



EFFECT OF REVENUE DIVERSIFICATION ON INFRASTRUCTURAL DEVELOPMENT IN NIGERIA (1991-2022).

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Abstract

The study investigated the effect of revenue diversification on infrastructural development in Nigeria for the period, 1991-2022. The specific objectives were to determine the effect of oil revenue, tax revenue and government borrowing on infrastructural development in Nigeria. The study employed ex-post facto research design and adopted the ordinary least squares regression techniques to analyze the data sourced from the Central Bank of Nigeria statistical bulletin for the period 1991 to 2022. The findings obtained from the analysis of the data revealed that oil revenue has a significant and positive effect on infrastructural development in Nigeria, tax revenue has significant and positive effect on infrastructural development in Nigeria and government borrowing has significant and positive effect on infrastructural development in Nigeria. The study concluded that revenue diversification has a significant and positive effect on infrastructural development in Nigeria. The finding implies that revenue diversification will lead to an increase in infrastructural development in Nigeria. Based on the findings, the study made the following policy recommendations: The Federal Government of Nigeria should establish a transparent and accountable system for allocating oil revenue to infrastructure projects, ensuring funds reach intended purposes, there should be increased effort to collect taxes from the informal sector by the Federal Inland Revenue Service through the use of technology and other innovative methods. The Federal Government of Nigeria should ensure a stable economy and prioritize concessional loans from development partners such as the Africa Development Bank and the World Bank.

Keywords: Revenue Diversification, Infrastructural Development, Tax revenue, Government borrowing.

Introduction

Revenue diversification evolved to address the high level of instability in the revenue structure of non-profit organizations (Iroegbu, 2022). Carroll and starter (2009) assert that non-profit organizations can reduce their revenue volatility through diversification by reliance on earned income, investments and contributions. The need for revenue diversification for non-profit organizations was accentuated by economic recession which forced such organizations to explore strategies for survival. A diversified

revenue stream reduces the risk of the organization crumbling over the loss of a source of money supply (Iroegbu, 2022). It is therefore germane to diversify the sources of funding to many sectors and even to multiple partners within a given sector (Musembi & Ambrose, 2017). The latest in the evolution of the concept is the application of revenue diversification to the funding of government, providing a stable source of funding for public services and infrastructure. It dates back to about fifty years ago when a study was made in the United States

of America on the effects of revenue diversification on revenue generation in some states and municipal councils (Yan, 2009). The dominant source of revenue in Nigeria before the discovery of oil by the British in the Niger Delta in the late 1950's was Agriculture (Onaolapo, Fasina & Adegbite, 2013). Due to instability in oil prices as a result of globalization and forces of demand and supply of oil, the Nigerian government has been forced to seek alternative sources of revenue.

The apparent need to diversify the economy became very glaring during the covid-19 pandemic when the Nigerian oil price was forced down from the estimated \$57 per barrel to \$30 per barrel (Nwagbara, 2020). This incident led to Nigeria's 2020 budget adjustment, for which both the capital and the recurrent expenditure were reduced by 25% respectively (Nwagbara, 2020).

The justification for revenue diversification stems from the need to enhance the welfare of a country's citizens, emphasizing financial stability, sustainability and self-reliance promoting economic development by providing necessary facilities for improved public services through appropriate administrative and structural systems (Illori and Akinwunmi, 2020). For the Government to fulfil its responsibilities, it needs to leverage all revenue sources at the national and international levels (Bohanon, Horowitz and McClure, 2014). Over the years, Nigerians have suffered a lack of infrastructure development due to corruption and mismanagement of resources (Omodero, 2019). Infrastructure is very significant to a country's developmental prospects as the adequacy of infrastructure may determine a country's success or failure in diversifying production, coping with population growth, reducing poverty and improving citizens' welfare (Mobolaji & Wale, 2012).

The Federal Government of Nigeria's over-reliance on the oil sector is harmful to the economy as oil revenue continues to dwindle. The Government must, therefore diversify its revenue and leverage on other sources of revenue (Ilori & Akinwunmi, 2020). It is against the above observation that this study is set to evaluate the effect of revenue diversification on

the infrastructural development of Nigeria from 1991 to 2022.

1.1 Statement of the Problem

Nigeria's infrastructure falls short of the International Benchmark of 70% of the Gross Domestic Product by 30% (International Trade Administration, 2023). With Nigeria's ever-increasing population at the rate of 2.5% annually and a projected population of 400 million by 2050, the current infrastructure in the country is likely to be overwhelmed (International Trade Administration, 2023).

Over the years, though slowly, Nigeria has recorded a marginal increase in infrastructure development across selected components such as transport, power, international and communication technology, water, sanitation (Babatunde, 2023) and telecommunication (Lola, Olufemi and Agboola, 2012). Despite these obvious improvements, the country still has over 50% infrastructure deficit as they scored 48.33 out of a total of 100 points and came 130th in position out of 141 economies that were surveyed for quality infrastructure facilities (Global Competitive Index Report, 2019).

Infrastructural development is pivotal to a nation's economic growth as they do not only aid economic activities but also stabilize the economy. The World Bank has projected that Nigeria will need to invest \$3 trillion to reduce its infrastructure deficit (International Trade Administration, 2023). The challenges are numerous and include finance, technology for development, maintenance and design (Olufemi, 2012). To boost her infrastructure deficit and overcome these challenges, the Federal Government of Nigeria has resorted to revenue diversification (oil revenue, tax revenue and borrowing). Extant studies have examined the effects of revenue diversification on the economic growth of Nigeria. Currently and to the best of the researcher's knowledge, no existing study has empirically examined the effects of revenue diversification on the infrastructural development in Nigeria. It is to bridge this gap, that this study has become highly relevant.

Objectives of the Study

The general objective of the study was to investigate the effects of revenue diversification on infrastructural development in Nigeria. However, the study specifically sought to:

1. To ascertain the effect of oil revenue on infrastructural development in Nigeria.
2. To determine the effect of tax revenue on infrastructural development in Nigeria
3. To examine the effect of government borrowing on infrastructural development in Nigeria.

Research Hypotheses

To accomplish the objectives of the study, the following hypotheses were formulated in null forms:

H₀₁: Oil revenue has no significant effect on infrastructural development in Nigeria

H₀₂: Tax revenue does not significantly affect infrastructural development in Nigeria

H₀₃: Government borrowing has no significant effect on infrastructural development in Nigeria.

Review of Related Literature

Revenue

The term revenue has been defined by various authors in different ways. Musgrave (2019), saw revenue as income received by a government or business from its economic activities. It is critical for funding government services, ensuring economic stability and promoting social welfare, (Musgrave, 2019). Adam (2006) defined revenue as the fund required by the government to finance its activities. These funds are generated from different sources such as taxes, borrowing, fines, fees etc. It is also defined as the total amount of income that accrues to an organization within a specified period (Hamid, 2008). Bhatia (2001) contends that revenue includes “routine and “earned” income. For these reasons, according to him, revenue does not include borrowing and recovery of loans from other parties but includes tax receipts, donations, grants, fees and fines and so on.

Revenue Diversification

Revenue diversification is the reduction in financial volatility of revenue portfolios and organizational sustainability enhancement through the broadening of revenue sources used by nonprofit leaders (Carroll & Starter, 2009). It involves relying on different revenue sources and avoiding dependence on specific types of taxes or non-tax sources. Revenue diversification aims at reducing dependence on a single source of revenue, thereby enhancing sustainability and financial stability (Gupta, 2017). In the same vein, diversified revenue streams increase competitiveness, mitigate risks and improve financial performance. Diversification of revenue is a major step in economic development, as it reduces dependence on a single source of revenue and transforms a simple economy into a developed economy through infrastructural development.

2.1 3 Tax Revenue

World Bank (2020) defined tax revenue as the revenue generated from taxes, fees and other compulsory payments. Tax revenue comprises revenue from taxes on income, profits, capital gains, and consumption (International Monetary Fund, 2020), it includes taxes on income, wealth, property, goods and services (Organization for Economic Cooperation and Development, 2020). Musgrave (2019) saw tax revenue as encompassing all revenues derived from compulsory payments to the government, in the same vein, (Gupta, 2017), referred to tax revenue as including revenue from direct taxes, indirect taxes and other taxes. Tax is a mandatory financial charge or some other type of levy imposed upon a taxpayer (an individual or a legal entity) by a state or the functional equivalent of a state, to fund various public expenditures. Taxation is the process whereby charges are imposed on individuals or properties by the legislative branch of the federal government and by many state governments to raise funds for public purposes. Tax is a compulsory levy imposed on a subject or on his properties and this is done by the government to provide security, social amenities, and create suitable conditions for the wellbeing of the society (Oluyombo & Olayinka, 2018). According to Ezu and Okoh

(2016), tax is a burden which every citizen must bear to sustain the government because the government has certain functions to perform for the benefit of those it governs. Tax revenue is the income that is gained by the government through taxation. Tax revenue allocation to infrastructure impacts economic growth and development (Slemrod, 2018). Infrastructure development outcomes are influenced by tax revenue performance to a great extent and benefit from accountable and transparent governments.

Oil Revenue

Oil revenue according to the Organisation of Petroleum Exporting Countries (2020), is generated from the sale of crude oil, natural gas liquids and petroleum products. It encompasses revenues derived from oil exploration, production, refining and marketing, (Musgrave 2019). Srivastava (2019), opines that oil revenue encompasses upstream (exploration, production) and downstream (refining, marketing) revenues. Oil revenue is the income realized from the sale of crude oil (Appah, 2022). When petroleum products are sold by any company or organization engaged in petroleum operations, income realized from such sales is oil revenue (Ogbonna, 2011). For the Nigerian government, it is the money received by its agencies, such as the Central Bank of Nigeria and the Nigerian National Petroleum Corporation in respect of the sale of crude oil and gas, petroleum profit tax, licensing fees, royalties and other incidentals. A significant financial resource is obtained from oil revenue by the government for investment in infrastructure development, (Tanzi, 2017). Large-scale infrastructure projects such as ports, bridges and roads can be funded by oil revenue (Mankiw, 2017), and improved public services, such as education, water supply and health care can also be funded by oil revenue (Gupta, 2017).

Government Borrowing

The process by which governments obtain funds from foreign or domestic sources to finance budget deficits is referred to as government borrowing (Tanzi, 2017). It occurs when the government issues debts such as bonds to finance its expenditure (Mankiw, 2017) and

encompasses all forms of debt financing, including short-term and long-term debts (Musgrave, 2019). Government borrowing refers to loans obtained by the government from different sources. In most countries, government expenditure exceeds the level of government income received through taxation. This shortfall is made up by government borrowing and bonds are issued to finance the government's debt. The core of any domestic capital market is usually the government bond market, which also forms the benchmark for all other borrowings. Governments have many competing demands for financial support. Any spending should be tempered by fiscal responsibility and by looking carefully at the spending's impact. When the government spends more than it collects in taxes, it runs a budget deficit. It then needs to borrow. When government borrowing becomes especially large and sustained, it can substantially reduce the financial capital available to private sector firms, as well as lead to trade imbalances and even financial crises. Government borrowing can be used to respond to economic shocks, finance development projects and cover budget deficits (Gupta, 2017).

Infrastructure Development

Investopedia (2021) noted that infrastructure is the basic physical system of a business or nation; transportation, communication, sewage, water and electric systems are all examples of infrastructure. There are two types of infrastructure, which are: hard and soft infrastructure (Adesoji & Chike, 2013). According to them, hard infrastructure refers to the large physical networks necessary for the functioning of a modern industrial nation, whereas soft infrastructure refers to all the institutions which are required to maintain the economic health, culture and social standards of a country, such as the financial system, the education system, the health care system, the system of government and law enforcement as well as emergency services. Infrastructure development is crucial for economic growth, as it increases productivity and competitiveness (Tanzi, 2017) and for this infrastructure

development to be achieved, there is a requirement for careful planning, prioritization, and funding strategies (Bird, 2017).

Infrastructure development is essential for achieving sustainable development goals (International Monetary Fund, 2020). In Nigeria, underinvestment in infrastructure development was a bane to her vision of becoming a top 20 economy by the year 2020. Despite her economic growth over the years, this has not translated to economic development due to lack of infrastructure, high poverty rate, unemployment etc.

Revenue Diversification and Infrastructure Development

A nation's economic development is dependent on the amount of government revenue available to it to provide infrastructure facilities (Appah, 2010). The Nigerian government realize its revenue from different sources, such as oil revenue, tax revenue, government borrowing etc. Revenue diversification reduces dependence on a single revenue source, enabling sustainable infrastructure development (Tanzi, 2017). Many countries around the world that have witnessed a sudden turnaround in infrastructure development have been found to have leveraged on revenue from an efficient tax system and other revenue sources. Aluko (2012) opines that revenue diversification will make funds available for infrastructure development and economic growth promotion (Mankiw, 2017). In a country like Nigeria, revenue diversification can have significant effects as it will provide stable funding for infrastructure programmes. However, the success of such diversification efforts depends on effective policies and management.

Empirical Review

Darshini and Gayithri (2023) explored an econometric analysis of revenue diversification among selected Indian States. The objective of the study was to examine the trends and determinants of revenue diversification with respect to 14 major Indian States. The panel cross-sectional-autoregressive distributed lag model test was employed in testing the data.

Result showed a gradual decrease in the level of revenue diversification.

Iroegbu (2022) empirically examined the effects of revenue diversification on the Economic growth of Nigeria. The broad objective of the study was to investigate the effects of revenue diversification on economic growth of Nigeria for the period, 1994-2021. Data was collected from different multiple secondary sources and subjected to different tests using E-views statistical software. Findings showed that the explanatory variables used in this research were statistically relevant.

Ejem Chukwu Agwu (2021) empirically investigated diversification of revenue base and growth synthesis. Macrofinametric evidence from Nigeria. Data was obtained from central Bank of Nigeria's statistical bulletin and National Bureau of statistics for economic growth. The data was subjected to various macrofinametric tools. Findings reveal that revenue from oil and non-oil exports insignificantly relate to economic growth in Nigeria.

Udeh (2021) evaluated the effect of oil and non-oil revenue on economic growth of Nigeria. The objective of the study was to ascertain the effect of oil and non-oil revenue of the government on economic growth of Nigeria. Secondary data on oil and non-oil revenue of the government for the period were collected from the Central Bank of Nigeria's statistical bulletin. Multiple Linear regression models were used in testing the data. Results from the study showed that oil and non-oil revenue exerted a positive and significant effect on gross domestic product.

Umar and Umar (2021) examined the effect of income diversification on the financial performance of quoted manufacturing firms in Nigeria. The study adopted an ex-post facto research design using secondary data of 42 firms from the 63 quoted manufacturing firms in Nigeria from 2007 to 2017. Structural equation modeling was utilized for data analysis. The study found that both product income segment diversification and non-product income segment diversification significantly affect the financial performance of quoted manufacturing firms in Nigeria.

Omodero and Ehikioya (2020) examined oil and non-oil Revenues Assessment of contributions to infrastructural development in Nigeria. Secondary data was used in this 2two primary revenue sources in Nigeria on infrastructure. The findings of the study reveal that oil revenue and exchange rate have a significant negative impact on infrastructural provisions.

Ilori and Akinwunmi (2020) investigated a comprehensive analysis of the effect of oil and non-oil revenues on economic development in Nigeria. Secondary data extracted from the Central Bank of Nigeria's statistical bulletin from 1989 to 2018 was used in the study. The study employed the model for analytical co-integration and error correction. Results generated indicated that oil revenue harms real gross domestic products in Nigeria.

Ndifon, Inah and Akpeh (2016) explored the relationship between revenue diversification and government spending in Cross River State. The objective of the study was to determine how revenue diversification affects government spending. The study adopted the survey design with data collected from both primary and secondary sources. The formulated hypotheses were tested using regression model in SPSS 20. The result revealed that the diversification of public revenue reduces revenue fluctuation.

Gap in the Literature

From the literatures reviewed, it has been observed that extant studies dwelt majorly on economic diversification of Nigeria. The study by Iroegbu, F. N. (2022), was specifically on the effects of revenue diversification on the economic growth of Nigeria for the period, 1994 to 2021. Currently and to the best of the researcher's knowledge, no existing study has empirically examined the effect of revenue diversification on infrastructure development in Nigeria. It is to bridge this gap that this study has become highly relevant.

Theoretical Framework of the Study.

The study is anchored on the contingency theory of income diversification. The theory was propounded by Kelvin Kearns in the year 2007. It is an adaptation of the Markowitz selection

theory on investment selection developed in 1952. The theory holds that an organization's mission determines the concentration or diversification of its income sources. The major assumption of the theory is that different missions are associated with different funding sources. Some missions could be conflicting or complementary, specific attention needs to be paid to the combination of missions that will create optimum benefits. The theory is related to this work in the sense that the Federal Government of Nigeria in their mission to provide quality infrastructure to her citizens, diversify their income portfolios (revenue sources) to be less susceptible to financial crisis and to increase her financial viability, as organizations with diversified revenues were less financially vulnerable than those that are not diversified.

METHODOLOGY

The research design adopted for this study is ex post facto design. Ex post facto research designs are those designs which are concerned with using past values of a variable to determine its effect on another variable overtime.

Model Specification

The study adopted a multivariate regression model to determine the effect of revenue diversification on infrastructural development in Nigeria by regressing the independent variables against the dependent variable. The general formular of a multiple regression model is as given below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon$$

Where;

Y = Dependent variable

B₀ = Constant term (equation constant)

B₁ = Beta coefficients of explanatory variables

X₁ = Independent (or explanatory) variables

ε = Error term

In this study, the representative variable for infrastructure development is the total annual government capital expenditure on infrastructure projects (TCEX; while the variables for revenue diversification are given as oil revenue (OREV), tax revenue (TAR), and government borrowing

(GBOR). The study therefore specified the following model for analysis;

$$TCEX = f(\text{OREV}, \text{TAR}, \text{GBOR}) \dots 1$$

Where,

TCEX = Total annual government capital expenditure

OREV = Oil revenue

TAR = Tax revenue

GBOR = Government borrowing

The model is stated mathematically as:

$$TCEX = \beta_0 + \beta_1 \text{OREV} + \beta_2 \text{TAR} + \beta_3 \text{GBOR} \dots 2$$

Since the study adopts the econometric method, the error term is incorporated into the model and restated as

$$TCEX = \beta_0 + \beta_1 \text{OREV} + \beta_2 \text{TAR} + \beta_3 \text{GBOR} + U_t \dots 3$$

Presentation and Analysis of Result

The stationarity test was conducted on the data and model to ensure that they were fit and suitable for use.

Table 1: Summary result of unit root test

SERIES	AT LEVELS		FIRST DIFFERENCES		ORDER	REMARK
	ADF Stat	5% critical value	ADF Stat	5% critical value		
TCEX	-2.043409	-3.562882	-7.501537	-3.568379	1(1)	Stationary
TAR	0.400973	-3.562882	-5.626979	-3.568379	1(1)	Stationary
OREV	-2.139413	-3.562882	-5.586664	-3.568379	1(1)	Stationary
GBOR	-2.249995	-3.362882	-4.877020	-3.568379	1(1)	Stationary

Source: Researcher's computation 2023(E-views)

The test for stationarity conducted using the Augmented Dickey Fuller Test (ADF), showed that all the model variables did not achieve stationarity at levels, the Augmented Dickey Fuller test statistic were less than their 5% critical values, and the probability value greater than (0.05) level of significance (column 2 and 3 of table 4.1). This makes it necessary for a difference testing. Difference testing was done when the data set failed to be stationary at level, stationarity is concluded if the ADF statistic is greater than the 5% critical value or if the probability value (P-value) is less than (0.05). The variables were subjected to unit root test at first difference, after which all achieved stationarity. The ADF t-stat became greater than the 5% critical value and the p-values less than

(0.05) level of significance (column 4 and 4 of table 4.1). Hence, stationarity and integration were achieved at order 1(1).

Correlation Test

Statistical analysis is often mostly interested in understanding the relationship among model variables. One way to quantify relationship is to use the correlation statistic which is a measure of the linear association between two variables. It has a value between -1 and 1 where: -1 indicates a perfectly negative linear correlation between two variables, 0 indicates no linear correlation between two variables, 1 indicates a perfectly positive linear correlation between two variables. Table 2 shows the results of the correlation test:

Table 2: Correlation Matrix

	TCEX	TAR	OREV	GBOR
TCEX	1.000000	0.934204	0.634774	0.757784
TAR	0.934204	1.000000	0.650367	0.753026
OREV	0.634774	0.650367	1.000000	0.212333
GBOR	0.757784	0.753026	0.212333	1.000000

Source: Researcher's Computation 2023 (E-view)

The correlation test results presented in table 2 above indicated that tax revenue variable (TAR) has very high positive relationship (0.934204) with infrastructure development. The correlation test result also showed that the oil revenue variable (OREV) has a significant positive relationship with infrastructure development. This is confirmed by the value of the correlation coefficient of (0.634774). Again, the correlation results also showed that the government borrowing variable (GBOR) has a significant positive relationship with the level of infrastructure development in Nigeria. The value of the coefficient was (0.757784). This implies that government borrowing has a significant positive relationship with the level of infrastructure development.

Cointegration Test of Long Run Relationship

Long run relationship and tendency of convergence of variables in a model is very important in economic and financial analysis, it gives an idea on whether their characteristics will have a common or individual spread over the long run. The relevance of long run analysis is also because most economic variables such as revenue diversification come as built-in economic intervention actions which enables the attainment of economic goals especially growth, price stability and development. For the purpose of this study, the Johansen cointegration test was adopted and the summary of the result is shown in Table 3 below:

Table 3: Cointegration test result
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.667868	58.38034	47.85613	0.0038
At most 1	0.438275	25.31368	29.79707	0.1505

Trace test indicates 1 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Researcher's computation (2023) using E-views

Decision concerning the presence or otherwise of cointegration can be made in three ways: by comparing the trace statistic with the 5% critical value, the maximum Eigenvalue, or the probability value. In using the p-value, conclusion on the presence of cointegration is made when the p-value at any of the identified cointegrating equations is less than 0.05. From the cointegration result in table 4.2 above, it showed that at the first level of integration, the trace statistic was greater than the 5% critical value [none* -: 58.38034 > 47.85613]; with probability values also less than 0.05. Similarly, the computed Eigenvalue is significantly different from zero in one of the hypothesized equations. As shown in the result (table 4.3

above) it is denoted that one of the hypothesized equations (none*,) the condition for cointegration were satisfied and the hypothesis of no cointegration among the variables is accordingly rejected. Thus, the study concluded that there was a long run tendency (relationship) among the infrastructure development variable and revenue diversification variables during the period 1991-2022. The major objective of this study was to determine the effect of revenue diversification on infrastructural development in Nigeria. Having evidenced the presence of cointegration among the revenue and infrastructure development variables, the researcher proceeded to run the Ordinary Least Squares regression as shown in the result below:

Table 4.4: OLS Regression Estimates

Dependent Variable: TCEX
 Method: Least Squares
 Date: 08/10/23 Time: 17:10
 Sample: 1991 2022
 Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TAR	0.227259	0.052748	4.308385	0.0002
OREV	0.054377	0.018842	2.885860	0.0073
GBOR	0.047527	0.017938	2.649439	0.0129
R-squared	0.883760			
Durbin-Watson stat	1.285930			

Source: Author's computation (2023) (E-views 10 see full result in Appendix)

The regression result as presented in Table 4 above showed that the tax revenue variable (TAR) is positive and significant in infrastructure development. This result conforms with the apriori expectation. It suggests that tax revenue has a significant positive effect on infrastructure development. The result shows that a unit increase in the funds generated from tax collections will lead to 0.227259 unit increase in infrastructural development in Nigeria. The regression results also show that the oil revenue (OREV) variable has a significant positive effect on infrastructural development in Nigeria. This result also conforms to the model apriori expectation of a positive coefficient. The government borrowing variable (GBOR) was found to have a significant positive effect on infrastructural development in Nigeria. Also, from Table 4, the following statistics are taken care of; the coefficient of multiple determination (R^2), f-ratio, the standard error of the regression (SER) and Durbin-Watson (DW) statistics. The R^2 measures the overall goodness of fit of the regression plane; the higher the R^2 , the better the goodness of fit. To pass the goodness of fit test, the coefficient of determination must have a

value of at least fifty percent. The standard error of the regression is a test of the significance of the relationship between the dependent variable (infrastructure development) and the independent variables of a model (revenue diversification – oil revenue, tax revenue and government borrowing), while Durbin-Watson statistics is used to test for the first-order autocorrelation of the random variable. Since a multiple regression model was used, we also included the adjusted R^2 or coefficient of multiple regression. This is the standard and procedure in most research of this magnitude. From the results, the explanatory power of the model as informed by the adjusted R-squared is seventy-nine percent (0.883760 or 88.38%), and is statistically significant given the high value. To this end, the model demonstrates a good fit given that about 88.4% percent of the variation in the dependent variable (infrastructure development) is jointly explained by variations in the observed behaviour of the revenue diversification variables. The relatively high adjusted R-squared shows that the model fits well.

Normality Test

The normality tests used in the study are the skewness, kurtosis and standard deviation. The results obtained from the study data are shown below:

Table 5: Jarque-BeraNormality Test

	TCEX	OREV	TAR	GBOR
Mean	704.9050	3242.042	1595.555	2944.404
Std. Dev.	6.380994	2.64.241	1.714786	3.728684
Skewness	1.259467	0.332393	1.026425	2.046817
Kurtosis	0.199840	0.963728	0.186712	0.780452
Observations	32	32	32	32

Source: Researcher's computation 2023 (Eviews)

Standard deviation is a measure of how dispersed the data is in relation to the mean. Low standard deviation means data are clustered around the mean, and high standard deviation indicates data are more spread out. A standard deviation close to zero indicates that data points are close to the mean, whereas a high or low standard deviation indicates data points are respectively above or below the mean. A high standard deviation shows that the data is widely spread (less reliable) and a low standard deviation shows that the data are clustered closely around the mean (more reliable). Looking into the result above, the standard deviation for each of the variables is very low when compared to their respective mean values, hence the outcome of the study is reliable. The kurtosis parameter is a measure of the combined weight of the tails relative to the rest of the distribution. So, kurtosis is all about the tails of the distribution. It measures the tail-heaviness of the distribution. The result (Table 5) above also show that the values of the kurtosis among the variables were very low. Skewness is a measure of symmetry or lack of it in a dataset. A perfectly symmetrical data set will have a skewness of 0. The normal distribution has a skewness of 0. A truly symmetrical data set has a skewness equal to 0. A positive skewness indicates that the size of the right-handed tail is larger than the left-handed tail. To ascertain when skewness is too much, the rule of thumb is: If the skewness is between -0.5 and 0.5, the data are fairly symmetrical, If the skewness is between -1 and -0.5 or between 0.5 and 1, the data are moderately skewed. If the skewness is less than -1 or greater than 1, the data are highly skewed. The result as above, confirmed that the series (our model variables) are moderately skewed as they hover between 0 and 1.

Evaluation of Research Hypotheses

In this section, the study used population parameters (t-statistics and p-values) to determine the probability that the given statements (hypotheses) are true or not. The probability values formed the basis for decision-making on the statistical significance of the results obtained for each of the research hypotheses. Thus, in testing the first, second and third hypotheses, the P-values of the t-statistics in Table 6 were used.

Test of Hypothesis One

Research hypothesis one provided the answer to research question one, it is tested thus:

Step 1: Restatement of the null hypothesis

H01: Tax revenue has no significant effect on infrastructural development in Nigeria.

Step 2: Decision Rules

(a) Decision Rule 1: Accept the alternate hypothesis and reject the null hypothesis if the P-value is less than the chosen level of significance (0.05). It implies that the estimated variable has a significant effect on the dependent variable.

(b) Decision Rule 2: Accept the null hypothesis and reject the alternate hypothesis if the P-value is greater than the chosen level of significance (0.05). It implies that the estimated variable has an insignificant effect on the dependent variable.

Step 3: Decision

Based on the regression results presented in table 4.4, the coefficient of tax revenue (TAR) is 0.227259 while its P-value is [0.0002]. The variable (TAR) is positive and significant in explaining infrastructure development as confirmed by the P-value. Since the p-value is less than the 5% level of significance ($0.0002 < 0.05$), the null hypothesis is rejected

and the alternative hypothesis accepted. It is concluded that tax revenue has a significant positive effect on infrastructural development in Nigeria.

Test of Hypothesis Two

Research hypothesis two provided answer to research question two and is tested thus:

Step 1: Restatement of the null and alternative hypothesis

H02: Oil revenue does not significantly affect infrastructural development in Nigeria.

Step 2: Decision Rules

(a) Decision Rule 1: Accept the alternate hypothesis and reject the null hypothesis if the P-value is less than the chosen level of significance (0.05). It implies that the estimated variable has a significant effect on the dependent variable.

(b) Decision Rule 2: Accept the null hypothesis and reject the alternate hypothesis if the P-value is greater than the chosen level of significance (0.05). It implies that the estimated variable has an insignificant effect on the dependent variable.

Step 3: Decision

Based on the regression result presented in table 4.4, the coefficient of oil revenue (OREV) is 0.054377 whereas its P-value is [0.0073]. The variable (oil revenue) has a positive significant influence on infrastructure development as confirmed by the P-value. Following that the p-value is less than the 5% level of significance ($0.0073 < 0.05$), the study hereby rejects the null hypothesis and accepts the alternative; conclusively, oil revenue has a significant positive effect on infrastructural development in Nigeria

Test of Hypothesis Three

Research hypothesis three provided answer to research question three and is tested as follows:

Step 1: Restatement of the null and alternative hypothesis

H03: Government borrowing has no significant effect on infrastructural development in Nigeria.

Step 2: Decision Rules

(a) Decision Rule 1: Accept the alternate hypothesis and reject the null hypothesis if the P-value is less than the chosen level of significance (0.05). It implies that the estimated variable has a significant effect on the dependent variable.

(b) Decision Rule 2: Accept the null hypothesis and reject the alternate hypothesis if the P-value is greater than the chosen level of significance (0.05). It implies that the estimated variable has an insignificant effect on the dependent variable.

Step 3: Decision

Following the regression results presented in table 4.4, the coefficient of the government borrowing variable (GBOR) is 0.047527 while the P-value is [0.0129]. The variable (government borrowing) has a significant positive influence on infrastructure development as confirmed by the p-value. The p-value is greater than the 5% level of significance ($0.0129 < 0.05$). Following the decision rule 2, the null hypothesis accepted and the alternative hypothesis rejected. In conclusion, government borrowing has a significant positive effect on infrastructural development in Nigeria.

Policy implication of Findings

The findings of this study (significant effect of tax revenue, oil revenue and government borrowing) have some policy implications. First, expansion policy for revenue diversification is needed to increase the capacity of the government to facilitate financing for large infrastructure projects. Secondly, a policy of prioritizing infrastructure tax revenue and oil revenue can produce a significant ease of financing solution for infrastructure development.

Conclusion

The study investigated the effect of revenue diversification on infrastructural development in Nigeria for the period 1991-2022 using time series data. With the analysis performed, the hypotheses tested and the findings gotten, the study concludes that oil revenue has significant and positive effect on infrastructural development in Nigeria, tax revenue has

significant and positive effect on infrastructural development in Nigeria and government borrowing also have significant and positive effect on infrastructural development in Nigeria.

Recommendations

Based on the findings, the study makes the following recommendations:

1. The federal government of Nigeria should establish a transparent and accountable system for allocating oil revenue to infrastructure projects, ensuring funds reach intended purposes. . This will make available more revenue for infrastructure development.
2. There should be increased effort to collect taxes from the informal sector by the Federal Inland Revenue Service through the use of technology and other innovative methods. This will improve Nigeria's tax revenue base and enlarge access to infrastructure development fund.
3. The Federal Government of Nigeria should ensure a stable economy and prioritize concessional loans from development partners, such as African Development Bank and World Bank as this will enlarge the pool of capital needed for massive infrastructure programmes.

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