon and Serven (2021) conducted a comprehensive analysis of infrastructure's impact on economic growth across Sub-Saharan Africa, finding that a 1% increase in infrastructure stock correlates with a 0.8% increase in GDP growth.

Core economic infrastructure in the areas of transport has always played important roles in maintaining economic performance. In fact, these infrastructural facilities are an important input in a nation's production function and it has major implication for the attainment of sustainable economic growth policy. It contributes to economic growth by increasing productivity, lower unit cost of production and enhances the quality of life.

According to Hausmann, Pritchett & Rodrik (2015), expenditure on investment and productive activities including state-owned production should contribute positively to growth, whereas government consumption expenditure is expected to be growth-retarding. Several analytical and empirical studies have focused on the traditional and new channels through which different types of government expenditure can affect growth (Carter, Craigwell & Lowe, 2013; Barro, 2013; Baldacci, Clements, Gupta, & Cui, 2014; Beraldo, Montolio & Turati, 2019). A direct effect relates to an increase in the economy's capital stock (physical or human) reflecting higher flows of government funds, especially when they are complementary to those privately financed. Government expenditure on education and health, for example, contribute to an increase in the stock of human capital. Similarly, to the extent that they trigger an accumulation of physical capital, most government expenditure on infrastructure falls in the category of having a direct impact on growth

2.2. Theoretical literature

i. The unbalanced growth theory

The proponents of the unbalanced growth theory include scholars like, Hirschman, Streeten, Fleming and Singer (1958). They promulgated the theory of unbalanced growth as a plan for development and growth to be used by underdeveloped countries. The theory emphasizes the need for investment in key strategic sectors of the economy rather than all the sectors simultaneously, for instance, investing into infrastructure development. Hirschman argued that creating imbalances in the system is the best strategy for growth. Stating further, he explained that owing to the lack of availability of resources in the less developed countries, the little that is available must be efficiently used.

If investment is carried out in the key sectors of the economy, the other sectors would automatically develop through what is known as "Linkage effect". This is possible by investing either in Social Overhead Capital (SOC) or Directly Productive Activities (DPA). Investments in social overhead capital are advocated not because of its direct effect on the final output, but

it permits and invites DPA to come in as some SOC are required as a prerequisite of DPA investment.

Social overhead capital has been defined as comprising those basic services without which primary, secondary, and tertiary productive activities cannot function. This includes in it the expenditure on roads, irrigation works, power, transport and communications. The investments on these projects create more economies and this is called divergent series of investment and is undertaken by public agencies. Whereas, Direct Productive Activities are those activities which are a consequence of some investment, add to the flow of final goods and services. It is called convergent series of investment because these project appropriate more economies than they have created. These series of investments are undertaken by private entrepreneurs.

The strategy of unbalance growth suggests that since the underdeveloped countries cannot pursue a simultaneous investment in both SOC and DPA due to a general lack of resources so therefore they should according to Hirschman unbalance the economy for overall growth through SOC, as this would stimulate investment in DPA. In SOC are included investments on communication, transportation, power, education, public health, water, irrigation and drainage schemes etc. A large investment in SOC will encourage private investment later in Directly Productive Activities (DPA).

2.3 Empirical literature

There are many literatures on the impact of infrastructural development on economic growth and these are examined as follows:

Ehizuelen, Michael & Omoruyi (2024) carried out a study on "Building a Better Nation: Assessing the Influence of Infrastructure on Economic Growth of Nigeria" by delving into the true nature of China's infrastructure financing in Nigeria. Their study utilized two model frame work which were collapsed into one, making it suitable to use OLS (Ordinary Least Square) to run the regression. The findings show that infrastructure is an intermediate goods and service for the real sector, a finished goods and service for consumers and an integral part of Nigeria economic growth. Fadila, Saheed; Mustapha; Alfa &Olure-Bank (2024) investigated "Infrastructure and economic growth in ECOWAS member states: The Westerlund co-integration approach" Their study utilized panel secondary data sourced from the World Bank Development Indicators (WDI) and the African Infrastructure Development Index (AIDI) across all fifteen ECOWAS Member States over eighteen years using the panel Non-linear Autoregressive Distributed Lag (NARDL) model and the Westerlund cointegration test for analysis. The findings revealed that investments in infrastructure, improvements in the African Development Index, and enhancements in the Electricity Composite Index significantly contribute to the economic growth of ECOWAS countries. Specifically, infrastructure investment was associated with a 0.01 percent increase in the Gross Domestic Product (GDP) of the ECOWAS countries studied. In comparison, the African Development Index and the Electricity Composite Index were linked to increases in GDP by 0.292 percent and 0.987 percent, respectively, in the long term. Based on these outcomes, the study recommended that ECOWAS country authorities enhance policies to optimize government spending on infrastructure quality. Furthermore, adopting quality- enhancing and efficiency-driven financing policies in infrastructure was advocated to complement ECOWAS's ongoing infrastructural development efforts. The realization of these recommendations' hinges on the availability of accurate data for informing decisions and guiding policymakers. Hence, the study underscores the need for the ECOWAS Commission to bolster its capacity for collecting reliable data on infrastructure variables and other indicators. It also proposes that future research should focus on promoting sub-regional peer-review mechanisms for infrastructure indicators among member states and establishing structures to fortify infrastructure in West

Africa. Edun, Akinde, Olaleye, &Idowu (2023) investigated infrastructural development and its effect on economic growth. The methodology adopted was a simple model of an economy with foreign investment and public infrastructure with a diversified equilibrium where the model was used to examine the impact of increased labour on production of private goods, public infrastructure, foreign investment, welfare and complete specialization. The study went on further to advice the nation on measures to take to accelerate economic development, as economic growth alone was not enough. Irene, Uche & Emmanuel (2023) examined the impact of Infrastructure Investment on Economic Growth in Nigeria: An Autoregressive Distributed Lag Approach government spending on economic infrastructure and economic growth in Nigeria from 1989 to 2018. Real gross domestic product was used to proxy economic growth and was specified as a function of government spending on transport and communication, government spending on power and employment rate (as a proxy for the classical theory of labour force).The Autoregressive Distributed Lag Bounds method to co- integration was chosen to ascertain the impact and the long-run relationship between the dependent and independent variables. The short-run and long-run results showed that government spending on power exerted a positive but insignificant effect on Nigeria's RGDP. However, government spending on transport and communication had a positive relationship in the short-run but negative relationship in the long-run. Furthermore, the Causality results showed a uni-directional causality running from RGDP to GEXP and EMP to GEXTC but there was no evidence to support the existence of causality between the remaining pairs of variables. It recommended that in order for Nigeria to achieve infrastructure development success, it is important that the government redirect excessive revenue in the maintenance of government official to these pivotal sectors of the economy with a view to monitoring the implementation after disbursing funds to the affected ones to subsequently trigger economic growth.

Bennee, Okoye & Amahalu (2023) examined the relationship between Infrastructure Development Expenditure and Economic Growth of Nigeria for twenty-one (21) years period ranging from 2000-2020. The study employed secondary data extracted from Central Bank of Nigeria (CBN) Annual Reports and Statement of Accounts and Statistical Bulletins of various issues, National Bureau of Statistics (NBS) bulletin, Budget Office of the Federation, World Economic data base, United Nations statistical bulletin, International Monetary Fund (IMF) Government Finance Statistics Year Book (various issues) of Nigeria for the study period. The study adopted Longitudinal (Ex-post facto) research design via E-Views 10.0. The result revealed that a significant and positive relationship exist between infrastructure development expenditure (t-Statistic = 2.908787 < 0.05) and RGDP at 5% level of significance. It was recommended inter alia that Government should diversify and develop economic infrastructure such as roads, social and community services, transport and communication to boost trade openness and economic growth in Nigeria.

Fadila, Saheed, Mustapha, Alfa & Adeyinka (2023), explored "The impact of infrastructure on member states' economic growth in the Economic Community of West African States (ECOWAS)". Utilizing panel secondary data sourced from the World Bank Development Indicators (WDI) and the African Infrastructure Development Index (AIDI) across all fifteen ECOWAS Member States over eighteen years, the study employs the panel Non-linear Autoregressive Distributed Lag (NARDL) model and The Westerlund cointegration test for analysis. The findings reveal that investments in infrastructure, improvements in the African Development Index, and enhancements in the Electricity Composite Index significantly contribute to the economic growth of ECOWAS countries. Specifically, infrastructure investment is associated with a 0.01 percent increase in the Gross Domestic Product (GDP) of the ECOWAS countries studied. In comparison, the African Development Index and the Electricity Composite Index are linked to increases in GDP by 0.292 percent and 0.987 percent,

respectively, in the long term. Based on these outcomes, the study recommended that ECOWAS country authorities enhance policies to optimize government spending on infrastructure quality. Furthermore, adopting quality-enhancing and efficiency-driven financing policies in infrastructure is advocated to complement ECOWAS's ongoing infrastructural development efforts. The realization of these recommendations' hinges on the availability of accurate data for informing decisions and guiding policymakers. Hence, the study underscores the need for the ECOWAS Commission to bolster its capacity for collecting reliable data on infrastructure variables and other indicators.

Apurv & Uzoma (2021) explored "The impact of public investment in infrastructure on the economic growth of the BRICS nations (Brazil, Russia, India, China, and South Africa) from 1980 to 2017", employing the panel least square method, panel least square fixed-effect model, and panel least square random effect model. Their findings indicated that while investment in energy infrastructure supports economic growth, investment in telecom infrastructure is significantly and negatively associated with the economic growth of BRICS countries. Country-specific OLS estimates revealed that Brazil and South Africa exhibit an insignificant relationship between infrastructure investment and economic growth. In Russia, energy and transportation infrastructure investments bolster economic growth. In contrast, China sees a negative relationship between transportation infrastructure investment and economic growth, and India's investment in telecommunications infrastructure negatively impacts economic growth. Chandana (2021) investigated the impact of Nigerian government expenditure (disaggregated into capital and recurrent) on economic growth using time series data for the period 1970-2019. The study employed the Autoregressive Distributed Lag (ARDL) model using Gross domestic product, capital expenditure, labour force, recurrent expenditure, trade openness, inflation, and non-oil revenue as key variables. To ensure robustness of results, the study accounted for structural breaks in the unit root test and the co-integration analysis. The key findings of the study were that capital expenditure had positive and significant impact on economic growth both in the short run and long run while recurrent expenditure does not have significant impact on economic growth both in the short run and long run. The study recommended that government should increase the share of the capital expenditure especially on meaningful projects that have direct bearing on the citizen's welfare. Government should also improve the spending patterns of recurrent expenditure through careful reallocation of resources toward productive activities that would enhance human development in the country.

Adole (2021) investigated the impact of government expenditure on economic growth in Nigeria for the period, 1984-2015 with view to re-assess the Keynesian and Endogenous Growth Models proposition that public expenditure stimulates economic growth. The study employed Johansen co-integration and Error Correction Model. The empirical results showed that public (recurrent and capital) expenditure had a significant positive impact on the growth of the economy in the long run and an insignificant negative impact on the Nigerian economy in the short run, reinforcing the Keynesian and Endogenous Growth Models that public expenditure stimulates economic growth in Nigeria when seen in the long run. The study therefore recommended that Nigerian government should readjust spending priority to accommodate more capital expenditure and channeling of increase expenditure into some critical sectors of the economy such as health, power, education and general infrastructure are fundamental in maximizing government expenditure in Nigeria.

Onuoha & Okoye (2020) explored the effects of aggregate public expenditure, recurrent government expenditure and capital government expenditure on economic growth, and the effect of economic growth on aggregate public expenditure. Using a time series data set from Nigerian context for the period between 1981 and 2018 and analyzing same with OLS regression model after a pre- estimation unit root test, an impressive result emerged. First, the

study found that whereas aggregate public expenditure positively affects economic growth, recurrent government expenditure and capital government expenditure have insignificant effects on economic growth. Second, the study found that economic growth positively affects government spending. Amadi & Alolote (2020) carried out a research on Government Expenditure on Infrastructure as a Driver of Economic Growth in Nigeria, adopting the Weighted Least Square technique. Their result revealed that government spending on transport, communication, education and health infrastructure has significant effects on economic growth whereas, spending on agriculture and natural resources record a significant inverse effect on economic growth in Nigeria. The study recommended an increase in investment on the infrastructure that concerns agriculture so as to increase food supply. Also, the need for public enlightenment campaign to educate the public on the need to protect and maintain infrastructure provided by the government.

2.15 Gap in the literature

Having examined extant literatures on exchange infrastructural development and economic growth in Nigeria, it was found that many studies were carried out in line with the area of interest of the researchers. In another vein, some studies were more concerned with economic infrastructure from the view point of public investment and government expenditures like the studies by Adole (2021) Onuoha & Okoye (2020) and Amadi & Alolote (2020). Those studies centred on infrastructural development but did not disaggregate their economic infrastructure, but this study intends to do. Thus, by so doing it closes the gap in the previous studies by Ehizuelen, Michael & Omoruyi (2024), Fadila, Saheed; Mustapha; Alfa &Olure-Bank (2024), Edun, Akinde, Olaleye, &Idowu (2023) Irene, Uche & Emmanuel (2023)

Section Three
Research Methodology

3.1 Research Design

A panel study is a type of research design in which you collect data from many different individual, groups or countries over a single point in time. In cross-sectional research, you observe variables without influencing both the dependent and independent variables in a dataset. One of the advantages of a panel study is that it provides rich, dynamic data and allows for analysis of changes, trends and patterns over time; thus, establishing causality and temporal relationships.

3.2 Source of Data

The data for this study will be obtained from the CBN Statistical Bulletin (2024) online edition and the World Development Indicators (2024) online database.

3.3. Model Specification

In an attempt to investigate "Economic infrastructure and economic growth of Nigeria", the work of Fadila, Saheed, Mustapha, Alfa & Adeyinka (2023), who carried out a study on "The impact of infrastructure on member states' economic growth in the Economic Community of West African States (ECOWAS)" was reviewed.

However, this study seeks to improve on their study by using key variables to measure economic infrastructure which will be decomposed into, digital, energy, road and ease of doing business to control for the internal macro-economic environment to that support's economic growth. Thus, we have the simplified model as follows **GDP=f (ICT, ROAD, ENERGY, EASEBUS).** In its econometric form it can be expressed as:

$$GDP=b_0+b_1ENERGY+b_2ICT+b_3ROAD+b_4EASEBUS+\mu$$

Where:

GDP = Real Gross Domestic Product (a proxy for economic growth as the dependent variable)
ICT = a proxy for digital infrastructure.
ROAD = a proxy for economic infrastructure.
ENERGY=Energy infrastructure
EASEBUS=Ease of doing business (a control variable for macro-economic environment)
b_1– b_4 are coefficients of parameters estimates and b_0 is the intercept of the model. μ is the white noise error term. Assuming all other conditions remain homogenous, it is expected that $b_1 > 0$, $b_2 > 0$, $b_3 > 0$ and $b_4 > 0$. This forms the basis of our ***a priori*** expectations

3.4. Pre-Estimation Tests

3.4.1 Unit Root Test

This was to test for the stationarity of the time series data. Test for stationarity was done to avoid the problem of spurious regression. The Augmented Dickey-fuller test statistic was used in this regard. The essence of unit root testing is to avoid the problem of spurious regression i.e. not having the sample variables oscillating about a mean value. If the sample variables wander off significantly from their mean values, there might be stationarity issues and the estimation technique might be flawed as well. The null and alternative hypothesis for the unit root test is summarized below:
H_0: There is a unit root in the model.
H_1: There is no unit root in the model.
Decision rule: Accept the null hypothesis if the Prob.F-test statistic exceeds the 5% critical value, except otherwise.

3.4.2 Cointegration Test: Bounds test.

The ARDL form for cointegration (Bounds test) states that if F-statistics is greater than I(0) and I(1) bounds, it means there is evidence of long run relationship in the model.
To perform the ARDL Bounds test, 5 cointegration tests are carried out and the hypotheses are stated as follows:
H_o: $\beta_1=\beta_2=\beta_3=\beta_4=0$
H_1: $\beta_1\neq\beta_2\neq\beta_3\neq\beta_4\neq=0$
If there is no evidence of cointegration, the error correction model (ECM) representation of the model will be estimated.

3.5 Method of Data Analysis

The Autoregressive Distributed Lag (ARDL) was used for the model estimation.
In this research study, data was analyzed based on three criteria: Economic, Statistical and Econometric criteria.
The Economic criterion attempted to create a correspondence of Economic theories with obtained estimates by examining the magnitude of the signs of the parameter estimates. This is also known as the *a priori* expectations.
The statistical criterion involved the use of statistical tools and E-views 10 software to obtain the parameter estimates. The estimated parameters were analyzed via the t-test, F-test, cointegration test, causality test and model stability test.
The econometric criterion sought to investigate if there were violations of classical Econometric assumptions of no autocorrelation and heteroscedasticity. The interpretation of the data was manually done after the estimation of the parameters from the E-views 10 software.

3.6 Test of Significance

This was to test whether the variables were significant at 5% level of significance individually and jointly. To do this, the t-test was employed to test each of the variables. Stating in terms of null and alternative hypothesis we had:

Ho: $\beta_i=0$, where i =1-4 and

H_1: $\beta_i \neq 0$

Decision rule: Accept Ho if prob.value > 0.05, otherwise, reject H_o. On the other hand, the joint test hypothesis is stated as follows:

Ho: $\beta_1=\beta_2=\beta_3=\beta_4=0$; and

H_1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$

Decision rule: Accept H_o if prob.value > 0.05, otherwise reject H_o.

3.7 Post-Estimation Test

3.7.1 Test for Autocorrelation: The Breusch-Godfrey test

This test makes up for the limitation of the lag period of the D-W test. This test is a more general test for autocorrelation up to the rth order. The model for the errors under this test is:

$$u_t = p_1 u_{t-1} + p_2 u_{t-2} + p_3 u_{t-3} \ldots\ldots\ldots\ldots p_t u_{t-r} + v_t$$

The test is a modification of White's Test statistic, but removes n lags from the sample size. i.e. $\chi^2 = (n-r)R^2$ which follows a chi-square distribution. The test revolves around ρ i.e.

Ho: ρ =0; $\rho_2 = 0$; $\rho_3 = 0 \ldots\ldots\ldots \rho_r = o$; and

H_1: $\rho \neq 0$; $\rho_1 \neq 0$; $\rho_2 \neq 0 \ldots\ldots\ldots \rho_r \neq 0$

The problem with this statistic is determining the lag length r. if the data is an annual one, we use r=1 or 4 and 12 if it is a monthly data.

Decision rule: Accept H_o if prob. value > 0.05, otherwise reject H_o.

3.7.2 Test for Heteroscedasticity: The Breusch-Pagan-Godfrey test

The classical assumption has it that the error terms of observations have constant variance; otherwise, non-constant variance and this could create problems in the model estimation which is undesirable and violates the classical assumption of constant variance. To detect this malady, the researcher employed the **Breusch-Godfrey-Pagan** heteroscedasticity test which follows a chi-square distribution.

Decision rule: If chi-square F- prob.value > 0.05, it means that there is no serial correlation in the model, except otherwise.

3.7.3 Goodness of Fit of the Model

The adjusted R-squared was examined to test for the Goodness of fit of the model. It explains how much variation in the model was accounted for by the explanatory variables of the model. A value above from 50% and above shows a good fit of the model; except below.

Section Four
Data Presentation, Analysis and Interpretation
4.1 Data Presentation

Table 4.1: Electricity infrastructure (ENERGY), Road transport (ROAD), Communication (ICT) and Ease of doing business (EASEBUS) from 2000-2024.

YEAR	ENERGY (MW)	ROAD (km)	ICT (Teledensity)	EASEBUS (scale)	GDP (USD Mill)
2000	5893	193200	0.03	0	69.17
2001	5893	193200	0.26	0	73.56
2002	5894	193200	1.5	0	95.05
2003	5905	193200	2.9	0	104.74
2004	5905	193200	8.1	0	1135.76
2005	5905	193200	16	0	175.67
2006	7447	193200	27.1	108	238.45
2007	7967	193200	33	108	278.26
2008	8476	195500	50	108	339.48
2009	8851	195500	57.5	108	295.01
2010	8575	195500	65.6	108	366.99
2011	9090	195500	69.8	108	414.47
2012	9105	195500	80.7	108	463.97
2013	10027	195000	88.9	108	520.12
2014	10596	195000	94.7	169	574.18
2015	10595	195000	100.2	170	493.03
2016	12542	195000	100	169	404.65
2017	12282	195000	91.5	145	375.75
2018	12282	195000	106.4	146	421.74
2019	11688	195000	110.9	146	574.52
2020	12036	196000	119.8	131	432.2
2021	13308	196000	95	131	440.83
2022	13337	196000	99.6	131	477.4
2023	14146	196000	98.5	131	363.85
2024	14146	198000	75	131	187.76

Source: WDI (2024).

4.2 Data Analysis and Interpretation
4.2.1 Pre-Estimation Test: Unit Root and Cointegration
4.2.1 Test for Unit Root

The test for unit root was carried with the Augmented Dickey fuller test. The summary is shown below:

Table 4.2.1: Unit Root Test Summary: Augmented Dickey-Fuller test.

VARIABLE	ADF(LEVEL)	5% CRITICA	ADF(1STDIFF)	5% CRITIC/	REMARK
ENERGY	-0.148031	-2.991878	-5.594257	--2.998064	I(1)
ROAD	-0.229923	-2.991878	-4.054336	-2.998064	I(1)
ICT	-1.671134	-2.991878	-3.562007	-2.998064	I(1)
EASEBUS	-1.648434	-2.991878	-4.545067*	-2.998064	I(1)
GDP	-4.631859	-2.991878	-7.775437	-2.998064	I(0)

The Asterisks (*) is used to indicate stationarity at the 5% level of significance.

Source: Author's computation with E-views 10 package.

The unit root test above revealed that the variables have a mixed order of integration of I(0) and I(1); therefore apt for the application of an ARDL test in analyzing the short run and the long run relationship in the model.

4.2.1 Cointegration Test: ARDL Bounds Test

H_0: There is a long run relationship in the model.
H_1: There is a long run relationship in the model.

ARDL Bounds Test
Date: 07/14/26 Time: 04:20
Sample: 2005 2024
Included observations: 20
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	13.00796	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's Computation with E-views 10

From table 4.3 above, the F-statistics for the model is 6.36414 and is greater than the upper I(0) and I(1) bounds of 4.01 and 5.07 respectively at 5% level of significance. Thus, we reject the null hypothesis and conclude that there is presence of cointegration in the model. This implies that there is a long run relationship between corruption and military expenditure in Nigeria. Since there is a long run relationship, we therefore estimate the short run and long run ARDL regression models

4.2 Model Estimation.

Table 4.2.1: ARDL Cointegrating and Long Run Form

ARDL Cointegrating And Long Run Form
Dependent Variable: LNGDP

Cointegrating Form: short run

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGDP(-1))	0.565322	0.189655	2.980796	0.0125
D(LNENERGY)	-1.552676	1.273592	-1.219131	0.2483
D(EASEBUS)	0.004993	0.001607	3.107903	0.0100
D(LNICT)	1.402387	0.467349	3.000725	0.0121
D(LNICT(-1))	-1.106790	0.381291	-2.902746	0.0144

D(LNROAD)	-39.278918	17.286917	-2.272176	0.0441
D(@TREND())	0.061171	0.019845	3.082413	0.0104
CointEq(-1)	-0.232160	0.330806	-6.747648	0.0000

Cointeq = LNGDP - (-2.1173*LNENERGY + 0.0022*EASEBUS + 0.3311
*LNICT + 4.8152*LNROAD -15.6761 + 0.0274*@TREND)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNENERGY	-2.117293	0.494758	-4.279455	0.0013
EASEBUS	0.002237	0.000650	3.442547	0.0055
LNICT	0.331131	0.111181	2.978309	0.0126
LNROAD	4.815240	8.882354	0.542113	0.5986
C	-15.676071	46.501224	-0.337111	0.7424
@TREND	0.027404	0.007297	3.755803	0.0032

4.3 Test of Significance

4.3.1. Short run analysis

D(LNENERGY): has a negative and significant relationship with GDP in the short run at 5% level of significance.

D(EASEBUS): has a positive and significant relationship with GDP in the short run at 5% level of significance.

D(LNICT): has a positive and significant relationship with GDP in the short run at 5% level of significance.

D(LNROAD): has a positive and insignificant relationship with GDP in the short run at 5% level of significance.

The ECM coefficient was negative and significant at the 5% level of significance; hence, any short run dis-equilibrium in the model will be corrected at the rate of 23.2% per annum and this will take less than 5 years.

4.3. 2 Long run analysis

I. ENERGY

H_o: ENERGY=0 at α=0.05

H_1: ENERGY≠0 at α=0.05

Prob.value =0.0013 α = 0.05

Decision: Since the prob.value (0.0013) < 0.05 the null hypothesis is rejected and it is concluded that energy infrastructure has a significant relationship with economic growth in Nigeria at α=0.05

ii. EASEBUS

H_o: EASEBUS=0

H_1: EASEBUS≠0

Prob.value =0.0055 α = 0.05

Decision: Since the prob.value (0.0055) < 0.05 the null hypothesis rejected and it is concluded that ease of doing business has a significant relationship with economic growth in Nigeria at α=0.05

iii. ICT

H_o: ICT=0

H_1: ICT≠ 0

Prob.value = 0.0126 α = 0.05

Decision: Since the prob.value (0.0126) < 0.05 the null hypothesis is rejected and it is concluded that communication infrastructure has a significant relationship with economic growth in Nigeria at α=0.05

iV. ROAD

H_o: ROAD=0

H_1: ROAD≠ 0

Prob.value = 0.5986 α = 0.05

Decision: Since the prob.value (0.5986) > 0.05 the null hypothesis is rejected and it is concluded that road infrastructure has a significant relationship with economic growth in Nigeria at α=0.05

4.3.3 Joint Test of Significance (ANOVA).

Ho: EXTDEBT=DEBTSER=BUDGBAL=0

H_1: EXTDEBT≠DEBTSER≠BUDGBAL≠0

Decision: From the regression result, the F-prob. value is 0.02173 which is less than 0.05; hence we reject the null hypothesis and conclude that there is a joint impact of ENERGY, ICT, ROAD, EASEBUS on economic growth in Nigeria at 5% level of significance.

4.4 Post Estimation Tests

4.4.1 Breusch-Godfrey Serial Correlation LM test.

H_o: There is no serial autocorrelation in the model at α = 0.05.

H_1: There is presence of serial autocorrelation in the model at α = 0.05.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.539965	Prob. F(1,2)	0.3404
Obs*R-squared	8.700453	Prob. Chi-Square (1)	0.0032

Decision: Since the observed Prob. Chi-square value is greater than 0.05, it means that there is no serial correlation in the model.

4.4.2 Breusch-Godfrey Test for Heteroscedasticity.

H_o: There is no heteroscedasticity in the model at α = 0.05.

H_1: There is presence of heteroscedasticity in the model at α = 0.05.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.233199	Prob. F (16,3)	0.9788
Obs*R-squared	11.08625	Prob. Chi-Square (16)	0.8041
Scaled explained SS	0.222854	Prob. Chi-Square (16)	1.0000

Decision: Since the Prob. Chi-square value (0.9788) is greater than 0.05, it means that there is no evidence of heteroscedasticity in the model.

4.4.3 Test for Causality

H_0: There is no causality between economic infrastructure and economic growth of Nigeria at $\alpha = 0.05$.

H_1: There is causality between economic infrastructure and economic growth of Nigeria at $\alpha = 0.05$.

Decision: From the Granger causality test result, it was seen that causality exists and flowed uni-directionally from LNGDP $\rightarrow$ LNENERGY, LNICT $\rightarrow$ LNGDP, LNGDP $\rightarrow$ LNICT. From the causality test, it can be seen that there is a causality effect between economic infrastructure and economic growth in Nigeria (See appendix for table).

4.4.4 Goodness of Fit of the Model.

Adj.R^2 = 0.925306 x 100% = 92.5%

From the result of the regression, the Adjusted R-squared shows that about 92.5% variation in economic infrastructure can be explained by the explanatory variables; hence, the model has a very strong explanatory power in relation to economic growth in Nigeria.

4.5 Discussion of Findings

Energy: was negatively related to economic growth and statistically significant at 5% level of significance in the long run. The negative relationship contradicts with our *a priori* expectation. The significant relationship it bears with economic growth is suggestive of the fact that the effect of provision of energy erodes improves the development capacity of the country as a social overhead and spills over to other sectors of the economy in the country.

ICT: was positively related to economic growth and statistically significant at 5% level of significance in the long run. The positive relationship conforms to our *a priori* expectation. The result of the findings suggests that the sector investment is growing and profitable in the long run; thereby attracting more private sector partnership.

Road: was positively related to economic growth and statistically insignificant at 5% level of significance in the long run. The negative relationship contradicts with our *a priori* expectation. This research finding is supportive of the fact that the budget allocation to transport sector needs to be increased to improve the road transport system for increased commercial links that spur economic growth in the long run.

Ease bus: was positively related to economic growth and statistically significant at 5% level of significance in the long run. The positive relationship conforms to our *a priori* expectation. This research finding is supportive of the fact that although the score on this variable is low, it has the potential of increasing the growth of business in the economy through the linking of deficit and surplus units as well as consumers of goods and services. This invariably means that the government should sustain its effort in this regard to trigger economic growth in the long by using appropriate policy frame work.

Section Five

Summary of Findings, Conclusion and Recommendations

5.1 Summary of Findings

The following summarizes the findings of the research;

1.Ease of doing business, digital and energy infrastructure have a significant effect on economic growth in Nigeria with the exception of road infrastructure in the long run;

2.There is a joint impact of Ease of doing business, communication, energy and road infrastructure on economic growth in Nigeria in the long run.
3.There is evidence of causality between economic infrastructure and military economic growth in Nigeria

5.2 Conclusion

Based on evidence from the above findings and causality established, it is concluded that external that economic infrastructure has an effect on economic growth in Nigeria.

5.3 Recommendations

From the findings of the study the following recommendations were made. They are as follows:

i. Ease of doing business has prospects for continued growth which can encourage economic growth in the future; hence, policy measures should be put in place for its sustainability
ii. Digital infrastructure showed huge leaps and bounds in the economy as one of the fastest growing sectors; hence, further investment and sustainable policies should be encouraged.
iii. Energy sector shows promise of growth despite recording low rates of economic returns on investment; hence, the right and purposeful policies should be implemented and sustained for the sake of economic growth in the long run.
i. Lastly, the government should develop ways and means to improve on its road infrastructure if it means to commercially link the economy to further ease the rate of doing business in the economy. Its investment should be increased and judiciously managed.

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5.4 Suggestions for Further Studies.

i. A VAR analysis will be adequate to capture the interaction between the variables when they are all transformed exogenously to become endogenous at some point. This will show greater interaction among the variables and their causality effects.
ii. An expansion of the variables and the use of Non-Linear auto-regressive distributed lag (NARDL) model analysis might produce more interesting results.

5.5 Contribution to Knowledge

The work has contributed to knowledge by modelling military expenditure as a function of external debt using an econometric approach to analysis as opposed to previous studies. Furthermore, the study enlarged the scope of study to a current time period.

Bibliography

Akomolehin, O. F. (2025, June 13). _Optimizing public infrastructure investment and economic growth in Nigeria_ [Paper presentation].

Alade, K., & Okubio, C. (2025, September 26). _Innovative infrastructure finance as a catalyst for economic development in Nigeria_ [Working paper]. SSRN. https://doi.org/10.2139/ssrn.5534078

Adah, A. A., Itanyi, O., Agbor, R. A., Ademu, M. L., Musa, S. A., Bako, M. J., & Opeyemi, A. A. (2025). A Toda-Yamamoto Granger-Non-Causality approach to the impact of taxation on infrastructural development in Nigeria. _International Journal of Research and Innovation in Applied Science, 10_(6), 1-12. https://doi.org/10.51584/IJRIAS.2025.10060001

Ebehung, N., & Ogar, O. J. (2023). _Foundations of growth: Evaluating the interplay between infrastructure and economic growth in Nigeria_.

Federal Ministry of Communications, Innovation and Digital Economy. (2024, January). _Broadband access for all: Deepening Nigeria's national backbone and middle mile infrastructure_ [White Paper]. NBAN.

Ojediran, O. A. (2023). Does infrastructural development promote economic growth in Nigeria? _ACU Journal of Social Sciences, 2_(1).

World Bank. (2020). _Doing Business 2020: Comparing business regulation in 190 economies – Economy profile Nigeria_

Abu, N & Abdullahi, U (2010). Government Expenditure and Economic Growth in Nigeria, 1970-2008: A Disaggregated Analysis, Business and Economics Journal, Volume 2010: BEJ-4: 1-11.

Abutu, U. O., & Agbede, E. A. (2015). Government Expenditure and Economic Growth in Nigeria: A Co-integration and Error Correction Modeling, Munich Personal RePEc Archive, MPRA Paper No. 69676, Accessed on 2nd December, 2020 from https://mpra.ub.uni-muenchen.de/69676/

Adamu, J., & Aluthge, C. (2019). Modelling the determinants of government expenditure in Nigeria. Journal of Cogent Economics & Finance, 7(1), 283-292.

Adeosun, K. (2016). Budget implementation. This day newspapers (November, 20- 2016). Thisdaylive.com

Adole, S.O & Odike, A.I (2021). Government expenditure and Economic growth in Nigeria; IOSR Journal of Economics,(IOSR-JEF),12(1),PP.28-35.

Alper, F.O., & Demiral, M. (2016). Public social expenditures and economic growth: Evidence from selected OECD countries. Research in World Economy, 7(2), 44-51.

Andohol, J. 2012. Nigeria's Food Security Programs: Implications for MDG's Goal of Extreme Hunger Eradication, International Journal of Business and Social Science, vol. Vol. 3, no. 9.

Andohol, J. 2012. Nigeria's Food Security Programs: Implications for MDG's Goal of Extreme Hunger Eradication, International Journal of Business and Social Science, vol. Vol. 3, no. 9

Anyanwu, A. (2000). Research Methodology in Business and Social Science, Owerri, Canon Publishers.

Azam, M., & Abu Bakar, N. A. (2017). The role of infrastructure in national economic development: Evidence from Malaysia. International Journal of Economic Perspectives, 11(4), 630-637.

Baldacci, E., Clements, B., Gupta, S., & Cui, Q. (2014). Social spending, human capital and capital expenditure on Nigeria's economic growth. European Journal of Business and Management, 4(19), 66-75

Beraldo, S., Montolio, D. & Turati, G. (2019). Healthy, educated and wealthy: A primer on the impact of public and private welfare expenditures on economic growth. The Journal of Socio-Economics, 38(1), 946-956.

Berg, A., & Ostry, J. (2017). Inequality and unsustainable growth: Two sides of the same coin. IMF Economic Review, 65 (4), 792–815.

Boussalem, F., Boussalem, Z. & Taiba, A. (2014). The relationship between public spending on health and economic growth in Algeria: Testing for Co-integration and Causality. International Journal of Business and Management, 2(3), 25-39.

Breton, T.R. (2015). Higher test scores or more schooling? Another look at the causes of economic growth. Journal of Human Capital. 9(2), 239–63.

Calderon, C., & Servén, L. (2004). The effects of infrastructure development on growth and income distribution (No. 270). World Bank. https://doi.org/10.1596/1813- 9450-3400

Calderon, C., & Servén, L. (2008). Infrastructure and economic development in Sub- Saharan Africa. Policy Research Working Papers. World Bank. https://doi.org/10.1596/1813-9450-4712

Carter, J., Craigwell, R., & Lowe, S. (2013). Government expenditure and economic growth in a small open economy: A disaggregated approach. CBB Working Papers, WP/13/15.

CBN (2024). Statistical Bulletin Central Bank of Nigeria. 1(1), December.

Chandana Aluthge; Adamu Jibir & Musi Abdu(2021).Impact of Government Expenditure on Economic growth in Nigeria, 1970-2019, CBN Journal of Applied Statistics, Vol.12,No.1,June.

Chinedu, U. A., Daniel, O. C., & Ezekwe, U. C. (2018). Sectoral spreads of government expenditures and economic growth in Nigeria (1980-2017): An approach of error correction model. International Journal of Academic Research in Economics and Management Sciences, 7(4), 180–195

Devarajan, S., Swaroop, V., & Zou, H. (2016). The composition of public expenditure and economic growth. Journal of Monetary Economics, 37(2), 313-344. Developing Areas, 49(4), 285-300., Development Studies, 35(1), 47- 82.

Donou-Adonsou, F. (2019). Technology, education, and economic growth in Sub- Saharan Africa. Telecommunications Policy, 43(4), 353-360. https://doi.org/10.1016/j.telpol.2018.08.005

Ebaid, A., & Bahari, Z. (2019). The nexus between government expenditure and economic growth: Evidence of the Wagner's law in Kuwait. Review of Middle East Economics and Finance, 15(1), 274-282.

Ebong, F., Ogwunike, F., Udongwo, U. & Ayodele O. (2016). Impact of government expenditure on economic growth in Nigeria: A disaggregated analysis. Asian journal of economics and empirical research 3(1), 113-121.

Ekechoba, F.N & Amakor, I.C (2017). The impact of Government expenditure on Nigeria's Economic growth: A further disaggregated approach; Journal of social Development, Vol.6 (3).

Ekeocha, D. O., Ogbuabor, J. E., & Orji, A. (2021). Public infrastructural development and economic performance in Africa: A new evidence from panel data analysis. Economic Change and Restructuring. 55(2), 931-950. https://doi.org/10.1007/s10644-021-09334-8.

Faremo, G. (2015). Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. UN Chronicle, 51(4), 21–22.

Hausmann, R., Pritchett, L., & Rodrik, D. (2015). Growth accelerations. Journal of Economic studies.

Ijuo, O. A. & Andohol, J. (2020). Agricultural Exports and Economic Growth in Selected West African Countries, World Academics Journal of Management, Vol.8, Issue.1, pp.29-39. Available online at: www.isroset.org .

Kimaro, E.L., Keong, C.C., & Sea, L.L. (2017). Government expenditure, efficiency and economic growth: A panel analysis of sub Saharan African low income countries. African Journal of Economic Review, 5(2), 34-54.

Nketiah-Amponsah, E. (2019). Public Spending and Economic Growth: Evidence from Ghana. Development Southern Africa, 26(3), 477-497.

Nwakoby, N. P., Ajike A. K., & Ezejiofor, R. A. (2017). SMEs financing and economic development: Nigerian government incentives (1999-2015). Scholars Journal of Economics, Business and Management. 4(8B):548-554.e-ISSN 2348-5302.

Nweze, P.N., & Edame, G.E. (2016). An Empirical investigation of oil revenue and economic growth in Nigeria. European Scientific Journal, 12(25), 24-31.

Okeke, M.N., Mbonu, C.M., & Amahalu, N.N. (2018). Effect of tax revenue on economic development in Nigeria. International Journal of Research in Business, Economics and Management, 2(4), 25-61.

Okeke, M.N., Mbonu, C.M., & Amahalu, N.N. (2018). Tax revenue and economic development in Nigeria: A Disaggregated Analysis. International Journal of Academic Research in Accounting, Finance and Management Sciences, 8(2), 178- 199.

Olanipekun, E.F., & Benjamin, A.F. (2015). Fiscal and monetary policy instruments and economic growth sustainability in Nigeria. American Journal of Economics, 5(6), 587-594.

Onifade, S.T., C¸ Evik, S., Erdo˘gan, S., Asongu, S. & Bekun, F. V. (2020). An empirical retrospect of the impacts of government expenditures on economic growth: new evidence

Paternostro, S. (2017). How does the composition of public spending matter? The Oxford University press.

Pierre-Richard, A., & Alpaslan, B. (2018). Infrastructure and industrial development with endogenous skill acquisition. Bulletin of Economic Research, 70(4), 25-27.

Razzolini, L., & Shughart, W.F. (2017). On the (relative) unimportance of balanced budget. Public Choice, 90, 215-233.

Singh, S.K. (2016). Voluntary exchange theory of lindhal for determination of public expenditure. S. Chand and Company Ltd. 57–59.

Udoffia, D. T.& Godson, J. R.(2016).The impact of federal government expenditure on economic growth in Nigeria (1981-2014).Greener journal of social sciences 6(4) 92-105.

Usman, F. K., & Adeyinka, O.-B. (2019). Effect of human capital development on economic growth of ECOWAS member states. Advances in Sciences and Humanities, 5(1), 27. https://doi.org/10.11648/j.ash.20190501.14

Okoli, U. V., Nwokoye, E. S., & Ezedebego, I. R. (2023, May 31). _Government infrastructural spending and economic growth in Nigeria_.

Appendix

Pairwise Granger Causality Tests
Date: 07/14/26 Time: 04:42
Sample: 2000 2024
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNENERGY does not Granger Cause LNGDP	23	0.14707	0.8643
LNGDP does not Granger Cause LNENERGY		11.9599	0.0005
LNEASEBUS does not Granger Cause LNGDP	23	0.01777	0.9824
LNGDP does not Granger Cause LNEASEBUS		0.85744	0.4409
LNICT does not Granger Cause LNGDP	23	12.4309	0.0004
LNGDP does not Granger Cause LNICT		2.60462	0.1015
LNROAD does not Granger Cause LNGDP	23	0.31063	0.7368
LNGDP does not Granger Cause LNROAD		0.09131	0.9132
LNEASEBUS does not Granger Cause LNENERGY	23	0.19171	0.8272
LNENERGY does not Granger Cause LNEASEBUS		0.95339	0.4041
LNICT does not Granger Cause LNENERGY	23	2.53558	0.1071
LNENERGY does not Granger Cause LNICT		1.00288	0.3864
LNROAD does not Granger Cause LNENERGY	23	0.07531	0.9277
LNENERGY does not Granger Cause LNROAD		2.13623	0.1471
LNICT does not Granger Cause LNEASEBUS	23	0.67519	0.5215
LNEASEBUS does not Granger Cause LNICT		0.11371	0.8932
LNROAD does not Granger Cause LNEASEBUS	23	1.31969	0.2919
LNEASEBUS does not Granger Cause LNROAD		0.04202	0.9589
LNROAD does not Granger Cause LNICT	23	0.18183	0.8353
LNICT does not Granger Cause LNROAD		0.86401	0.4382