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Tax Revenue and Infrastructural Development in Nigeria

Lawrence Imeokparia[1]
Ikenna Theodore Nnoli[1]*
David Ojo[1]
Olufunmilayo Ajibola[2]

[1] Department of Economics, Accounting and Finance, College of Management Sciences, Bells University of Technology, Ota, Ogun State, Nigeria
[2] Department of Accounting, College of Management and Social Sciences, Anchor University, Lagos State, Nigeria
*Corresponding Author: itnnoli@bellsuniversity.edu.ng; nnolis22@yahoo.com

ABSTRACT

This study examines the relationship between tax revenue and infrastructural development in Nigeria. The study explores Company Income Tax (CIT) and Value Added Tax (VAT) as indicators for tax revenue. Also, three measures of capital expenditure; administrative capital expenditure, economic capital expenditure, and social services capital expenditure were adopted as a proxy for infrastructural development. The data used in the study were gathered from 2011-2021 and sourced from the Federal Inland Revenue Service (FIRS) and Central Bank of Nigeria Statistical Bulletin. To establish the relationship between tax revenue and infrastructure development, Pearson correlation and regression analysis were explored. The study finds that there is a positive relationship between CIT and economic capital expenditure, administrative capital expenditure and services capital expenditure. Likewise, the study shows a positive link between VAT and services capital expenditure, economic capital expenditure, and administrative capital expenditure in Nigeria. Therefore, it is recommended that the federal government effectively utilize the revenue generated from tax for infrastructural advancement and ensure there is no wastage in the process of disbursement of funds.

Keyword: capital expenditure; company income tax (CIT); infrastructural development; Nigeria; value added tax (VAT)

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INTRODUCTION

Promoting economic growth and, as a result, raising living standards are the primary economic objectives of emerging countries. Any country's development depends on its infrastructure (Amahalu et al., 2018; Khan et al., 2022). A well-designed infrastructure facility promotes economic growth by boosting investment productivity, boosting output, and reducing operating costs (Amahalu, 2018; Widjaja, 2024). The standard of a nation's infrastructure may have an influence on the nation's ability to diversify its economy, deal with population expansion, combat poverty, and improve the welfare of its residents (Mobolaji & Wale, 2012; Hidayat et al., 2024). According to the Social Overhead Capital (SOC) operations classification, public works are a part of infrastructure development. This development is the result of all the amenities and services offered to raise the standard of living for the people. The infrastructure may be thought of as including things like piped water, good roads, respected educational institutions, appropriate medical facilities, and classrooms with sufficient furniture (Ezeudu & Fadeyi, 2024). But there is evidence that Africa's lack of infrastructure expansion has hampered growth and development (Foster & Briceno-Garmendia, 2010; Thusi & Mlambo, 2023; Nwokolo et al., 2023).

Building infrastructure requires a lot of resources and cash. Therefore, the government must mobilize and generate a significant amount of money to finance infrastructure development. Taxation is one method of raising money. Tax revenue is collected and generated to efficiently and continuously build infrastructures such as those for education, health, and the provision of basic public services (Inyiama Edeh, & Chukwuani , 2017; Omodero & Igodo, 2024). One method of mobilizing resources and generating revenue is taxation. (Lompo, 2024). Tax revenue has macro consequences on the level of capacity output, employment, price, and growth in addition to micro effects on income distribution and the efficiency of resource use. Additionally, as Oluba, (2008), stated, countries such as the United States, Canada, the Netherlands, and the United Kingdom have used tax revenue from import duties, value-added taxes, and corporate income taxes to effectively enhance their economies. In some developed economies, taxes account for more than 40% of the GDP, according to Tax Justice Network (2012). However, because of the decline in income generation, using taxes as a tool for fiscal policy to finance infrastructure development is no longer a viable option in most developing countries (Ajeigbe et al., 2024; Oluba, 2008).

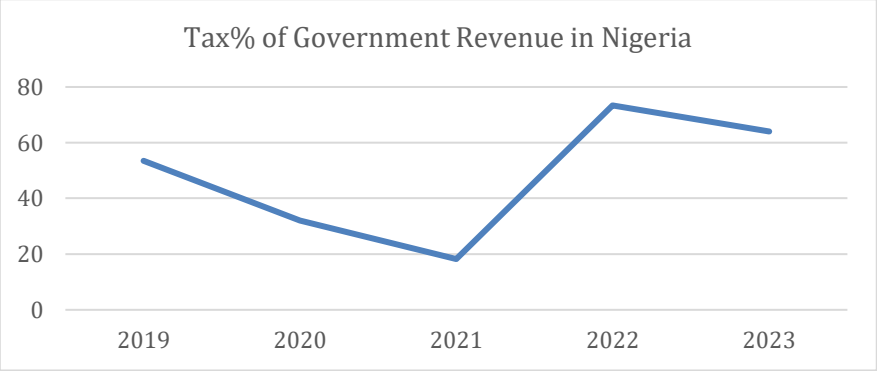

Figure 1. Tax revenue as a percentage of government revenue in Nigeria
Source: Authors computation (2025)

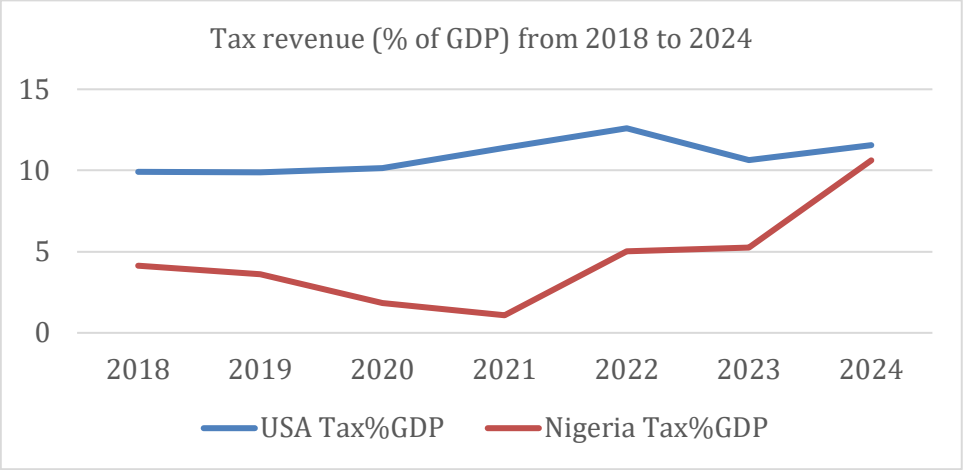

Figure 2. Comparison of tax revenue to GDP between Nigeria and the USA
Source: Authors computation (2025)

Nigeria serves as an important case study for examining the relationship between tax revenue (proxied by Company Income Tax (CIT) and Value Added Tax (VAT)) and infrastructural development due to its status as Africa's largest economy and its persistent infrastructural deficits. Despite being a major oil-producing nation, Nigeria has struggled with low tax revenue mobilization, which has constrained its ability to fund critical infrastructure such as roads, power, and healthcare (Nkiru et al., 2024). The fluctuations in tax revenue as a percentage of government revenue (Figure 1) and tax-to-GDP ratio (Figure 2) highlight Nigeria's fiscal challenges compared to developed economies like the USA.

Nigeria's tax-to-GDP ratio has historically been low, averaging around 5-6% in recent years (Figure 2), significantly below the USA's average of 10-12% and the Sub-Saharan African average of 16-18% (World Bank, 2023). This inefficiency in revenue collection limits the government's capacity to invest in infrastructure, exacerbating poverty and hindering economic growth (Olasunkanmi & Adejuwon, 2024). The sharp decline in tax revenue as a percentage of government revenue in 2020 and 2021 (Figure 1) can be attributed to the COVID-19 pandemic and oil revenue shocks, further underscoring Nigeria's vulnerability to external shocks due to its over-reliance on oil.

Infrastructure development in Nigeria is still simply "a pipe dream" despite the yearly tax income generated, leading to high rates of poverty, unemployment, and low standards of living (Nwite, 2015). Considering this, Alabi and Ocholi, (2010), noted that Nigeria's infrastructure is in a bad shape; both its quality and quantity are woefully insufficient and unrepresentative in comparison to other economies around the world. Even if Nigeria's infrastructure has recently experienced a significant and still continuous transition, the development required for economic success is yet in the future. The argument over whether tax income is a good tool for supporting infrastructural development in the policy and academic environment was sparked by this conundrum. Numerous studies have looked at how tax money affects infrastructure development, with varying degrees of success. The numerous tax revenues collected and mobilized by the Nigerian government, according to Adenugba and Ogechi, (2013); Oladipupo and Ibadin, (2016), have a considerable impact on infrastructure development. However, other research; Anyaduba and Aronmwan, (2015), Inyiama, Edeh, and Chukwuani (2017) and Adeleke, Osayomi and Adeoti (2020), either indicate a lack of link or a negligible effect of tax revenue on infrastructure development. Ayeni and Afolabi (2020), for example, explore the dynamic relationship between tax revenue and infrastructure growth, considering both how infrastructure may increase tax revenue and how tax revenue encourages infrastructure development.

The choice of Nigeria as a case study is further justified by ongoing tax reforms, such as the Finance Act 2020 and the introduction of the Tax-for-Service initiative, aimed at improving compliance and linking tax payments to infrastructural benefits (FIRS, 2022). Given these dynamics, analysing how CIT and VAT contribute to infrastructural financing provides critical insights into Nigeria's fiscal sustainability and development trajectory. The question at hand is how much tax money the Nigerian government has raised to invest in infrastructure. Additionally, how the different measures of tax revenue have impacted infrastructural development in Nigeria. The main purpose of this study is therefore, to examine the impact of tax revenue on infrastructural development in Nigeria.

This section presents literature on the concept of infrastructure development and the measures of tax revenue. Also, it entails the theoretical and empirical reviews of the relationship between tax revenue and infrastructure in Nigeria.

Concept of Infrastructure Development

According to Malah Malah-Kuete and Asongu, (2023), the provision of all utilities and social amenities with the goal of raising the general public's standard of living is referred to as infrastructure development. The social amenities may include piped water, good roads, top-notch educational institutions, and medical facilities. According to Inyiama, Edeh, and Chukwuani (2017), the primary goal of emerging economies is to increase economic growth and, in turn, per capita income in order to improve their standard of living. Generally, infrastructure refers to the essential services that must be provided in order for development to occur. The physical facilities required for a society to function, according to Waziri, Ali, and Nura (2014), can also be thought of as infrastructure. Infrastructure is defined by Oisasoje and Ojeifo, (2012), as those components that act as a catalyst for development and an improvement in the welfare of citizens. When viewed holistically, infrastructure development can be equated with consistent increases in per capita income. According to Todaro and Smith (2011), the existence of physical, social, and economic infrastructures can support and expedite the development of infrastructural systems. The absence of essential infrastructure and services will make development all but impossible (Migap, 2014).

Concept of Value Added Tax

Value Added Tax (VAT) is a multistage tax that is levied on the value added to goods and services as they move through different stages of production and distribution, as well as to services as they are rendered. Although it is ultimately paid by the family consumer, VAT is collected at each stage of the production and distribution chain. In 1994, the VAT was implemented in Nigeria as a consumption tax. All consumable items that are categorized as vatable items are subject to a 5 percent levy. Adereti, Sanni, and Adesina, (2011) also demonstrated how VAT revenue affected Nigeria's economic growth from 1994 to 2008. VAT is a tax that is paid by people, the government, and businesses on the consumption of goods and services. It is an indirect tax that is assessed on goods and services at every stage of production, avoiding the cascading (double) effect of tax that occurs with taxes that are comparable to sales taxes. As a result, it has become more popular than sales taxes (Obaretin & Uwaifo, 2020).

A tax on consumption, known as Value Added Tax (VAT), is paid when products are purchased and services are rendered (FIRS, 2020). All goods produced domestically or imported into Nigeria are subject to VAT, except for those items specifically exempted under the VAT Act. The value-added is taxed at every stage of production in the value chain since VAT is a multi-stage tax. The current VAT rate is 7.5 percent, which went into effect in February 2020. The decision to raise the VAT rate from 5 percent to 7.5 percent was not unexpected because previous governments had made many attempts to do so. The fact that Nigeria VAT rate is among the lowest in the world is one of the arguments put up by the current administration for raising it. Another argument is that it will be used to pay for the new minimum wage

in Nigeria. However, given the dynamic nature of Nigeria, spending funds on a new minimum wage may not be a rational justification for increasing the VAT rate.

Concept of Company Income Tax

Revenue obtained from taxes levied on business profits is known as company income tax. Company income tax, according Inyiama and Nwankwo (2016), is a type of tax collected by the federal government on the earnings of corporations. Ezu and Okoh (2016), asserted that this tax resource is reliant on the earnings reported by businesses. When a business declares a loss, the government loses these taxes. It can be claimed at a rate of 30% on the earnings of any legally registered corporate companies that are not involved in the production of petroleum. In a closed economy, corporate taxes are quite simple, but it becomes more difficult when businesses operate in multiple nations (Zucman, 2014). Company income tax is one of the major taxes collected by the federal government and helps in the provision of funds for the development of various important sectors in Nigeria, while not being the greatest contributor to tax revenue in Nigeria (John-Akamelu et al., 2022). By paying taxes, businesses can take advantage of some crucial government services including the improvement of road networks, reliable and effective telecommunication, energy, and water supply (Akinola & Akinrinola, 2023). The establishment of universities and technical colleges enables the government to develop a skilled workforce and ensures the efficient functioning of its operations. Therefore, the amount of tax that these businesses pay should be a significant factor in how much they contribute to the economy (Adegbite, 2015).

Tax Regulations on Company Income Tax (CIT) and Value Added Tax (VAT) in Nigeria

Taxation serves as a critical fiscal instrument for revenue generation and economic development in Nigeria, with Company Income Tax (CIT) and Value Added Tax (VAT) being two of the most significant revenue sources for the government. Despite ongoing reforms, Nigeria's tax system continues to grapple with challenges such as low compliance, widespread evasion, and administrative inefficiencies (Nkiru et al., 2024). This conceptual review explores the regulatory frameworks governing CIT and VAT, analysing their effectiveness and impact on Nigeria's economy through empirical literature.

The legal foundation for Company Income Tax (CIT) in Nigeria is established under the Companies Income Tax Act (CITA) Cap. C21 LFN 2004 (as amended), which has undergone several revisions, including key amendments introduced by the Finance Acts of 2019, 2020, and 2021. The standard CIT rate is set at 30% for large corporations, while small and medium enterprises (SMEs) benefit from a reduced rate of 20%, as stipulated in the Finance Act 2020. Taxable income under CIT includes profits derived from trade, business, and investments, with allowable deductions for legitimate business expenses (CITA, 2004). Additionally, Nigeria's tax regime provides incentives such as tax holidays for pioneer industries and exemptions for agricultural and export-oriented businesses to stimulate economic growth (Amadi-Robert, 2025). Empirical studies, however, reveal that CIT compliance remains suboptimal due to tax evasion, multiple taxation, and administrative bottlenecks, resulting in a CIT-to-GDP ratio of less than 2%, significantly lower than the African average of 4-6% (World Bank, 2023). To address these challenges, the government has implemented measures such as the TaxPro-Max digital platform for automated tax filings and the introduction of thin capitalization rules in the Finance Act 2019 to curb tax avoidance by multinational corporations (Umenweke, 2024).

Similarly, Value Added Tax (VAT) in Nigeria is governed by the Value Added Tax Act Cap. V1 LFN 2004 (as amended), which replaced the Sales Tax in 1993. The Finance Act 2020 marked a significant shift by increasing the VAT rate from 5% to 7.5%, aiming to expand the tax base and enhance revenue generation (Nkiru et al., 2024). VAT applies to a broad range of goods and services, with exemptions for

essential items such as basic food products, medical services, and educational materials (VAT Act, 2004). Businesses with an annual turnover of ₦25 million and above are legally required to register and remit VAT, while the revenue collected is distributed among the federal government (15%), state governments (50%), and local governments (35%) (Ojo & Shittu, 2023). Despite its potential as a stable revenue source, VAT compliance in Nigeria remains low, with only about 40% of eligible businesses fulfilling their obligations, largely due to weak enforcement and the dominance of the informal sector (World Bank, 2023). Administrative inefficiencies, including manual processing and corruption, further hinder effective VAT collection (Olasunkanmi & Adejuwon, 2024). Recent reforms to improve VAT administration include the adoption of digital platforms by the Federal Inland Revenue Service (FIRS) to enhance transparency and reduce revenue leakages (FIRS, 2022). Additionally, the contentious 2021 court ruling, which initially granted states the authority to collect VAT (later overturned), highlighted ongoing debates over fiscal federalism and revenue allocation in Nigeria.

When comparing the performance of CIT and VAT, CIT demonstrates moderate compliance, particularly within the formal sector, but contributes only about 2% to GDP due to persistent evasion. Conversely, in spite of its wider base, VAT has been estimated to constitute around 1.5 percent of GDP and there is a substantial potential waiting to be unlocked owing to non-compliance in the informal sector (World Bank, 2023). E-reforms, including TaxPro-max system, have demonstrated the potential to enhance CIT filers, whilst an upsurge in the VAT rate in 2020 has strengthened revenue collection. Nevertheless, the two taxes still have a systemic problem, such as tax evasion, a large informal economy, and multiple taxation, which does not encourage compliance and acts as a brake on revenue collection improvements (Olasunkanmi & Adejuwon, 2024). To alleviate these challenges, the policymakers have to make a priority of developing digital tax systems, coming up with compliance incentives, which in this case are tax credit, and to even harmonize tax laws to remove redundant taxes. Reinforcing these mechanisms will play a very major role in increasing the tax revenue in Nigeria and meeting its infrastructural development and economic growth on a sustainable basis.

Optimal Taxation Theory

This study examines the relationship between tax revenue and infrastructure development in Nigeria through the lens of Optimal Taxation Theory, which provides a normative framework for designing tax systems that maximize social welfare. The theory traces its origins to foundational works by Ramsey (1927), Pigou (1920), and Mirrlees (1971) as cited by Anyaduba and Aronmwan (2015). Ramsey (1927) advocated taxation as a tool for income redistribution, while Pigou (1920) emphasized linear commodity taxation to correct market externalities. Mirrlees (1971) expanded the discourse by introducing non-linear income taxation, arguing that tax structures should balance efficiency and equity.

Optimal Taxation Theory adopts a welfare economics approach, positing that governments (as social planners) should design tax systems that maximize revenue while minimizing economic distortions. The theory assumes that policymakers act as utilitarian agents, seeking to enhance societal welfare by efficiently allocating tax revenues toward public goods, including infrastructure (Anyaduba & Aronmwan, 2015). In the contest of Nigeria, this implies that tax policies should be structured to generate sufficient revenue for infrastructural investments without overburdening taxpayers or stifling economic growth. However, challenges such as tax evasion, weak enforcement, and inefficiencies in revenue allocation often hinder optimal outcomes (Nkiru et al., 2024).

Institutional Theory

Complementing the optimal taxation framework, institutional theory provides insights into how formal and informal institutions shape tax compliance and revenue utilization. North (1990) defines institutions as the "rules of the game," encompassing laws, regulations, norms, and enforcement

mechanisms that govern economic behaviour. In Nigeria, weak institutional frameworks, such as corruption, bureaucratic inefficiencies, and inconsistent tax policies, have historically undermined revenue mobilization (Olasunkanmi & Adejuwon, 2024).

Empirical studies suggest that stronger tax institutions, including transparent administration and digitalized systems (e.g., FIRS's TaxPro-Max), can enhance compliance and revenue collection (FIRS, 2022). Institutional Theory thus reinforces the argument that effective governance structures are critical for translating tax revenues into tangible infrastructural development.

Fiscal Federalism Theory

Given Nigeria's federal structure, Fiscal Federalism Theory (Oates, 1972) is highly relevant to this study. The theory examines how revenue responsibilities and expenditure allocations are distributed across different tiers of government. In Nigeria, VAT revenue is shared among federal (15%), state (50%), and local governments (35%), while CIT is primarily a federal tax (VAT Act, 2004). However, disputes over revenue allocation, such as the 2021 legal battle on VAT collection rights, highlight tensions in fiscal decentralization (Aliyu, 2024).

Fiscal Federalism Theory suggests that decentralized tax administration can improve accountability and infrastructure delivery if accompanied by strong intergovernmental coordination. However, Nigeria's experience reveals challenges, including uneven revenue distribution, mismanagement, and lack of subnational fiscal autonomy (World Bank, 2023).

Empirical Review

The significance of tax revenue as a vehicle for enhancing Nigerian infrastructure development has also been the subject of numerous disputes. According to certain research, Nigeria's degree of infrastructure development has increased because of the amount of tax income the country has accrued over the years. In Nigeria, the association between tax revenue and infrastructure development is evaluated by Oladipupo and Ibadin (2016). According to the study, tax revenue and infrastructure growth in Nigeria have a considerable and favourable link. The authors suggest that legislative changes to increase tax revenue production and collection will have a positive impact on Nigeria's infrastructure development process. Furthermore, using Lagos State as a case study, Adenugba and Ogechi (2013), investigated the relationship between tax income and infrastructural development. According to the study's findings, Lagos State's infrastructural growth and tax income are significantly correlated. Similarly, Mbah, and Onuora, (2018), investigated how tax revenue affects infrastructure development in the Southeastern states of Nigeria. According to the study, tax income and infrastructure growth in the Southeastern states are significantly and favourably correlated.

According to certain research, Nigeria's infrastructure development has not progressed because of the tax income collected throughout the years. For instance, Inyiama, Chinedu, and Nnenna (2017) evaluated the effect of tax revenue on infrastructure development in Nigeria. Value-Added Tax (VAT), Corporate Income Tax (CIT), and Petroleum Profit Taxes (PPT) are used in the study to calculate tax revenue. The study's findings indicate that tax money has a small but positive influence on Nigeria's infrastructure growth. According to the study, infrastructure must be established to enable effective tax generating and collection. Anyaduba and Aronmwan (2015) examined the impact of tax revenue on the growth of infrastructure in Nigeria. Their analysis discovered that while firm income tax and education tax have a substantial correlation with infrastructure development in Nigeria, petroleum profit tax and value added tax had no discernible influence on infrastructure development in Nigeria. Additionally, Ayeni and Afolabi, (2020), contend that the amount of tax income amassed over the years has been justified by the level of infrastructure development. The study's findings, when seen in the context of

the dynamic link between tax revenue and infrastructure development in Nigeria, indicate that tax revenue collection has a substantial impact on infrastructure development, but the converse relationship was not established. Studies that investigate the effect of tax revenue from sources other than oil on infrastructure development are also included in this body of knowledge.

For developing countries, Chauvet and Ferry (2020) scrutinized the effect of tax revenue on infrastructure and explained that tax revenues are important for the financing of infrastructures; particularly, infrastructures that benefit corporate activities in the country. Specifically, for Latin America and the Caribbean, Cerra et al., (2017), investigated the factors that drive infrastructural development. The study establishes that tax revenue is a contributing factor to infrastructural improvement. For some East Africa countries, Mwakalobo (2015) assessed the effect of revenue on public spending. The study found that in Tanzania and Uganda, the increase in revenue leads to a strong impact on physical spending such as infrastructure in the countries. Furthermore, Aghion et al., (2016), highlights that tax revenue has a positive effect on infrastructure development. More so, the authors emphasize that the positive effect of tax revenue is largely hinged on the level of corruption and political accountability.

RESEARCH METHOD

The data explored in this study are already available; therefore, an ex-post facto research design is adopted. The study uses annual data from secondary sources to examine the relationship between tax revenue and infrastructure development in Nigeria. The data used in the study were gathered from 2011-2021 and obtained from FIRS and Central Bank of Nigeria Statistical Bulletin. The variables explored in the study include capital expenditure to measure infrastructure development in Nigeria. In contrast to previous studies in the literature, this study explores a multi-proxy approach to measure infrastructure development. The indicators for the dependent variables are administrative capital expenditure, economic capital expenditure, and social services capital expenditure. More so, to measure the tax revenue, the study adopts CIT and VAT.

Model Specification

In line with the study of Inyiama, Chinedu, and Nnenna, (2017) and Anyaduba and Aronmwan (2015), the following model specifications are adopted for the study.

$$Infdev = f(CIT, VAT, PPT, CE) \dots\dots\dots\dots (1)$$

$$Infdev_t = \beta_0 + \beta_1 CIT_t + \beta_2 VAT_t + \beta_3 PPT_t + \beta_4 CE_t + \varepsilon_t \dots\dots\dots (2)$$

Where $Infdev$ is the infrastructure development, measured by three indicators namely administrative capital expenditure, economic capital expenditure, and social services capital expenditure. Tax revenue is measured by Company Income Tax (CIT), Value-Added Tax (VAT), Petroleum Profit Tax (PPT) and Custom and excise duties.

To achieve the objectives of this study, the multiple regression model for this study can be written as,

$$InINFRADEV_t = \beta_0 + \beta_1 TAXREVENUE_t + u_t \dots\dots\dots (3)$$

Information:
$InINFRADEV$ = the natural log of infrastructure development
$InTAXREVENUE$ = the natural log of tax revenue and u denotes the error term

The natural logarithm of the variables is explored to linearize the data and ensure there are no outliers of value in each variable which could lead to spurious regression analysis and cause our empirical result to be unreliable. For this study, infrastructural development is proxy by three indicators; the administrative capital expenditure, the economic capital expenditure, and the social capital expenditure. Also, the tax revenue is measured as CIT, PPPT, VAT, and Customs and Excise duty (CE)

To incorporate the three measures into the empirical model, the specified model can be rewritten.

$$InADMINCAPEX_t = \beta_0 + \beta_1 CIT_t + \beta_2 PPT_t + \beta_3 VAT_t + \beta_4 CE_t + u_t \ldots\ldots\ldots (4)$$

$$InECONCAPEX_t = \beta_0 + \beta_1 CIT_t + \beta_2 PPT_t + \beta_3 VAT_t + \beta_4 CE_t + u_t \ldots\ldots\ldots (5)$$

$$InSOCIALCAPEX_t = \beta_0 + \beta_1 CIT_t + \beta_2 PPT_t + \beta_3 VAT_t + \beta_4 CE_t + u_t \ldots\ldots\ldots (6)$$

Information:
InADMINCAPEX = the natural log of administrative capital expenditure
InECONCAPEX = the natural log of economic capital expenditure
InSCOIALCAPEX = the natural log of social capital expenditure

Equations 4 – 6 are estimated using the Ordinary Least Square (OLS) estimator in other to achieve the objectives of this study.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1. Descriptive statistics analysis

Variables	Mean	Std. Deviation	Min	Max
CIT	1181.63	325.57	654.45	1747.99
PPT	2133.43	703.71	1157.81	3201.32
VAT	335.19	424.78	164.64	1605.17
Custom and Excise	705.29	216.72	467.68	1183.45
Admin capex	339.04	163.44	147.72	635.73
Economic capex	575.27	279.21	278.95	1102.47
Social capex	157.65	76.99	68.80	303.66

Table 1 contains the descriptive analysis of the variables employed for this study. The characteristics under consideration include the mean, standard deviation, minimum and maximum value. The mean characteristic is the average series value obtained by dividing the total series value by the number of observations. The table shows that the average value of Company Income Tax (CIT), Petroleum Profit Tax (PPT), Value-Added Tax (VAT), and Custom and Excise Duties (CE) are 1181.63, 2133.43, 335.19, 705.29, 339.04, 575.27, and 157.65, respectively. Also, the standard deviation which reflects the degree of deviation of the series from its actual mean measures the dispersion of the series.

The descriptive statistic table presents that only VAT deviates above its actual mean while other variables were found to not deviate from their actual mean. The table also presents the minimum and maximum values for the data explored in the study.

Correlation Analysis Matrix

Table 2. Pairwise correlations analysis

Variables	Social capex	Economic capex	Admin capex	CIT	VAT	Custom and Excise
Social capex	1.0000					
Economic capex	0.9897	1.0000				
Admin capex	0.9847	0.9976	1.0000			
PPT	-0.0386	-0.0690	-0.0786			
CIT	0.8408	0.8543	0.8636	1.0000		
VAT	0.6901	0.6912	0.6688	0.6329	1.0000	
Custom and excise	0.3194	0.3367	0.3565	-0.3621	0.3257	1.0000

To establish the relationship between tax revenue and infrastructure development in Nigeria, this study explores the correlation analysis method. From Table 2, the Pearson Correlation analysis result shows that the association between the variables is mixed. The result presented shows that there is a positive relationship between economic services capital expenditure and social and community capital expenditure. The positive relationship was shown to be strong at 98.9 percent degree. This implies that when the federal government invests in social and community capital expenditures such as education and health, it positively links to the expenditure made on economic services such as agriculture, road, and construction. Also, the table shows that there exists a positive relationship between social and community capital expenditure and administration capital expenditure. Summarily, all the indicators of capital expenditure used to proxy infrastructure development were found to be positively linked to each other. Therefore, the improvement of one aspect of infrastructure leads to the improvement of other aspects of infrastructure development.

Further, the result shows that Company Income Tax (CIT) has a positive correlation with social capital expenditure, economic capital expenditure, and administration capital expenditure. Therefore, it can be concluded that the improvement in the company income tax can positively drive infrastructure development in Nigeria. This study finding of a positive correlation between CIT and infrastructural development in Nigeria, corroborates the result of Oladipupo and Ibadin (2016), who asserted that there is a significant and positive relationship between CIT and infrastructural development in Nigeria. Likewise, the value added tax shown in the table has a positive relationship with social capital expenditure, economic capital expenditure, and administration capital expenditure. More so, the study examines the correlation between the measures of tax revenue and finds that there is a positive association between CIT and VAT. Thus, the mobilization of one form of tax revenue positively affects the mobilization of another source of tax revenue. Nigeria still grapples with the expansion of its tax base and revenue, as tax authorities are faced with issues with tax avoidance among other challenges tied to administration and tax collection system.

Ordinary Least Square (OLS) Empirical Result

Table 3. Ordinary least square regression

	Admin capex (equation 4)		Economic capex (equation 5)		Social capex (equation 6)	
	Co-efficient	P-values	Co-efficient	P-values	Co-efficient	P-values
Constant	0.016		0.018		0.019	
CIT	0.323	0.020	0.512	0.027	0.141	0.032
PPT	0.083	0.037	0.141	0.038	0.418	0.034
VAT	0.149	0.091	0.289	0.063	0.079	0.072
Custom and Excise	0.279	0.059	0.487	0.056	0.131	0.068
R-square	0.918		0.917		0.909	
Adjusted R-square	0.853		0.841		0.827	
F-Statistics	0.000		0.000		0.000	

Table 3 shows the OLS estimation result. The table depicts that the probability of the F-statistics is significant at the 1% level. The 1% significant level of the F-statistics explains the reliability of the independent variables to predict the dependent variable; i.e., infrastructural development is significant. The linear regression also shows that there is a statistically significant relationship between the dependent variables and the independent variables. For this study, the dependent variables are administrative capital expenditure, economic capital expenditure, and social capital expenditure. Meanwhile, the independent variables are CIT, PPT, VAT, and Customs and Excise (CE). Further, the table reports that the R-squared of the first model explains 91.8% of the variance in administrative capital expenditure. Also, the R-squared of the second empirical model explains 91.7% of the variance of economic capital expenditure while the third model predicts 90.9% of the variance of social capital expenditure. Additionally, the adjusted R-squared is close to the R-squared, implying a true association between all the measures of infrastructural development and tax revenue measures.

To examine the effect of tax revenue on infrastructural development in Nigeria, this study explores the simple regression model. The result shows that there is a positive effect of CIT on administrative capital expenditure, economic capital expenditure, and social capital expenditure. The positive effect established is explained to be significant by a 5% level for all the measures of infrastructural development. The findings of the study establish that the higher the revenue generated from CIT, the higher the expenditure for infrastructural development via administrative. economic, and social capital expenditure. The empirical finding shows that a unit increase in CIT revenue will lead to a 32.3 percentage point increase in administrative capital expenditure, a 51.2 percentage point increase in economic capital expenditure, and a 14.1 percentage point increase in social capital expenditure. Therefore, it can be concluded that the improvement in the company income tax can positively drive infrastructure development in Nigeria. This finding corroborates the result of Oladipupo and Ibadin (2016) who found that there is a significant and positive effect of CIT on infrastructural development in Nigeria.

Further, the table shows that PPT has a positive and significant effect on administrative capital expenditure and economic and social capital expenditure. The positive effect exhibited is statistically significant by 5% level for all the measures of infrastructural development. The coefficient of the result shows that a unit increase in the PPT revenue will lead to an 8.3 percentage point increase in

administrative capital expenditure, 14.1 percentage point, and 41.8 percentage point increase in economic and social capital expenditure, respectively. This study however contradicts the findings of Inyiama, Chinedu, and Nnenna (2017) who found that PPT has no significant impact on infrastructure development in Nigeria.

Also, the table shows that VAT has a positive effect on administrative capital expenditure, economic capital expenditure, and social capital expenditure. The result shows that a unit increase in VAT revenue will lead to a 14.9 percentage point increase in administrative capital expenditure, and a 28.9 percentage point and 7.9 percentage point increase in economic and social capital expenditure, respectively. More so, the study finds that custom and excise have a positive effect on all the measures of infrastructural development. The result shows that a unit increase in customs and excise duty will lead to a 27.9 percentage point, 48.7 percentage point, and 13.1 percentage point increase in administrative, economic, and social capital expenditure, respectively.

Using the magnitude of effect to compare the extent of the effect of each tax revenue on infrastructural development in Nigeria. It is revealed in the study that based on the measures of tax revenue that the CIT has a stronger impact on administrative capital expenditure then followed by customs and excise duty. Likewise, regarding the economic capital expenditure, the result reveals that, CIT is more effective than other tax revenue gauges considered in the analysis. In the meantime, PPT is more significant of the expenditure on social capital than other measures of tax revenue performed in the research. In sum, the study results indicate that higher generation of tax revenues positively impacts on infrastructural growth in Nigeria. Thus, the greater amount of tax money collected by the government of Nigeria means more means of fiscal intervention in case of infrastructural development. The study is in line with the conclusion made by Ayeni and Afolabi (2020), who posit a dynamic relationship between tax revenue and infrastructural development in Nigeria, stating that the collection of tax revenue influences infrastructural improvement significantly.

CONCLUSION

This paper explores how tax revenue relates to infrastructure development in Nigeria in the period between 2011 and 2021 by analyzing Company Income Tax (CIT) and Value Added Tax (VAT) as major indicators of tax revenue and expenditure on administrative, economic, and social capital as proxies to infrastructural development. The results indicated that there existed a positive significant correlation between CIT, VAT, and infrastructural development, which reflects the Optimal Taxation Theory, which argues that revenue collections made through taxes must be efficiently spent on public goods such as infrastructural construction in order to attain the highest degree of social utility (Ramsey, 1927; Mirrlees, 1971). Nevertheless, this theoretical match notwithstanding, there are empirical limitations to the full-scale harvesting of this potential e.g. by complexity of the tax regime, inefficiency of tax administration, and difficulties of tax compliance.

Nigeria's tax system, governed by the Companies Income Tax Act (CITA) and the Value Added Tax Act, faces significant hurdles in CIT administration, including ambiguity in tax refund procedures and the prevalence of tax fraud (Nkiru et al., 2024). These challenges are compounded by the existence of multiple taxes and weak enforcement mechanisms, which discourage compliance and limit revenue generation (World Bank, 2023). Institutional Theory (North, 1990) underscores how these systemic inefficiencies, rooted in corruption and bureaucratic bottlenecks; impede the translation of tax revenues into tangible infrastructural outcomes. For instance, while the Finance Act 2020 introduced reforms like the TaxPro-Max digital platform to streamline tax filings, implementation gaps persist, particularly in the informal sector where compliance remains low (FIRS, 2022).

Fiscal Federalism Theory (Oates, 1972) further highlights the disparities in revenue allocation and utilization across Nigeria's federal, state, and local governments. The centralized administration of CIT and the contentious distribution of VAT revenues, 15% to the federal government, 50% to states, and 35% to local governments, often lead to mismanagement and inequitable infrastructural development (Aliyu, 2024). Empirical evidence from this study supports the need for stronger intergovernmental coordination to ensure that tax revenues are effectively channeled into projects like road networks, healthcare, and education, which directly impact economic growth and social welfare (Akinola & Akinrinola, 2023).

To address these challenges, the study recommends the following policy measures:

1. Streamline CIT and VAT processes to reduce complexity and enhance compliance, particularly for SMEs.
2. Strengthening Institutional Frameworks by Investing in digital tax administration tools and anti-corruption measures to improve transparency and accountability.
3. Fiscal Decentralization: Empower subnational governments with greater autonomy and capacity to manage tax revenues, ensuring equitable infrastructural development.
4. Public Awareness Campaigns to educate taxpayers on the link between tax compliance and infrastructural benefits to foster voluntary compliance.

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