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TAX REVENUE, EXTERNAL DEBT, AND INFRASTRUCTURAL DEVELOPMENT IN NIGERIA

Adewale. O. Taiwo[1], Ibrahim Sadiq Mathias[2]

[1]*Faculty of Management and Social Sciences, Department of Management and Accounting, Lead City University, Ibadan, Nigeria.*

[2]*Faculty of Management and Social Sciences, Department of Management and Accounting, Lead City University, Ibadan, Nigeria.*

ABSTRACT

This study examined the relationship between tax revenue, external debt, and infrastructural development in Nigeria, with a focus on government expenditure in agriculture, transport, and communication. The objectives were to determine how external debt affects government expenditure on agriculture and transport/communication. Using secondary data from 2000–2022 sourced from the Central Bank of Nigeria and World Bank, regression analysis was applied. The findings revealed that external debt had a significant effect on agricultural expenditure ($\beta = 0.421$; $p = 0.012$) and an even stronger effect on transport and communication expenditure ($\beta = 0.537$; $p = 0.004$). The study concluded that while external borrowing positively impacts infrastructure, the transport and communication sector benefits more than agriculture. It recommended prudent debt management, equitable allocation of funds, stronger tax reforms, and enhanced accountability. These measures will ensure sustainable infrastructural growth and reduce fiscal vulnerability.

KEYWORDS: *Agriculture, External Debt, Infrastructural Development, Nigeria, Tax Revenue*

INTRODUCTION

Infrastructural development is a critical driver of economic growth, social stability, and national competitiveness. It encompasses the provision and maintenance of physical structures such as roads, electricity, water supply, schools, hospitals, and telecommunication networks that support productive activities and improve living standards. In Nigeria, infrastructural development has historically lagged population growth and economic needs, resulting in significant bottlenecks that limit productivity and reduce the attractiveness of the country as an investment destination. The inability to provide adequate infrastructure has been linked to weak fiscal performance, limited revenue mobilization, and heavy reliance on debt financing. This scenario has raised pressing concerns about how effectively tax revenue and external debt contribute to infrastructural development in the country.

The relationship between tax revenue and infrastructural development has been widely acknowledged in economic literature. Taxation is the most sustainable and reliable source of government revenue, as it enables the financing of long-term public goods and services without creating a burden of debt for future generations. In developed economies, taxes contribute significantly to infrastructure provision, thereby enhancing industrial productivity and social welfare (Muojekwu & Udeh, 2023). In Nigeria, however, the tax-to-GDP ratio remains among the lowest in sub-Saharan Africa, reflecting inefficiencies in tax administration, evasion, and an overreliance on oil revenue (Jerry Oziegbe & Itua, 2024). This has constrained the fiscal space for infrastructural financing, forcing the government to depend heavily on borrowing, which creates concerns about sustainability.

Despite the challenges, tax revenue remains central to infrastructural development in Nigeria. Governments at federal, state, and local levels use proceeds from taxes such as Value Added Tax (VAT), Company Income Tax (CIT), and Petroleum Profit Tax (PPT) to finance roads, schools, healthcare facilities, and energy projects (Ajiteru, Adaranijo, & Bakare, 2018). However, the weak institutional framework, corruption, and poor accountability in public financial management have often led to the diversion or misallocation of tax revenues, reducing their impact on infrastructural growth (Hammayo, Shittu, & Abdullahi, 2020). This reality has created a growing debate on how Nigeria can strengthen domestic revenue mobilization mechanisms to fund the country's critical infrastructure deficit. In addition to tax revenue, external debt has also played a pivotal role in financing infrastructural development. External borrowing is often undertaken to bridge the gap between limited domestic resources and the massive capital required for infrastructure projects, especially in developing economies (Epaphra & Mesiet, 2021). Nigeria has consistently accessed funds from bilateral and multilateral creditors such as the World Bank,

International Monetary Fund (IMF), Paris Club, and Eurobond markets. These loans are intended for infrastructure expansion in transportation, power, and water sectors, with the expectation of boosting economic growth. However, the mismanagement of borrowed funds and the accumulation of unsustainable debt burdens have raised questions about the efficiency of external debt utilization (Akplehey, 2019).

Historically, Nigeria's external debt profile has fluctuated significantly, reflecting periods of heavy borrowing, debt relief, and reaccumulating. The country experienced a major debt crisis in the 1980s and 1990s, which culminated in the Paris Club debt relief in 2005 (OGBORU, 2006). Following this relief, the government regained fiscal space to pursue infrastructural development. However, rising deficits, falling oil revenues, and increasing expenditure demands have once again pushed Nigeria into substantial external borrowing. The concern today is whether such debts are channelled effectively into productive infrastructure that generates sufficient returns to service the loans and sustain economic development (Osadume & Ikubor, 2022). The nexus between tax revenue, external debt, and infrastructural development is complex, particularly in the Nigerian context where governance challenges persist. While tax revenue should ordinarily form the backbone of infrastructural financing, its insufficiency has necessitated reliance on external borrowing. The effectiveness of this financing mix depends on institutional quality, fiscal discipline, and transparency in public spending (Manasseh et al., 2022). Empirical evidence suggests that when managed prudently, both tax revenues and external debt can complement each other to close infrastructure gaps and drive economic transformation (Frimpong, Fumey, & Nketiah-Amponsah, 2024). Conversely, mismanagement leads to debt overhang, reduced investor confidence, and underdeveloped infrastructure despite high expenditure.

Several studies have argued that infrastructural development in Nigeria suffers not merely from inadequate financing but from weak linkages between revenue mobilization, debt management, and expenditure patterns (Kengdo, Nchofoung, & Ntang, 2020). For instance, while external debts are acquired for infrastructure, a significant portion of these funds is sometimes diverted to recurrent expenditure, leaving infrastructure underfunded. Similarly, tax revenues are often eroded by corruption, inefficiency, and lack of accountability, thereby limiting their potential developmental impact (LOLA & ONI, 2022). Addressing these structural issues is crucial if Nigeria is to achieve sustainable infrastructural development that supports inclusive growth and global competitiveness. Against this background, examining the interplay between tax revenue, external debt, and infrastructural development in Nigeria is both timely and relevant. The study seeks to provide empirical evidence on whether the country's current fiscal structure can effectively bridge its vast infrastructure deficit. This is particularly important given Nigeria's ambition to diversify its economy, reduce poverty, and achieve the Sustainable Development Goals (SDGs). A deeper understanding of these dynamics will guide policymakers in designing more effective strategies for revenue mobilization, debt management, and infrastructural investment. The findings are expected to contribute to the ongoing discourse on fiscal sustainability and development financing in Nigeria.

STATEMENT OF THE PROBLEM

Infrastructural development in Nigeria remains one of the most persistent challenges undermining economic growth and social progress. Despite successive governments' promises and significant public spending, the nation still grapples with poor road networks, unstable electricity, inadequate health facilities, and insufficient educational infrastructure. The gap between infrastructural needs and available provisions has widened due to rapid population growth and urbanization, which outpaces the rate of investment in infrastructure. This persistent infrastructural deficit not only reduces the competitiveness of Nigerian industries but also erodes the quality of life for citizens (Ani, Igwe, & Nwabuisi, 2024). Consequently, the need to critically assess the financing sources for infrastructural development has become more urgent, particularly in relation to tax revenue and external debt. Tax revenue, which should ordinarily serve as a sustainable source of infrastructural financing, has not been adequately harnessed in Nigeria. The tax-to-GDP ratio remains significantly below global and regional averages, limiting the government's capacity to mobilize resources for long-term investments (MR & Chike, 2013). Weak tax administration, pervasive evasion, corruption, and a narrow tax base have constrained revenue collection. While several studies have examined the role of taxation in economic growth, few have specifically focused on how tax revenues are linked to infrastructural development in Nigeria (Nkechi & Onuora, 2018). Many researchers have left unresolved the question of whether improvements in tax efficiency and compliance can translate into tangible infrastructural outcomes, thereby leaving a knowledge gap that this study seeks to fill. External debt has also been widely debated as an alternative financing mechanism for infrastructural development. Nigeria's increasing reliance on loans from multilateral and bilateral institutions has raised concerns about debt sustainability and intergenerational equity (Kapindula, 2019). Previous studies have either concentrated on the macroeconomic implications of external debt such as its effect on GDP growth, exchange rate stability, or debt

servicing capacity or assessed debt sustainability in general (Matla, n.d.). However, limited scholarly attention has been given to whether external debt translates into visible infrastructural improvements. This leaves unanswered questions on the effectiveness of external borrowing as a catalyst for infrastructure delivery, particularly in a context where mismanagement and corruption often dilute its developmental impact (Emmanuel & Adewinle, n.d.).

Another unresolved issue in the literature is the combined effect of tax revenue and external debt on infrastructural development. While some scholars have explored each factor independently, few have attempted an integrative analysis of how both financing sources interact to influence infrastructure outcomes in Nigeria (Onye, Akpama, & Ikegwuonu, 2020). The interplay between domestic revenue mobilization and foreign borrowing is crucial, as overreliance on either source carries risks: heavy taxation could stifle private sector growth, while excessive borrowing could result in debt overhang. The failure of past studies to comprehensively evaluate this interaction leaves a critical gap in understanding the most effective financing mix for sustainable infrastructural development (Onyekachi-Onyele, Umezurike, & Nwagwu, n.d.). Therefore, this study is motivated by the gaps in existing research that have not fully addressed the linkages between tax revenue, external debt, and infrastructural development in Nigeria. By focusing on the dependent variable actual infrastructural outcomes this research moves beyond abstract macroeconomic indicators to assess tangible developmental results. It aims to bridge the gap left by previous scholars by providing empirical evidence on whether the funds generated from taxation and external borrowing are effectively channelled into infrastructure that meets the nation's pressing needs. Addressing this gap will contribute significantly to policy formulation, fiscal reforms, and sustainable financing strategies for infrastructural development in Nigeria (Ifarajimi & Onyejiuwa, n.d.).

Aim and Objectives of the Study

The main aim of this study is to examine the relationship between tax revenue, external debt, and infrastructural development in Nigeria, with particular emphasis on how external borrowing contributes to sectoral government expenditure and its effectiveness in addressing the country's infrastructural needs. The study is designed to evaluate whether external debt serves as a catalyst for infrastructural growth or merely increases the nation's fiscal burden without corresponding improvements and the specific objectives are to:

i. examine the way external debt affects government expenditure on agriculture in Nigeria.

ii. investigate the influence of external debt on government expenditure on transport and communication in Nigeria.

Research Questions

i. In what way does external debt affect government expenditure on agriculture in Nigeria?

ii. What is the influence of external debt on government expenditure on transport and communication in Nigeria?

Hypotheses

H_o1: External debt has no significant effect on government expenditure on agriculture in Nigeria.

H_o2: External debt has no significant influence on government expenditure on transport and communication in Nigeria.

Scope of the Study

The scope of this study is primarily centred on infrastructural development, which serves as the dependent variable. Infrastructural development in Nigeria has continued to face enormous challenges, ranging from poor road networks and unreliable electricity supply to inadequate healthcare and limited educational facilities. For this reason, the study narrows its focus to government expenditure on key infrastructural sectors such as agriculture, transport, and communication, which are central to both economic growth and citizens' welfare. By examining these areas, the research intends to determine how infrastructural outcomes have been shaped by the country's fiscal choices and external borrowing patterns over time (Kengdo, Nchofoung, & Ntang, 2020).

Geographically, the study is confined to Nigeria because the country provides a unique case of infrastructural deficit despite high resource inflows from oil revenue and external loans. Nigeria's infrastructural gap is among the widest in Africa, with estimates suggesting that the country requires over $100 billion annually for the next decade to close its infrastructure shortfall (LOLA & ONI, 2022). Focusing on Nigeria is thus justified, as it allows the study to critically examine how both domestic revenue and external borrowing mechanisms have been used to address the persistent infrastructural crisis. This geographical boundary ensures that the findings will be directly relevant to Nigeria's fiscal and developmental realities.

The study covers the period from 2010 to 2023. This period is selected to capture contemporary fiscal and infrastructural dynamics, especially considering Nigeria's increasing reliance on external borrowing following the 2008–2009 global financial crisis and the subsequent fall in oil prices that constrained government revenue. Within this period, Nigeria also implemented several tax reforms, adopted multiple Eurobond issues, and expanded borrowing from international institutions to finance infrastructure projects (Ani, Igwe, & Nwabuisi, 2024). The 2010–2023 window therefore provides a rich context to analyse both the opportunities and constraints in using tax revenue and external debt for infrastructural development. In terms of the population and sampling, the study draws from government expenditure data on agriculture, transport, and communication sourced from the Central Bank of Nigeria (CBN), the Debt Management Office (DMO), and the National Bureau of Statistics (NBS). To achieve precision, a sample size of 217 was determined using the Taro Yamane formula at a 5% margin of error. This sample is considered adequate for the econometric analysis, as it balances statistical reliability with feasibility in terms of data accessibility (MR & Chike, 2013). The sample size also reflects the need to ensure representation of fiscal and infrastructural variables across the selected years.

The study specifically focuses on external debt and tax revenue as explanatory variables, analysing their influence on government spending in the agricultural and transport/communication sectors. Agriculture is chosen because it remains the backbone of Nigeria's non-oil economy, employing a significant proportion of the population and serving as a vital sector for food security and rural infrastructure (Nkechi & Onuora, 2018). Transport and communication are included because they are critical enablers of commerce, industrialization, and integration into global markets. Together, these sectors provide a balanced measure of infrastructural development and capture the essential link between fiscal policy and national growth. Another dimension of the scope is the emphasis on the effectiveness of resource utilization. While many studies focus on the volume of tax revenue or external debt, this research is more concerned with the actual impact of these financing sources on infrastructural outcomes (Kapindula, 2019). By concentrating on expenditure in agriculture and transport/communication, the study avoids the dilution that may occur when analysing overall government expenditure, which includes recurrent spending such as salaries and subsidies. This targeted scope ensures that the research remains focused on sectors directly tied to infrastructural growth.

It is also important to note that the study is limited to secondary data obtained from recognized government and international sources, such as CBN statistical bulletins, DMO reports, and World Bank databases. This restriction ensures data reliability and comparability, as these institutions are mandated to provide credible and standardized fiscal and infrastructural statistics (Matla, n.d.). However, the reliance on secondary data implies that the research does not account for micro-level infrastructural outcomes, such as regional disparities or household-level access to facilities, which may require primary data collection. The scope of this study is justified by the gaps identified in the literature. Previous researchers have often focused on the general effect of external debt on economic growth or the role of taxation in revenue mobilization without linking these variables directly to infrastructural development in specific sectors (Emmanuel & Adewinle, n.d.). By narrowing the focus to Nigeria between 2010 and 2023, examining agriculture and transport/communication, and applying econometric analysis to a defined sample size, this study addresses those gaps. The scope is therefore both practical and purposeful, providing relevant insights for policymakers on how to harness tax revenue and external debt more effectively to drive infrastructural development in Nigeria (Onye, Akpama, & Ikegwuonu, 2020).

SIGNIFICANCE OF THE STUDY

The significance of this study is first anchored on its contribution to addressing Nigeria's persistent infrastructural deficit. Infrastructure is the backbone of economic growth, and without adequate roads, power supply, schools, hospitals, and communication systems, Nigeria's productivity and global competitiveness remain limited. By analysing how tax revenue and external debt influence infrastructural development, this study provides insights that can guide government officials in making better fiscal decisions. The findings will be particularly valuable for policymakers who aim to align fiscal strategies with the urgent need to close the country's infrastructure gap.
For fiscal authorities, this study is significant because it highlights the role of taxation as a sustainable source of infrastructural financing. In Nigeria, where the tax-to-GDP ratio remains one of the lowest globally, the findings can inform reforms in tax policy and administration. By showing the extent to which tax revenue contributes to infrastructure, this study emphasizes the need to expand the tax base, reduce evasion, and improve efficiency in tax collection. This will not only reduce dependence on borrowing but also ensure more predictable funding for long-term development projects.

The research also holds importance for debt managers and financial regulators. Nigeria's increasing reliance on external debt has raised questions about sustainability, intergenerational equity, and the efficiency of borrowed

funds. By examining the direct impact of external debt on infrastructural expenditure, this study provides evidence that can help debt management institutions like the Debt Management Office (DMO) and the Ministry of Finance ensure that borrowed funds are channelled into productive projects. This reduces the risk of debt overhang and ensures that external borrowing results in tangible developmental outcomes.

Another significance lies in the study's focus on specific sectors agriculture, transport, and communication. These sectors are vital for Nigeria's growth trajectory: agriculture provides food security and rural development, while transport and communication underpin industrialization and trade. By examining how external debt and tax revenue affect expenditure in these areas, the study provides sector-specific insights that can guide targeted policy interventions. This is especially useful for ministries and agencies that oversee these sectors, as it helps them advocate for better funding allocations and more effective project implementation.

From an academic perspective, the study contributes to the literature on public finance and development economics in Nigeria. Previous studies have concentrated on the general effect of taxation on revenue mobilization or the broad macroeconomic implications of external debt. Few have explicitly connected these variables to infrastructural development in Nigeria, particularly within agriculture, transport, and communication. By filling this gap, the study enriches academic debates and provides a framework for future researchers interested in the nexus between fiscal policy, borrowing, and development outcomes. The study is also significant for civil society organizations and advocacy groups working on issues of fiscal transparency and accountability. Findings from this research can empower such groups to hold government accountable for how tax revenues and borrowed funds are utilized. By linking fiscal inflows directly to infrastructural outcomes, the study offers evidence that can be used to demand better governance, reduce corruption, and ensure that resources are not diverted away from critical development needs.

In addition, the study will be beneficial to international development partners and donor agencies. Institutions such as the World Bank, IMF, and African Development Bank often extend credit and technical support to Nigeria for infrastructural projects. By providing empirical evidence on how external debt affects infrastructure delivery, the study can help these partners better evaluate the effectiveness of their interventions and align their assistance with Nigeria's developmental priorities. This creates opportunities for more sustainable and impactful collaborations. The study is significant for the Nigerian populace, who are the ultimate beneficiaries of improved infrastructure. Citizens face the daily consequences of poor roads, unreliable electricity, inadequate schools, and weak health systems. By identifying whether tax revenues and external debts are being effectively used to address these challenges, the study indirectly advocates for a better standard of living for Nigerians. If its findings are implemented, the study could contribute to reducing poverty, creating jobs, and fostering inclusive development through enhanced infrastructure.

LITERATURE REVIEW

Infrastructural development has been widely recognized as the cornerstone of economic growth and social transformation. It encompasses physical facilities such as roads, schools, hospitals, power plants, and communication networks that enable production, improve living standards, and facilitate trade. Scholars argue that sustainable infrastructural investment is necessary for long-term growth, as it not only supports private sector productivity but also enhances human capital formation (Ajiteru, Adaranijo, & Bakare, 2018). In Nigeria, the persistent gap between infrastructural demand and supply has generated significant academic discourse, particularly in relation to financing mechanisms. Researchers note that despite several government initiatives, infrastructural facilities remain inadequate, thereby hindering economic diversification and competitiveness (Hammayo, Shittu, & Abdullahi, 2020).

Tax revenue is considered one of the most stable and predictable sources of infrastructural financing. According to fiscal theory, taxation provides governments with the resources needed to deliver public goods without imposing unsustainable financial burdens on future generations (Epaphra & Mesiet, 2021). In developed economies, efficient tax systems have been linked to improved infrastructure quality and accessibility. However, in Nigeria, the tax-to-GDP ratio remains among the lowest in Africa, reflecting structural inefficiencies, widespread evasion, and overdependence on oil-related taxes (Akplehey, 2019). This weak tax base has constrained infrastructural investment, forcing the government to rely on borrowing. Studies emphasize that improving tax administration and compliance could significantly expand Nigeria's fiscal space for infrastructural development (OGBORU, 2006).

Empirical studies further highlight that specific tax categories such as Value Added Tax (VAT), Company Income Tax (CIT), and Petroleum Profit Tax (PPT) are linked to infrastructural projects in Nigeria (Osadume & Ikubor, 2022). For instance, VAT proceeds are often earmarked for education and healthcare, while oil-related taxes finance energy and road projects. Yet, research reveals that the actual impact of these revenues on infrastructure is often undermined by corruption, poor planning, and misallocation of funds (Manasseh et al., 2022). This has led scholars to call for greater transparency and accountability in tax revenue utilization as a prerequisite for infrastructural expansion in Nigeria (Frimpong, Fumey, & Nketiah-Amponsah, 2024).

External debt is another significant financing option explored in literature, particularly for developing countries facing limited domestic resources. Borrowing from multilateral institutions, bilateral partners, or international capital markets is often seen to bridge fiscal gaps and fund large-scale infrastructure projects (Kengdo, Nchofoung, & Ntang, 2020). In Nigeria, external debt has been used to finance transport, power, and communication projects, which are crucial for economic growth. However, researchers caution that the effectiveness of external debt depends on prudent management, as excessive borrowing without corresponding infrastructural outcomes leads to debt overhang and fiscal vulnerability (LOLA & ONI, 2022).

Historically, Nigeria's external debt profile has attracted scholarly attention due to its volatility. Studies show that the debt crisis of the 1980s and 1990s, which culminated in the Paris Club debt relief of 2005, limited infrastructural investment for decades (Ani, Igwe, & Nwabuisi, 2024). Following the relief, the government expanded borrowing once again, particularly after oil revenues declined in the mid-2010s. Scholars argue that while these borrowings were justified as means of financing infrastructure, the results have been mixed. Some projects improved road networks and power generation, but others failed due to mismanagement and corruption (MR & Chike, 2013). Thus, researchers highlight the importance of institutional quality in determining whether external debt translates into infrastructural development.

The interaction between tax revenue and external debt as joint sources of infrastructural financing has received limited but growing attention in the literature. Some scholars argue that tax revenue should serve as the foundation of infrastructural financing, while external debt should complement it during revenue shortfalls (Nkechi & Onuora, 2018). Others contend that overreliance on external debt can undermine tax reforms by reducing the urgency of improving domestic revenue mobilization (Kapindula, 2019). The debate highlights a critical gap in empirical evidence on whether the two financing sources work as substitutes or complements in Nigeria's infrastructural development.

Several studies have also examined sectoral dimensions of infrastructural financing. Research on agriculture shows that government expenditure in this sector often relies on a mix of tax revenue and concessional loans, with varying impacts on rural infrastructure and food security (Matla, n.d.). Similarly, studies on transport and communication emphasize that external debt has played a significant role in financing highways, airports, and ICT infrastructure (Emmanuel & Adewinle, n.d.). However, scholars note that inefficiencies in project implementation often reduce the developmental returns on these investments. This underscores the need for focused analysis of how fiscal variables specifically affect expenditure in agriculture, transport, and communication.

Despite these contributions, the literature reveals gaps that justify further investigation. Many studies have concentrated on the broad relationship between tax revenue, debt, and economic growth, without narrowing the focus to infrastructural development outcomes in Nigeria (Onye, Akpama, & Ikegwuonu, 2020). Moreover, while external debt has been studied extensively in terms of sustainability, less attention has been paid to whether the funds translate into sector-specific infrastructure such as agriculture, transport, and communication (Onyekachi-Onyele, Umezurike, & Nwagwu, n.d.). This study seeks to fill these gaps by providing empirical evidence on how tax revenue and external debt jointly influence infrastructural development in Nigeria, thereby contributing to both academic debate and policy formulation (Ifarajimi & Onyejiuwa, n.d.).

THEORETICAL REVIEW

The relationship between infrastructural development, tax revenue, and external debt in Nigeria can best be appreciated through relevant theoretical frameworks. Infrastructural development, as the dependent variable, is critical to a nation's growth and productivity. Economic theories argue that investment in infrastructure promotes efficiency in production, reduces transaction costs, and stimulates sustainable economic growth. However, the financing of infrastructure often requires stable and sufficient sources of revenue, either from tax mobilization or

borrowing externally, which creates theoretical debates around public finance and debt sustainability (Akplehey, 2019).

One major theory relevant to this study is the Wagner's Law of Increasing State Activity. The theory posits that as an economy develops, the functions of the government expand, resulting in higher demand for infrastructure such as roads, energy, and communication facilities. Consequently, this expansion requires higher government expenditure financed through taxation or external borrowing. In the Nigerian context, the pressure for infrastructural development has consistently exceeded the internally generated tax revenue, leading policymakers to rely on external debt to bridge funding gaps (OGBORU, 2006). While the theory emphasizes the natural growth of public spending, critics argue that Wagner's Law underestimates issues of fiscal mismanagement, corruption, and debt overhang, which often distort government capacity to invest efficiently (Osadume & Ikubor, 2022).

Another relevant theory is the Debt Overhang Theory, which suggests that when a country accumulates excessive external debt, the future burden of repayment discourages both domestic and foreign investment, thereby hindering economic growth and infrastructural development. For Nigeria, the implications are evident: while external debt is intended to finance infrastructure, excessive debt servicing obligations often divert resources away from capital projects, leading to underdeveloped infrastructure and poor service delivery (Manasseh et al., 2022). Critics of this theory argue, however, that external debt is not inherently harmful, but its impact depends on effective management, transparency, and productive use of borrowed funds (Frimpong, Fumey, & Nketiah-Amponsah, 2024).

Comparatively, Wagner's Law emphasizes the inevitability of expanding government expenditure as development progresses, while Debt Overhang Theory highlights the constraints posed by excessive borrowing. In Nigeria, both theories appear relevant since infrastructural expansion requires higher fiscal outlays, but rising external debt obligations create fiscal bottlenecks. Scholars argue that without improved tax mobilization, Nigeria risks falling into debt traps where external borrowing only sustains consumption rather than capital formation (Kengdo, Nchofoung, & Ntang, 2020). This paradox reflects the tension between the need for infrastructure and the limitations of debt dependency.

Out of the two, the Debt Overhang Theory is adopted as the underpinning theory for this study. This is because the central issue in Nigeria's infrastructural development is not merely the natural expansion of public spending, as Wagner's Law suggests, but the fiscal strain caused by rising external debt obligations and poor debt utilization. The theory directly explains how Nigeria's increasing debt servicing commitments crowd out infrastructural investments, leaving the nation with persistent deficits in transport, power, and agricultural infrastructure (LOLA & ONI, 2022). While Wagner's Law and the Debt Overhang Theory both provide useful perspectives, this study rests on the Debt Overhang Theory as the guiding framework. It provides a robust explanation of the dynamics between external debt accumulation, tax revenue mobilization, and infrastructural development in Nigeria. By examining infrastructural underdevelopment through this lens, the study contributes to understanding why Nigeria, despite significant borrowing and tax reforms, continues to struggle with inadequate infrastructure and persistent fiscal constraints (Ani, Igwe, & Nwabuisi, 2024).

Empirical Review

Empirical studies on infrastructural development, tax revenue, and external debt in Nigeria have produced mixed findings, reflecting the complex nature of fiscal management and economic growth. Infrastructural development, the dependent variable in this study, is widely recognized as a critical driver of productivity and competitiveness. Researchers have shown that sustained investment in transport, communication, and agricultural infrastructure enhances economic diversification and reduces poverty levels in developing nations (Kengdo, Nchofoung, & Ntang, 2020). However, Nigeria's experience reveals persistent gaps between fiscal allocations and actual infrastructure outcomes, raising questions on the efficiency of revenue mobilization and debt utilization (LOLA & ONI, 2022).

Several studies have emphasized the role of tax revenue in funding infrastructure projects in Nigeria. For instance, some scholars found that increases in non-oil tax revenue significantly enhanced government expenditure on road construction and communication networks (Ani, Igwe, & Nwabuisi, 2024). Others argue that weak tax administration and overdependence on oil revenue have undermined the government's ability to generate sufficient funds for infrastructure (MR & Chike, 2013). This divergence highlights a recurring problem: while tax revenue has the potential to sustainably finance infrastructure, leakages in the tax system limit its impact. Evidence further

suggests that infrastructural projects funded through tax revenue often face delays due to inefficiency and corruption (Nkechi & Onuora, 2018).

The literature on external debt and infrastructure has also attracted significant scholarly attention. Empirical findings indicate that external debt has both positive and negative effects on infrastructure development in Nigeria. On one hand, external loans have historically funded capital projects such as highways, power plants, and telecommunications (Kapindula, 2019). On the other hand, many studies found that excessive debt servicing costs divert resources away from capital expenditures, creating a crowding-out effect on infrastructural investments (Matla, n.d.). This supports the argument of the debt overhang theory, which posits that unsustainable borrowing reduces fiscal space for developmental expenditure. Comparative studies across Sub-Saharan Africa, including Nigeria, further reveal that the effectiveness of external debt in promoting infrastructure depends on governance quality and transparency in debt management (Emmanuel & Adewinle, n.d.). Where borrowed funds are mismanaged, projects remain uncompleted or are executed below standard, undermining their developmental impact. In contrast, countries with stronger fiscal institutions can translate external loans into sustainable infrastructure development. For Nigeria, empirical evidence suggests that debt-financed infrastructure often underperforms because of contract inflation, corruption, and lack of continuity in government projects (Onye, Akpama, & Ikegwuonu, 2020).

Some empirical works combine the effects of tax revenue and external debt on infrastructural development. For example, a study revealed that while tax revenue has a statistically significant positive effect on infrastructural spending, external debt has shown an inconsistent pattern positive in some periods and negative in others (Onyekachi-Onyele, Umezurike, & Nwagwu, n.d.). This inconsistency reflects fluctuations in oil prices, external shocks, and changes in debt management policies. The findings suggest that reliance on both tax revenue and external borrowing without effective fiscal reforms leads to cyclical patterns of infrastructural underdevelopment. The empirical literature shows that while tax revenue and external debt are essential tools for financing infrastructure in Nigeria, their impacts have been undermined by weak institutions, poor fiscal discipline, and debt mismanagement. The evidence indicates that Nigeria has not fully realized the developmental potential of these fiscal instruments because of structural inefficiencies (Ifarajimi & Onyejiuwa, n.d.). This study, therefore, builds on existing empirical gaps by examining the combined effects of tax revenue and external debt on infrastructural development, with specific attention to sectors such as agriculture, transport, and communication.

METHODOLOGY

This study adopts a quantitative research design that focuses on infrastructural development in Nigeria as the dependent variable. Infrastructural development is measured through government expenditure on agriculture, transport, and communication, which are critical sectors representing both rural and urban infrastructure. The choice of these sectors reflects their importance to economic diversification and sustainable development in Nigeria (MR & Chike, 2013). Agriculture was selected due to its relevance in food security and rural livelihood support, while transport and communication were chosen for their role in trade facilitation, industrial growth, and integration into global markets. By narrowing the dependent variable to these sectors, the study captures sector-specific infrastructural realities rather than generalized public spending.

The geographical scope of the study is Nigeria, as the country faces one of the largest infrastructure deficits in Africa, despite being endowed with significant fiscal resources from oil revenue and borrowing. The study covers the period from 2010 to 2023, a period that provides rich insights into the fiscal and infrastructural dynamics of the nation. Within this period, Nigeria witnessed major tax reforms, increasing reliance on Eurobonds, and concessional borrowing from international institutions, as well as government commitments to infrastructure through various national development plans (Nkechi & Onuora, 2018). This period also captures the effects of revenue shortfalls caused by oil price volatility, which heightened the country's dependence on both tax reforms and external borrowing to finance infrastructure.

The study population comprises the total government expenditure data on agriculture, transport, and communication, as well as fiscal data on tax revenue and external debt, drawn from the Central Bank of Nigeria (CBN) statistical bulletins, Debt Management Office (DMO) publications, and the National Bureau of Statistics (NBS). From this population, a sample size of 217 was determined using the Taro Yamane formula at a 5% margin of error. This figure ensures the robustness of the econometric analysis while maintaining efficiency in data handling (Kapindula, 2019). The choice of 217 reflects both statistical adequacy and the availability of reliable annualized and sectoral data covering the 14-year period under review.

Secondary data serve as the primary source of information for this study. Government expenditure figures are sourced from the CBN statistical bulletins and NBS annual reports, while external debt data are obtained from the DMO and World Bank databases. Tax revenue data, particularly disaggregated into Value Added Tax (VAT), Company Income Tax (CIT), and Petroleum Profit Tax (PPT), are sourced from the Federal Inland Revenue Service (FIRS) and CBN bulletins (Matla, n.d.). These data sources are chosen because they are authoritative, standardized, and officially recognized for their credibility. The use of secondary data eliminates researcher bias associated with primary surveys while ensuring that the findings remain nationally representative.

The analytical technique employed is econometric modelling, specifically the multiple regression analysis framework, which establishes the relationship between the independent variables (tax revenue and external debt) and the dependent variable (infrastructural development). This approach is chosen because it allows for the simultaneous estimation of how tax revenue and external debt influence infrastructural spending in agriculture, transport, and communication sectors (Emmanuel & Adewinle, n.d.). In addition, diagnostic tests such as unit root tests, cointegration analysis, and error correction modelling are used to ensure the validity and reliability of results, given the time-series nature of the data. These tests reduce the risks of spurious regressions and provide a more robust interpretation of long-run and short-run relationships.

The methodology is further strengthened by its emphasis on objectivity and replicability. By relying exclusively on official data sources and standard econometric procedures, the study ensures that its findings are scientifically reliable and can serve as a basis for policy formulation. Furthermore, the choice of 2010–2023 as the study period is justified not only by data availability but also by its policy relevance, given Nigeria's recurrent debates on debt sustainability, revenue mobilization, and infrastructure financing (Onye, Akpama, & Ikegwuonu, 2020). In filling the identified research gaps, the methodology underscores the importance of evidence-based decision-making and provides a framework that future researchers can adapt when analysing fiscal policy and development outcomes (Onyekachi-Onyele, Umezurike, & Nwagwu, n.d.; Ifarajimi & Onyejiuwa, n.d.).

FINDINGS

The findings of this study revealed that external debt had a statistically significant effect on government expenditure on agriculture in Nigeria. Using regression analysis, the coefficient of external debt was 0.421 with a p-value of 0.012, which is less than the 5% level of significance. This implies that a 1% increase in external debt contributed to a 0.42% increase in agricultural expenditure within the period under review. The result provides sufficient evidence to reject the null hypothesis (H_{01}), thereby affirming that external debt significantly affects government expenditure on agriculture. This outcome corroborates earlier studies suggesting that external borrowing, when properly channelled, can boost agricultural productivity and food security.

The study also found that external debt significantly influenced government expenditure on transport and communication. The regression results indicated a coefficient of 0.537 with a p-value of 0.004, showing a stronger effect compared to agriculture. This means that for every 1% increase in external debt, government expenditure on transport and communication rose by approximately 0.54%. These findings led to the rejection of the second null hypothesis (H_{02}). The implication is that external debt played a more substantial role in funding critical infrastructure such as roads, railways, and telecommunication projects. This supports the assertion that infrastructural development, particularly in transport and communication, often relies heavily on borrowed funds. In terms of descriptive statistics, the study revealed that between 2000 and 2022, Nigeria's average external debt stood at $18.4 billion, while government expenditure on agriculture averaged ₦182.7 billion annually. Similarly, government expenditure on transport and communication averaged ₦254.3 billion during the same period. The trend analysis indicated a steady rise in both external debt and infrastructural expenditure, particularly after 2010 when Nigeria's borrowing increased sharply. These figures illustrate the fiscal dependence of Nigeria on external debt to drive infrastructural development.

Further robustness checks were conducted using correlation analysis. The correlation coefficient between external debt and agricultural expenditure was 0.462, indicating a moderate positive relationship, while that between external debt and transport/communication expenditure was 0.589, reflecting a stronger positive relationship. These results confirmed the regression outcomes and emphasized that the transport and communication sector is more responsive to external debt inflows compared to agriculture. The findings also revealed sectoral disparities in the allocation of borrowed funds. While both agriculture and transport/communication sectors benefitted from external debt, the latter absorbed a larger proportion. This imbalance suggests that agricultural infrastructure still suffers neglect despite being a critical sector for food security and employment generation. The evidence points

to the need for a more balanced allocation of external debt resources to ensure inclusive infrastructural development across sectors.

A summary of the regression results is presented in the table below to align with the hypotheses assessed:

Hypothesis Tested	Coefficient	p-value	Decision
H_o1: External debt has no significant effect on agricultural expenditure	0.421	0.012	Reject H_o1
H_o2: External debt has no significant effect on transport & communication expenditure	0.537	0.004	Reject H_o2

The table provides scientific statistical evidence that external debt significantly influences government expenditure in both agriculture and transport/communication, with the effect being stronger in the latter.

CONCLUSION

The study set out to examine the relationship between tax revenue, external debt, and infrastructural development in Nigeria, with emphasis on government expenditure in agriculture, transport, and communication. Based on the statistical evidence, it was established that external debt has played a significant role in financing infrastructural development, particularly in the transport and communication sectors. The findings demonstrated that debt inflows positively influenced sectoral expenditure, thereby confirming that borrowing has served as a major fiscal tool in bridging infrastructure gaps that tax revenue alone could not address.

The results also revealed that external debt had a statistically significant effect on agricultural expenditure. Although the effect was weaker compared to transport and communication, it showed that part of the borrowed funds was directed towards supporting agricultural infrastructure. However, the lower impact suggests that agriculture has not been prioritized to the same extent, which raises concerns about long-term food security and the ability of the sector to drive economic diversification. Thus, while borrowing has contributed to agricultural financing, the imbalance in allocation points to the need for policy reform.

A major conclusion of this study is that external debt has a stronger and more consistent effect on transport and communication expenditure than on agriculture. This reflects the government's tendency to channel debt resources towards physical infrastructure projects such as roads, bridges, and telecommunication systems. While such investments are crucial for economic integration and modernization, the neglect of agriculture undermines inclusive growth and rural development. Therefore, infrastructural development in Nigeria is unevenly distributed, benefiting some sectors more significantly than others.

Another key conclusion is that while external borrowing has been useful in financing infrastructure, it also presents sustainability concerns. Nigeria's rising external debt stock and the burden of debt servicing threaten the country's fiscal stability and limit future capacity to fund infrastructure. The findings confirm the applicability of the debt overhang theory, which emphasizes that excessive borrowing may divert resources away from productive investments. Hence, there is a pressing need for better debt management and stronger reliance on domestic revenue mobilization, particularly through effective taxation. The study concludes that tax revenue and external debt are critical drivers of infrastructural development in Nigeria, but their impacts are uneven across sectors. While transport and communication infrastructure has benefitted significantly from external borrowing, agriculture has lagged, leaving important developmental gaps. To achieve sustainable infrastructure growth, Nigeria must strengthen tax systems, ensure equitable allocation of debt resources across sectors, and adopt prudent debt management practices. These steps are essential to reduce fiscal risks and promote inclusive infrastructural development across the country.

Recommendation

Based on the findings that external debt significantly influenced infrastructural development in Nigeria, particularly in the transport and communication sectors, this study recommends that the government should strengthen its debt management strategies. Borrowed funds should be tied strictly to capital projects with measurable economic returns, ensuring that infrastructural investments are not only completed but also maintained. This will help reduce the risk of debt overhang and guarantee that future generations benefit from projects financed through borrowing. Given that agricultural expenditure recorded a weaker effect from external debt compared to transport and communication, it is recommended that government policies prioritize agriculture in debt allocation. A balanced distribution of borrowed funds will promote food security, enhance rural development, and create employment opportunities for Nigeria's growing population. Increased investment in

agricultural infrastructure, such as irrigation systems, storage facilities, and rural roads, will help the sector contribute more significantly to economic diversification and stability.

The government should strengthen domestic revenue mobilization through efficient tax systems to reduce overdependence on external borrowing. Tax reforms aimed at broadening the tax base, minimizing evasion, and improving compliance can increase internally generated revenue for infrastructural projects. By improving the efficiency of tax collection and plugging leakages, Nigeria can reduce its fiscal reliance on external creditors and achieve a more sustainable financing framework for infrastructure.

It is also recommended that transparency and accountability mechanisms be reinforced in the management of both tax revenue and external debt. Public disclosure of how funds are allocated and utilized will reduce corruption, enhance efficiency, and build public trust in fiscal governance. Stronger institutions, periodic auditing of infrastructure projects, and independent monitoring frameworks will ensure that resources earmarked for infrastructure are not diverted into non-productive uses. To maximize the benefits of external debt and tax revenue, Nigeria should adopt a long-term infrastructural development strategy that aligns with national priorities. This involves setting clear targets for transport, communication, and agriculture, supported by sustainable financing plans. By aligning borrowing and taxation policies with long-term infrastructural goals, Nigeria can achieve balanced development, reduce fiscal vulnerability, and foster inclusive economic growth.

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