Tax Revenue Mobilization and Infrastructural Development in Nigeria

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Abstract
This study sought to examine the relationship between Tax Revenue Mobilization and Infrastructural Development in Nigeria. Specifically, the study investigated the impact of Petroleum Profit, Company Income Tax, Value Added Tax and Capital gain tax revenue on Infrastructural Development in Nigeria. The study adopted ex-post factor research design, and data was gathered from the Federal Inland Revenue Service Statistical Bulletin (2002-2022) and CBN Statistical bulletin (2022). In order to evaluate the analysis, four hypotheses were formulated and tested using Ordinary Least Squares (OLS) regression technique. The findings revealed that the Petroleum Profit Tax Revenue has no significant effect on Infrastructural Development in Nigeria. It was also revealed that Company Income Tax Revenue has significant effect on Infrastructural Development in Nigeria. The findings as well revealed that Value Added Tax Revenue has significant effect on Infrastructural Development in Nigeria; and also, showed that Capital Gain Tax Revenue has on Infrastructural Development in Nigeria. The study thus concluded that corporate income taxes revenue and value added tax revenue have significant effect on infrastructural development while petroleum profit tax and capital gain tax were otherwise. These implied that tax revenue measures such as (companies' income tax and value added tax significantly affect infrastructure development in Nigeria. It was recommended that government should put in place adequate measure to ensure that revenue generated from petroleum profits tax and capital gains tax are effectively utilized to develop and grow the economy through proper infrastructural development.

Keywords: Tax revenue mobilisation, Corporate Income tax, Value Added Tax, Capital Gain Tax, Petroleum Profit Tax

1. Introduction

The Nigerian government grapples with numerous responsibilities and challenges as it endeavours to fulfil its campaign commitments. These include tasks such as constructing roads, ensuring a consistent power supply, expanding the railway system, providing comprehensive security measures, ensuring food security, and meeting the salary obligations of federal workers. Accomplishing these goals demands substantial financial resources to effectively execute these initiatives. The

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aforementioned tasks are carried out when there is adequate revenue for the government. One of the surest ways Nigerian government realises revenue aside from revenue from Oil and Gas is through taxation.

Tax represents a compulsory levy imposed by a government—whether at the federal, state, or local level—on the income generated by individuals and businesses through the production, sale, and utilization of goods and services (Oladapo & Olalekan, 2023). It holds a direct influence on the Human Development Index (HDI), a widely used metric for gauging a country's economic development. An effective tax system serves to safeguard emerging industries, fostering entrepreneurial growth crucial for sustaining economic progress in any nation (Eyisi, Chioma & Bassey, 2015).

In recent times, Nigeria has undergone various reforms in its tax policies, aiming to enhance tax administration and boost revenue collection. For instance, the enactment of the Value Added Tax (Amendment) Act 2004 LFN sought to broaden the Value Added Tax base and enhance the mechanisms for its collection. Likewise, the Company's Income Tax (Amendment) Act 2007, the Federal Inland Revenue Service (Establishment) Act 2007, and the Petroleum Profit Tax (Amendment) Act 2004 were all designed to promote tax compliance and augment tax revenue (Aguolu, in Agbo, & Onuegbu 2022). Unfortunately, despite these efforts, citizens often do not reap the benefits of their tax contributions due to issues like inefficient governance, unqualified tax personnel, and corrupt revenue collectors, particularly within Local Government Areas and Local Government Development Authorities (LGDA) known as "Agbero" (Agbo, especially in LGA and LGDA), who divert government revenue for personal gain.

In Nigeria, as in other countries throughout the world, the government plays a vital role in providing basic infrastructure, such as energy, telecommunication, water supply, and effective transportation systems at different levels. These systems have a major impact on promoting economic growth. This provision not only facilitates investment and trade but also fosters business opportunities, generates employment, and ensures that basic amenities are accessible to the less privileged for their livelihoods. Unfortunately, the realization of these benefits has been impeded due to the absence of adequate infrastructure (Daniel-Adebayo, Akintoye, Adegbie, & Ajayi-Owoeye, 2022). This deficit in infrastructure creates an expectation gap, where certain fundamental amenities are either unavailable to stakeholders or, even if present, fail to address the pertinent economic realities on the ground. As a result, this deficit is not consistent with the rationale behind the tax revenue collected and is not comprehensive enough to satisfy the expectations of stakeholders concerning the use of tax revenue in the economy (Alawi, Wadi & Kukreja, 2018).

Crucially, effective infrastructure plays a pivotal role in bolstering and enhancing economic activity within a nation. For instance, sufficient electricity supply and reliable communication systems contribute to improved business operations, streamlined production of goods and services, and ultimately foster business expansion. Conversely, a flourishing economy ensures that the government has the financial resources for expenditures, and taxpayers, in turn, possess the means to meet their tax obligations. This underscores the interconnection between tax revenues, infrastructure, and overall economic development.

The significance of a country's infrastructure, regardless of its developmental stage, cannot be overstated. It is imperative that a nation adequately provides and efficiently manages its various infrastructural components. This not only becomes a source of national pride but also serves as an exemplary model for other countries aspiring towards economic development and growth. Even with the significant increase in the federal government's revenue and spending over the last ten years, there are still questions about how the funds designated for socioeconomic and infrastructure development are being used. Criticisms have centered on the perceived low tax structure and fluctuating state revenue, contributing to a negative impact on Nigeria's infrastructure development, partially attributed to volatility in international oil prices and financial planning uncertainties (UAE, 2006). However, there appears to be a disconnect between tax revenue mobilization and the level of infrastructural development.

Presently, Nigeria grapples with inadequate infrastructure, causing a 2% annual reduction in economic growth per capita and diminishing firms' productivity by up to 40%. The most significant infrastructure deficit is observed in the power sector, where only a quarter of the population has access to electricity, leading to regular blackouts. Despite firms resorting to installing backup generators, this incurs costs significantly higher than grid electricity. This lack of affordable and reliable power is cited as the primary constraint for investors conducting business in various African countries, Nigeria included (Muojekwu & Udeh, 2023).

Another notable infrastructural shortfall is observed in Nigeria's road network. With approximately 200,000km of roads, of which 36,000km fall under federal jurisdiction, only about 30% are in good condition. State and local

government-owned roads fare even worse. These deficiencies in infrastructure pose significant deterrents to potential investors, resulting in lower income and reduced income tax accruing to the government. Nigeria's lack of infrastructure is a significant barrier to its development and progress; the country's total infrastructure stock only makes up 35% of GDP, far less than the emerging economies average of 70% (Manny, 2021). Nigeria's poor infrastructure is the main reason for its ranking of 116 out of 141 countries in the World Economic Forum's 2019 Global Competitiveness Index.

The main objective of the study is to examine the impact of Tax Revenue Mobilisation on Infrastructural Development in Nigeria, while the specific objectives are to:
i. investigate the impact of Petroleum Profit Tax Revenue on Infrastructural Development in Nigeria
ii. examine the effect of Companies Income Tax Revenue on Infrastructural Development in Nigeria
iii. determine the effect of Value Added Tax Revenue on Infrastructural Development in Nigeria
iv. investigate the impact of Capital gain tax revenue on Infrastructural Development in Nigeria

The paper is further divided into five sections. The second section examines the extant literature to provide the conceptual, theoretical and the empirical review relating to tax revenue mobilization and infrastructural development. The third section shows the research methods adopted in the execution of the study. The fourth section presents and analysis the result obtained from the data gathered and discussed the findings. The fifth section concludes the paper with recommendations and contribution to knowledge.

2. Literature Review

This chapter critically examines prior research on the causal connection between tax revenue mobilization and infrastructural development in Nigeria. It explores the study's theoretical and empirical facets in an effort to determine the cause-and-effect relationship between the variables under investigation. The basic theories adopted are: Tax Revenue Theory, Theory of Public Economy; The Benefit Received Theory. It also presented several empirical evidences to establish literature comparison among the studies.

2.1 The Concept of Taxation

Revenue is described as the comprehensive sum of earnings that an organization accumulates to support its operational endeavors (Olunga & Solomon, 2019). All state revenue is acknowledged to come from a variety of sources, such as licenses, fines, and taxes (Carfora, Pansini, and Pisani, 2018). Governments around the world recognize tax revenue as a crucial and important source of funding (Oladipupo and Ibadin, 2015). Revenues from taxes include money and money, health benefits, goods and services, payroll tax, property and transfer tax, and so on (Okwara and Amori, 2017). The primary goal of taxation is to raise revenue by implementing policies that are suitable for the circumstances and managerial capacities of each nation.. A well-designed tax system should be able to reduce the negative impact on the distribution of resources while generating revenue and smooth out the equitable impact on various groups in society (Ojochogwu and Stephen, 2012).

The objectives of taxation include increasing income, reducing inequality, regulating and controlling the consumption of certain goods, limiting inflation, repaying debts in the country, planning and conducting business, protecting emerging markets, promoting exports, and restricting exports and managing credit balances etc (Njoku, 2009).

Tax Revenue Mobilisation

Agya, Ibrahim, and Emmanuel (2015) expressed the view that revenue serves as a comprehensive term encompassing all monetary inflows derived from both tax and non-tax origins, including fees, grants, and contributions, and constitutes the vital source of sustenance for local governments. Generating revenue stands as one of the paramount activities for any business entity.
This procedure is characterized as the strategic planning a business does to promote and sell its goods or services in an effort to make money. Sources of income of the state include taxes on the income and growth of individuals and organizations, as well as taxes on goods and services, fees and taxes, exports, benefits received from the state, non-profit sources such as bank activity. Profit for the World Bank in the form of foreign loans and guarantees (Olasukanmi, 2022).

The mobilization of tax revenue stands as a focal point in the formulation of economic policies across numerous countries. Previous observations indicate that some countries see significant increases in their tax-to-GDP ratios, while others show little or no increases over extended periods of time. Improving domestic resource mobilization is crucial, particularly for developing nations. The augmentation of tax revenue mobilization is essential for these nations, serving as a means for governments to establish fiscal leeway for financing public investment initiatives and ensuring the delivery of essential public services (Bernardin, Anja, Clay, Olamide, Keyra & Veronique, 2020).

Infrastructural Development

According to Manggat, Zain, and Jamluddin (2018), infrastructure development is correlated with the caliber of social services, particularly when it comes to healthcare, well-maintained roads, energy and power, education, and other social welfare goods and services that have the potential to improve and elevate the standard of living for both urban and rural residents. Sullivan and Sheffrin (2013) defined infrastructure as "structural and physical amenities needed by the community in general for humanity's welfare". Infrastructure encompasses various elements such as buildings, roads, bridges, health services, sound corporate governance, and many more that influence and improve the standard of acceptable living. Infrastructure is the term used to describe the organizational and physical structures and facilities that are important for maintaining a country's security, public health, and safety, as well as its economic growth. According to Okwara and Christian (2019), infrastructure is the fundamental organizational and physical framework required for a society or business to run, or the amenities and services required for an organization to operate.

Petroleum Profit Tax (PPT)

The Petroleum Profit Tax (PPT) is a type of tax applied to the earnings from oil extraction made within a given accounting period while conducting petroleum operations. Exploration, development, production, and sale of crude oil are all included in the legislative definition of petroleum operations. The Petroleum Profit Tax Act of 2004, along with its amendments, is the main body of law governing the calculation of this tax. The legislation that was first introduced in 1959 under the name Petroleum Profit Tax Act (PPTA) imposes taxes on the chargeable profits of companies that operate in the Nigerian jurisdiction. For the purpose of assessing taxes, petroleum operations are further defined by the PPTA. "the winning or obtaining of oil in Nigeria by or on behalf of a company for its account by any drilling, mining, extracting or other like operations or process, not including refining at a refinery, in the course of a business carried on by the company engaged in such operations and all operations incidental thereto and any sale of or any disposal of chargeable oil by or on behalf of the company".

Gelb (1981) asserted that "the oil and gas production sector had historically received favorable tax treatment, with a particular provision related to percentage depletion applicable to most oil and gas producers in 1975". Nwete (2004) asserts that the goals of petroleum taxation are complex and include the claim that taxing the petroleum industry gives the government authority over assets owned by the public. Additionally, the imposition of high taxes serves as a regulatory measure to manage industry participation, discouraging rapid depletion to conserve resources for future generations.

Nigeria's economy is largely dependent on oil, and a sizable base of oil revenue is necessary for it to be able to finance social and economic growth. Roughly 90% of foreign exchange earnings, 90%–95% of export revenue, and 80% of government revenue come from oil. With over 70% of the government's total revenue coming from this sector and 95% of foreign exchange earnings, it is the most important source of tax revenue in Nigeria (Odusola, 2006).

Economic Development

Over time, underdevelopment in Nigeria has deteriorated, resulting in diminished capital formation, impoverished living conditions, and an escalating poverty level. According to Owusu-Gyimah (2015), economic development is defined as the augmentation of national output coupled with alterations in the technical and institutional frameworks governing its production. According to the study, structural changes and economic growth go hand in hand. The latter involves changes in institutional and technological factors that cause labor to migrate from agriculture to modern manufacturing and service sectors, resulting in output growth that is self-sustaining. The economic relationship between economic development and

growth is emphasized by Taci and Gerxhaliu (2018). While economic development includes a wider range of indicators than GDP per capita, economic growth measures an increase in the real gross domestic product (real output), which represents the total volume of goods and services produced in an economy. Development, therefore, concentrates on how people's living standards are affected.

2 *Theoretical Framework*

This section examines the basic theories that have been documented in the literature to understand the relationship between the tax revenue mobilization and infrastructural development and growth.

Tax Revenue Theory

The tax revenue theory was propounded by Bhartia in 2009. The author of the theory derived the tax revenue theory because there is no need and unnecessary for an association between tax payment and the derivable benefit from government activities. The author also brought to light some other theory he considered related to tax revenue theory. There are supporters of the tax revenue theory, as well as critics. While the study of Desislava (2018) supports the theory, it posited that the tax revenue theory encourages the citizens to see tax as a civic responsibility and should be patriotic in faithfully discharging their civic obligations to the government. It said that no tax payment amount will ever equate to the benefits being derived from the government.

On the contrary, the study of Gasteratos, Karamalis, and Koutoupis (2016) in line with an earlier postulation of Anyanfo (1996) who vehemently opposed to the theory, this assertion is not consistent with earlier postulated benefit received theory that believed that tax should be paid in line with the amount of benefit being derived from the government (Anyanfo, 1996). The study opined that the state is the sole custodian of the public enterprises that are generating revenue. Hence, there is no real rationale for imposing taxes on the same masses that do not see the state's collective enterprise's accounts being managed by a few government officials. The theory is suitable for this study since tax payment, and service delivery is connected to tax revenue theory. In most countries of the world, when the government considers her total revenue, a reasonable amount of that revenue comes from taxation, thus making tax revenue relevant to economic development for society's benefit.

Theory of Public Economy

The public economy could also be referred to as the national household, public household or country household. The theory holds that public economy is viewed by classical theory as economic relationship existing between the state and its citizens whereby the citizens pay tax in exchange for public goods or services. Scholars in the literature, such as Agenor (2006), have submitted in the literature that public and private economies are related; they both have common roots and similar aims. They both have the same objective of maximisation of the utility of scarce resources. But the public economy has its own specific means of power, which it uses to solve its specific problems in a special way. The best way to describe the economic structure of a state is by starting with public expenditure (Musgrave and Peacock, 1967). Public investment in infrastructure should be enhanced because infrastructure services have direct impact on production costs, rate of return on capital, and the productivity of private inputs. Also, infrastructure indirectly affects growth through different means.

The Benefit Received Theory

Adam Smith in The Wealth of Nations (1776) wrote: "Such things as defending the country and maintaining the institutions of good government are of general benefit to the public. Thus, it is reasonable that the population as a whole should contribute to the tax costs. It is also reasonable to demand certain other things of a tax system. In modern public-finance literature, there have been two main issues: who can pay and who can benefit (Benefit principle). The benefit received theory formed the framework for this study. The theory derived from the presumed relationship between the state and taxpayers, and in which the state is obligated to provide certain goods and services so the members of the society in compensation for taxes paid for such supplies (Bhartia, 2009).

This theory addresses the need for government to effectively utilize tax revenue in providing economic and social facilities to the populace, and by extension contribute to economic development (Ihendinihu, 2014). This theory therefore presupposes that improvements in tax revenue should be accompanied by increased spending on infrastructural amenities. Increased spending in turn may facilitate shift from low productivity and low savings, to high steady growth state.

The Critics and Relevance of Public Economy Theory

The critics of public economy theory, such as Wagstaff and Cleason (2004) have expressed their views that do not align with the principle underlying the beliefs of the theory. They submitted that although government should provide for public goods and services, it is not under any obligation to utilise the tax revenue solely for such. And that the citizens are not expected to see payment of taxes as an exchange or bargaining power for public goods or services. There are other obligations to be met with tax revenue aside provision of public goods and services. The significance of the theory of public economy to the current study is based on its principle which advocates that taxpayers' funds should be invested in infrastructure that will benefit them and meet their expectations with due reference to the fact that there are utilities that need to be maximised. Also, the theory is premised on the fact it shows the interconnectivity between revenues generated from taxes and expectation of stakeholders in meeting the required budgeted infrastructure per time. Consequently, when the expectations of stakeholders regarding infrastructure in a particular country are met, stakeholders are better motivated to voluntarily contribute their quota rather than avoiding or evading tax as a result of not getting value for their contribution to the revenue (Igga, 2018).

3. Methodology

This section explores the methodology employed in the study, aligning with the research question's nature and the anticipated findings sought by the researcher. It outlines the study's population, elucidates the process of determining the sample size, and details the sampling technique applied. Additionally, the section reveals the data collection method, introduces the research instrument, discusses the validity and reliability of the instrument, and expounds on the chosen method for data analysis.

Sources of Data Collection

The data used in this study came exclusively from secondary sources. This approach was chosen in response to econometric claims that historical time series data on variables can reveal information about their behavior. The Federal Inland Revenue Service Statistical Bulletin (i.e., PPT, CIT, VAT, and CGT) and the CBN Statistical Bulletin (Infrastructural Development) will be the exclusive sources of data for this study. Since there were substantial structural changes during this time, the 2002–2022 period was chosen in order to critically address the nation's unique dimension in the taxation–diversification–led infrastructure debate.

Techniques for Data Analysis

In a study like this, researcher is often encountered a dilemma on the method of data analyse to adopt in analyzing the hypothesis. To solve, the researcher considers the nature and the stationarity of the data gathered in order to predict the best method to apply when analyzing the hypotheses. To test the stationarity and the short or long relationships of the data gathered, there is need to perform unit root test and the Johansen Co-integration test, Vector Auto-Regressive Model or Vector Error Correction Model. These are explicitly explained as follows:

Unit Root Test

To test for a unit root, the researcher employed the Philips-Perron and Augmented Dickey-Fuller (ADF) tests. Finding out if the variables are stationary or not is the aim of these tests. A stationary time series, according to Nau (2019), is one in which statistical features like mean, variance, autocorrelation, and so forth hold steady over time. The premise behind the majority of statistical forecasting techniques is that time series can be mathematically rendered roughly stationary, or "stationarized".

Model Specification

To achieve the primary goal of this study, the researcher modeled the variables involved in the study for easy analysis. As a result, Infrastructural development was measured by "Value of Infrastructural Investment", and this served as a function of Petroleum Profit Tax; Company Income Tax; Value Added Tax; and Capital gain tax. To specify the relationship, the researcher identified the variables and explain their mathematical relationship in the model bellows:

Mathematically, Y = F(X)

$$Y_t = \alpha_0 + \beta_1 PPT_{1t} + \beta_2 CIT_{2t} + \beta_3 VAT_{3t} + \beta_4 CGT_{4t} + \varphi_t \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Y =   Value of Infrastructural Investment (Infra)
X =   Tax Revenue Mobilization (TRM) being measured by:
x_{1t} =   Petroleum Profit Tax Revenue (PPT)
x_{2t} =   Company Income Tax Revenue (CIT)
x_{3t} =   Value Added Tax Revenue (VAT)
x_{4t} =   Capital gain tax revenue (CGT)
φ_t =   Unexplained variable

Where; $VInf_t$ is the dependent variable and x_{1t} to x_{4t} are the independent variables β_{01} = constant term β_1- β_4= φ_t parameters to be estimated.

Estimation Technique

The collected data was analyzed using an estimation technique. To be more specific, the Ordinary Least Squares (OLS) method was used to compute independent variable coefficients and dependent variable proxies. At least half of the independent variables must be significant for a model to be accepted. A result can be considered significant at four levels: 0.1%, 1%, 5%, and 10%. In this study, 5% level of significance was used.

Limitations of the Research Methodology

As with any OLS model or statistical model, there are some limitations a priori, such as: Possibility of multi-collinearity. This term refers to the situation where two or more independent variables are related. In these cases, the significance of the partial regression coefficients in the multiple regression equation is not clear. Consecutively observed outcomes depending on the variables are numerically related rather than uncorrelated. The existence of this relationship is called autocorrelation. It has been said that the assumption that continuous values of dependent variables are uncorrelated is an important assumption in simple regression and simple correlation analyses.

4. Data Analysis and Results

This section examines the outcomes derived from the analysis of the collected data and provides a discussion of the findings. The analysis involves the application of statistical tests such as the Augmented Dickey Fuller (ADF) Unit Root Test to determine the presence of a unit root in the study variables. Additionally, a co-integration test is conducted to ascertain whether the variables exhibit a short-term or long-term relationship. The section also introduces the Ordinary Least Square (OLS) Model for testing hypotheses. Furthermore, this part of the study encompasses the presentation of data, aiming to establish the correlation between tax revenue mobilization and infrastructural development in Nigeria. Table 1 presents the descriptive data.

Table 1: Descriptive Analysis

	INFRA	PPT	CIT	VAT	CGT
Mean	6001.648	1787.245	876.4515	788.1432	11.74296
Median	4605.390	1516.980	820.5700	710.5600	3.180000
Maximum	23412.00	4209.020	2649.191	2511.518	99.40000
Minimum	1018.178	224.4000	89.10000	108.6000	0.000000
Std. Dev.	5509.711	972.6782	652.2628	630.6656	22.83366
Skewness	1.916705	0.667051	0.860904	1.292493	2.999292
Kurtosis	6.288568	3.115014	3.604817	4.227817	11.69146
Jarque-Bera	22.32100	1.568924	2.914123	7.165979	97.58397
Probability	0.000014	0.456365	0.232920	0.027792	0.000000
Sum	126034.6	37532.15	18405.48	16551.01	246.6022
Sum Sq. Dev.	6.07E+08	18922056	8508934.	7954781.	10427.52
Observations	**21**	**21**	**21**	**21**	**21**

Source: E-view 9.

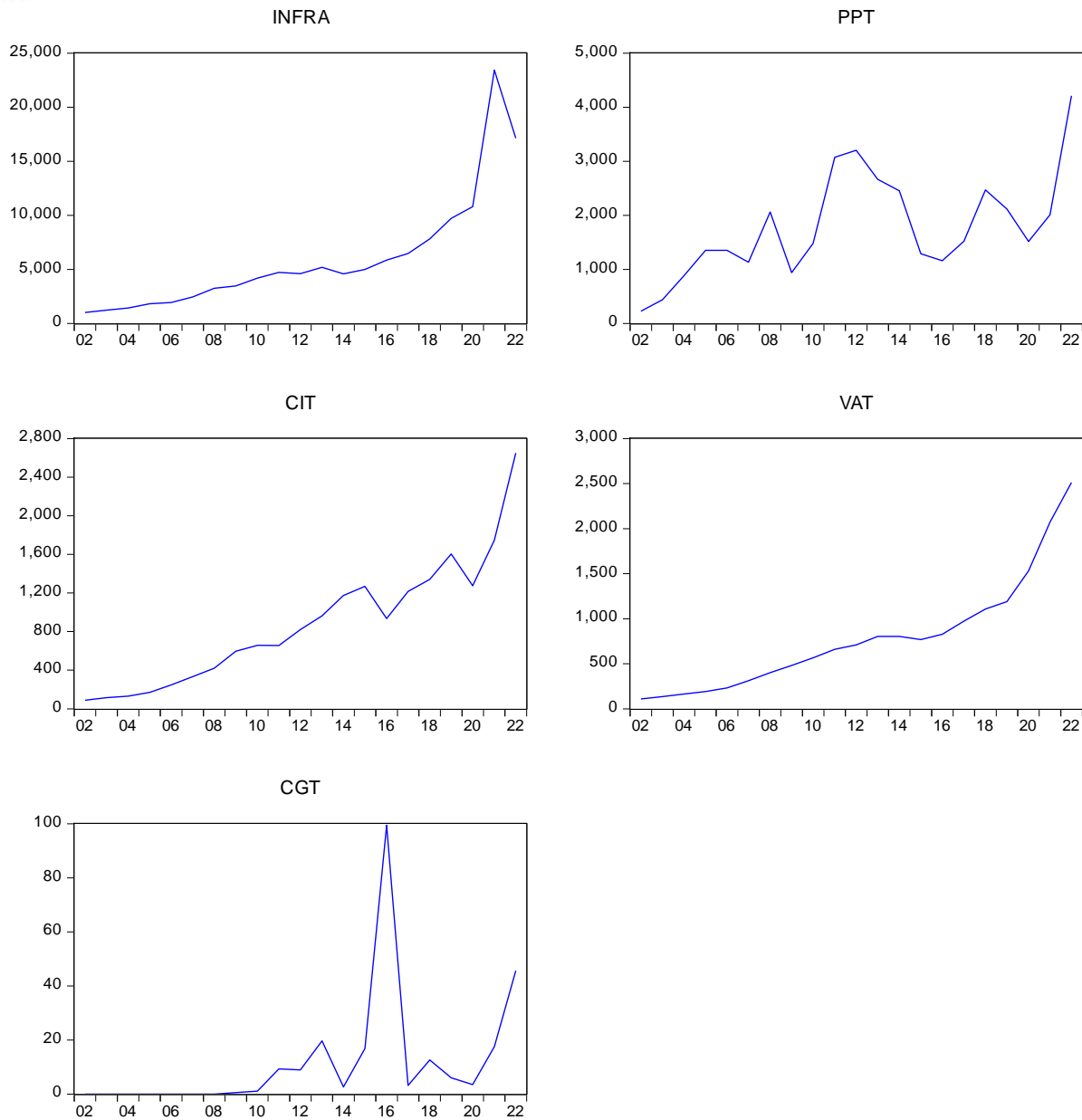### INFRA

PPT

CIT

VAT

CGT

Figure 1: Graphical Illustration of the Descriptive Statistics
Source: E-view 9.0

Table 1 shows the mobilization of tax revenue and the development of infrastructure in Nigeria between 2002 and 2022. Initially, the table showed that the average value of infrastructure development for the period under review was ₦6001.648 billion, with minimum and maximum values of ₦1018.178 billion and ₦23412.00 billion, respectively. It was also confirmed that the variable had a median value of ₦4605.390billion and deviated with ₦5509.711 billion. However, the distribution was positively skewed with the value of ₦1.916705billion which showed that the infrastructural development has a long right-tail and the kurtosis is leptokurtic in nature, simply because the infrastructural development exhibited the value of 6.288568 > 3. It implies that there was a greater chance of extreme positive or negative events because the variable had a flatter shape and fatter tails. While the normal distribution of infrastructural development over the studied years predicted a range of + or - three standard deviations from the mean, the value of 6.288568 showed that

the tax system occasionally experienced extreme returns that exceeded this range. Given that the p-value was less than the table value (i.e., 0.000014 < 0.05), the Jarque-Bera value of 22.32100 indicated that the variable conformed well to the distribution and further supported its statistical significance.

The petroleum profit tax was found to have a positive median value of ₦1516.980 billion and a mean value of ₦ 1787.245 billion. The distribution showed ₦ 4209.020 billion as the maximum value and ₦ 224.4000 as the minimum. Because the variable had a value of 3.115014 > 3, the table indicated that the variable had a deviation of ₦972.6782 billion from the total distribution and was positively skewed with a value of ₦0.667051 billion. This indicates that the petroleum profit tax has a moderate long left-tail and a leptokurtic distribution in nature. This indicated that there is a higher likelihood of extreme positive or negative events due to the variable's wider or flatter shape and fatter tails. In Nigeria, the amount of ₦3.115014 billion indicated that the tax system encountered occasional extreme returns, surpassing the typical range of + or - three standard deviations from the mean predicted by the normal distribution of petroleum profit tax over the studied years. However, in Figure 4.1, the value of petroleum profit tax in the Jarque-Bera test, which measures the goodness-of-fit test to determine whether sample data exhibit skewness and kurtosis matching the normal distribution, was observed. The Jarque-Bera value of 1.568924 suggested that the variable conformed well to the distribution but also confirmed that the variable was statistically insignificant, as the p-value was greater than the table value (i.e., 0.456365 > 0.05).

The table also related corporate income tax with infrastructural development in Nigeria over the period under review. The distribution depicted that an average value of ₦ 876.4515 billion which indicated that the accumulated contribution of the average on CIT on infrastructural development during the period. The table further confirmed that variable had a median value of N820.5700billion with the minimum and maximum value of ₦89.10000 and ₦ 2649.191 respectively. The variable according to the table deviated with ₦ 652.2628billion from its mean value and positively skewed with the value of ₦ 0.860904billion which showed that CIT had a moderate long right-tail and the kurtosis is leptokurtic in nature, simply because the net claim exhibited the value of 3.604817> 3. This implied that the variable had a flatter shape with fatter tails resulting in a greater chance of extreme positive or negative events. Further, the value of Jarque-Bera of 2.914123 was observed for CIT which implied that the variable had a good fit in the distribution but confirmed statistically insignificant as the p-value > the table value (i.e,0.232920>0.05).

According to the table, the tax system was said to have experienced effective VAT rate over the years which put her average value at ₦788.1432billion naira and the median value of ₦710.5600 billion naira over the years under review. It was further observed that, since the inception of VAT practice, the tax system had been experiencing a perfect shape of VAT rate which staged the minimum and maximum value of the variable at N 108.6000 billion and ₦2511.518billion respectively. The table deviated with ₦630.6656 billion from its mean value and positively skewed with the value of ₦1.292493billion which showed that the variable had a long left-tail and the kurtosis is leptokurtic in nature, simply because the returns exhibited the value of 4.227817> 3. However, the value of Jarque-Bera of 7.165979 was recorded for the variable which implied that the variable had a good fit in the distribution and confirmed statically significant as the p-value < the table value (i.e, 0.027792 < 0.05).

Finally, the tax system had a claim on Capital gain tax staged at an average value of ₦11.74296billion and the Median value of ₦3.180000billion. The table further confirmed that the variable had a minimum and maximum value of 0.000000 and N99.40000billion respectively. The variable according to the table deviated with ₦22.83366billion from its mean value and positively skewed with the value of ₦2.999292billion which showed that the CGT had a long right-tail and the kurtosis was leptokurtic in nature, simply because the variable exhibited the value of 11.69146>3. This implies that the variable exhibited a flatter shape with fatter tails, increasing the likelihood of extreme positive or negative events. However, the value of 11.69146 indicated that the tax system encountered occasional extreme returns, surpassing the typical range of + or - three standard deviations from the mean predicted by the normal distribution of claim cost over the studied years. Nevertheless, a Jarque-Bera value of 97.58397 was recorded, signifying that the variable conformed well to the distribution and was statistically significant, as the p-value was less than the table value (i.e., 0.000000 < 0.05).

Diagnostic Test

In order to test for the stationarity of the data set gathered, there is need to employ unit root test to avoid false and misleading conclusions. Unit root testing informs the researcher, the next line of action is all variable used are stationary or otherwise.

Unit Root Test

When there is no change in the mean or the finite variance of a series, it is considered stationary. However, the variance of a non-stationary series varies over time and exhibits a distinct time trend. High persistence is a characteristic of non-stationary series. This problem can be resolved by applying the Augmented Dickey Fuller (ADF) test to the time series to check for stationarity and determine whether the variables in this study have a unit root. The outcomes of the unit root test are shown below. The assumption of unit –root test is that Null Hypothesis (H0) has a unit root, Alternative Hypothesis (H1) has a unit root

Table 2: Unit Root Test

Parameters	At Level (1(2))			At First difference (1(0))		
	ADF test statistic	Test critical value @ 5%	Prob.*	ADF test statistic	Test critical value @ 5%	Prob.*
Infra	1.320226	-3.052169	0.9974	3.254558	-3.052169	1.0000
PPT	-1.660596	-3.020686	0.4349	-3.171536	-3.029970	0.0380
CIT	1.205218	-3.020686	0.9969	-3.147991	-3.040391	0.0408
VAT	1.175552	-3.052169	0.9963	1.259095	-3.052169	0.9970
CGT	-3.655195	-3.020686	0.0138	-6.604725	-3.029970	0.0000

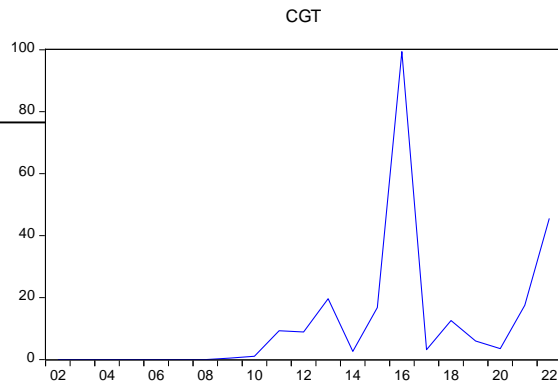**Source: Author's computation, 2023(Eview-9.0)**

CGT
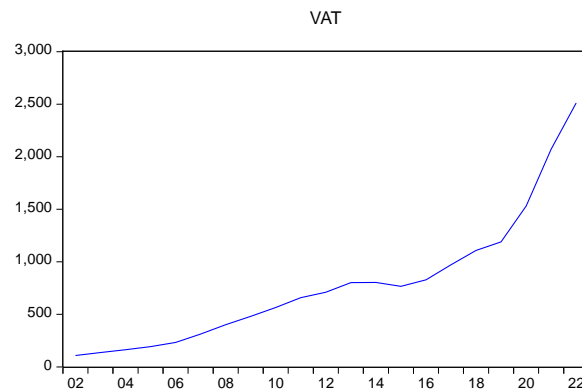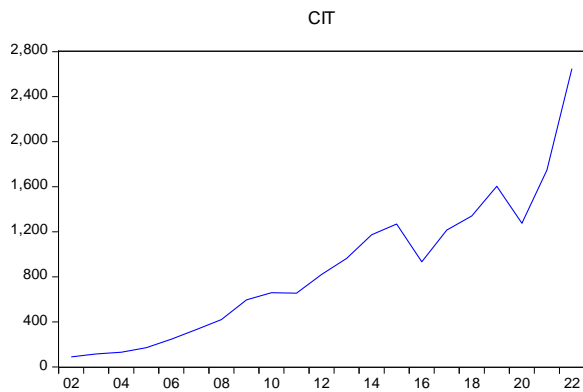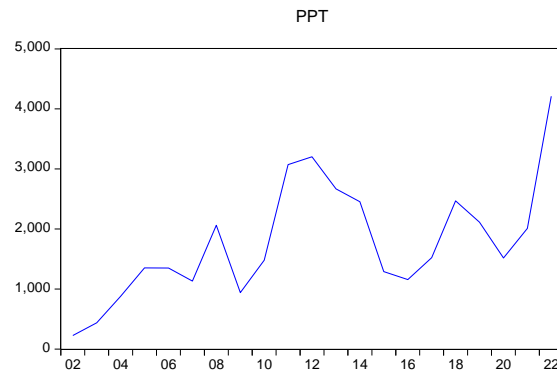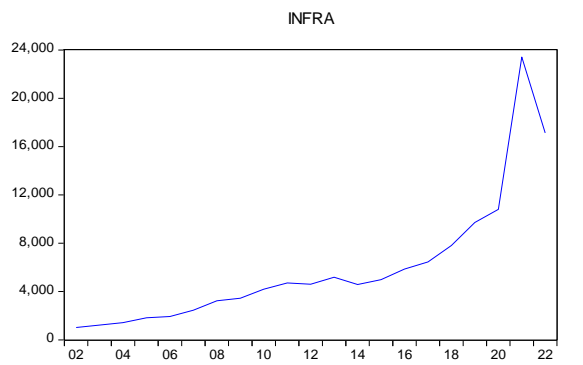
Fig. 2: Graphical Illustration on the Unit Roots Results
Source: E-view 9.0

During the period, it can be seen from the Table 2 that majority of the variables are non-stationary at level except capital gain tax (CGT) at 0.0138. This is because their P-value of Augmented Dickey Fuller (ADF) is greater than significance value (0.05). However, at 1st difference, more than the average variables were stationary except infrastructural development and Value Added Tax respectively. The analysis above called for further justification (Cointegration test).

Panel Co-Integration Test

In this study, the researcher used Johansen's test of co-integration to perform the tests on the variables in the models. Table 3 showed the co-integration results at 5% level of significance, the result indicated the existence of a co-integrating equation.

Table 3: Summary of Johansen's test of co-integration

Trace Statistics				Maximum Eigen Value			
Null Hypotheses	ADF test statistic	Test critical value @ 5%	Prob.*	Null Hypotheses	Eigenvalue	Test critical value @ 5%	Prob.*
r = 0*	84.49768	47.85613	0.0000	r = 0*	0.923368	27.58434	0.0000
r = 1*	35.69164	29.79707	0.0093	r = 1*	0.708864	21.13162	0.0232
r = 2	12.24632	15.49471	0.1455	r = 2	0.414040	14.26460	0.2019
r = 3	2.090735	3.841466	0.1482	r = 3	0.104201	3.841466	0.1482

Source: Author's computation, 2023(Eview-9.0)
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
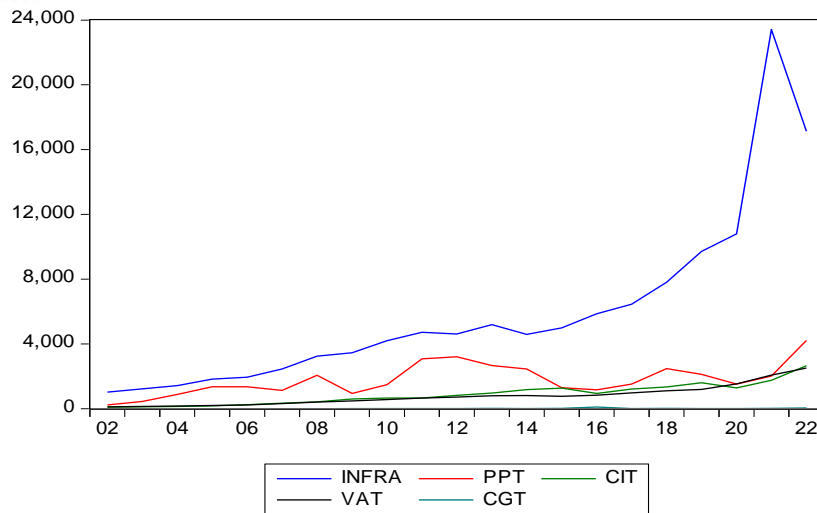**MacKinnon-Haug-Michelis (1999) p-values

Figure 3: Graphical Illustration of the Johansen's test of co-integration
Source: E-view 9.0

The results of the co-integration tests shown above were used to demonstrate the existence of short-run or long-term relationship between the amongst in the study. The results were considered with two different techniques (i,e, Augmented Dickey-Fuller results (parametric) and Phillips-Peron results (non-parametric). In both cases (Augmented Dickey-Fuller and Phillips-Peron results), only r_0^* and r_1^* were significant while null hypotheses of r_2 and r_3 refused to be rejected. These results indicated that there is no presence of a long run relationship among the variables in the model at level. That means that the series are not related and can be perfectly combined in a linear fashion. The researcher therefore concluded that the parameters measured over time have no significant relationship. As a result, the error correction model for the models can be estimated.

Vector Error Correction Estimates (VECE)

The model is used to analyze cointegrated variables or cointegrating relationships. It provides a mechanism to understand the long-run as well as short-run behaviour of the variables in the system.

Table 4: Vector Error Correction Estimates

Error Correction:	D(CIT)	D(VAT)	D(CGT)
R-squared	0.930797	0.934724	0.811919
Adj. R-squared	0.852943	0.861289	0.600328
Sum sq. resids	84922.79	25911.35	3340.558
S.E. equation	103.0308	56.91150	20.43452
F-statistic	11.95571	12.72857	3.837208
Log likelihood	-101.6730	-90.98948	-72.55259
Akaike AIC	12.40811	11.22105	9.172510
Schwarz SC	12.90277	11.71570	9.667161
Mean dependent	139.9106	130.4565	2.531789
S.D. dependent	268.6731	152.8076	32.32307
Determinant resid covariance (dof adj.)		1.66E+09	
Determinant resid covariance		1.45E+08	
Log likelihood		-245.7736	
Akaike information criterion		30.97485	
Schwarz criterion		32.60720	

Source: E-view 9.0

In the analysis above, the estimate showed that if all of the independent variables (PPT, CIT, VAT, CGT proxies) are held constant, the dependent variable (infrastructural development) would still be positive and statistically significant at the 1% level. Further, the VECM estimated established a coefficient of determination of R^2 of 0.930797 (93.0%) on PPT. This suggested that the model as a whole had high explanatory powers. Also, it could be read from the same estimate that CIT exhibited a R^2 of 0.934724 (93.5%) which showed the accumulated contribution of CIT on infrastructural development with the stochastic term accounting for the remaining 6.5%. When adjusted, the regressor only accounted for (6.5%) of the variance. This suggested that the model as a whole had a very high explanatory power. However, VAT had an estimated R^2 of 0.811919 (81.1%) indicating that VAT contribution jointly accounted for 81.1% of the variation in the regressed, with the stochastic term accounting for the remaining 18.9%. When adjusted, the regressor only accounted for (18.1%) of the variance. This suggested that the model as a whole had a high explanatory power. Further, a look at CGT value from the estimate showed an R^2 of 0.557461 (55.8%) indicating that CGT jointly accounted for 55.8% of the variation in the regressed, with the stochastic term accounting for the remaining 44.2%. When adjusted, the regressor only accounted for 44.2 of the variance. This suggested that the model as a whole had a high explanatory power.

Testing Assumption of Linear Regression Model

Testing the linear regression model's assumptions is the first step before moving on to panel data econometric measurement. A few presumptions concerning the linear regression model were made. These were necessary to demonstrate the many desirable properties of the ordinary least squares (OLS) estimation technique as well as the validity of conducting hypothesis tests on the coefficient estimates.

The Error have Zero Mean E (ut) = 0

It is necessary to make the initial assumption that the errors' average value is zero. In fact, this assumption will never be broken if the regression equation contains a constant term (Brooks 2008). The first assumption was met by this study because the regression model contained a constant term (α).

Heteroskedasticity (ut) = $\partial^2 < \infty$

The assumption that the variance error is constant $\sigma2$ is called the homoscedasticity assumption. If errors do not have constant variance, they are called heteroscedastic. To test this hypothesis, the Breusch-pagan LM test with heteroscedasticity null hypothesis was used:
H0 = $\partial_1 = \partial_2 = \partial_3$ = ...….... =∂k = 0
H1 = At least one ∂ is not 0 and at least one X affects the variation of the rest.

Autocorrelation

The main factor that creates autocorrelation in time series data is time. Autocorrelation can occur when there is some order among the parameters. This hypothesis states that the variance of error messages over time (or interval for such data) is zero. In other words, the errors are considered unrelated. If the errors are correlated with each other, they are said to be "autocorrelated" or "serial correlated".

Normality

The normal distribution is characterized by zero skewness and a mean kurtosis coefficient of 3. Jarque-Bera established this standard by assessing the normality of residuals, with skewness and kurtosis coefficients ideally equal to 0 and 3, respectively. The Jarque-Bera test is employed to examine the null hypothesis of normality in a regression model. A Jarque-Bera value exceeding 0.05 signifies the presence of normality (Brook, 2008).

Heteroskedasticity Test

Here, the Breusch-pagan LM test was conducted on equation (1) stated in the previous chapter:

Infra = α + β_t PPT + β_t CIT + β_t VAT + β_t CGT + μ_t 1

Recall: $\mu_{t=}$ *e,*

Then $e = \bar{\mu} = \partial_0 + \partial_1 X_{1it} + \partial_2 X_{2it} + \partial_3 X_{3it} + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + \partial_k X_{kit} + V_{it}$

This model is used to optimized on the regressor (μt) using the hypothesis of the Breusch-pagan LM test. The assumption goes thus:

$H_0 = \partial_1 = \partial_2 = \partial_3 = \ldots\ldots\ldots = \partial_k = 0$ (i.e, when the ∂_s is constant, that said the data are homoskedastacity and otherwise heteroskedasticity)

Note: in order to test for homoskedastacity and otherwise heteroscedasticity, the above assumption is key, and several assumptions and methods available. But in this study, Breusch-pagan LM test is adopted

H₁ = At least one of the ∂_s is different from 0 and that at least one of the Xs affects the variance of the residuals.

Decision Criteria

If LM = nR^2_{it} statistic > chi-square value (X^2_K): Reject the null hypothesis and conclude that there is significant evidence of heteroskedasticity in the model

Alternatively, if the p-value < 0.05: Reject the null hypothesis and conclude that there is significant evidence of heteroskedasticity in the model.

Table 5: VAR Residual Heteroskedasticity Tests

| Joint test:					
Chi-sq	**df**	**Prob.**			
171.5806	160	0.2516			
Individual components:					
Dependent	**R-squared**	**F(16,2)**	**Prob.**	**Chi-sq(16)**	**Prob.**
res1*res1	0.996538	35.98595	0.0274	18.93423	0.2721
res2*res2	0.974267	4.732653	0.1882	18.51108	0.2948
res3*res3	0.998521	84.39804	0.0118	18.97190	0.2701
res4*res4	0.974813	4.837918	0.1846	18.52145	0.2943
res2*res1	0.850830	0.712970	0.7254	16.16577	0.4415
res3*res1	0.993110	18.01854	0.0538	18.86910	0.2755
res3*res2	0.993978	20.63238	0.0472	18.88558	0.2746
res4*res1	0.941486	2.011224	0.3827	17.88823	0.3305
res4*res2	0.717243	0.317076	0.9300	13.62762	0.6264
res4*res3	0.980104	6.157808	0.1485	18.62198	0.2888
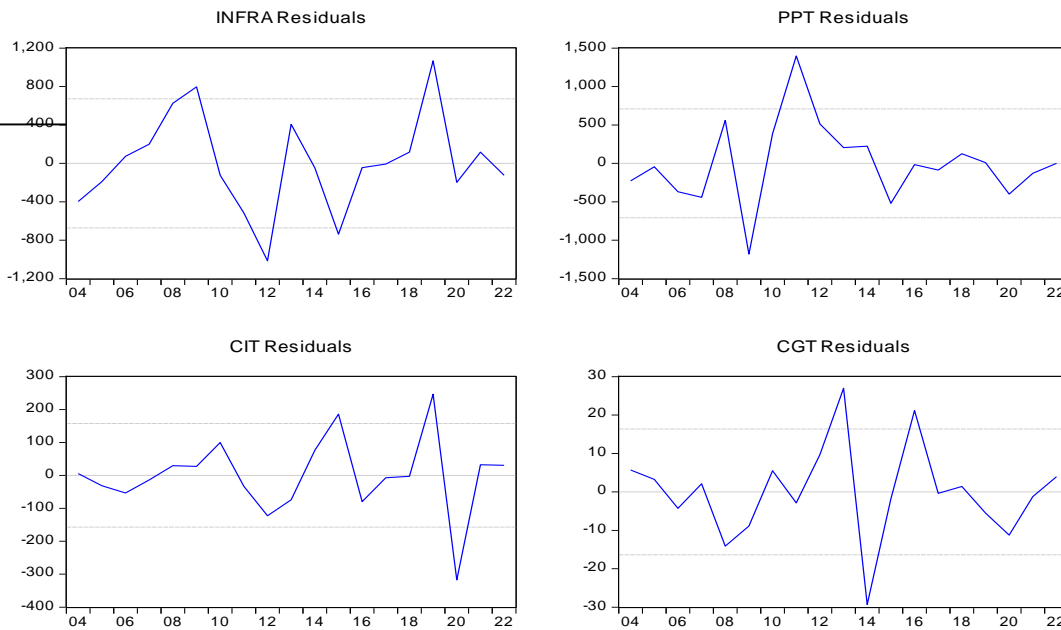
Figure 4: Graphical Illustration of the Heteroskedasticity Test
Source: Eview 9.0

This test shows that the P value is 0.2516>0.05, thus rejecting the null hypothesis of homoskedasticity at the 5% significance level. This shows that there is sufficient evidence that the variation of infrastructure data with other variables is homoscedastic. The Durbin-Watson statistic (DW) shows a value of 1.269376, indicating autocorrelation. The D-W number is always between 0 and 4. A value of 1 indicates autocorrelation

Inferential Statistics

Table 6: Ordinary Least Square

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PPT	-0.700146	0.503504	-1.390548	0.1834
CIT	-4.128120	1.928719	-2.140343	0.0481
VAT	13.16301	1.892076	6.956915	0.0000
CGT	-11.31440	17.28170	-0.654704	0.5220
C	629.6022	750.3569	0.839070	0.4138
R-squared	0.931926	Mean dependent var		6001.648
Adjusted R-squared	0.914908	S.D. dependent var		5509.711
S.E. of regression	1607.215	Akaike info criterion		17.80665
Sum squared resid	41330264	Schwarz criterion		18.05535
Log likelihood	-181.9698	Hannan-Quinn criter.		17.86062
F-statistic	54.75968	Durbin-Watson stat		3.360507
Prob(F-statistic)	0.000000			

The empirical model used in the study in order to examine the relationship between tax revenue mobilisation and infrastructural development in Nigeria is:

Infra = α + β_t PPT + β_t CIT + β_t VAT + β_t CGT + μ_t 1

Thus, based on the result in the OLS, the following model was developed:

Infra = 629.6022 - 0.700PPT - 4.128CIT + 13.16VAT - 11.31CGT + μ_t 2

Discussion of Findings

In the above analysis, business income tax and value added tax are important, while revenue from oil revenue and capital tax are not. Owolabi-Merus (2015) found that infrastructure development is important and beneficial for economic growth. Oliver, Edeh, and Chukwuani (2017) findings indicate that tax revenue sources, including Petroleum Profit Tax (PPT), corporate tax, and Value Added Tax (VAT), exhibit a positive influence on infrastructure development in Nigeria; however, the impact is not statistically significant. On the other hand, Obi, Emenike, and Chukwurah (2021) demonstrate that there is no discernible impact on infrastructure development at the local government level, attributed to the inadequacy of internal revenue. Nedoziet al. (2014) also stated that Africa not only lacks infrastructure, but the existing infrastructure is also poorly managed, leaving Africa in a bad condition and leading to problems with economic growth and regional development.

Similarly, Kamuri and Sharma (2017) found that economic and social relations have a positive relationship with the country's economic growth. Shi et al. (2017) argue that private capital will withdraw when real estate investment becomes dominant. Some studies show that tax revenues also affect Nigeria's infrastructure development. Iniyama et al. (2017) reported that capital tax was effective but not effective for infrastructure development in Nigeria. Ajiteru et al. (2018) discovered that taxation serves as a potent instrument for promoting infrastructure development within the state, contending that the absence of tax collection can hinder regional development. Despite various studies exploring the literature on the impact of taxes on infrastructure, tax effects on economic growth, and the reciprocal relationship between infrastructure development and overall economic growth, there is, to the best of our knowledge, a gap in research that delves into the combined impact of taxes and the nexus between infrastructure and development. This study aims to address this gap by examining the interplay among taxation, infrastructure, and economic growth in Nigeria. Okoli and Afolayan (2015) identified Value Added Tax (VAT) as the second-largest revenue source for the state. In contrast, Nwite (2015) asserted that the government's tax-derived revenue does not manifest in Nigeria's development, leading to issues such as poverty, unemployment, low living standards, and inadequate infrastructure. He also highlighted that tax reforms, targeting an improvement in the tax/economy gap, have yet to yield significant positive outcomes, raising genuine concerns.

5. Summary and Conclusion

While infrastructure development is achieved in Nigeria, an amount of tax revenue is obtained that will affect infrastructure development. Support. Therefore, the level of tax revenue should determine the pattern and level of infrastructure, and the level of infrastructure provided should be associated with tax revenue. This means that the government must be able to ensure that taxpayers support and adapt to the creation of tax services and management, and that taxpayers want and like it. However, the level of compliance, and hence income tax revenue, is largely impacted by the level of tax knowledge and whether taxpayers have faith in that the level of infrastructure created by the government is sufficient to justify paying taxes. . To demonstrate this, researchers conducted this study to understand the problems and possibilities of tying tax revenues to infrastructure development in Nigeria. According to the findings, the stability and expansion potential of Nigeria's revenue from corporate tax and surtax revenues holds great promise for good use of Nigeria's infrastructure. The results show that the company's income and income from additional income are associated with infrastructure development, while income from tax and investment income have an impact. This implies that taxation mechanisms, including corporate income tax and value-added tax, play a role in shaping infrastructure development in Nigeria. In conclusion, this research recommends the following:
1. The government should take appropriate measures to ensure that PPT revenues are effectively used to build and grow the economy through appropriate infrastructure development.
2. Considering the relationship between corporate income and capital expenditure, it becomes clear that the government must take strict action against corrupt officials and organizations that refuse to pay taxes on corporate income.
3. Governments at all levels should create a platform that will make it easier for businesses to report their tax liabilities, thereby increasing tax revenues.
4. If the government and relevant organizations are concerned about exempting enterprises from VAT in a timely manner, the benefits of VAT on enterprises can be promoted and enhanced.

5. This study proposes an increase in the income of tax officials by expanding the tax base and reducing tax output. This is necessary because increasing companies' revenues benefits infrastructure development.

6. The government should to utilize the taxes collected to enhance infrastructure development, as this practice will incentivize timely tax payments by the citizens.

Existing literature showed that studies are yet to reach a consensus about the degree of relationship between tax revenue mobilisation and infrastructural development in Nigeria. Therefore, the relationship and effect thereof, is yet to be well established. This study contributed to the existing literature on tax revenue accruing to infrastructural development in Nigeria through identification of the key tax revenue types that have a direct impact on infrastructural development of which my findings revealed that the Petroleum Profit Tax Revenue and the Capital Gains tax Revenue have no significant effect on Infrastructural Development in Nigeria. It was also revealed that Company Income Tax Revenue has significant effect on Infrastructural Development in Nigeria. The findings as well revealed that Value Added Tax Revenue has significant effect on Infrastructural Development in Nigeria. Also, the data gathered form the FIRS which seemed to appear in no studies of this nature in the past.

This study was not exhaustive by any means and therefore it is suggested that future study should conduct comparative studies on taxation revenue mobilisation and infrastructural development across sub-sahara, in Africa using the same variables so as to establish whether the findings of this study would hold true for individual country.

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