



Tax digitization and revenue performance: Pre and post analysis

 **Omasoro Stephen Goodluck¹**

 **Odey Thomas Okujor²**

 **Cordelia Onyinyechi Omodero³⁺**
Teju Somorin⁴

^{1,2,3,4}Department of Accounting, Finance and Taxation, College of Arts, Social and Management Sciences, Caleb University, IMOTA, Lagos State, Nigeria.

¹Email: omasoro.stephenpg24@calebuniversity.edu.ng

²Email: odey.thomaspg24@calebuniversity.edu.ng

³Email: cordelia.omodero@calebuniversity.edu.ng

⁴Email: teju.somorin@calebuniversity.edu.ng



(+ Corresponding author)

ABSTRACT

Article History

Received: 8 July 2026

Revised: 17 August 2026

Accepted: 14 September 2026

Published: 16 October 2026

Keywords

Exchange rate

FIRS

Nigeria

Non-tax revenue

OLS regression

Tax digitization

Tax revenue performance

TaxPro-max.

The effect of digitization on two distinct outcomes is examined using quarterly time series data for the period 2010Q1 to 2025Q4 provided in the FIRS Annual Reports, the CBN Statistical Bulletin, the NBS, and OECD Revenue Statistics in Africa. An ex post facto design is adopted, with the tax digitization phenomenon represented by a binary dummy, which distinguishes the pre-digitization time period of 2010Q1–2015Q4 from the post-digitization time period of 2016Q1–2025Q4. This is because the unit root tests performed using ADF confirm that all the series are stationary at level (I(0)); therefore, OLS regression is performed in the estimation process. Both models give different results: Digitization has a positive and statistically significant impact on tax revenues, and the post-digitization period corresponds to a 43.6 percent increase over pre-digitization baseline levels. The opposite is true of non-tax revenue. It has only a slight and negative impact, and digital tax administration reforms have hardly had any impact on non-tax revenues at all. Interestingly, the exchange rate, rather than inflation, emerges as the most stable indicator in both models, a characteristic that is typically observed in Nigeria because it relies heavily on oil- and FX-dependent fiscal inflows. The essential variation in revenue in either category is not due to inflation. Combined, the results imply that tax digitization is effective and supplies the revenue stream that it is designed to capture. Thus, there is a need for institutional reform pertaining to non-tax revenue administration, as well as revenue diversification and the provision of additional digital tools.

Contribution/Originality: This research contributes novel empirical evidence on digitization's asymmetric fiscal impact in Nigeria, showing a 43.6% tax revenue gain versus slight non-tax effects. It distinctively recognizes exchange rate stability over inflation as critical, while revealing institutional gaps in non-tax administration. This provides insight to guide digital reforms and revenue diversification strategies for emerging economies.

1. INTRODUCTION

1.1. Background

In recent years, one of the more significant measures of a government's fiscal responsibility has been the effectiveness with which the state can raise revenues. Direct revenue support contributes to key public investments in transportation infrastructure, health, education, national defense, and social protection. In addition to expenses, revenue enables the economy of a sovereign country to withstand economic shocks. The urgency to collect tax and other revenues is worsening in the developing world, and so is it becoming a proxy indicator of the state's capacity.

Tax administration continues to be a challenge in sub-Saharan Africa, where tax evasion, the size of the informal sector, implementation issues, and corruption play significant roles in restricting tax revenue. Low revenue for governments in the region entails two broad consequences: firstly, they must seek resources elsewhere, including donor support and concessional loans; and, secondly, they face increased vulnerabilities to fiscal policy due to reliance on natural resources (International Monetary Fund, 2023; OECD, 2024). Nigeria is a case study of how developing-country governments are apt to experience fiscal gaps that can only be filled with other sources of funding. With one of the largest economies in Africa, Nigeria's ratio of tax revenues to GDP is among the lowest in the region, at 7% compared to a regional average of 17% (Ackom, Ocansey, & Asamoah, 2025; OECD, 2024). This illustrates the fiscal gap between revenue and expenditures in the country, which has contributed to the need for external financing on the part of the country. Nigeria's dependence on oil and external financing to close its revenue-expenditure deficit is a sign of its revenue administration's shortcomings in its new role of filling the gap in a context of depreciating currency and inflation. Nigeria's dependence on oil and external financing to close its revenue-expenditure deficit is indicative of its revenue administration's limitations in its new role of gap-filling, in a context of depreciating currency and rising inflation (International Monetary Fund, 2023).

Mechanisms of revenue collection in Nigeria have been characterized by debates on tax issues and neglect of non-tax revenues. The surprise here is that non-tax revenues are an important source of additional revenues in the public sector. Non-tax revenues are poorly managed due to implementation challenges, which include the absence of institutional coordination, control, and auditing of non-tax revenues, and the informal sector (Okiakpe, Empere, & Etale, 2024; World Bank, 2024). In many developing countries, digital technology has been increasingly advocated as a remedy to the issues of tax and non-tax revenue collection. The overarching principle concerns transparency and the reduction of discretion for tax officials and opportunities for leaks of revenue through other mechanisms of using technology. Tax digitization works by introducing electronic taxpayer registration, electronic filing and payment of taxes, electronic tax assessment, and digital tax compliance and audit processes (Bassey, Mulligan, & Ojo, 2022). Digital tax administration is one of the seven challenges listed by the Organization for Economic Co-operation and Development (OECD) that are essential for efficient tax administration, expanding the tax base, and cost reductions. The digitization of tax administration has clearly been included in national and global fiscal strategies, as noted in the OECD Report (OECD, 2025).

While all the hopes and expectations associated with the potential of digital technologies to transform tax collection are valid, the extent to which digitization programmes actually impact tax collection is influenced by various factors beyond the authority of tax administrators. This, in turn, undermines the effectiveness of digital tax collection efforts and makes the factors that govern a country's fiscal and administrative landscape, like the willingness of taxpayers to comply, awareness, and the extent of administrative infrastructure, crucial. The impact that digitization can have on tax collection, and hence public revenues, is dependent on these factors. They also detail the continuing uncertainty about how digitization relates to revenue collection, particularly in developing countries where these supporting factors are not often in place (OECD, 2025; World Bank, 2024). Tax digitization in Nigeria forms part of a series of activities being carried out in the country for over a decade that involve the principle of the digitalization of transactions. The Federal Inland Revenue Service (FIRS) has led the process of digitizing tax collection and enhancing public revenues. FIRS initiated such projects as the Modernization Project, followed by the Taxpayer Identification Number (TIN) in 2011; after 2013 came the Integrated Tax Administration System (ITA), followed by TaxPro-Max in 2021 (Olasunkanmi & Adejuwon, 2024; Tivde, 2024). All such plans were aimed at minimizing the involvement of human agents in tax collection and taxpayer identification and enhancing transparency. Earlier, I discussed how technology is impacting the tax department, one aspect of which is the new TaxPro-Max, which has emerged as an innovation to revolutionize public revenue through various benefits that allow for better taxpayer compliance and satisfaction, as well as more efficient tax-related transactions. The software highlights taxpayer registration and tax return filing, tax payment, provision of tax clearance certificates, and tax

compliance analysis as areas of tax administration that need improvement. It is linked to the Corporate Affairs Commission, Nigeria Inter-Bank Settlement System, and Nigeria Customs Service to bring transparency and ensure compliance with tax regulations (Federal Inland Revenue Service, 2025).

Secret language proves that this is undeniably going on, at least outwardly. FIRS projected federal revenue collected at N21.6 trillion in 2024, exceeding the target of N19.4 trillion, while VAT collection in the same year is estimated to be N6.72 trillion (Federal Inland Revenue Service, 2025; Nairametrics, 2025). This is reflected in the academic literature. Digital tax administration and tax administration process automation increased tax compliance and reduced tax evasion (Henry & Edward, 2024), and the tax administration process became more efficient with the use of digital tax administration and computerization structures (Ikilidih, Okafor, & Eze, 2024). However, this is a myth: these digitized figures should not be taken for granted. Revenue is growing amidst a period in which other aspects of the economy were also in motion: interest rates, levels of inflation, exchange-rate levels, etc., general fiscal reform, and changes in the way tax administration works. It is not possible to enrich the distinctive impact of digitization without incorporating the same hullabaloo and then ascribing the improvement completely to digitization, which will diminish the reality of the fact that they actually have a pretty complex fiscal situation. We cannot yet answer, with inference from a trend line, how much of the improvement is attributable to digitization; however, we must test it properly in order to do so.

There is also a lacuna in the literature which could be invoked explicitly. Despite the ever-growing use of empirical techniques in the administration of taxes in Nigeria, very few research papers have adopted the two complementary lenses of "tax revenue" and "compliance" or "administrative efficiency". Few ask whether digitization has brought any benefits for non-tax revenues, in turn. It's a major missed point, since all of those governments ought to be paying attention to non-tax revenue, which may be just what they'll need to diversify out of dependence on oil. With the tax revenue issue not being addressed, there are real-world implications about how far a fiscal modernization strategy is going to go with the digitization. This study fills that void. In this regard, it takes into consideration both tax revenues and non-tax revenues, and endeavours to draw a line on the achievements of digital reform for Nigeria's evolution. To make a concrete contribution to the fiscal modernization and digital governance debate and deliver tangible evidence to policymakers that they can put into practice when they intend to significantly increase their domestic revenue mobilization in the future.

1.2. Statement of the Problem

Nigeria's revenue problem has passed through many successive administrations of troubleshooter reformers. It's the biggest economy on the continent, but the government's income has never been able to keep pace with this level of economic production. Much like the statements I said previously, as infrastructure needs grow, population grows, welfare demands grow, and debt service grows, spending needs continue to rise, rather than falling. This is not a simple volume-of-collection issue. It is additionally an institutional one. These revenue leakages, weak compliance, silo mentality regarding information technology, and lack of transparency within the agencies involved in the collection have been the subject of declarations for a long time, only not to be solved, and contribute to giving Nigeria a sub-optimal fiscal structure that is heavily dependent on oil revenue and borrowing instead of a wide-ranging and well-functioning domestic tax base. Policy response: digitization. Each of these, TIN, ITAS, and TaxPro-Max, was launched using the same principle: that the system should drive compliance, it should be more transparent, and it should be governed by process rather than discretion, and the revenue numbers will follow. The theory is, anyway.

It is more difficult to tell if it has actually happened like that. The most recent revenue growth is cited as proof that the reform had been effective, but at the same time, inflation was increasing, exchange rates were moving, government tax policy was changing, enforcement increased, and many more macroeconomic reforms took place simultaneously. There is another gap right under the top gap. Almost all empirical studies of this subject focus on revenues to the tax collector. However, Nigeria's intention to diversify from oil has led to an unprecedented disinterest

in examining nontax revenue, which is becoming increasingly more critical. Much of what does exist is based on survey information, descriptive snapshots, or short time horizons, none of which can truly answer the question of the long-term, broad impact that digitization has had on revenue performance. Combined, these gaps give a real picture of whether there is a real improvement in Nigeria's revenue performance as a result of tax digitization across both tax-to-GDP and nontax revenue streams, or whether such progress was incidental. The answer is as it should be, meaning that it is not just about grades. Policymakers should be certain whether what is seen as a sole means of achieving digitization, 'on its own', is a strategy in which they should continue to invest or whether it must be coupled with something else entirely.

1.3. Research Objectives

The broad objective of this study is to examine the effect of tax digitization on government revenue performance in Nigeria over the period 2010 to 2025, with specific attention to both tax and non-tax revenue outcomes.

1.4. Specific Objectives

- i. To examine the effect of tax digitization on tax revenue performance in Nigeria.
- ii. To evaluate the effect of tax digitization on non-tax revenue performance in Nigeria.

1.5. Research Questions

- i. What effect does tax digitization have on tax revenue performance in Nigeria?
- ii. To what extent does tax digitization influence non-tax revenue performance in Nigeria?

1.6. Research Hypotheses

H₀₁: Tax digitization has no significant effect on tax revenue performance in Nigeria.

H₀₂: Tax digitization does not have a significant effect on non-tax revenue performance in Nigeria.

1.7. Significance of the Study

There has been a great deal of interest among governments and development practitioners in this technology and tax reform in the past few years, not because the question has been answered, but because there is simply no clear conclusion yet: Is all this technology fulfilling the agenda regarding revenues, or does it seem like doing work? Even in those jurisdictions of developing nations that have invested heavily in digital tax, that issue remains unresolved. This study attempts to give it a Nigerian response, and it does just that; it does not restrict its attention to the digitization of tax revenue alone, but combines tax and non-tax revenues.

Here, there is a relatively straightforward policy relevance. There is no doubt that it is the fiscal sustainability issue of domestic revenue mobilization that attracts most attention these days when the country is facing higher debt service costs and pressure on expenditure. Domestic revenue mobilization is the core issue of fiscal sustainability, with no doubt about it, as the memory of debt service costs is on the rise and pressure on expenditure is becoming more of a necessity. It could be helpful confirmation if the results indicate that digitization is truly effective. If they prove it is not, or is only partially effective, that is still more useful, in a different way, of course, to show where the institutional gaps lie. There is a bigger fiscal policy angle. Nigeria, as other oil-rich nations are doing, has been wondering for years how it can shift from volatile revenue streams without always complementing the communication with proof as to what works. The question of whether digitalization is of any use to that diverse effort or has been exaggerated is relevant for the design of the next wave of reform.

Academically, it is more specific. There are numerous studies that have examined the impacts of electronic tax systems on tax compliance and tax revenue. But very few have asked the same question about non-tax revenues. This study bridges that void by placing both inside one analytical 'space', rather than as two separate research problems;

and it is a relatively uncluttered space to analyze, as there is not much work out there already. In methodologically contributing in a small way, this article puts a much firmer empirical footing on the literature, which in most cases has been used only in survey or descriptive comparison mode. But its significance extends past Nigeria's borders. Many of the developing world's economies as a group are grappling with the same structural problems in revenue administration, very limited tax bases, and increased fiscal burden, and are even trying out the same digital tweaks. The good and bad of Nigeria can only be extrapolated to other countries that have the same questions about their systems.

1.8. Scope of the Study

Investigates the impact of tax digitization on revenue performance in Nigeria, including tax revenue and non-tax revenue. The digital reforms under consideration are those that truly reflect the modernization of Nigeria, namely electronic filing, electronic payment, the Taxpayer Identification Number programme, the Integrated Tax Administration System, and TaxPro-Max. They do not represent an arbitrary sample of reforms, but rather the entire range of major changes in the country's revenue administration brought about through technology. They are not necessarily representative samples selected for ease of understanding and are, in fact, the body of major changes the country's revenue administration has undergone because of technology. The time frame runs from 2010 to 2025. It was selected because it is long enough to show a meaningful digital tax history, but also because the window is closely connected to Nigeria's macroeconomic rollercoaster of the last few years, encompassing the ups and downs of oil prices, foreign exchange rate changes, and two recessions, as well as numerous adjustments to tax policy. Running checks on the digitization–revenue relationship over such an increase or decrease will give the results more weight than they would have had during a calmer period.

Having embarked on the journey of digitalization, Nigeria's situation is geopolitically focused on federal-level revenue administration, with the Federal Inland Revenue Service being the most relevant agency for this type of evaluation. The data are secondary and are based on FIRS publications, CBN, NBS, and any related government agencies, and the revenue is measured in aggregate, not broken down by tax type. It is a deliberate choice; we are not interested in making comparisons between the various instruments, as this would limit the analysis of the overall impact of digitization on government tax revenue. The same applies to non-tax revenue, with all the data being aggregated together to get a full picture of the impact of digital reform on non-tax revenue. The method used in the study is Ordinary Least Squares (OLS) regression. OLS was selected because its purpose here is to answer the research question without making the analysis so complicated that it cannot be used for policy discussion while still doing what is needed.

2. LITERATURE REVIEW

2.1. Concept of Tax Digitization

Tax administration reforms have undergone significant changes over the years, and the current shift towards digital technology has been the major driving force. Tax authorities worldwide, including Nigeria, have been investing in digitalizing tax collection to improve compliance, strengthen oversight, and increase the number of taxpayers monitored effectively. The process itself entails the digitization of taxpayer registration, assessment, filing, payment, audit, compliance, and information management (Bassey et al., 2022). However, the primary objective of digitalizing tax administration goes beyond the mere replacement of traditional systems with digital ones. Rather, it is about transforming the underlying administrative and operational structures to enable more transparent, data-driven governance while, at the same time, automating functions to reduce inefficiencies, improve taxpayer experience, and minimize opportunities for tax evasion (Bassey et al., 2022). Tax digitization fits into the broader context of e-government, which has been the focus of reforms in public administration, as digital technology enables

enhanced service delivery, increased accountability, and improved citizen-state relationships (Tolossa & Melese, 2024).

Tax administration reform and digitization, in particular, stand out as the central pieces of public finance management reforms in many countries (Tolossa & Melese, 2024). The rationale behind this view is that tax collection is one of the key pillars underpinning state finances and economic development. It, therefore, becomes critical for the state to enhance its capacity to realize revenues through more efficient, effective, and transparent tax administration. The need for tax administration reform is particularly acute in developing countries due to the limited capacity of institutions to enforce tax laws, scant information systems and taxpayer databases, and generally weak institutional architecture. Traditional manual tax administration systems have created numerous loopholes, including weak taxpayer compliance, irregular assessments, weak oversight, and poor taxpayer information management (Tolossa & Melese, 2024). Tax digitization, therefore, promises to address these weaknesses by enhancing information management and transparency, minimizing discretion at various stages of tax collection, and ultimately improving taxpayer compliance. Nigeria is not an exception, as the country has been facing similar challenges with its tax administration, including poor taxpayer compliance, weak oversight, and a generally inefficient tax collection process. Consequently, the country has been digitalizing its tax administration systems through various initiatives, including the FIRS Modernization Project, Taxpayer Identification Number, Integrated Tax Administration, and TaxPro Max (Olasunkanmi & Adejuwon, 2024; Tivde, 2024).

It is essential to note that TaxPro-Max is the culmination of the reforms and has been designed to handle registration, filing and payment, tax clearance, and taxpayer compliance management (Federal Inland Revenue Service, 2025). The system has been developed to connect to other government agencies, including the Corporate Affairs Commission, NIBSS, and Nigeria Customs (Federal Inland Revenue Service, 2025). Therefore, the main objective of digitizing tax administration is to promote taxpayer compliance and transparency in revenue collection while, at the same time, enhancing interagency collaboration and improving taxpayer experience.

Several factors are associated with the ability of digitizing tax administration to increase revenues, including improved taxpayer compliance, enhanced transparency, improved taxpayer information management and control, and the potential to broaden the tax net. First, digitization can help reduce compliance costs and, in turn, increase revenues by reducing the administrative burdens faced by taxpayers in dealing with the tax system. Additionally, the use of software in managing tax collection and audit processes reduces the scope for discretion at various stages, thereby promoting transparency and accountability (Belahouaoui & Attak, 2024). Furthermore, tax digitization supports improved taxpayer information management and risk management capabilities, as the system tracks taxpayers' activities and assesses their compliance levels. Consequently, it becomes easier to identify defaulting taxpayers and ensure that they are brought to account. Finally, digitization enhances the ability to broaden the tax net by including more taxpayers in the system and, thus, increasing revenue.

Although the potential benefits of digitization are enormous, it is crucial to acknowledge the factors that may affect its impact on increasing taxpayer compliance and revenue. Notably, the success of digitization has been linked to several factors, including institutional capacity, infrastructure, taxpayer awareness, and general support from stakeholders (Ackom et al., 2025). Consequently, for tax digitization to be effective in increasing revenue, the relevant authorities need to have the capacity to implement it, robust infrastructure, and overall support from stakeholders. However, the effectiveness of tax digitization remains a subject of debate, as the experience in different countries has been mixed. Therefore, it is evident that the effectiveness of tax digitization in increasing revenue is context-specific and needs to be evaluated based on specific circumstances.

Finally, it is essential to acknowledge that the concept of tax digitization has also evolved over time and currently encompasses the use of digital systems for collecting all types of government revenues, including non-tax revenues. The use of digital technology in collecting non-tax revenues has been critical in supplementing tax revenues, particularly in countries such as Nigeria, where the latter has been a challenge (World Bank, 2024). As such, although

tax digitization has been the focus of many reforms, it fits into the broader framework of digital government and public finance management reforms. It can be argued that it promotes economic growth by enabling the government to collect revenues efficiently and effectively to support public expenditures and, by extension, Nigeria's economic development plans.

2.2. Concept of Tax Revenue

The tax performance of any government is generally taken to indicate the extent to which that government is capable of achieving a given level of performance. Tax revenue is a source of finance for obvious expenditures such as the maintenance of infrastructure, health, education, and security. Besides the role played in reflecting economic performance, tax revenue embodies information concerning the efficacy of governance structures as well as the fiscal relationship that exists between the government and taxpayers. In its basic form, tax revenue takes the form of direct and mandatory payments on income, trades, assets, and businesses by individuals and legal firms to the government. This is different from loans and aid in that it is self-generated and normally takes place at a national level for the purpose of providing publicly accessible services in a sustainable manner. Thus, taxation remains the primary method of government financing in both advanced and developing countries. According to the International Monetary Fund, tax revenue is that portion of the government budget which consists of compulsory and unrepayable payments by citizens and businesses to the government, with the exception of penalties and social protection contributions (International Monetary Fund, 2023). Tax revenue is significant not only because it provides information on the state of the economy but also because it serves several fiscal functions. Starting with Ramsey (1927), public finance literature has identified the fiscal role taxonomy, including the role of taxation in resource allocation, redistribution, stabilization, and control of individual behavior, business activity, economic development, and natural resources. Tax revenue, therefore, plays an important role in a country's fiscal framework. Its magnitude and composition often contribute to informing the state of the economy as well as the effectiveness of fiscal policy.

The performance of taxation in many developing countries remains a key aspect of fiscal strategy for achieving broader economic objectives. The ability to reduce dependence on borrowing as well as commodity revenues is often a key motivation for many developing countries in enhancing their fiscal management strategies. This has meant that governments that lack the capacity to mobilize substantial tax revenues from the relatively small tax bases find themselves in a perpetual deficit (Ackom et al., 2025). Nigeria finds itself in the second category of countries whose tax performance is below expectations given the potential tax base. Nigeria's tax-to-GDP ratio has remained low, and this has raised concerns among policymakers and international organizations because of the implications for fiscal space and the overreliance on oil revenues and borrowing to finance budget deficits (OECD, 2024). Consequently, improving tax performance is considered an important policy option in Nigeria's fiscal strategy. The issue of factors affecting tax performance has received considerable policy and research attention over the years. Traditionally, the determinants of tax performance have been related to macroeconomic factors such as economic growth and the structure of the tax system. However, there has been growing interest in exploring the role of institutional factors such as compliance, taxpayer information, and digitalization, particularly as electronic tax collection has demonstrated its ability to directly affect tax revenue growth independently of any changes to the tax policy regime (Henry & Edward, 2024; Ikilidih et al., 2024). Tax revenue in this study is operationalized as the aggregate of all federal taxes collected by the Federal Inland Revenue Service during the period under consideration. The rationale for using the aggregated tax revenue is to emphasize the overall performance of the revenue administration and the combined impact of digitization initiatives on total tax collection capacity.

2.3. Concept of Non-Tax Revenue

Most discussions on government revenues are dominated by taxation. This trend, however, has changed over time due to fiscal pressures, volatility in commodity prices, and increased demand for expenditures, which has

triggered more interest in non-tax revenues as an alternative source of income. Non-tax revenue is a term that describes all non-statutory revenues, administrative charges, fees, and permissions, royalties, rents, payments for services rendered, and dividends from state-owned enterprises, as well as operating surpluses (World Bank, 2024). While tax revenue results from the implementation of a statutory obligation, non-tax revenue is often derived from government operations and services rendered. The significance of non-tax revenues emanates from their role in promoting fiscal resilience. Fiscal policies relying too much on any one revenue source face the risk of becoming vulnerable to fluctuations in that particular source. Diversification away from reliance on narrow sets of revenue streams is particularly desirable for resource-rich economies since commodity prices often fluctuate unpredictably. It is in this regard that Nigeria's growing interest in non-tax revenues has been viewed as prudent. Indeed, the need for diversification away from taxes as a source of government revenue has been underscored by huge fiscal deficits and debt servicing costs, as well as the volatility of oil prices as a key revenue source. As a result, the Nigerian government turned its attention to MDA-generated revenues, surplus from state-owned enterprises, extractive industry revenue, administrative charges, and other statutory payments as more stable sources of revenue. However, the success of each of these alternative sources of revenue depends primarily on their administrative machinery, revenue collection, audit control, and reporting procedures. It was in this respect that weaknesses in the Nigerian tax system, particularly in relation to non-tax revenues, were highlighted. The problems of weak reporting, auditing, and accounting systems, as well as a lack of oversight, have hindered effective revenue generation and accountability, creating room for leakages and delays in payments (Okiakpe et al., 2024).

This background information explains the relevance of digital innovation to non-tax revenue mobilization in Nigeria. The introduction of digital processes and technologies such as the Treasury Single Account, electronic payment systems, revenue portals, and automated payment systems was designed to address the challenges of weak administrative machinery in non-tax revenue mobilization. Like their tax counterparts, non-tax revenues benefit from digital innovations in terms of enhanced transparency, audit trails, and accountability. In addition, digitization of non-tax revenue streams can make it easier for taxpayers to pay government dues, thus raising revenue. However, it is important to note that, just as with taxation, digitization of non-tax revenue will be a success if and only if there is appropriate administrative machinery. Administrative and enforcement capabilities, infrastructure, and inter-agency coordination play important roles in the ability of digital systems to collect non-tax revenues effectively. These concerns are particularly pertinent to Nigeria, which faces challenges with inter-agency coordination and infrastructure, hindering the ability of digital systems to resolve revenue mobilization issues. Indeed, Nigeria's institutional challenges with implementing new systems and technologies illustrate the limits of digital innovation in fiscal policy in the absence of the right reforms at the institutional level. In this regard, non-tax revenue is revenue collected at the federal level from non-tax sources by the Nigerian government. The research question seeks to establish whether the aforementioned digital innovations adopted in the tax system have an effect on non-tax revenue. The inclusion of non-tax revenue in this study adds to the analysis, since most of the previous discussion on digital innovations and fiscal policy has been on taxation.

2.4. Theoretical Framework

Tax digitization is a multifaceted phenomenon that can be explained by various theories. From the researcher's perspective, it is hard to identify a particular theoretical framework that would adequately describe either the short- or long-term effects of digitization. Indeed, the process of introducing digital technologies into a given context may be regarded as the outcome of individuals' technological perceptions, institutional pressures towards reforms, and fiscal efficiency mechanisms, which govern the emergence of taxation as a concept. With this in mind, this study will utilize the Technology Acceptance Model, New Institutional Theory, and Optimal Tax Theory, which will allow addressing the former phenomenon from both individual and institutional perspectives while considering the fiscal rationale behind taxation.

2.4.1. Technology Acceptance Model (TAM)

Davis (1989) developed TAM based on a simple but effective idea: people adopt new technology when they find it useful and not difficult to use, forming a perception about the innovation, which then shapes their intention to adopt it. The model has been successful because it postulates an intuitive relationship between variables, making it easy to comprehend, apply, and integrate. When applied to tax administration, TAM helps explain common phenomena that may seem unrelated to taxes, such as the likelihood of a digital filing system becoming popular with taxpayers despite being user-friendly. Indeed, systems that appeared to reduce compliance effort had a positive impact on adoption rates, while technologies that seemed ineffective or imposed additional challenges were shunned by the target population.

The results were corroborated by studies in Nigeria, where Tivde (2024) found that the perceived general usefulness of digital tax systems was positively associated with adoption rates among both administrators and taxpayers, which then influenced compliance and collection efforts. Similarly, the findings were supported in other developing countries, as evidenced by Saptono et al. (2026), who discovered that digital tax system reforms reduced transaction costs and improved compliance. However, TAM's limitations become evident when analyzing institutional factors impacting the reforms, such as governance policies, regulations, organizational culture, and infrastructure, which the model does not consider. For this reason, the next theory to be employed in the research is New Institutional Theory, addressing the gaps in TAM.

2.4.2. New Institutional Theory (NIT)

DiMaggio and Powell (1983) question the assumption that organizations adopt reforms purely on grounds of their efficacy in enhancing organizational efficiency. Rather, they argue that pressure from the environment—coercive, normative, or mimetic—often explains why organizations do what they do. When viewed through this theoretical framework, Nigeria's digital tax reforms take on a different hue and flavour, being a response to pressures from the environment rather than an intrinsic desire to increase organizational performance.

The coercive forces that led to Nigeria's digital tax reforms manifest in the legislative, administrative, and societal imperatives that have forced revenue agencies worldwide to embrace technological innovations to improve tax collection. Normative factors influencing Nigeria's adoption of digital tax processes emanated from international organizations such as the IMF, World Bank, and OECD, which have been encouraging countries in the Global South to improve domestic revenue mobilization through digital technologies. This creates professional expectations that lead to the need for digital processes simply for the sake of having them.

Finally, mimetic factors influencing digital tax reforms in Nigeria emanated from observing the experiences of our neighbours, whose adoption of digital tax technologies improves their tax revenues. This makes Nigeria's reforms a mimetic response to the desire to achieve similar outcomes. What NIT's research contributes to the discussion on digital tax reform in Nigeria is a nuanced but important observation that highlights the difference between adopting reforms and being able to implement them successfully. Organizations respond to external pressures by complying with the prescriptions, even though organizational aspects such as informal structures, values, and culture remain the same. This makes the formal adoption of reforms and the existence of effective reforms two entirely different realities, and it is a critical observation when evaluating the outcomes of the study.

2.4.3. Optimal Tax Theory

TAM explains adoption, while NIT explains institutional behaviour. Neither theory fully explains why digitization would improve fiscal revenues in a tax system, which is why Optimal Tax Theory is relevant, with its origins in Ramsey (1927) and further developed by Mirrlees (1971). The basic premise of Optimal Tax Theory is that an optimal tax system is one that both maximizes government revenues and minimizes economic distortions and administrative costs. By this logic, digitization is an intervention that should improve tax revenues because it reduces

administrative costs by relying on electronic filing, automated assessment, integrated databases, and electronic payments. It also makes taxpayer information harder to conceal, thus broadening the tax base while minimizing evasion and non-compliance.

However, Optimal Tax Theory has a caveat, which is integral to this study's argument. The efficiency of the tax system, according to the theory's implication, is conditional upon the system's digital infrastructure, the taxpayers' digital literacy, and the level of interconnectivity of the relevant government databases. In other words, the efficiency gain is not guaranteed unless the critical supporting factors are present. The theory, therefore, partly explains the study's rationale for choosing Nigeria as the subject of the study. The efficiency of digital tax reform is not automatic, even when the reform is technically viable.

2.4.4. Theoretical Integration and Relevance to the Study

TAM, NIT, and Optimal Tax Theory together provide an in-depth theoretical basis for the study. TAM explains the factors that contribute to the adoption of digital tax systems, while NIT explains the institutional behaviours that lead to their adoption, and Optimal Tax Theory explains why digitization, when correctly implemented, is likely to improve tax revenues in the first place. Collectively, the theories underpin the study's argument, which is that digital tax reform is a multifaceted intervention that requires taxpayer acceptance and institutional adoption to be effective. The theories also inform the study's scope, which is limited to examining the factors that contribute to adoption, rather than focusing exclusively on implementation and efficiency gains.

2.5. Empirical Review

2.5.1. Global Evidence on Tax Digitization and Revenue Performance

There are a significant number of pieces of research examining the possible gains in revenue from digitizing tax administration. In most cases, the focus is on how and to what extent the transition to digital technologies can affect tax revenues positively, and the results are generally positive. However, the level of influence varies considerably depending on the region and country, and how digitization manages to affect revenues remains similar. Research reports conducted at OECD levels highlight that the adoption of technologies in tax administration leads to improved taxpayer compliance, a higher degree of identification, as well as cost reduction and increased transparency of the process (OECD, 2025).

IMF comes to a similar conclusion regarding the impact of digitization practices, although with an important nuance: technology alone is not sufficient, and its impact depends substantially on institutional characteristics (International Monetary Fund, 2023). There is less research regarding developing economies, but it confirms several trends observed at the OECD level, suggesting that the degree to which technology is able to influence revenue is contingent upon institutional and infrastructural characteristics, as well as taxpayer compliance behaviours (Ackom et al., 2025). According to Tolossa and Melese (2024), analyzing data from several countries in Africa, the level of e-government development is positively correlated with the tax effort of a country, net of other factors affecting potential revenue.

It is also noteworthy that most reports examining the relationship between digitization and tax revenues at a national level utilize examples from Kenya and Rwanda, illustrating how the adoption of digital technologies improved taxpayer compliance and transparency and, consequently, tax revenues (Bellon, Dabla-Norris, Khalid, & Lima, 2022). Another example of successful digital tax reform comes from Indonesia, where digital technologies reduced compliance costs and, thus, improved taxpayer behaviour and willingness to pay (Saptono et al., 2026). Thus, the international experience and research data overall are positive regarding the impact of digitization on revenues, although they highlight the importance of considering the context-specific nature of the reform and ensuring taxpayer compliance.

2.5.2. Evidence from Nigeria

The Nigerian literature on this topic has grown considerably, mirroring domestic policy interest in digitization. The studies generally report the positive revenue-generation potential of digitized tax administration, albeit presenting varying conceptualizations, scope, and depth of analysis.

The literature predominantly agrees that e-filing, e-payment, automated assessment, and TaxPro-Max have enhanced administrative efficiency and decreased tax evasion opportunities (Henry & Edward, 2024; Ikilidih et al., 2024). This view aligns with the general theme running through this literature that digitization reduces administrative gaps and increases taxpayer compliance. Studies on administrative perceptions of digitized tax administration reveal that technical competence and institutional preparedness significantly affect the success of implementing tax digitization initiatives (Olasunkanmi & Adejuwon, 2024). This finding is important in highlighting the role of institutional and human capacity in tax administration digitization, complementing the technological aspects.

Literature specific to the TaxPro-Max digital tax collection platform has attracted great attention, as it represents the most comprehensive of FIRS's digitization initiatives. Tivde (2024)'s analysis of federal revenue using federal tax data further reveals a positive trend. Some studies go beyond establishing a revenue-generation link and explore digitization's indirect effect on economic growth, development, and public investment through improved tax administration (Dagunduro, Falana, Akinadewo, Oluwagbade, & Akinboboye, 2025; Fadipe, Adegbe, & Ogundajo, 2025; Nnamani & Akintoye, 2024; Udo, 2024). These findings are insightful but demonstrate how the literature easily conflates revenue-generation aspects with overall economic impact.

The Nigerian literature on digitization and revenue generation has some limitations, with most authors relying on descriptive studies, surveys, and short-term observations unable to fully capture long-drawn relationships between the two phenomena. Further, the focus on tax-administration aspects dominates the literature, with non-tax revenue poorly explored despite the value these sources bring to public finance. This study addresses these gaps by conducting an extensive analysis using a long-term perspective and assessing the impact of digitization on both tax and non-tax revenue.

2.6. Identified Research Gaps

Based on the reviewed literature, four research gaps can be identified. The first relates to the methodological limitations of most studies relying on descriptive statistics and short-term observation. These approaches are limited in capturing long-term trends and establishing a direct link between digitization and revenue generation. More quantitative analyses using mixed methods and long-term perspectives are needed to explore the causal link between the two variables.

The second literature gap pertains to the scope of analysis, which primarily focuses on tax administration while neglecting other revenue areas. Despite the significance of non-tax revenue in national budgets, the literature barely acknowledges its digitization processes and challenges. The third research gap is conceptualized around the level of aggregation of findings. Most studies focus on specific tax types, locations, and aspects of tax administration, providing limited insights into overall revenue trends at the national level. Lastly, while Nigeria's tax administration digitization reforms have gone through several stages, the literature rarely attempts to analyze them together within one framework to establish long-term trends. Thus, this study focuses on the entire timeline of revenue administration digitization reforms in Nigeria, using an extensive body of literature and quantitative analysis to fill the identified gaps. It addresses the methodological and temporal aspects by applying econometric analysis and long-term perspectives to explore the connection between digitization and revenue trends while considering both tax and non-tax revenue.

3. RESEARCH DESIGN

The study employs an ex-post facto design using secondary time-series data from 2010 to 2025. The present design was chosen because the variables of interest, namely tax digitization and revenue performance, are historical events that cannot be manipulated experimentally. The estimation technique used for this study is Ordinary Least Squares (OLS) regression analysis.

3.1. Model Specification

Government revenue comprises two broad categories, tax and non-tax, for which different policy levers are applied in Nigeria. Consequently, this study specified the analysis as two distinct models to estimate the relative influence of digitization on total tax and total non-tax revenues. This approach was adopted because the two revenue categories are not entirely independent and heterogeneous. As such, pooling the data would obscure the extent to which each type of government revenue would be influenced by the proposed digital reforms. A separate statistical analysis was, therefore, needed to establish whether the effect sizes were equal or not.

Model 1: Aggregate Tax Revenue Performance

$$TRP_t = \beta_0 + \beta_1 TDUMMY_t + \beta_2 INF_t + \beta_3 EXR_t + \mu_t$$

Model 2: Aggregate Non-Tax Revenue Performance

$$NTRP_t = \alpha_0 + \alpha_1 TDUMMY_t + \alpha_2 INF_t + \alpha_3 EXR_t + \varepsilon_t$$

3.2. Measurement of Variables

3.2.1. Dependent Variables

Tax Revenue Performance (TRP): Total federally collected tax revenue in Nigeria, measured in billions of naira (₦ billion). Non-Tax Revenue Performance (NTRP): Revenue generated from non-tax sources, such as royalties, licences, fees, fines, and administrative charges.

3.2.2. Key Independent Variable (Tax Digitization Dummy)

Tax digitization is proxied using a binary dummy variable.

$$TDUMMY_t = \begin{cases} 0 & \text{Pre-digitization period (2010–2015)} \\ 1 & \text{Post-digitization period (2016–2025)} \end{cases}$$

3.2.3. Control Variables

- INF (Inflation Rate): Captures macroeconomic instability affecting purchasing power and compliance.
- EXR (Exchange Rate): Controls for external-sector volatility affecting fiscal revenues, especially oil-linked receipts.

3.3. A Priori Expectations

- $\beta_1 > 0$: Tax digitization is expected to improve tax revenue performance through enhanced compliance, reduced leakages, and a broader tax net.
- $\alpha_1 > 0$: Digitization is also expected to improve non-tax revenue performance via improved billing systems, automation, and transparency.
- Inflation and exchange rates are expected to exert negative or unstable effects, depending on macroeconomic conditions.

3.4. Estimation Technique

The study employs Ordinary Least Squares (OLS) regression because of its efficiency in estimating linear relationships under classical assumptions.

The estimation process involves:

- Coefficient estimation via OLS.
- Hypothesis testing using t-statistics and F-statistics.
- Model fit evaluation using R^2 and Adjusted R^2 .

3.5. Diagnostic Tests

Diagnostic tests will be conducted to ensure robustness and reliability.

3.5.1. Stationarity Test

- Augmented Dickey-Fuller (ADF) test ensures variables are free from unit roots.

3.5.2. Multicollinearity Test

- Variance Inflation Factor (VIF) detects interdependence among regressors.

3.5.3. Heteroskedasticity Test

- Breusch-Pagan or White test to ensure constant variance of residuals.

3.5.4. Autocorrelation Test

- Durbin-Watson statistic detects serial correlation in residuals.

3.6. Data Sources

This study draws on secondary data from the institutions actually responsible for revenue administration and macroeconomic reporting in Nigeria. Revenue figures come from FIRS annual publications, while the supporting macroeconomic variables, inflation and the exchange rate, are sourced from the CBN Statistical Bulletin and NBS publications. For broader context on revenue administration trends and how Nigeria compares regionally, the OECD's Revenue Statistics in Africa reports were also used. These four sources were chosen because they are the most authoritative and consistently maintained fiscal datasets available for Nigeria over this period, which matters for a study covering 2010 to 2025: the data needs to be reliable across the full window, not just well documented for recent years.

4. DISCUSSION AND RESULTS

4.1. Descriptive Statistics

Table 1. Summary of descriptive statistics results.

Test type	INF	LNEXR	LNNTTR	LNTR	TAXDIG
Mean	15.20	5.765	5.931	7.327	0.625
Median	12.85	5.723	5.663	7.094	1.000
Maximum	34.60	7.352	7.542	8.966	1.000
Minimum	7.900	5.007	5.170	6.587	0.000
Std. Dev.	6.521	0.726	0.660	0.643	0.488
Skewness	1.284	0.949	1.151	1.178	-0.516
Kurtosis	4.137	2.992	2.982	3.250	1.266
Jarque-Bera	21.05	9.626	14.14	14.99	10.85
Probability	0.000	0.008	0.001	0.001	0.004
Sum	973.0	368.9	379.6	468.9	40.00
Sum Sq. Dev.	2679	33.22	27.46	26.02	15.00
Observations	64	64	64	64	64

Table 1 exhibits the descriptive statistics results show real variation across the variables over the study period. Inflation, for instance, swings widely, averaging 15.20 percent but ranging all the way from 7.9 to 34.6 percent, which says something on its own about how unstable prices have been in Nigeria across these fifteen years. The exchange rate (LNEXR) sits at a mean of 5.77 in log form, tracking the substantial movement the naira has gone through over the period. Revenue moved in a clearer direction. Both non-tax and tax revenue, LNNTR and LNTR, averaged 5.93 and 7.33, respectively, and despite the fluctuations sitting underneath those averages, the overall trend points upward. Tax digitalization, measured as a binary dummy, has a mean of 0.63, meaning roughly 63 percent of the observations in the sample fall within the digital-era period, post-2016. In terms of distribution, INF, LNEXR, LNNTR, and LNTR are all positively skewed, while TAXDIG skews negatively, which makes sense given that it is a dummy variable weighted toward the post-digitization period. Kurtosis values mostly sit close to normal, with some moderate leptokurtosis. The Jarque-Bera statistics, though, tell a more specific story: the probability values fall below the 5 percent threshold across the board, meaning none of the variables strictly satisfy normality. That's not unusual for macroeconomic time series, and it doesn't undermine the analysis. OLS coefficient estimates stay unbiased and consistent even without normally distributed residuals; what normality actually governs is the validity of the standard t and F-test inference in small samples, and with a sample of this size, the asymptotic properties of OLS hold regardless. The dataset is therefore still appropriate for the regression analysis that follows.

4.2. Pre-Diagnostic Test

Table 2. ADF Unit Root Test Summary.

Variables	ADF Prob. Value	Stationary at Level	Order of Integration
TAXDIG	0.0036	Yes	I(0)
LNTR	0.0088	Yes	I(0)
NTR	0.0169	Yes	I(0)
INF	0.0149	Yes	I(0)
EXR	0.0086	Yes	I(0)

Table 2 presents the unit root results for the five variables using ADF probability values. All are less than 5%, leading to the rejection of the null hypothesis of a unit root in each case. This confirms that all variables are stationary at level, integrated of order zero, I(0), and are therefore suitable for estimation using the Ordinary Least Squares (OLS) technique without the need for differencing.

4.3. Results and Discussion

4.3.1. OLS Regression Results Model 1: Tax Revenue Performance (LNTR)

Table 3. Summary of OLS Regression results for tax revenue (LNTR).

Variables	Coefficient	Prob.	Interpretation
C	1.3013***	0.0016	Significant baseline
TAXDIG	0.4751***	0.0000	+43.56% revenue in the post-digitization era
INF	-0.1062	0.2158	No significant effect on tax revenue
LNEXR	1.1247***	0.0000	More elastic; depreciation boosts revenue

Note: *** = 1% level.

In Table 3, *** implies significance level at 1%. The regression results show that the model explaining the determinants of tax revenue (LNTR) fits the data well, with an R-squared value of 0.892, indicating that about 89.2 percent of the systematic variation in tax revenue is explained by the included explanatory variables. The adjusted R-squared of 0.887 confirms the robustness of the model after accounting for degrees of freedom. The constant term is positive and statistically significant at 1 percent, suggesting a baseline level of tax revenue even in the absence of

the explanatory variables. Tax digitization has a positive and statistically significant effect on tax revenue. The coefficient of 0.475 suggests that digital tax reforms contributed to improved revenue collection, likely through enhanced compliance and reduced leakages. Exchange rate (LNEXR) also exerts a positive and significant influence on tax revenue, indicating that exchange rate movements may have expanded nominal tax receipts. In contrast, inflation has a negative but insignificant effect, suggesting that its influence on tax revenue is relatively weak within the model. The overall model is statistically significant, while the Durbin-Watson statistic indicates that serial correlation is not a concern, supporting the reliability of the estimates. These findings are consistent with previous studies which reported that digital tax administration systems improved revenue mobilization by strengthening compliance and increasing collection efficiency (Kareem & Olaoye, 2025; Olasunkanmi & Adejuwon, 2024). Overall, the evidence suggests that tax digitization has contributed significantly to tax revenue growth in Nigeria, supporting the argument that technology-driven reforms can strengthen government revenue mobilization.

4.3.2. OLS Regression Results Model 2: Non-Tax Revenue Performance (LNNTR)

Table 4. Summary of OLS regression results for non-tax revenue (LNNTR).

Variables	Coefficient	Prob.	Significance	Interpretation
C	0.1339	0.3026	Not significant	No statistically significant baseline
TAXDIG	-0.4955***	0.0000		Negative and statistically significant
INF	0.0005	0.9522	Not significant	No significant effect on non-tax revenue
LNEXR	1.0577***	0.0000		Positive and statistically significant.

Note: *** = 1% level, R-squared value = 0.871; Adjusted R-squared = 0.864.
F-statistic = 135.1, p-value = 0.000; Durbin-Watson statistic = 2.051.

In Table 4, *** means significance level at 1%. Interpretation: As can be seen in the results, the model has a high explanatory power, which is determined by the R² of 0.871 and the adjusted R² of 0.864. This means that roughly 87.1 per cent of the differences in non-tax revenues are explained by tax digitization, inflation, and the exchange rate. The overall F-statistic is 135.1, with a probability value of 0.000, which indicates that the model is statistically significant. A Durbin-Watson statistic of 2.051 is close to 2, which indicates no serious evidence of first-order serial correlation of the residuals.

The coefficient for TAXDIG is -0.4955 at the 1 percent significance level. This suggests that, on average, in the sample of countries, a higher level of tax digitization was associated with lower levels of non-tax revenue during the study period. Here, the result indicates that the period of the tax digitization reform is identified as being connected with a decrease in non-tax revenue, while controlling for inflation and exchange rates, which proves to be an effect of TAXDIG. The result of this, however, should be seen as indicative rather than proof that the process of digitization was responsible for declining non-tax revenue. These can be a result of shifts in the pattern of government revenue or other events around the time of the reform. The coefficient of inflation is 0.0005, and the relation is statistically insignificant, with a p-value of 0.9522. That is, based on the estimated model, inflation's statistical effects on non-tax revenue are non-existent. A positive coefficient does not suggest a positive relationship, but the high p-value does suggest there is no significant relationship.

The coefficient of the exchange rate variable (LNEXR) is 1.0577 and is significant at the 1 percent level of significance. The coefficient is logarithmic (expressed in log form), so it can be considered an elasticity. Therefore, the non-tax revenue increase from a 1 percent increase in the exchange rate is about 1.06 percent, with the other variables held constant. The positive relationship could be interpreted as exchange rate fluctuations being linked to fluctuations in government revenue from non-tax or non-border-related sources, such as those that rely on foreign exchange-related transactions or those that are denominated in a foreign currency.

However, in light of the hypothesis, the null hypothesis (H_0), which holds that tax digitization does not have any significant effect on Nigeria's non-tax revenue performance, is rejected. Hence, the alternative hypothesis (H_1) is

accepted, as Nigeria's non-tax revenue was found to be significantly influenced by tax digitization. The TAXDIG coefficient is (-0.4955) , and the probability value is 0.0000, which is less than the 5 percent significance level, and this information is used for this decision. Based on the foregoing, the result thus proved a statistically significant relationship between the interaction between tax digitization and non-tax revenue performance in Nigeria (the relationship is negative).

The results show that, overall, taxation digitization and movements in exchange rates are important factors in the model, whereas inflation does not have a statistically significant influence on non-tax revenue. The result of the negative coefficient on TAXDIG suggests a drop in non-tax revenue for the digitization period, while the positive exchange rate coefficient indicates a relationship between a rise in the exchange rate and an increase in non-tax revenue. The results of these findings have led to the conclusion that both institutional changes and macro-economic conditions play a role in explaining the changes in the non-tax revenue performance of the Nigerian state.

4.4. Post Estimation Test

4.4.1. Serial Correlation Test

The Breusch-Godfrey LM test suggests that serial correlation is not present in the model. This conclusion is based on the probability values of the F-statistic (0.1649) and Obs*R-squared statistic (0.0888), both of which exceed the 5 percent significance level.

Consequently, the null hypothesis of no serial correlation cannot be rejected, indicating that the model residuals are independently distributed.

Table 5. Summary of results of the Serial Correlation Test.

Test Statistic	Probability	Decision
Prob. F(2,10)	0.1649	Fail to reject null hypothesis
Prob. Chi-Square(2)	0.0888	Fail to reject null hypothesis

Table 5 presents the results of the serial correlation test, indicating Prob. F(2,10) = 0.1649.

The p-value exceeds the 5% level of significance; therefore, the study concludes that there is no serial correlation in the model. The outcome of the chi-square test also agrees with this because the p-value is 8.88%, which is more than 5%.

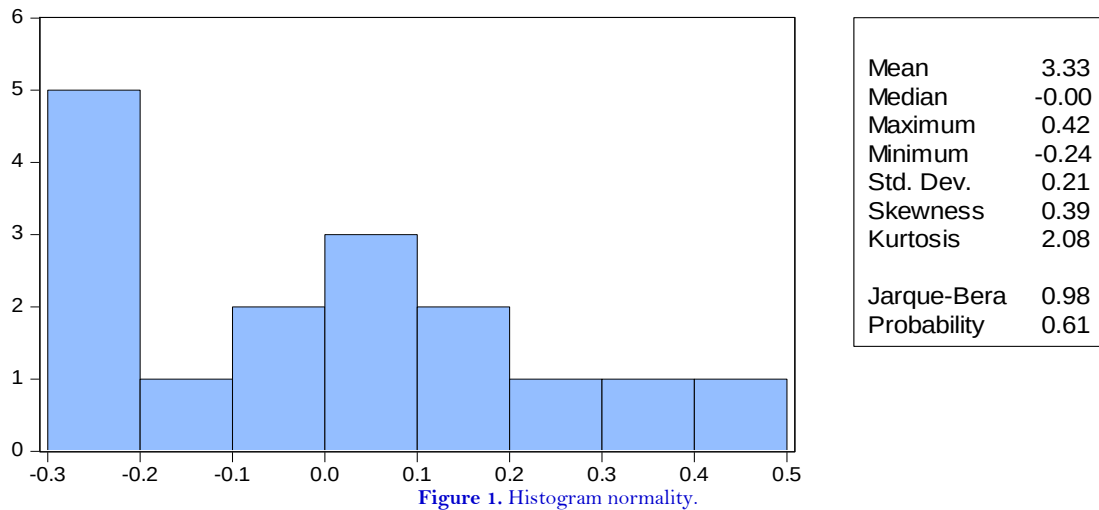
4.4.2. Heteroskedasticity Test

The Breusch-Pagan-Godfrey test indicates that heteroskedasticity is not a concern in the model.

Table 6. Summary of Heteroskedasticity Test Results.

Test Statistic	Probability	Decision
Prob. F(2,10)	0.1311	Fail to reject null hypothesis
Prob. Chi-Square(2)	0.1210	Fail to reject null hypothesis

Table 6 presents the results of the Breusch-Pagan-Godfrey test. Both the F-statistic (0.1311) and Obs*R-squared statistic (0.1210) have probability values above the 5 percent significance threshold. As a result, the null hypothesis of constant error variance is retained, suggesting that the model satisfies the homoskedasticity assumption.



4.4.3. Normality Test

Figure 1 includes the Jarque-Bera test results, which suggest that the normality assumption is satisfied. With a Jarque-Bera statistic of 0.98 and a probability value of 0.612, which exceeds the 5 percent significance level, there is insufficient evidence to reject the null hypothesis of normality. This indicates that the residuals are approximately normally distributed, supporting the validity of statistical inference from the estimated model.

4.4.4. Ramsey Test

Table 7. Summary of Ramsey Test Results.

Test Type	Statistic	df	p-value	Decision at 5%
t-statistic (FITTED ²)	1.4566	11	0.1732	Fail to reject H ₀
F-statistic	2.1217	(1,11)	0.1732	Fail to reject H ₀
Likelihood Ratio	2.8220	1	0.0930	Fail to reject H ₀ (5%)

Table 7 presents the results of the Ramsey RESET test. The result provides no evidence of model misspecification. The probability value associated with the F-statistic (0.1732) exceeds the 5 percent significance level, indicating that the null hypothesis of correct model specification cannot be rejected. Likewise, the t-statistic and likelihood ratio test produce insignificant probability values, suggesting the absence of serious omitted variable bias or functional form errors. Overall, the results support the adequacy of the model specification and indicate that the estimated relationship is appropriately captured by the selected variables.

4.4.4.1. Multicollinearity Test

Table 8. Correlation Matrix.

Variables	TAXDIG	LNINF	LNEXR
TAXDIG	1.000	0.602	0.507
LNINF	0.602	1.000	0.835
LNEXR	0.507	0.835	1.000

Table 8 shows the outcome of correlation analysis. The correlation matrix was examined to assess the presence of multicollinearity among the explanatory variables. The results show that the correlation coefficients between TAXDIG and LNINF (0.602) and between TAXDIG and LNEXR (0.507) are relatively moderate and below the commonly applied threshold of 0.80. However, the correlation between LNINF and LNEXR is 0.835, indicating a

relatively strong positive association between inflation and exchange rate movements. This may reflect the exchange rate pass-through effect in Nigeria, where currency depreciation can contribute to domestic price pressures. Although the correlation suggests there is no serious association between inflation and the exchange rate, the correlation matrix alone does not establish the presence of severe multicollinearity. Therefore, further assessment using the Variance Inflation Factor (VIF) is required to determine whether the degree of collinearity is sufficiently high to affect the reliability of the regression estimates.

4.4.4.2. Variance Inflation Factor (VIF)

Table 9. Variance Inflation Factor (VIF) Test for Multicollinearity.

Variable	R-squared (Auxiliary Regression)	VIF	Interpretation
TAXDIG	0.36	1.57	No serious multicollinearity
LNINF	0.74	3.86	No serious multicollinearity
LNEXR	0.69	3.31	No serious multicollinearity

Table 9 displays the results of the multicollinearity test. The Variance Inflation Factor (VIF) test was conducted to assess the presence of multicollinearity among the explanatory variables. The results show that the VIF values for TAXDIG, LNINF, and LNEXR are 1.57, 3.86, and 3.31, respectively. All the VIF values are below the commonly used threshold of 5, indicating that there is no serious multicollinearity among the explanatory variables. Although inflation has the highest VIF value of 3.86, it remains below the threshold, suggesting that its correlation with the other explanatory variables is not sufficiently high to cause serious multicollinearity concerns. Therefore, the explanatory variables can be retained in the regression model, and multicollinearity is unlikely to materially affect the reliability of the estimated coefficients.

4.4.5. Chow Test

Table 10. Summary of output.

Test	Statistic	p-value	Decision
F-statistic	14.8028	0.0000	Reject H_0
Log likelihood ratio	36.3857	0.0000	Reject H_0
Wald Statistic	44.4085	0.0000	Reject H_0

Table 10 presents the summary of the Chow test. The statistical null hypothesis of coefficient stability can be rejected overwhelmingly. This indicates that there is, in fact, a huge structural break in the data.

There is a difference in the relationship between the independent variables and the dependent variable among the subgroups being tested. This is the reason why the study employed two regression models to avoid misleading and biased estimates. Two parallel regression runs were performed for each of the two subgroups, with an interaction term/dummy variable added to the model to account for structural differences between the subgroups. The Wald statistic (44.4085) is exactly three times the F-statistic ($14.8028 \times 3 = 44.4084$). The result reinforces the output of the process.

5. SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1. Summary of Findings

This study set out to test whether tax digitization has actually moved the needle on revenue performance in Nigeria, using quarterly data from 2010Q1 to 2025Q4 and two separate models, one for tax revenue and one for non-tax revenue, with inflation and the exchange rate held as controls. The diagnostics held up: the data met the conditions

required for OLS, the descriptive statistics showed real variation worth noting, particularly in inflation and the exchange rate, and the stationarity tests confirmed all series were stable at level. The two models told different stories. For tax revenue, digitization showed a positive, statistically significant relationship; the post-digitization period was associated with meaningfully higher collections, and the exchange rate added a further significant positive effect on top of that, while inflation contributed nothing statistically. Non-tax revenue moved the other way. Digitization's effect there was negative, though weaker than the tax-side effect; the exchange rate again came through as positive and significant, and inflation again showed no meaningful influence. Put simply, digitization has done real work on the tax side. It hasn't done the same on the non-tax side. And across both models, the exchange rate is the one variable that consistently matters.

5.2. Conclusion

What this points to is that tax digitization has been a genuine win for tax revenue mobilization in Nigeria. Electronic filing, digital payment, taxpayer identification, and TaxPro-Max: these tools appear to have actually tightened collection and cut into the leakages that used to define manual administration. That's a reasonably strong endorsement of the broader argument that technology can lift fiscal capacity in a developing-economy context, at least where it's been deliberately targeted. But that endorsement doesn't extend cleanly to non-tax revenue, and that gap is arguably the more interesting finding of the two. It suggests non-tax revenue performance isn't really a technology problem in the same way tax revenue was; it's more likely tied up in governance, monitoring, and sector-specific reform issues that sit outside what digital tax platforms were ever built to fix. Digitizing the tax side doesn't automatically digitize, or fix, everything else. The exchange rate result deserves its own note too. Its consistent significance across both models is really a restatement of something Nigeria's fiscal position has struggled with for decades: how exposed government revenue still is to externally linked, currency-sensitive sources. Digitization hasn't changed that exposure. If anything, the results suggest it was never going to. So, the honest read of all this is that digitalization is a real, useful piece of revenue reform, but not a complete one. Getting the rest of the way will take institutional and structural change that sits well outside what tax administration alone can deliver.

5.3. Recommendations

Based on the findings of the study, the following recommendations are proposed.

1. Government should continue to expand digital tax administration systems by strengthening platforms such as TaxPro-Max, electronic filing, electronic payment channels, and integrated taxpayer databases. Greater digital coverage would improve compliance monitoring and reduce revenue leakages.
2. Digital reforms should be extended beyond tax administration to non-tax revenue collection. Ministries, departments, and agencies should adopt integrated electronic collection and remittance systems to improve transparency and accountability.
3. Efforts to diversify government revenue should be intensified. The strong influence of exchange-rate movements on revenue performance indicates continued fiscal vulnerability to external shocks and highlights the need to expand non-oil revenue sources.
4. Revenue authorities should strengthen taxpayer education and digital literacy programmes to improve the adoption and effective utilization of digital tax platforms, particularly among small businesses and informal sector operators.
5. Future studies should examine the effects of digitization on specific revenue components and incorporate additional variables, such as governance quality, digital infrastructure, and institutional effectiveness, to provide deeper insights into the drivers of revenue performance.

Funding: This study received no specific financial support.

Institutional Review Board Statement: Not applicable.

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Data Availability Statement: The corresponding author can provide the supporting data of this study upon a reasonable request.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

REFERENCES

- Ackom, E. K., Ocansey, E. O. N. D., & Asamoah, F. O. (2025). Influence of digitalization, tax system and tax compliance on revenue mobilization in Sub-Saharan Africa as moderated by religion and culture. *Journal of Accounting*, 7(1), 86–113. <https://doi.org/10.47941/jacc.2741>
- Bassey, E., Mulligan, E., & Ojo, A. (2022). A conceptual framework for digital tax administration - a systematic review. *Government Information Quarterly*, 39(4), 101754. <https://doi.org/10.1016/j.giq.2022.101754>
- Belahouaoui, R., & Attak, E. H. (2024). Digital taxation, artificial intelligence and Tax Administration 3.0: Improving tax compliance behavior – a systematic literature review using textometry (2016–2023). *Accounting Research Journal*, 37(2), 172–191. <https://doi.org/10.1108/ARJ-12-2023-0372>
- Bellon, M., Dabla-Norris, E., Khalid, S., & Lima, F. (2022). Digitalization to improve tax compliance: Evidence from VAT e-Invoicing in Peru. *Journal of Public Economics*, 210, 104661. <https://doi.org/10.1016/j.jpubeco.2022.104661>
- Dagunduro, M. E., Falana, G. A., Akinadewo, I. S., Oluwagbade, O. I., & Akinboboye, G. O. (2025). Role of digital tax platforms adoption in enhancing revenue generation and capital projects funding in emerging markets. *Economy*, 12(2), 26–39. <https://doi.org/10.20448/economy.v12i2.6778>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160. <https://doi.org/10.2307/2095101>
- Fadipe, A. O., Adegbe, F. F., & Ogundajo, G. (2025). Tax administration digitalization and sustainable development in Nigeria. *International Journal of Management Science and Business Analysis Research*, 7(7), 61–96. <https://doi.org/10.70382/caijmsbar.v7i7.005>
- Federal Inland Revenue Service. (2025). *2025 FIRS Management Retreat: Tax revenue performance report*. Abuja: Federal Inland Revenue Service.
- Henry, I., & Edward, A. (2024). Electronic taxation and improved tax compliance: The case of tax evasion and avoidance in Enugu State, Nigeria. *Journal of Management Information and Decision Sciences*, 27(S4), 1–12.
- Ikilidih, R., Okafor, N., & Eze, C. (2024). Impact of e-taxation on tax administration in Nigeria. *International Journal of Innovative Finance and Economics Research*, 12(2), 154–163.
- International Monetary Fund. (2023). *Nigeria: Tax revenue mobilization – Lessons from successful revenue administrations*. IMF Selected Issues Paper No. 2023/019, Washington, DC: IMF.
- Kareem, J., & Olaoye, C. O. (2025). Tax digitalization and revenue performance in Kwara State. *Nigerian Journal of Banking and Financial Issues*, 11(2), 313–330.
- Mirrlees, J. A. (1971). An exploration in the theory of optimum income taxation. *The Review of Economic Studies*, 38(2), 175–208. <https://doi.org/10.2307/2296779>
- Nairametrics. (2025). *Nigeria's VAT revenue hits N6.72 trillion in 2024, surges by 84.62%*. Retrieved from <https://nairametrics.com/2025/01/31/nigerias-vat-revenue-hits-n6-72-trillion-in-2024-surges-by-84-62>
- Nnamani, C., & Akintoye, I. (2024). Digital taxation and sustainable economic development in Nigeria: 2000–2022. *International Journal of Economics and Financial Issues*, 14(3), 291–304.
- OECD. (2024). *Revenue statistics in Africa 2024*. Paris, France: OECD Publishing.

- OECD. (2025). *Tax administration digitalisation and digital transformation initiatives*. Paris, France: OECD Publishing.
- Okiakepe, J., Empere, C., & Etale, L. (2024). Public sector capital expenditure and petroleum profit tax in Nigeria: A public finance perspective. *Journal of Accounting and Financial Management*, 10(1), 88–101.
- Olasunkanmi, F. O., & Adejuwon, J. A. (2024). Digitalisation of tax system and revenue generation in Nigeria. *Lead City Journal of the Social Sciences*, 9(3), 4–21.
- Ramsey, F. P. (1927). A contribution to the theory of taxation. *The Economic Journal*, 37(145), 47–61. <https://doi.org/10.2307/2222721>
- Saptono, P. B., Mahmud, G., Khozen, I., Saragih, A. H., Sari, W. K., Hendrawan, A., & Setyowati, M. S. (2026). Tax professionals' perceptions, compliance costs, and compliance intentions under Indonesia's Core Tax Administration System. *Informatics*, 13(4), 52. <https://doi.org/10.3390/informatics13040052>
- Tivde, J. K. (2024). Leveraging e-taxation for enhanced revenue generation in Nigeria. *International Journal of Research and Innovation in Social Science*, 8(9), 661–670. <https://doi.org/10.47772/IJRISS.2024.809059>
- Tolossa, G., & Melese, W. E. (2024). Revisiting determinants of tax revenue mobilization in Sub-Saharan African countries: Does e-government matter? *Cogent Social Sciences*, 10(1), 2399937. <https://doi.org/10.1080/23311886.2024.2399937>
- Udo, M. (2024). Digital taxation and sustainable economic growth in Nigeria: 2017–2023. *Journal of Economics and Finance*, 8(2), 44–57.
- World Bank. (2024). *Nigeria development update: Staying the course—Progress amid pressing challenges*. Washington, DC: World Bank. <https://doi.org/10.1596/42407>