

Digital Transformation of Nigerian Tax Administration and Tax Revenue Performance

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ABSTRACT: The study evaluated the effect of digital transformation of Nigerian tax administration on tax revenue performance. The objectives were to access the effect of digital transformation in Value Added Tax (VAT), Company Income Tax (CIT), and Customs and Excise Duties administration on tax revenue performance as measured by contribution of tax to Gross Domestic Product (tax-to-GDP ratio). The study adopted an ex-post facto research design using annual time series data for the period 2005 to 2024. The study employed Ordinary Least Square (OLS) regression technique to determine the relationship between the dependent and independent variables of the study. Also Chow test is used to determine whether there is structural break in the relationship between digital tax administration variables and tax revenue performance before and after the adoption of digital tax in Nigeria. The findings revealed that digital transformation in VAT administration had a positive and significant effect on tax revenue performance in Nigeria. The study also found that digital transformation in Company Income Tax administration significantly improved tax revenue performance in Nigeria. Furthermore, digital transformation in Customs and Excise Duties administration positively influenced tax revenue performance. The study concluded that digital transformation of Nigerian tax administration significantly enhanced tax administration efficiency and revenue performance as measured by tax TGP ratio in Nigeria. The study recommended that government should strengthen digital tax infrastructure and continuously upgrade electronic tax administration systems such as Tax Identification Number, TaxPro Max, e-tax payment systems, and electronic invoicing platforms to improve tax revenue performance.

KEYWORDS: Digital Tax Administration, Tax-to-GDP Ratio, Value Added Tax, Company Income Tax, Customs and Excise Duties, TaxPro Max, E-tax, Tax Identification Number

INTRODUCTION

In developing economies, the internal capacity to mobilize domestic tax revenues effectively dictates the degree of fiscal independence a sovereign nation can exercise over its development strategies. Tax revenue remains the most sustainable, non-debt-creating, and predictable engine for financing public goods, expanding critical infrastructural networks, and maintaining macroeconomic stability across both developed and emerging markets (Besley and Persson, 2014).

Historically, Nigeria's tax architecture has been dominated by manual, bureaucratic and brick-and-mortar administrative setup (Oladele et al., 2020). The traditional system relied heavily on non-digital documentation, face-to-face discretionary tax assessments, paper-based corporate files, and manual, unintegrated payment verification channels. Econometric evidence from this manual era highlights an "administrative collection ceiling" (Olaoye and Kehinde, 2023). Domestic direct and indirect revenue taxes such as Value Added Tax (VAT) and Company Income Tax (CIT) remained structurally prone to tax evasion and non-responsive to economic expansion due to widespread administrative compliance loopholes. Furthermore, international trade-related revenues like Customs and Excise Duties (CUSED) showed massive, highly erratic swings (National Bureau of Statistics (NBS), 2023). This behavior reflected a fiscal regime heavily reliant on volatile physical border transactions that are prone to global oil shocks, commodity cycles, and human leakages at international entry points rather than stable internal collections. Consequently, the limitations of the manual era created a highly porous tax ecosystem prone to corporate tax avoidance, high compliance costs for businesses, and systemic revenue leakages. Digital transformation in tax system involves application of digital systems, electronic platforms, and automated processes in tax administration to improve efficiency, transparency, accountability and compliance. The Federal Inland Revenue Service implemented Value Added Tax (VAT) automation systems to strengthen VAT administration and collection processes. VAT automation facilitates transaction monitoring, invoice reconciliation and electronic filing of VAT

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returns. The automation of VAT administration became more advanced with the introduction of digital invoicing and structured VAT filing system. In 2021, the FIRS launched the TaxPro Max platform as a comprehensive digital tax administration option. TaxPro Max is an integrated online platform that allows taxpayers to register, file tax returns, remit taxes electronically, obtain tax clearance certificates, and monitor tax obligations digitally and effectively. The platform also facilitates automatic crediting of withholding taxes and provides online communication between taxpayers and tax authorities with easy access. TaxPro Max is being implemented to transform tax administration in Nigeria by integrating different taxes such as Company Income Tax (CIT), Value Added Tax (VAT), Withholding Tax (WHT), and Education Tax into a unified digital platform. The system has aims to improve tax administration efficiency and reduce compliance costs for taxpayers. Additionally, recent innovations to TaxPro Max have strengthened VAT filing requirements through detailed transaction-level reporting and input VAT credit mechanisms. The Nigerian government has also introduced electronic invoicing systems and real-time transaction monitoring mechanisms to improve VAT collection and reduce revenue leakages. The Merchant Buyer Solution (MBS) and e-invoicing initiatives are examples of recent tax digital reforms aimed at strengthening transparency and accountability in tax system of administration. The traditional relationships that defined trade tax generation in the manual era is thus replaced with the introduction of digitized trade tracking and automated single-window clearing system in the Nigerian Custom and Excise Duties. These reforms have transformed the Nigerian tax system from a manual process to a technology, digital-driven tax administration structure.

Digital tax technologies utilize specialized software platforms to fully automate core tax processes, including electronic taxpayer registration, faceless automated profiling, online filing, real-time data integration, and instant e-banking payment remittances (Ajuonu and Anizoba, 2024). By cutting out administrative delays, minimizing human discretion, and creating digital audit trails, digital tax transformation aims to expand the formal taxpayer base, curb tax evasion, and structurally enhance tax revenue performance in Nigeria. The study sharply focused on assessment of efficiency of tax digitalization transformation on tax GDP ratio in Nigeria.

STATEMENT OF THE PROBLEM

Despite Nigeria's transition from traditional, manual workflows to automated tax portals, the country's tax revenue performance still faces structural loopholes. The publication of FIRS on tax revenue collections reveals that individual tax components like VAT and CIT have shown substantial increases in nominal figures in the post digitization period (FIRS 2024). However, IMF records that the aggregate Tax-to-GDP ratio (TGDP) has remained low in Nigeria (IMF, 2023). International trade tax administration, Customs and Excise Duties (CUSED) has historically suffered from extreme volatility and human interference at physical border points. While digital customs portals like NICIS II were introduced to standardize operations, border revenue continues to experience structural fluctuations. This raises questions about the depth of digital integration across Nigeria's border enforcement points. This creates a critical gap for empirical investigation: Why hasn't the digitalization of specific tax streams translated into a significant shift in aggregate national tax-to-GDP performance over the period?

Objectives Of The Study

The primary objective of this study is to evaluate the impact of digital tax administration on tax revenue performance in Nigeria. The specific objectives are to:

1. Determine whether adoption of digital trade systems has introduced a significant structural break in the performance of Customs and Excise Duties (CUSED) revenue relative to the Tax-to-GDP ratio (TGDP) in Nigeria.
2. Evaluate whether the transition to automated consumption tracking has led to a significant structural break in the relationship between Value Added Tax (VAT) revenue and the Tax-to-GDP ratio (TGDP) in Nigeria.
3. Determine if the transition to digital corporate tax administration has caused a significant structural break in the relationship between Company Income Tax (CIT) revenue and the Tax-to-GDP ratio (TGDP) in Nigeria

RESEARCH QUESTIONS

The study addresses the following research questions in line with the objectives of the study:

1. To what extent has the implementation of digital tax administration systems introduced a structural break in the performance of Customs and Excise Duties (CUSED) relative to the Tax-to-GDP ratio (TGDP) in Nigeria?
2. How has adoption of automated tax platforms structurally altered the relationship between Value Added Tax (VAT) and the Tax-to-GDP ratio (TGDP) in Nigeria?
3. To what extent has digital corporate tax administration altered a significant structural break in the relationship between Company Income Tax (CIT) and the Tax-to-GDP ratio (TGDP) in Nigeria

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RESEARCH HYPOTHESIS

The study addresses the following research hypotheses in line with the objectives of the study:

- H0₁ There is no significant structural break in the relationship between Customs and Excise Duties (CUSED) revenue and the Tax-to-GDP ratio (TGDP) in Nigeria following the implementation of digital tax system.
- H0₂ There is no significant structural break in the relationship between Value Added Tax (VAT) revenue and the Tax-to-GDP ratio (TGDP) in Nigeria following the adoption of digital tax systems.
- H0₃ There is no significant structural break in the relationship between Company Income Tax (CIT) revenue and the Tax-to-GDP ratio (TGDP) in Nigeria following the adoption of digital tax systems.

2.0 LITERATURE REVIEW

2.1 Conceptual Framework

Digital Tax Administration in Nigeria

Nigeria has been on a journey to digitalize its tax administration for more than a decade. The introduction of Integrated Tax Administration System (ITAS) in 2013 marked a significant milestone in Nigeria's digitalized tax administration journey. Research has shown that taxpayers are generally open to using digital systems, but improvements are still needed, particularly on the government side, especially at sub national levels (Abdulsalam 2025). Digital tax administration in Nigeria refers to the integration of information and communication technologies (ICT), online portals, and data analytics by revenue agencies, the Federal Inland Revenue Service (FIRS) and various State Internal Revenue Services to automate and streamline tax processes. The key milestone of Digital Tax Administration include: firstly, the automation and e-Filing system secondly the Integrated Tax Administration System (ITAS) and various electronic tax (e-Tax) portals that allow taxpayers to register, file returns, and make payments online without visiting physical offices. Thirdly, the Digital Public Infrastructure (DPI), a modern integration effort that focus on linking tax identification with primary databases, notably using the National Identification Number (NIN) and Tax Identification Number (TIN) to minimize duplication and improve tracking. Fourthly, digital economy taxation, which is driven by legislative milestones like the Finance Acts. Nigeria has expanded its tax net to capture e-commerce, cross-border digital services, and online transactions to curb revenue leakages. The Nigerian government introduced these several digital tax reforms, electronic tax payment systems (2015), VAT automation (2020), TaxPro Max platform (2021), to modernize tax administration. These reforms are expected to positively influence tax collection efficiency and increase the tax-to-GDP ratio.

According to the International Center for Tax and Development (ICTD 2025) recently, the Nigeria Governors Forum (NGF) organized a Digital Public Infrastructure (DPI) Peer Learning Event, held from 30th June to 1st July 2025, which brought together various stakeholders within the DPI and tax administration space. It launched DPI Readiness and Intelligent Revenue Authorities (IRA) Reports, highlighting the maturity levels of sub national tax administrations in Nigeria. The reports showed more automation in tax administrations and centralization of databases that were once in silos. Integration between identity systems, especially the National Identity Number (NIN), and revenue systems has also improved. Updated electronic tax systems (e-Tax) now make compliance monitoring and real-time reporting easier. While only two states reached high digital maturity, most are at a moderate stage of digital transformation. Further investment in technical skills, digital tools, and strategy is still needed to fully leverage intelligent systems (Abdulsalam 2025).

Electronic Tax System

An electronic system is a digital transformation that enables taxpayers to file and remit taxes online. Electronic tax system was implemented in Nigeria in 2015 in line with the global best practices. Tax payers pay taxes through the electronic platform, print tax payment receipt, verify the authenticity of receipt, and also verify if the deducted withholding tax or VAT payment have been remitted to the government online. Included in the features is the online tax filing platform which is facilitated through Federal Inland Revenue Service (FIRS) Integrated Tax Administration System (ITAS) and Government Information Financial Management System (GIFMIS). The introduction of digital tax transformation in Nigeria demonstrates FIRS commitment to leverage on technology to improve tax system in Nigeria. The Nigerian interbank settlement system (NIBSS) and System Specs Nigeria limited partnered with the FIRS and provided electronic tax system in Nigeria (Abdulrazo 2015). This was prompted by the need to shift from a discretionary, face-to-face manual assessment regime to a faceless, automated oversight structure capable of tracking corporate and non corporate income patterns as the national economy expanded. Implementation phase began with the launch of the Integrated Tax Administration System (ITAS) , which established the initial framework for digital filing. This architectural layout was later strengthened by electronic payment mandates introduced under successive federal Finance Acts from 2019 through 2023 (Finance Act 2019, 2023). E-Tax serves as the institutional foundation for the Technology Acceptance Model (TAM) within public finance in Nigeria.

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Value Added Tax (VAT) Automation

Value Added Tax is a highly liquid consumption tax that suffered from massive system leakages in traditional manual system. Corporate withholding agents frequently collected input VAT from customers but delay or falsify remittances using paper invoices. To secure this indirect revenue stream, the FIRS initiated a technological integration targeting retail networks, banking payment gateways, and automated point-of-sale reporting platforms. The FIRS introduced Value Added Tax automation collection system in 2020. The automation is assessed through a platform identified as eVAT (electronic VAT). VAT automation enables seamless collection and remittance of VAT on relevant transactions covering: branded shops, super stores, general supermarkets, standard restaurants and eateries. It also enables direct audit and reconciliation of all VAT transactions to enhance tax compliance. The automated system became effective from 1st April 2020 as the approved channel for all VAT returns, filing and payment processing for the affected businesses. The reforms are targeted to effect case of tax payment tax compliance in Nigeria (Anderson tax alert 2020) VAT automation created an immediate, verifiable transaction-matching grid. By linking retail financial points and corporate invoicing channels directly to the FIRS ledger, it thus has the potential to dramatically reduce input-VAT inflation fraud in Nigeria.

Taxpro Max

It is an integrated digital tax administration platform introduced by the Federal Inland Revenue Service in 2021 for online tax registration, filing, payment, and compliance management (FIRS 2021). Prior to 2021, the Federal Inland Revenue Service (FIRS) operated on fragmented electronic modules under the Integrated Tax Administration System (ITAS). While ITAS initiated online filing, it lacked unified capability often forcing taxpayers to visit physical tax offices to reconcile payments, resolve administrative glitches, and clear manual assessment backlogs. In response, the FIRS developed and launched TaxPro-Max as a proprietary, cloud-based solution designed to provide a single, integrated window for end-to-end tax transactions. TaxPro-Max completely transformed direct tax administration (specifically Company Income Tax, CIT) by integrating taxpayer registration, filing, assessment, automated payment routing, and the instant issuance of Electronic Tax Clearance Certificates (e-TCC). It maps corporate bank remittance platforms directly to FIRS accounting ledgers, eliminating manual processing reconciliation delays and preventing paper-trail related challenges. Anderson Tax Digest (2023) identified four parameters as TaxPro Max viability in tax administration. These are discussed below:

a) Convenience and Ease of Compliance: The most observable benefit anticipated by all and sundry is the enhanced convenience TaxPro Max has offered for tax compliance. Taxpayers can now file returns and pay tax liabilities digitally on the platform from any physical location. This reduces the need for in-person interactions and the cost of visits to tax offices, thereby conserving scarce resources. The length of the tax compliance processes is shortened and the risk of human error is potentially mitigated by the ability to file returns and pay taxes online. The platform is also generally easy to navigate for all taxpayers, although some taxpayers have opined the platform is too pedantic on the details required to file tax returns under a self-assessment regime (Anderson Tax Digest 2023).

b) Centralized System for Tax Collection and Management: TaxPro Max provides a centralized administrative system for collection and management of taxes payable to the Federal Government, allowing taxpayers to make and track tax payments in real time. Taxpayers also have easy access to their tax information as needed, contributing to improved management of the taxpayer database. This simplifies the government's ability to expand and enhance the quality of taxpayer information. In addition, the data obtained from the database can be challenged by taxpayers, ensuring accountability and responsible handling of tax administration by the FIRS (Anderson Tax Digest 2023).

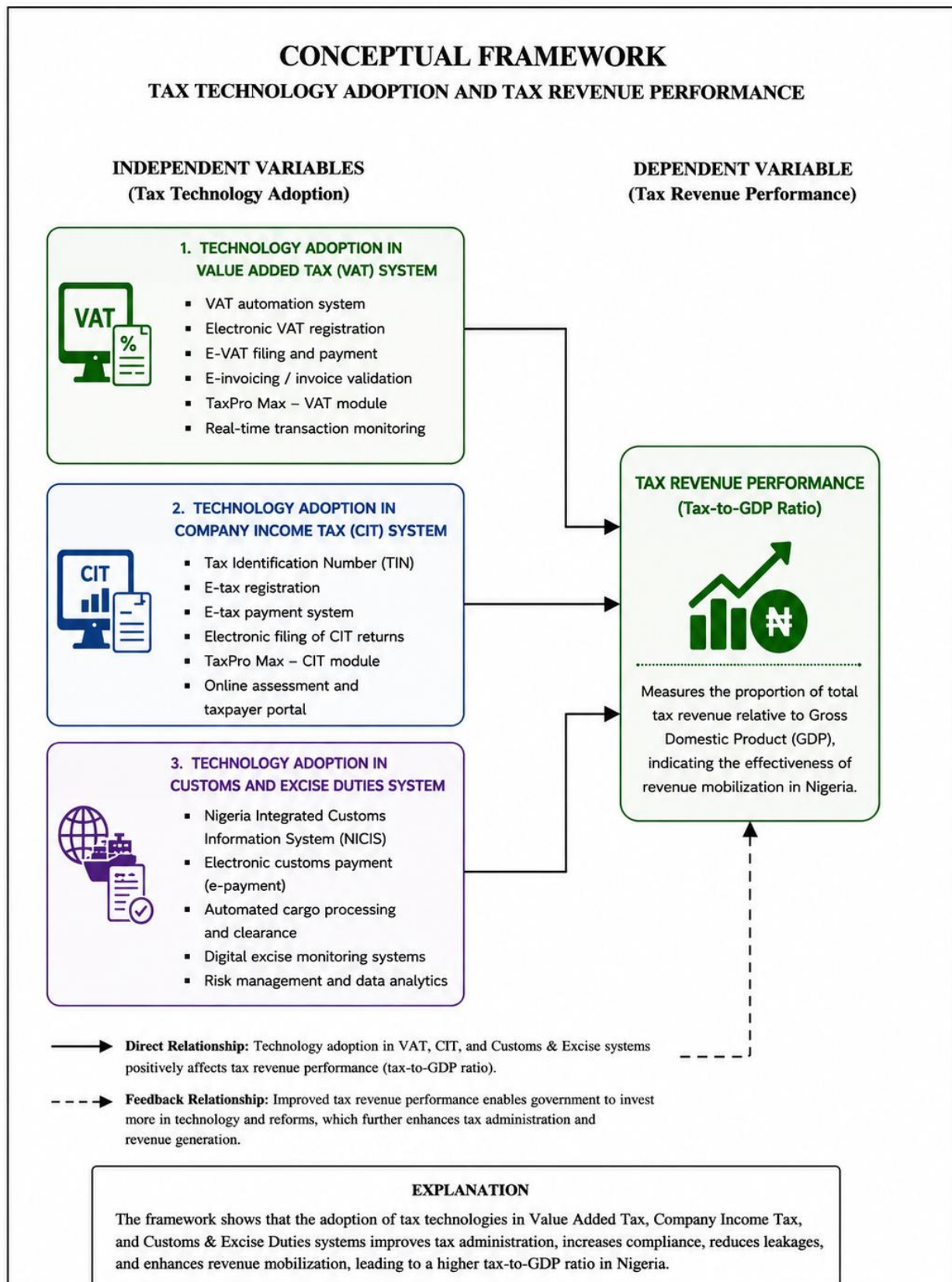
c) Improved Tax Compliance: The TaxPro Max platform has played a major role in promoting tax compliance over time. Recent collection reports from the FIRS indicate a consistent increase in revenue collection each year, which can be partially attributed to the implementation of the TaxPro Max and reliance on technological transformation. TaxPro Max also helps users access basic information about tax laws and regulations, in order to keep track of their compliance requirements. The platform maximizes tax revenue collection and promotes taxpayers' voluntary compliance. For instance, in cases where companies are unable to submit their Companies Income Tax (CIT) returns by the due date due to unavailability of signed Audited Financial Statements, the platform provides an option for companies to make payment on account and this helps in avoiding additional penalties and interest charges for late payment (Anderson Tax Digest 2023).

Digitalization in Customs and Excise Duties (Trade Automation Platform)

International border and trade taxation under the Nigeria Customs Service (NCS) has consistently been vulnerable to international trade volatility, cargo valuation fraud, and slow clearing processes at maritime ports. Manual inspection frameworks allowed extensive human interference, leading to widespread revenue loopholes and leakages. To address these issues, the federal government deployed automated single-window clearing platforms to standardize tariff classifications and track trade values

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electronically. Modern trade digitization accelerated with the launch of the Nigeria Customs Information System II (NICIS II) in 2017/2018, building upon the older Automated System for Customs Data (ASYCUDA) frameworks. Digital customs platforms automate classification, valuation, and manifest processing. This shift removed heavy layers of physical human discretion from port border checkpoints, securing import revenue streams against systemic manipulation in the system.



2.2 Theoretical Review

The Technology Acceptance Model (TAM)

The theory was originally developed by Fred Davis in 1989; the Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The model posits that when users are presented with a new digital tool, two primary factors influence their decision about how and when they will use it: (1) Perceived Usefulness (PU): The degree to which a user believes that using a particular system would enhance their job performance or simplify a process. (2) Perceived Ease of Use (PEOU): The degree to which a user believes that using a system will be free from physical or mental effort.

Linkage to the Study: TAM is the foundational operational theory for the supply-side and demand-side of the digital tax variables captured in the current study. When the FIRS introduced TaxPro-Max in 2021, its success depended on TAM's core principles. For corporate taxpayers, the online filing, automated assessments, and instant e-payment notifications increased the perceived ease of use, reducing the high compliance costs associated with the manual system in Nigeria.

The Optimal Tax Theory

The theory was advanced by Nobel laureate James Mirrlees (1971) and later expanded by Ramsey. The Optimal Tax Theory looks at how a state can configure its tax systems to maximize revenue mobilization while minimizing economic distortions, deadweight loss, and administrative compliance costs. The theory posits that an optimal tax system must balance administrative efficiency, equity, and simplicity. It highlights that high transaction friction and complex manual compliance mechanisms lead to heavy deadweight loss and drive economic factors into the informal sector.

Linkage to the Study: Optimal Tax Theory provides the economic justification for eliminating manual tax systems in favor of the digitalization system. The manual systems is prone to high compliance burden. Paper heavy trails and physical audits drives up processing costs, making evasion an attractive option for companies. An optimal tax system must balance administrative efficiency, equity and simplicity.

2.3 Review of Literature

Ogbada, Onyedika, and Modebelu (2023) carried out a research work on digitalization and effective tax administration in Nigeria for the period spanning from 2010 to 2021. Digitalization was proxied with Information and Communication Technology (ICT), while effective tax administration was proxied with tax revenue and tax evasion. Analysis was carried out with linear regression. The study revealed that ICT has no significant adverse effect on tax revenue in Nigeria. The study also revealed that ICT has no significant low, positive effect on tax evasion in Nigeria.

Ogbonna, Emmanuel, and Peace (2022) evaluated the role of taxation as a tool of economic growth in Nigeria. The sample consisted of firms that paid taxes to the FIRS from the 36 states of Nigeria and the Federal Capital Territory, Abuja, for the period 1995 to 2021. Autoregressive Distributed Lag (ARDL) was used for analysis. Findings revealed that withholding taxes and VAT from the digital economy significantly affects Nigeria's economic growth. Company Income Tax (CIT) from the digital economy had no significant effect on economic growth in Nigeria.

Olaoye and Atilola (2018) examined the effect of e-tax payments on revenue generation in Nigeria. The study covered the period from the first quarter of 2012 to the second quarter of the year 2018. The first and second quarters of 2015 are the end and beginning of the pre-and post-tax period. Paired analysis, descriptive statistics of mean, standard deviation, and paired sample t-test were utilized for the analyses. Findings showed that e-tax payment has a positive, insignificant effect on Value Added Tax in Nigeria. Also, a positive insignificant difference exists between pre- and post-Company Income Tax revenue in Nigeria.

Olaoye and Ogundipe (2018) carried out a research work on Electronic Taxation and Tax Compliance in Nigeria for the period 2010–2017. The objective was to examine the influence of electronic taxation on taxpayer compliance in Nigeria. Expost factor research design was adopted in the study. The findings revealed that electronic taxation improved taxpayer compliance and reduced tax evasion thereby increasing tax revenue performance.

Udo (2024) investigated on effect of digital taxation on sustainable economic growth in Nigeria covering the period 2017 to 2023. One-sample t-test statistics and descriptive statistics were used to analyze the secondary data were accessed from the Central Bank of Nigeria, Federal Inland Revenue Service, and National Bureau of Statistics. Digital economy taxes and e-tax payments were found to have a significant influence on sustainable economic growth in Nigeria.

Gap in Literature

Previous studies have extensively explored the nominal growth effects of digital tax administration tools on individual tax streams (such as CIT and VAT), several major gaps persist. First, there is lack of comprehensive modeling that analyzed direct domestic taxes (CIT), indirect taxes (VAT), and international trade taxes (CUSED) together within Tax- GDP ratio unified econometric framework. Also, previous literature has largely failed to deploy rigorous, inferential structural stability models such as the Chow

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Forecast Test to statistically establish whether the transition from manual processing (2005–2014) to automated ecosystems (2015–2024) introduced significant structural break in revenue generation. This study directly addresses these empirical and methodological gaps by evaluating how digital tax administration influences tax revenue performance in Nigeria using robust time-series stability diagnostics.

3.0 RESEARCH METHODS

3.1 Research Design

The research adopted the Ex-post factor research design to examine how the independent variables affected the dependent variable. The design aimed at examining the difference on effect of digital tax administration on tax revenue performance between the post period, 2015 -2024 and the pre period 2005 to 2014 of investigation.

3.2 Sources of Data.

The main sources of data for this study were secondary sources obtained from online data publication of the Nigerian Federal Inland Revenue Service (FIRS 2024), Organization for Economic Co-operation and Development (OECD 2024)

3.3 Measurement of Variables of Tax Reform and Tax Revenue Performance.

In this study, digital tax transformation was measured by tax revenue sources that were affected by the reforms. In this regard, tax variables captured in the model include, Company Income Tax (CIT), Value Added Tax, Custom and Excise Duty (CUSED) respectively. Tax Revenue performance was measured by Tax-GDP ratio.

Model Specification Using Chow Test

To examine the effect of digital tax transformation on tax revenue performance in Nigeria, the study adopts the Chow Test model specification. The Chow Test is used to determine whether there is a structural break in the relationship between digital tax administration variables and tax revenue performance before and after the adoption of major digital tax reforms in Nigeria. The dependent variable is Tax GDP Ratio (TGDP), while the independent variables are Value Added Tax (VAT), Customs and Excise Duties (CUSED), and Company Income Tax (CIT). The functional relationship is specified as follows:

$TGDP = f(VAT, CUSED, CIT)$

$TGDP_t = \beta_0 + \beta_1 VAT_t + \beta_2 CUSED_t + \beta_3 CIT_t + \mu_t$

Where:

TGDP_t = Tax GDP Ratio at time

VAT_t = Value Added Tax at time

CUSED_t = Customs and Excise Duties at time

CIT_t = Company Income Tax at time

B₀= Constant term, β₁ – β₃ = Coefficients of explanatory variables

μ_t = Error term

t = Time period (where: t₁ period 2005-2014, t₂ period 2015-2024)

Chow Test Structural Break Model

The Chow Test divides the study period into two sub-periods: Pre-Digital Tax Administration Period: 2005 – 2014. Post-Digital Tax Administration Period: 2015 - 2024. The break period is based on the significant adoption of digital tax transformation in Nigeria beginning from 2015, including, TaxPro Max, Electronic Tax Payment Systems, VAT Automation and Electronic Customs Systems,

Pre-digital tax administration reforms Model

$TGDP_{t_1} = \beta_0 + \beta_1 VAT_{t_1} + \beta_2 CUSED_{t_1} + \beta_3 CIT_{t_1} + \mu_t$ For: 2005 - 2014

Post -digital tax administration reforms Model

$TGDP_{t_2} = \beta_0 + \beta_1 VAT_{t_2} + \beta_2 CUSED_{t_2} + \beta_3 CIT_{t_2} + \mu_t$ For: 2015 - 2024

The primary inferential tool used to prove the impact of digital tax transformation is the Chow Breakpoint/Forecast Test. The test checks whether a significant structural break split the parameters between the pre-digitalization era (2005-2014t₁) and the post-digitalization era (2015 -2024t₂).

Decision Rule for Chow Test

Decision Criteria: Reject H₀ if the computed F-statistic or Likelihood Ratio probability value is less than the standard 0.05 at 5% significance level. Rejection statistically confirms that the adoption of digital tax transformation altered the underlying framework of revenue collection in Nigeria.

4.0 RESULTS AND DISCUSSION OF FINDINGS

4.1 Graphical Trend Analysis (Comparative Perspectives)

Over the period 2005 to 2024, Nigeria tax to GDP experienced structural break in 2015 as a result of digital tax transformation, comparative analysis over the two periods were carried out with respect to the graphical trends as presented below over the pre and post period of digital tax reforms.

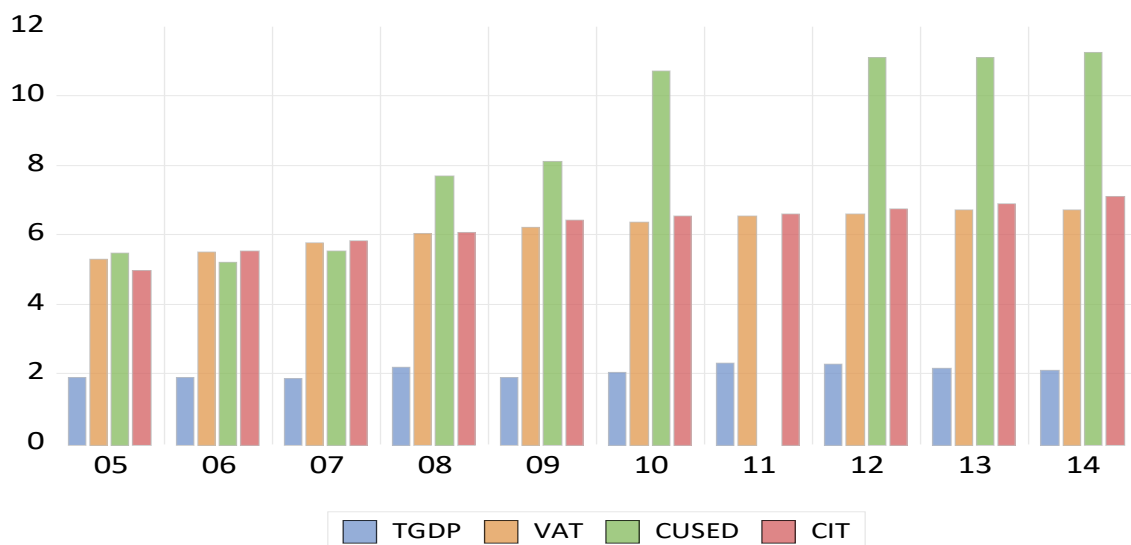


Figure 4.1 Pre-Digital Tax Adoption Era Trend (2005–2014)

The empirical observable trend from the period 2005 to 2014 reveals a stagnant tax system. Throughout this ten-year pre period of digital transformation, both VAT and CIT remain rigidly stacked between the 4% and 6% thresholds. This continuous horizontal flat line provides visual evidence of an administrative collection ceiling. Without integrated digital tracking, taxpayer registers were managed via paper ledgers and fragmented offline systems, creating wide compliance gaps that limited domestic revenue from growing alongside real gross economic activity. Conversely, Custom and Excise Duties (CUSED) initially was within the threshold of 6% from 2005 to 2007 but it experienced dramatic and erratic peaks surging observable in 2008, 2010, and 2012–2014 to values exceeding 10%. This behavior highlights a fiscal regime heavily reliant on manual collections at seaports and borders, which were highly reactive to trade volume cycles but deeply susceptible to human discretion and systemic leakage.

4.2 Post-Digital Adoption Era Trend (2015–2024)

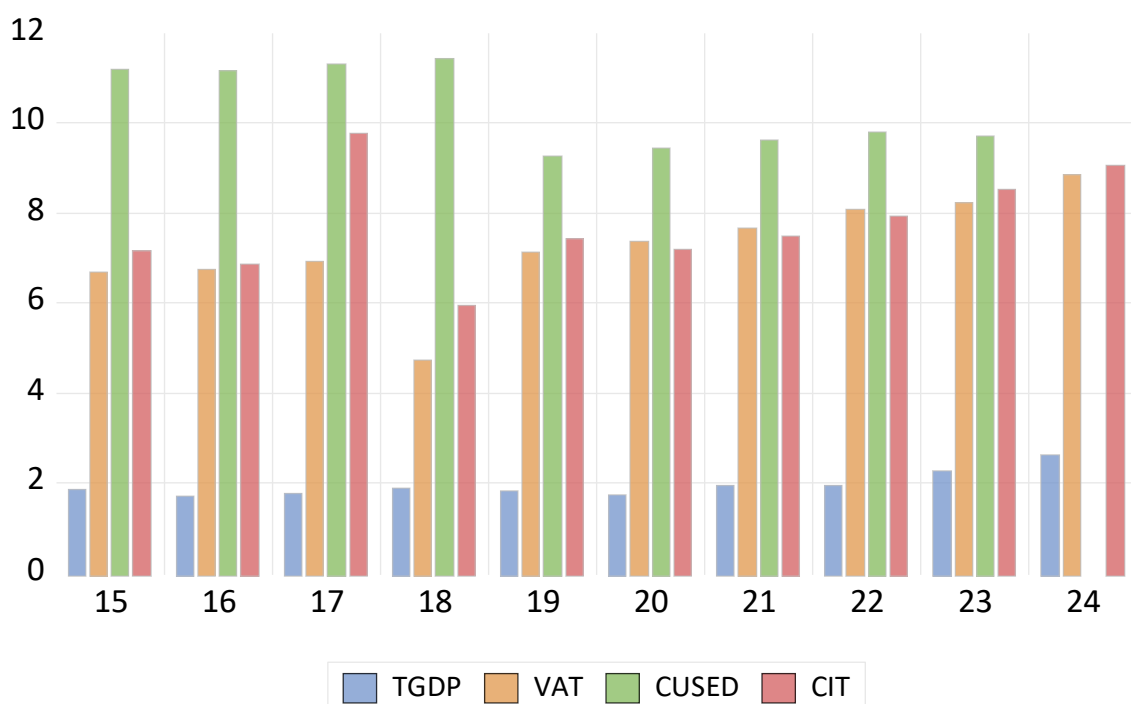


Figure 4.2 Post-Digital Tax Adoption Era Trend (2015–2024)

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There is an observed structural shift upon entering the 2015–2024 trend. Following structural adjustments and a sharp compliance correction in 2018, both VAT and CIT broke out of their historical stagnation and moved into a threshold of moving 10% on a strong consecutive upward trend that peaked in 2024. This growth directly reflects major institutional adjustments in Nigeria's tax architecture: the implementation of the Federal Inland Revenue Service (FIRS) Integrated Tax Administration System (ITAS), the strict enforcement mandates of successive Finance Acts, and the landmark implementation of TaxPro-Max in June 2021. However, an observable structural paradox remains, despite these strong increases in nominal VAT and CIT yields, the aggregate Tax-to-GDP ratio (TGDP) remained flat below the 2% threshold across the entire decade. This points to a persistent structural challenge.

4.3 Chow Forecast

Chow Test is a test for structural stability and is applied on the time series data since it had structural break in 2015 (occasioned by period of digitalization reforms) splitting the data into the two periods, Chow Forecast test is used to assess whether the significance of the coefficients in the regression model are the same for the periods with respects to their reported F-statistics, the estimate of the break periods is necessitated for evaluation of the dimension and t of the explanatory variables on the dependent variable and for test of hypotheses.

Table 4.1 Chow Test Results of Tax Variables and TGDP

Intercept	Model 1 CUSED & TGDP	Model 2 VAT & TGDP	Model 3 CIT & TGDP
F-statistics	3.900947 (P-value 0.0432)	4.708635 (P4.708635 -value 0.0191)	4.174988 (P-value 0.0271)
Likelihood ratio	32.29812 (P-value 0.0002)	38.58921 (P-value 0.0000)	36.55133 (P-value 0.001)
Remark	P- values 0.0432, 0.002 ≤ 0.05 (Remark significant)	P- values 0.0191, 0.000 ≤ 0.05 (Remark significant)	P- value, 0.0271, 0.001 ≤ 0.05: (Remark significant)

Source: E-VIEW 13

H0₁ There is no significant structural break in the relationship between Customs and Excise Duties (CUSED) revenue and the Tax-to-GDP ratio (TGDP) in Nigeria following the implementation of digital tax system.

The first stability model with respect to adoption of digital tax system in Custom and Excise Duties administration in Nigeria is presented in table 4.1. The results of the table reveal an F-statistic value of 3.900947 with a corresponding p-value of 0.0432. Since $0.0432 < 0.05$, the null hypothesis (H₀) of no structural break across the periods is rejected at the 5% significance level. This is further supported by the Likelihood Ratio value of 32.29812 ($p = 0.0002$), which is highly significant at the 5% level.

H0₂ There is no significant structural break in the relationship between Value Added Tax (VAT) revenue and the Tax-to-GDP ratio (TGDP) in Nigeria following the adoption of digital tax systems.

The second stability model evaluates the impact of Value Added Tax (retail and consumption) on TGP. The test shows an F-statistic of 4.708635 ($p = 0.0191$) and a Likelihood Ratio of 38.58921 ($p = 0.0000$). Since these values are highly significant with probability values less than 0.05 ($p < 0.05$), the null hypothesis of no significant structural break is rejected.

H0₃ There is no significant structural break in the relationship between Company Income Tax (CIT) revenue and the Tax-to-GDP ratio (TGDP) in Nigeria following the adoption of digital tax systems.

The third stability model evaluates the impact of Company Income Tax level of digital transformation on TGDP. The test shows an F-statistic value of 4.174988 (P-value 0.0271) and a Likelihood Ratio of .36.55133 (P-value 0.001), since these values are less than 0.05, they are highly significant ($p < 0.05$), the null hypothesis of no significant structural break in the relationship is rejected

DISCUSSION OF EMPIRICAL FINDINGS

The study investigated on relationship between digital tax transformation in Nigerian tax administration and tax revenue performance for the period (2005-2024). Tax digitalization aims to expand the formal taxpayer base, curb tax evasion, and structurally enhance tax revenue performance in Nigeria. The combined empirical results provide statistical confirmation for study. The graphical trend revealed flat, stagnant domestic revenue movement observed in the pre period 2005–2014 era, this illustrates the functional limits of traditional, paper-based systems in tax administration. Further there is an observed structural shift upon entering the 2015–2024 trend. Following structural adjustments and a sharp compliance correction in 2018, both VAT and CIT broke out of their historical stagnation and shifted into a threshold of moving 10% on a strong consecutive upward trend

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that peaked in 2024. These findings align with Technology Acceptance Model (TAM) assumptions, which state that the perceived usefulness and ease of use of digital portals significantly boost compliance intentions among taxpayers. By reducing compliance times and eliminating physical bottlenecks, platforms like TaxPro-Max minimized human discretion, leading to the upward revenue trends observed from 2021 to 2024.

Furthermore, the rejection of the null hypotheses in Chow Forecast tests in the three models provides clear empirical evidence of significant structural break in the relationship between Custom and Excise Duties, Value Added Tax and Company Income Tax and the Tax-to-GDP ratio (TGDP) in Nigeria following era of digital transformation in tax administration. These are in consonance with findings of Adegbite et al. (2022) and Olaoye and Kehinde (2023), who established that tax automation in developing countries goes beyond making incremental improvements, it shifts the collection ecosystem entirely by making transactions more traceable. These findings are also in line with findings of Ogbonna, Emmanuel, and Peace Ngozi, (2022) whose study revealed that VAT from the digital economy significantly affects economic growth in Nigeria. These proves that the traditional relationships that defined trade tax generation in the manual era broke down after 2015 due to the introduction of digitized trade tracking and automated single-window clearing systems. The introduction of automated VAT collection platforms, e-banking remittance integrations, and automated withholding mechanisms structurally transformed the revenue performance of indirect tax revenue in Nigeria. The observed statistical break further confirms that the implementation of the Federal Inland Revenue Service (FIRS) Integrated Tax Administration System (ITAS), the strict enforcement mandates of successive Finance Acts, and the landmark implementation of TaxPro-Max in June 2021 structurally transformed the revenue performance of Company Income Tax in Nigeria.

However, the low, sticky average Tax-to-GDP ratio that fluctuated from 1.92% to 2.2% (from graphical trend of fig 4.2) in post digitalization era highlights a persistent structural issue. This matches the warnings of Enahoro and Oseghale (2024), who noted that digital tools can only maximize national revenue performance if they are integrated with broader digital identity systems (like BVN and NIN) to expand the tax base.

Summary of the Findings

This study investigated the impact of digital transformation in tax administration on tax revenue performance in Nigeria using data from 2005 to 2024. The findings from the empirical models are thus summarized:

1. The trend analysis revealed a clear structural change: the flat domestic tax yields of the manual era (2005–2014) were broken by a strong upward shift in CUSED, VAT and CIT from 2015 to 2024, caused by the rollout of ITAS and TaxPro-Max.
2. The Chow Forecast Tests confirmed a significant structural break in the post period of 2015 - 2024 era for both Customs duties ($p = 0.0432$) Value Added Tax ($p = 0.0191$), and Company Income Tax ($P\text{-value } 0.0271$) providing observable statistical evidence that digitalization introduced a higher-performing tax collection framework.
3. The trend also revealed low, sticky average Tax-to-GDP ratio that fluctuated from 1.92 % to 2.2% in post digitalization era. Which highlights a persistent structural issue in tax revenue performance despite the digital transformation.

5.0 CONCLUSION

The study concludes that digital transformation in tax administration has a positive and structurally significant impact on tax revenue performance in Nigeria. The empirical evidence shows that replacing manual processes with integrated digital platforms (like TaxPro-Max and automated customs systems) significantly improved compliance and revenue predictability by blocking traditional collection loopholes. However, the persistent low Tax-to-GDP ratio shows that the digital dividends have primarily been realized within the formal corporate sector. To achieve long-term fiscal sustainability, digital tax tools must expand beyond their current boundaries to track and capture the informal economy.

5.1 Recommendations

Based on the empirical findings, the following recommendations are provided:

Nigerian tax revenue authorities should sustain and upgrade TaxPro-Max infrastructure, given the clear post-2021 upward trend in CUSED, CIT and VAT, the FIRS should continually upgrade its digital server architecture to prevent system downtime during peak filing periods, sustaining high taxpayer compliance ease.

There should be an expansion of the digital tax net to the informal sector. This will help to address the low Tax-to-GDP ratio, the Ministry of Finance should lead an integrated data mapping project, linking corporate tax databases with the National Identity Number (NIN) and Bank Verification Number (BVN) networks to identify and tax wealthy informal businesses.

Nigerian tax revenue authorities should enhance Customs Single-Window Systems. This will minimize the historical volatility observed in Customs and Excise duties in trend analysis, the Nigeria Customs Service should further automate port clearing through Artificial Intelligence driven fraud-detection risk profiles, reducing human intervention and blocking revenue loopholes at border posts.

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Appendix

Variables of the study

YEAR	VAT in Billions of Naira	CUSED in Billions of Naira	CIT in Billions of Naira	TGDP in %
2005	192.7	232.8	140.3	6.4
2006	237.7	177.7	246.7	6.3
2007	312.6	241.4	332.4	6.2

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2008	407	2095.5	420.6	8.6
2009	481.4	3195.5	600.6	6.4
2010	564.89	42955.5	666.05	7.3
2011	659.15	53811..4	715.44	9.7
2012	710.55	64667	816.51	9.4
2013	802.684	63638.5	963.55	8.3
2014	802.965	75053	1180	7.8
2015	767.334	69459.6	1229.02	6.1
2016	829.199	67948.5	933.53	5.3
2017	972.348	78589	17121.6	5.7
2018	108.04	88476	371.31	6.3
2019	1189.98	10054.9	1604.69	6
2020	1531.17	12085.4	1275.38	5.5
2021	2072.85	14515	1747.99	6.7
2022	3100	17390	2649.91	<u>6.7</u>
2023	3639.32	15952.5	4896.47	9.4
2024	6721.36	-	8386.51	13.5



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