Digital Tax Applications and Tax Revenue Generation in Nigeria

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Certification

This is to certify that Francis Olatayo OLASUNKANMI with matriculation number LCU/PG/000508 carried out this research work title "Digital Tax Applications and Tax Revenue Generation in Nigeria" in the Department of Management and Accounting, Faculty of Management and Social Sciences, Lead City University, Ibadan, Oyo State, for the award of Doctor of Philosophy Degree in Accounting and that this has not been previously submitted.

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Dedication

The thesis is dedicated to Almighty God, the giver of life, and my spiritual father, Pastor Benjamin Iorguma for his unwavering spiritual support throughout this period of study

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Abstract

The study examined Digital Tax Applications and Tax Revenue Generation in Nigeria. Specifically, determined the effect of Integrated Tax Administration System on tax revenue generation in Nigeria; determined the effect of the Standard Integrated Government Tax Administration System on tax revenue generation in Nigeria; and examined the relationship between Tax Pro-max system and tax revenue generation in Nigeria. Data were collected across five (5) countries (i.e, Nigeria, the U.S, the U.K, Irish, and Germany). The data were collected for the period of 1990 – 2024 from the FIRS audited annual report, CBN statistical bulletin, Internal Revenue Service (U.S), HM Revenue & Customs (U.K), The Revenue Commissioners (IRISH), ELSTER / Federal and State Tax Authorities (Germany). Mixed research design was used, while the work leveraged the technology acceptance model. The population consisted of 10,336 tax officers and 41,000,000 taxpayers in Nigeria. The sample size of 400 was determined using Taro (1967) formula and on the basis of stratified sampling as the populations of the tax officers and the taxpayers are heterogeneous in nature. The hypotheses were tested using Ordinary Least Square. The findings that the ITAS exhibits ($\beta_2 = 4.659414$, $p = 0.0366$), indicating that it was highly significant at the 5% level. This suggested a high and positive correlation between the adoption of ITAS and the generation of tax revenue in Nigeria during the study period. The findings on the hypothesis indicated that the Standard Integrated Government Tax Administration System (SIGTAS) ($\beta_3 = -2.74$, $p = 0.0435$) and thus statistically significant at the 5% level. This indicated a strong but negative effect, hence, adoption of SIGTAS could have transitioned inefficiently which weakened its effect on tax revenue in Nigeria. The hypothesis indicated that Tax Pro-Max exhibits ($\beta_4 = 11.39948$, $p = 0.0016$), reflecting strong statistical evidence of significant effect on tax revenue generation. This signified that the adoption of Tax Pro-Max has significant effect on tax revenue generation, arguably due to improved compliance, mechanisation, and efficiency of the digitalised process. The study concluded that the necessity of sustained investments in digital tax infrastructure, the execution of coherent implementation frameworks, and the advancement of complementary institutional reforms to optimise the fiscal sustainability of digital taxation and ensure the sustainability of Nigeria's tax revenue architecture is progressively improving through the prevailing digital tax application process. The study recommended that the government should invest in robust ICT infrastructure to ensure seamless operation of systems across all tax offices in Nigeria; establish regular monitoring and evaluation assessments for ascertaining the performance and impact of the tax promax for making more improvements in time; the tax pro-max should be continuously updated because of their positive impacts to handle more taxpayer interactions and data complexity; taxpayers should be educated on utilising digital platforms effectively to facilitate voluntary compliance and reduce errors when filing; taxpayers' data should be secure, digital tax policies should be flexible enough to take in new technology and taxpayer trends; provide comprehensive training to FIRS staff to utilize, troubleshoot, and optimize digital tax platforms.

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List of Acronyms

Abbreviation	Meaning
ITAS	Integrated Tax Administrative System
SIGTAS	Standard Integrated Government Tax Administrative System
SDGs	Sustainability Development Goals
GDP	Gross Domestic Product
FAD	Fiscal Affairs Department
IMF	International Monetary Funds
TIN	Tax Identification Number
UTIN	Unique Tax Identification Number
VAT	Value-added Tax
NIBSS	Nigerian inter-bank Settlement System
CIT	Company Income Tax
CGT	Capital Gain Tax
PPT	Petroleum Profit Tax
PIT	Personal Income Tax
EMEs	Emerging Market Economies
RA	Revenue Administration
PE	Permanent Establishment
VAIDS	Voluntary Assets and Income Declaration Scheme
TRC	Transaction Code
E-TCC	Electronic Tax Clearance Certificate
AI	Artificial Intelligence

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ML	Machine Learning
UNDP	United Nations Development Programmes
DIN	Document Identity Number
RRR	Remita Retrieval Reference Number
TAM	Technology Acceptance Model
ANT	Actor-Network Theory

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Chapter One

Introduction

1.1 Background to the Study

Governments and corporate organizations have incorporated technology and the internet of things in various businesses to remain competitive and sustainable. Technological evolution has fostered the imagination of governments to leverage available technological innovations, which gave more power to serve their population better. It has become a catalyst for redefining human and organizational efforts towards improved efficiency and productivity with a shift towards robust technological innovations. This digital revolution has emerged important trends in the global tax laws, given rise to various Digital tax applications to proffer sophisticated approach to tackle tax transactions issues.

However, there has been unparalleled improvement in Information and Communication Technology (ICT) in the last two decades, to the extent that numerous activities (i.e, records) in both public and private sectors were previously performed manually[1,2,3,4]. The adoption of Information and Communication Technology (ICT) has increased the expansion in the growth of e-governance including tax administration all over the world due to the use of computer systems and networks in the process of tax registration, filing of tax returns and payment of taxes[5]. Many developed and developing economies around the world have experimented with and proven that no nation can truly develop without developing its technology-based tax system; as a result, the primary function of a good tax system is to raise enough revenue to finance essential government expenditures on goods and services[2].

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Digital tax applications on tax administration were initiated globally about 30 years ago, and since then, the system has evolved into a common network, assisting many taxpayers all over the world[6]. Digital tax applications simply refer to the channel through which taxpayers can gain access or permission to the platform in order to access all of the services provided by the tax authority, such as the registration for a tax identification number, electronic tax filing of tax returns, and the electronic taxation system, which was introduced in Nigeria in 2013 (i.e, ITAS) by the Federal Inland Revenue Service[7]. The advances in the scope, versatility, and sophistication of today's technologies, which refers to as emerging technologies, have expanded the scope for extensive use of technology in the area of taxation[8]. This comprises Digital tax applications that most businesses are yet to fully adopt and conventional techniques that enterprises are yet to implement. This includes: Artificial Intelligence, block chain, cloud computing geospatial data, internet of things, predictive analysis, robotics and automation agile methodologies etc. The saturation of the world with digital tax applications cut across both the public and private sphere[1].

Digital tax applications on tax administration and tax procedures creates the basis for further tax system reforms. Without building a strong organization of tax administration, information system and professionalization of tax administrators, the tax reform will not be possible. The tax policy reform ensures that digital businesses are taxed in a just and sustainable way that is adapted to economic growth[9,10]. Digital tax applications ensure greater stability in revenues generation and minimizes costs for tax administration, effectively combat tax evasion, and increases the certainty of tax rules. Further, digital tax applications require not only the improvement of the administration system and tax payment mechanisms, but also changes in the tax system itself and tax policy vectors related to digitalization[11].

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In African countries, especially the Oil producing, particularly Nigeria, tax system was lopsided and dominated by oil revenue. However, it was clear that the Nigeria's oil revenue can no longer adequately support her developmental objectives due largely to the serious decline in price of oil in the internationals market, which has led to oil price volatility and decrease in totally generated revenue by government[12]. As a result, strict attention has been paid on tax revenue as one of the major sources of revenue. Governments, through revenue so collected, can meet expenditures of governance and achieve economic growth through the delivery of adequate and desirable infrastructures[13]. This is even important for developing countries having an estimated annual $2.5trillion financing gap towards achieving the Sustainable Development Goals (SDGs). This is coming at a time when many developing countries are still struggling to collect sufficient tax revenues to finance their own development with many collecting less than 15% of their Gross Domestic Product (GDP) in taxes[14]. This threshold of 15% tax to GDP ratio is regarded as tipping point to make a state viable and put it on growth path; thus, countries with less than the threshold must increase their tax revenue collection to meet basic needs of citizens and businesses[15].

Nigeria as a developing African country, recorded a tax to GDP ratio of 6% in 2019 which is far below the average of 16.60% making Nigeria to be in the company of war-torn countries of Yemen and Somalia[16]. Conversely, Nigeria's rapidly increasing population means more added pressure on available public infrastructures and services and the greater need to build more infrastructures and enhancement of provision of services[17]. These can only be achieved if the federal government is able to enhance inflow of viable and sustainable revenue such as revenues from taxes.

Currently, the federal pool of revenue on which both the federal, state, and local governments heavily depend on is from oil and gas natural resources which are almost always associated with shocks and rent seeking[18]. Although, during this era, the country has been generating revenue

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through taxation but the process was so corrupt to the extent that huge percentage of the generated revenue were usually diverted either by the tax personnel or banks for other purposes[19]. To overcome the challenges in tax administration and reduce the heavy reliance on oil and gas revenues, the Federal Inland Revenue Services (FIRS) has embarked on digitalization of its services for easy and enhanced revenue collection[14]. However, an effective reform and a robust tax system offers excellent opportunities to the government to generate more revenue needed in discharging its pressing obligations. Besides, an efficient tax system would present an effective means of mobilizing a nation's internal resources while also lending itself as an avenue where an environment conducive to the promotion of economic growth can be created[20].

In the Nigerian tax administrative system, series of developmental stages were undergone (i.e, traditional (manual) tax system to the modernization programme), which was suggested by the Fiscal Affairs Department of the International Monetary Fund (FAD/IMF) in 2004, 2005, and 2006 to establish reform project initiatives and implementation of e-taxation for ease of doing business in Nigeria to bring all taxable people into the tax-net[19]. The manual system was bedeviled with a variety of issues, which results to the need of well-structured technological based tax system[2]. The deficiencies, brought in the modernization programmes, which were structured into phrases, the first-second enable to reform project initiative and implementation in 2008 to 2011, while the third phrase has significant effect on the journey on Digital tax applications in the tax administration in Nigeria[19].

In the modernization programmes III, there came the reasons for companies to have unique "TIN" (unique tax identification number). When the unique "TIN" was done, an engagement of project was done with "project VAT" This project was engaged to register all companies in Nigeria into tax-net for online monitoring by the Service, and to ensuring no company has more than one

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"TIN". During the era of "project VAT", a programme called Integrated Administration system (ITAS), was launched to make tax assessment and payment easier for taxpayers[21]. Electronic-Tax pay system is an online self-service tax payment system which gives taxpayers the opportunity to pay their taxes through their banks' online payment portals. It is an initiative of FIRS in collaboration with the (NIBSS) Nigerian Interbank Settlement System[22]. However, ITAS supports a "do it yourself" methodology for taxpayer calculating and filing, and is specifically created to reflect Nigerian tax legislation. The ITAS is a complete tax administrative solution that allowed the tax authorities to automate and streamline the operations for managing VAT[1]. Further, the process is the transformation of manual process into a system-based process. The application was made to carry-out some standard tasks thereby, increasing the process efficiency[19]. ITAS process includes the use of payment automations, e-filing tax returns, e-processing tax clearance certificates, computing and applying late filing penalties automatically, and corresponding with tax officials[1]. This application makes it simple for taxpayers to file their tax returns from the convenience of their offices at any time within the mandatory filing period, minimizing the difficulty, time, and expense of paying taxes.

In the process, an account is filed online, assessment is raised, and companies are monitored, while audit are done to enhance revenue generation and to find out whether the system is functioning as intended[22]. However, the cost of tax administration considerably decreases with competent management and full adoption, increasing compliance and government revenue in Nigeria. While tax officers are equipped to conduct timely reviews of tax returns, taxpayers can make better use of the time and amount spent traveling to tax offices by making sure their tax returns are current[1].

Going by the application of ITAS, it was discovered that ITAS cannot meet the need to the system-as the Value added tax (VAT) was not user friendly. Due to the ambiguity in the tax process, ITAS

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could no longer continue the pace. While roughly two years later, the Standard Integrated Government Tax Administration System (SIGTAS) were staged to capture the stated objectives failed in the ITAS process. Although the applications were running concurrently to serve better. Prior to the deployment of ITAS, the taxpayers were being registered and assigned Tax Identification Number (TIN) different from the TIN assigned by the Joint Tax Board (JBT) resulting in taxpayers having more than one "TIN". With the ITAS deployment, both federal and state taxpayers are assigned only one unique TIN[19]. The implementation of Standard Integrated Government Tax Administration System, however, enables an automatic determination of taxable amount and the necessary penalties. The process also enables the administrative to identify the taxpayers' errors of omission through tax declaration processing, as well as improved case management for audit, investigation and appeals[19].

In 2015, a South-African based tax process was introduced, called "Amanda" process by the former Executive Chairman "Babatunde Fowler" to effectually sophisticate the Nigerian Tax Administrative system. The loopholes of the formal application processes were observed, analysed and capitalized to implement this new process. This brought in the use of "e-filling, e-receipt, and e-voicing" (part of which were introduced in the formal processes) to complement the existing applications and to further simplify the VAT collecting operations, flexibility of time, reduce computations of errors on tax return forms to the tax payers, and taxpayer privacy and security[3].

The process was subjected to several critics as a result of steady decline in revenue collection by the service since the inception of the process in 2015. The revenue performance between 2011 and 2019 also revealed that, although having fewer employees (6,445), the agency's actual revenue collection (N4.629 trillion) exceeded the planned collection objective of N3.639 trillion by almost 127.2 percent[1]. Unfortunately, since 2015, the FIRS has been failed to fulfill the revenue target of

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N4.572 trillion, realizing only N3.7 trillion in actual tax collection. This is despite having larger personnel (7,182) than before. Further, in 2016, a FIRS revenue collection target of N4.9 trillion was only able to achieve N3.3 trillion, despite an equivalently greater staff of seven thousand one hundred and eighty-two (7,182). Despite employing the most workers of nine thousand four hundred and forty-eight (9,448) and having a revenue collection target of about N8.802 trillion in 2019, the FIRS was only able to realize N5.008 trillion[3].

Amanda process was abolished, while the Tax Promax was introduced in 2021 during the administration of then Executive Chairman Muhammed Nami, who discovered more issues in the previous tax processes, then called for a more robust process. Tax promax was lunched and the system gradually revolutionizing into the pure digital word (tax digitalization system) in Nigeria till today. Consequently, significant tax revenues have been generated in Nigeria since the inception of these modernization plans.

In 2024, Federal Government of Nigeria presented an appropriation bill to the National Assembly which was called the 'Budget of Renewed Hope.' The budget, like others before it, further accentuates the persistent disparity between Government's anticipated revenue against expenditure. The Bill anticipates total spending of N27.5 trillion against a revenue projection of N18.32 Trillion with a deficit of N9.18 Trillion[23]. The growth in digital activities across the world and in Nigeria in particular has introduced a new vista of opportunity for government to grow its tax revenues and widen the tax net as often been canvassed.

The digital economy has a solid potential of increasing the revenue of the government vis-à-vis taxation in Nigeria[23]. However, the payment automation system has demonstrated to be a major instrument in fighting the challenges of any tax system as it provides information, education and

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support to taxpayer and facilitates tax compliance and administration[24]. Further, it is agreed that the objective of e-taxation is to improve revenue generation in the system[25]. Revenue generation has remained a key concern for several nations including Nigeria. The introduction of electronic taxation payment system will bring about an increase in tax revenues, which will in turn bring about an increase in revenues collected as a whole as noticed in various countries of the world after the introduction of e-tax payment system[6]. As a result, it is intended to look into how Digital tax applications would improve tax revenue generation in Nigeria.

1.2 Statement of the Problem

The Undeniable reality is that digitalization has changed business models and the world at large. While the digital economy is now accounting for up to 15% of Global GDP ($15 Trillion). This expansion has created multiple economic opportunities which were not foreseeable a decade ago[23]. However, concomitant with these opportunities are emerging tax challenges, as most of the activities circumvents the requirement of permanent establishment for the completion of transactions. Since the establishment of revenue authority when it was Board of Internal revenue service (BIRS), tax has been manually collected from inception whereby assessment is raised for taxpayer to make payments into the banks. Sometimes, the cheques issued to the bank would be diverted for another purposes by tax personnel. This shows one of the flaws of manual process. When cheque is lodged, most banks during the time trade with the tax funds for a longer period without remitting it to the Federation Accounts, this is another loophole of the manual process. Least consideration on the aforementioned, tax collection is capital intensive, for any assessment, there is need for Federal Inland Revenue Service to contract security documents. For instance, withholding tax form is contracted to be issued to every taxpayer to make payment. There is

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demand notice which is printed as a contract for taxpayer to demand for the amount due. There is also an assessment forms for (CIT, EDT, VAT) each of which are printed in four copies and distributed to various tax offices within the country regardless the geographical location. This is done with huge investment on the Service.

Furthermore, the manual process is a bridge or connivers between the taxpayers and tax personnel. For instance, if taxpayer wants to make payment of tax, walk to FIRS to meet the tax officer. If the payment is late, in most cases the tax officer negotiates for bribe to wipe the penalties. At times, accumulated penalties could be written off while the documents are backed dated. Another issue with the manual process is reduction of due amount by the taxpayers. A taxpayer whose income is N500 million may declare N50 million and connive with the tax officer to overlook the difference. The bank would not be check and the bank statement would not be audited. It was observed that manual process of tax enables most taxpayers to doge payments. Some are not even in the tax net, this is as a result of inadequate number of tax officers to cover the look and crony of the country. They are only able bring to tax net, the few ones who probably have contract and need tax clearance certificates. This mandated many to register for tax because the certificate is very important for the contract to be awarded. They come around to file returns, reduce it for payment and when the certificate is issued, most of them turn back to their usual habit, until when the tax clearance certificates are needed again.

As the error continues, a reform committee was formed to strategizes towards reducing the flaws. This challenge is borne majorly out of the decreasing relevance of physical presence in the jurisdiction of taxpayers which destabilizes conventional tax regimes that are inherently location-based in Nigeria. Further, the Nigerian tax system generally which was meant to achieve core economic, political and social objectives such as, revenue generation for the sustainable economic

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and social needs, control stakeholders' demand, encourage investment and savings, fight economic depression, inflation and deflation, guarantee equitable distribution of income and wealth, control the general trend of the national economy, and ensure a proper allocation of national resources has hither-to failed because of several impediments[26].

The tax authorities are faced with the challenges of collecting appropriate tax revenue as well as the problem of tax evasion, which is made easier by the click of a button. This adds to the already identified challenges with tax administration, which include collusion between revenue officials and tax administrators, tax evasion activities, errors resulting from manual computations, and insufficient management of tax administrators' databases, among other things[27]. The tax regime introduced in every country has a direct bearing on the amount of revenue that can be derived from taxation. This probably influenced the decision of the Federal Government of Nigeria (FGN) to set up a study group with the objective of maximising revenues from different tax sources, a review of the Nigerian Tax Administration is being carried out. The problem of the complexity of payments, the lack of tax statistics and information, as well as the poor quality of information, has traditionally led to about 12 billion naira disappearing into the pockets of individuals[12].

The main difficulties that the digital economy poses for the application of existing international tax rules and develop detailed options to address these difficulties, taking a holistic approach and considering both direct and indirect taxation. Issues to be examined include, but are not limited to, the ability of a company to have a significant digital presence in the economy of another country without being liable to taxation due to the lack of nexus under current international rules, the attribution of value created from the generation of marketable location relevant data through the use of digital products and services, the characterization of income derived from new business models, the application of related source rules, and how to ensure the effective collection of

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VAT/GST with respect to the cross-border supply of digital goods and services. Such work will require a thorough analysis of the various business models in this sector[28].

Digital tax applications, on the other hand, alters the order of the Nigerian economic and social processes[29]. These changes should elicit an equal reaction, resulting in changes to existing laws and the implementation of existing laws, and a digital economy built firmly on the foundations of information and communications technology. As a result, tax administrators must embrace ICT in order to revolutionize their processes and alleviate some of the challenges associated with manual processing[19]. Despite this measure, it is still unclear whether electronic taxation has helped to improve the tax compliance level among taxpayers in Nigeria. Undoubtedly, if electronic tax system is properly administered in Nigeria, that could be a lasting solution to the irregularities such as tax evasion and avoidance, in the tax administrative system in Nigeria tax system[30]. It is in line with the above problem that this study was prompted to ascertain whether digital tax applications can improve tax revenue generation in Nigeria.

1.3 Justification of the Study

The widespread adoption of digital tax applications throughout Nigeria plays a crucial role in improving tax collection and updating the tax management framework of the nation. The tax revenue of Nigeria represents 10.8% of its GDP while remaining the largest economy in Africa so the country depends on borrowing to finance its budget. The situation demands better tax reform and more effective compliance systems to ensure proper tax collection[31]. The adoption of digital tax administration presents an effective answer to current problems. Research indicates that enhancing e-filing consumption by fifty percent would produce 1.6% of GDP increase in tax revenue for countries that match Nigeria's situation[31]. Electronic tax systems have the capability

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to resolve traditional tax collection problems by improving tax statistics retrieval and reducing compliance expenses and addressing both record-keeping limitations and collection rate deficiencies[12]. Digital ventures in Nigeria have produced inconsistent results regarding their operational success. Several research papers indicate that electronic taxation platforms appear to produce no substantial improvements in the collection of tax revenues and nationally collected funds as well as tax-to-GDP relationships. The metrics measured by these researchers showed a reverse trend after system implementation according to research conducted by[25].

The results show that researchers need to study all elements that affect the success rates of digital tax programs. Digital tax protocols form the core backbone of tax operations since Nigeria needs these systems to execute changes aimed at inflation management and improved tax enforcement processes. Through the upcoming decade Nigerian authorities plan to increase their value-added tax (VAT) rate to 12.5% while they remove taxes from food items together with medical supplies. These reforms are predicted to produce price reductions across most of Nigeria's population and establish linkage between its tax system and worldwide standards[31]. The research determines the effects of digital tax applications on Nigerian tax revenue production. The research examines present digital tax approaches and their operational effectiveness as well as the obstacles which prevent their accomplishment to present recommendations that enhance policy making and administrative performance for Nigeria's tax system.

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1.4 Aim and Objectives of the Study

The aim of this study is to examine the digital tax applications in improving tax revenue generation in Nigeria, while the specific objectives are to:

i. determine the effect of the Integrated Tax Administration System on tax revenue

generation in Nigeria

ii. determine the effect of the Standard Integrated Government Tax Administration System on tax revenue generation in Nigeria

iii. examine the relationship between Tax Pro-max system and tax revenue generation in Nigeria.

1.5 Research Questions

Drawn from the above, this research will provide answers to the following research questions:

i. What is the effect of the Integrated Tax Administration System on tax revenue generation in Nigeria?

ii. To what extent does Standard Integrated Government Tax Administration System effect tax revenue generation in Nigeria?

iii. What is the relationship between tax pro-max system and tax revenue generation in Nigeria?

1.6 Hypotheses

To provide empirical finding for the aforementioned research questions, the following research hypotheses were formulated for this study:

H_{01}: Integrated Tax Administration System has no significant relation with tax revenue generation in Nigeria.

H_{02}: Standard Integrated Government Tax Administration System has no significant impact on

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tax revenue generation in Nigeria.

H_{03}: Tax Pro-max system has no significant relationship with tax revenue generation in Nigeria.

1.7 Significance of the Study

The findings of the study will be useful to improve tax automation policies and practice in Nigeria to ensuring dull compliance and at the same time prevent taxpayers from defaulting, as well as to provide easy tax collection processes. The study's findings will also help in providing useful documentation to the Federal Inland Revenue Service, tax collectors, and tax administration on the importance of taxation, as well as to providing a lasting solution to tax evasion in Nigeria. By exploring the benefits of Digital tax applications and its potential to transform tax administrative system in Nigeria, the findings of the study will provide valuable insights that can inform government policies and strategies to improve tax collection and compliance. The study can highlight the potential benefits of increased transparency and accountability in tax collection, which can improve public trust and reduce corruption.

The findings from the study would help to streamline and improve tax administration and can enhance the job performance, increase efficiency, and reduce the risk of human error. The findings would as well help the potential for digital tax applications to simplify tax filing and payment processes, thereby improving the taxpayer experiences, increasing satisfactions and reducing resistance to tax compliance. The findings would also help in simplifying tax filing and payment processes, making compliance easier and more efficient, and providing valuable insights into the potential benefits and challenges of digital tax applications for the tax administration, as well as help to inform future research and policy decisions. The research would be extremely useful to future researchers, policymakers, and students to understand the complexities of tax administration

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and the role of technology in addressing these challenges, as well as its potential benefits and the management of the processes.

1.8 Scope of the Study

This study focuses on digital tax application processes on tax revenue generation in Nigeria, using Federal Inland Revenue Service as a study case. For sophisticated analysis, the study shall gather data through primary (i.e, digital tax applications' checklist) and secondary sources (FIRS reports) (i.e, control variables: Company Income Tax (CIT), Capital Gain Tax (CGT), Petroleum Profit Tax (PPT), etc,) while GDP growth rate shall be sourced from the CBN statistical bulletin for the years: 1994 to 2024. This covers the Itas era to the era of TaxPro-Max in the Nigerian Tax Administration System.

1.9 Operational Definition of Terms

Capital Gain Tax: This form of Tax is charged to profits that originate from selling assets including land, buildings, shares and other types of capital investments. Nigerian tax law requires capital gains tax to equal 10 percent of the profit earned from asset selling.

Company Income Tax: This is a tax levies against business profit which arises from operating within the country.

Digital Economy: This is referred to as the new economy, in which information will be available and used to improve business operations at a lower cost and to meet the expectations of various customers through the use of ICT devices.

Federal Inland Revenue Services: This is the government agency responsible for tax

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administration in Nigeria.

Integrated Tax Administration System (ITAS) is a comprehensive tax administration solution which will enable the tax authorities streamline and automate the tax management processes

Petroleum Profit Tax: This is the tax that assesses profit earnings from oil exploration together with production activities of companies.

Revenue Generation: This includes revenue from revenue and profit taxes, social security contributions, taxes on goods and services, payroll taxes, taxes on property ownership and transfer, and other taxes.

Standard Integrated Government Tax Administration System (SIGTAS): This is a modernized computerized system to optimize both tax collection and administrative operations. SIGTAS enables tax authorities to achieve efficient organized management for rating taxpayers and tax return processing and tax assessment as well as payment supervision and audit oversight.

Tax Administration: Tax administration refers to the interpretation of tax laws and their practical application in achieving specific goals. It is the third and most important activity of the taxation process that has led to tax administration becoming the actual practice of taxation.

Tax Avoidance: This is defined as the practice of lowering one's tax burden by fully utilizing the tax code or exploiting loopholes in the tax laws to reduce tax liabilities by structuring one's tax affairs using tax shelters in the tax law and avoiding tax traps in the tax laws.

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Tax Compliance: This requires the taxpayer to file all required tax returns on time and to report tax liabilities accurately in accordance with the Internal Revenue Code, regulations, and court decisions in effect at the time the return is filed.

Tax Evader: A criminal who breaks the law to reduce his or her tax liabilities must be concerned about possible detection and the potential penalties, which range from conviction to a prison sentence, a fine, or a combination of the two.

Tax Evasion: This is defined as any deliberate, illegal reduction in tax payments, typically in the form of underreporting income, sales, or wealth, or overstating deductions, including failure to file appropriate tax returns.

Tax Risk: This is the risk that businesses are paying or accounting for an incorrect amount of tax (including both income and indirect taxes), or that the tax positions they take are inconsistent with the tax risk appetite that the board of directors has authorized or believes is prudent.

Tax Pro-Max: This is a system that enables seamless registration, filing, payment of taxes and automatic credit of withholding tax as well as other credits to the Taxpayer's accounts among other features.

Value-Added Tax (VAT) is a consumption tax assessed on the value added in each production stage of a good or service. Every business along the value chain receives a tax credit for the VAT already paid.

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Chapter Two

Literature Review

2.1 Conceptual Review

2.1.1 The Concept of Taxation

Taxation refers to when a taxing authority, usually a government, levies or imposes a financial obligation on its citizens or residents. Paying taxes to governments or officials has been a mainstay of civilization since ancient times. Taxation applies to all types of involuntary levies, from income to capital gains to estate taxes. Though taxation can be a noun or verb, it is usually referred to as an act; the resulting revenue is usually called taxes[1]. Taxation is differentiated from other forms of payment, such as market exchanges, in that taxation does not require consent and is not directly tied to any services rendered. The government compels taxation through an implicit or explicit threat of force.

Taxation is legally different than extortion or a protection racket because the imposing institution is a government, not private actors. Taxation is the means of raising money for governance purposes through contribution of both individuals and corporate bodies. Tax is collected by government mainly to finance public expenditure and to redistribute income among its citizens and thereby attaining economic development as required[2]. Taxes are "the means by which governments finance their expenditure by imposing a financial charge or levy on citizens"[3]. A broader perspective, however, sees taxation not just as a means of raising revenue, but also as part of a social contract between the state and its citizens. Taxes are a means by which citizens fulfill their social contract obligations, providing the state with the resources necessary for governance

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and social welfare[4]. From this viewpoint, taxation is viewed as a civic duty and an essential component of collective responsibility. It serves as a reminder that citizens benefit from public goods such as infrastructure, security, and education and thus have a moral obligation to contribute to their funding.

Taxation is described as "a system of compulsory financial contributions imposed on individuals and businesses by governments to fund public services, infrastructure, and welfare programs. This definition highlights not only the revenue-generating aspect of taxation but also its role in sustaining economic stability, promoting growth, and ensuring social equity. It aligns with the idea that taxation is integral to the functioning of a modern economy, underpinning government spending on essential services. Taxation plays a pivotal role in the economic development of nations. It is the principal means by which governments finance public services that contribute to economic growth, such as education, healthcare, and infrastructure development. Without a robust tax system, governments would struggle to fund initiatives that foster social and economic development. Taxes are essential for the functioning of any modern economy, as they finance the infrastructure and services needed for growth and prosperity[6].

In Nigeria's National Tax Policy, taxes are urged in the sense of the "growth of economic activity, infrastructure development and income redistribution"[7]. The Central Bank of Nigeria (CBN) precisely states, "The contribution of non-oil revenue to the federal government's total revenue remained below 10% in recent years." It is so problematic for the government to be heavily depending on oil revenue considering the fact that international oil prices exert a considerable influence on the government's fiscal situation. Volatility in oil prices generates exorbitant budget deficits and jeopardizes the capacity of the Nigerian state to fund its public sector in the long term.

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Most scholars have noted that there is a necessity for the nation to diversify revenue sources, especially with a concentration on taxation in the non-oil economy[8].

Besides its function in the generation of revenue, taxation is also a significant mechanism in controlling economic behavior. Governments employ tax policy to alter consumption, investment, and labor supply. Taxes on cigarettes and alcohol, for instance, are normally high to deter individuals from consuming dangerous products, whereas tax credits given to renewable energy facilities are aimed at encouraging investments in green technology[8]. Efficient taxation systems can spur economic growth through the redistribution of wealth and raising the availability of education, healthcare, and other public services, and in doing so, enhance human capital and productivity[9]. The redistribution of wealth also requires taxation. Progressive taxation, where the rich give a larger share of their income to the state, helps limit economic inequality. Progressive taxation is one of the most significant mechanisms that states in the contemporary world aim at curbing inequality. Progressive taxation helps to address the resulting inequality created by the concentration of wealth in fewer hands. With such mechanisms of taxation, states are able to redistribute wealth in a manner where there is improved access to opportunities and wealth, thereby ensuring social stability is guaranteed[10].

Taxation, however, has its issues. The tax administrations in the majority of developing economies are underdeveloped with limited administrative strength to collect taxes. Developing economies are characterized by a strong barrier to effective tax collection, including a large informal economy, low-quality institutions, and the inability to tax and collect from largely rural populations[11]. These barriers render the governments of developing economies unable to raise the revenue needed for development and alleviation of poverty. Taxation is the major tool in the use of fiscal policy. Fiscal policy refers to government action on public spending and taxation to seek

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macroeconomic objectives such as economic growth, low inflation, and maximum employment. Taxation plays a significant role in fiscal policy by determining the level of revenue that can be applied to government spending. As the International Monetary Fund notes, tax is a fundamental instrument for guiding national economies, particularly during a recession or inflation. In times of economic recessions, states can implement taxes as a way of stimulating demand and stimulating economic activity. For example, tax cuts can be harnessed to increase disposable income and stimulate consumption, while tax incentives can stimulate business investment[12].

On the other hand, when there is inflation, governments can increase taxation to limit spending and decelerate a boom economy. Counter-cyclical fiscal policies, including these, are most important in maintaining the balance of the economy. Taxes also contribute towards financing social services, such as health care, education, and pension plans. Progressive taxation is typically linked with public welfare provision, and more affluent individuals contribute a larger percentage of their income toward these services. The vital role of taxation in facilitating social equality is emphasized by the European Commission, which notes that "fair and efficient tax systems are central to promoting sustainable development and reducing inequality"[13].

Despite the crucial role played by taxation, there exist various challenges that prevent its successful enforcement. The most significant challenges faced by tax systems in the world are tax evasion and avoidance. Tax evasion, which involves the unauthorized underreporting of income or assets for reducing the tax incidence, is a widespread phenomenon in the majority of countries. In advanced economies, legal tax evasions methods used to reduce tax liabilities, such as the exploitation of loopholes or the use of foreign tax havens also present problems for the revenue collection of governments. According to the OECD, tax evasion and avoidance cost governments

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trillions of dollars in revenue every year, compromise public finance, and create suspicion around the tax system[14].

The underground sector is another problem in developing countries. The OECD adds that most of the economic activity in many developing economies lies outside the formal tax system, such that governments find it challenging to evaluate and collect taxes effectively[14]. This is most evident in nations with widespread rural populations or economies based primarily on subsistence agriculture. The challenge of taxing informal workers, who often do not have regular earnings or formal employment contracts. Tax collection in most developing nations is usually crippled by the high level of informal sector, which frustrates efforts to tax broaden the tax base[11]. The second key issue is imposing tax compliance. Taxing systems rely on voluntary compliance, where individuals and companies are relied upon to report themselves and their assets and earnings. But noncompliance is a widespread issue, driven by low government trust, lack of understanding of the tax law, and perceived unfairness of tax policy. The level of tax compliance is not necessarily a function of enforcement rate or penalty but also of the perceived fairness of the tax system and the level of trust in government[15]. The question of tax compliance improvement is critical because it has straightaway effects on the efficiency of tax regimes and the ability of governments to fund essential services.

The increasing globalization of investment, business, and trade activities has introduced new aspects to the issue of taxation. Multinational corporations (MNEs) are more likely to undertake tax planning strategies that take advantage of differences in tax rates between jurisdictions, a strategy known as tax avoidance or shifting of profits. This can result in erosion of tax base where gains made in high-tax jurisdictions are shifted into low-tax jurisdictions, depriving governments of tax returns. The Base Erosion and Profit Shifting (BEPS) project of the OECD, which began in

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2013, is designed to address these problems by setting out strategies for closing loopholes in cross-border taxation law and ensuring that profits are taxed where economic activity giving rise to the profits occurs. In the view of the OECD, "The BEPS project aims to curb harmful tax practices and promote a more transparent and equitable global tax system". Project success is critical to ensuring that multinational businesses pay their fair share in the economies in which they are working[14].

2.1.2 Digital Tax Applications

Digitalisation has far-reaching implications for taxation, influencing tax policy and administration at both the domestic and international levels, providing new tools while posing new challenges. As a result, the tax policy implications of digitalisation have recently been at the center of a global debate over whether or not international tax rules are still fit for purpose in an increasingly changing environment[16]. Digital tax applications are applications or software or system through which taxes payments are collected for ease practices. Digital tax applications are methods by which governments around the advanced world use information and communication technologies to improve the delivery of public services and the dissemination of public administration information to the public[17]. Digital tax application is an online system or channel through which the taxpayers can gain access or permission to the payment platform via the internet, in order to access all of the services provided by the tax authority, such as e-registration for a tax identification number, e-registration, e-filing, e-payment, e-invoicing, and electronic fiscal devices (EFDs), etc[17].

Digital tax application was implemented to increase tax revenue generation in Nigeria and to make it easier and more convenient for tax payers to pay taxes from various locations and at various

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times[18]. Nigerian taxpayers pay the following taxes online in Nigeria: Company Income Tax (CIT), Value Added Tax (VAT), Capital Gains Tax (CGT), and Petroleum Profits Tax (PPT). When these taxes are paid online, the taxpayer can apply for and receive his/her tax clearance certificate without having to visit the tax authority's office[17]. Digital tax applications have the potential to strengthen tax administration and enhance domestic revenue mobilization; such mobilization has been a long-standing challenge (particularly in developing countries) for scaling up priority social and infrastructure spending. Over the past few decades, tax administrations have adopted new technologies to enhance the effectiveness of tax collection, yet they have also introduced new challenges[18].

The Nigerian Investment Promotion Commission forecasted in 2018 that Nigeria's digital economy would generate $88 billion and create three million new jobs by the end of 2021. However, unless Nigeria amends its laws to adapt to changing technological advancements, it may be unable to tax the massive income generated by the digital economy[19]. Indeed, the Nigerian Tax Administration has been supportive of the Nigerian tax system, but more is required as cases of evasion rise. To address some of the country's current tax issues, the system must be digitalized[21].

Recent literature offers rich studies that quantifies the revenue yields from the adoption of digital tax applications in tax administration while pointing to the importance of developing and enabling the fundamentals of tax in the country[22]. Digital tax applications and services are foundational to tax administration; their adoption varies based on levels of development and the types of taxes administered. Modern tax administrations rely heavily on digital support for nearly all aspects of their core operations, both service and enforcement, ranging from registration, filing, and payment to audit, appeals, enforced collection, and an array of other important functions. Digital tax applications facilitate taxpayers' compliance, such as e-filing, have become almost ubiquitous in

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advanced economies and are more frequently employed for value-added tax (VAT) and corporate income tax (CIT) than for personal income tax (PIT)[19].

In addition, there is a significant difference in online filing rates between low-income developing countries (LIDCs) and AEs across all types of taxes. For example, only 47.2 percent of VAT was filed online in LIDCs, whereas 92.7 percent of VAT was filed online in AEs. Tax administrations are adopting Digital tax applications in many other areas, beyond core operations, including e-invoicing and in the use of EFDs. These options improve services and provide taxpayers and tax administrations with higher levels of certainty, which is often important for their planning purposes.

In terms of prevalence, e-invoicing is more commonly used in emerging market economies (EMEs), while EFDs are used more uniformly across income groups. This is due to the structure of the economy (informality), limited overall development of digitalization (public and private sector, including among taxpayers), and limited development of financial markets in EMEs and LIDCs, prompting them to resort to using these technologies as alternative tools of revenue administration (RA). Other Digital tax applications being deployed to boost revenue administration's efficiency include digital identification, mobile applications, artificial intelligence, and other related tools[19].

In specific contexts, Digital tax applications have had a positive impact on tax administration, and improving tax revenue generation. Several causal estimates in the literature reveal the effect of digital services and technologies (such as e-registration, e-filing, e-payment, e-invoicing, and EFDs) on revenue mobilization; however, as almost all existing studies use microdata from specific countries, their external validity is limited. The introduction of e-filing and e-payment

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increases the share of on-time tax payments, reduces compliance costs, and results in higher reported net tax liability for taxpayers with a higher risk of evasion. However, the result based on data from Tajikistan suggests that the overall impact on reported net tax payment is uncertain, as previously compliant businesses tend to underreport their tax liability after the introduction of e-filing[24]. In contrast, e-filing can lead to a significant increase in reported taxable income up to 4 percent of GDP. The impact of e-filing is higher on CIT than on PIT; however, they also demonstrated that the increase in reported taxable income does not translate into more tax revenue, due to lack of enforcement capacity[25].

The introduction of mandatory e-invoicing and/or EFD leads to increases in declared revenue and costs, with an increase in net tax liability. In particular, mandatory use of e-invoicing and EFDs can boost revenue by almost 1 percent of GDP[26] Be. The improvement in tax compliance from introducing EFD is significantly larger for VAT than for CIT[26]. The self-enforcing mechanism inherent in VAT may be the reason for the higher impact. E-registration reduces both taxpayers' and tax administrations' costs. Empirical results also show that it is effective in mobilizing revenue from property taxes. The positive relationship is also present in analysis from cross-country data, confirming that Digital tax applications and services are often associated with improvements in tax revenue collection. The adoption of Digital tax applications and services in tax administration (as measured by ISORA and TADAT) is slow moving and correlated with country-level characteristics[27].

Digital tax application can identify the level of evasion while also scrutinizing and strengthening the system's auditing capacity. To some extent, the system would address the level of corruption in the tax system and ensure no double taxation. Many tax administrations are embracing digitization by automating fundamental functions such as electronic registration and filing.

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However, more emerging economies, particularly Nigeria, are allowing real-time transaction data to flow directly into tax administration (e.g., through a cash register function or an online-accounting system which is linked directly to the tax administration data collection system). The general rule under Nigerian tax laws for taxing the income of foreign enterprises in a given jurisdiction is to establish that the entity has a taxable presence or permanent establishment (PE) in Nigeria. Digital transactions necessitate little or no physical presence of the transacting parties, the income derived from the transaction may not be captured in the jurisdiction where the income is derived. While the Nigerian tax authorities are working to ensure that the tax collection process is digitalized, it is unfortunate that this digitalization has not been extended to include effective monitoring and collection of taxes from digital transactions.

2.1.3 Tax Revenue Generation

Tax revenue is one of the critical sources of revenue for the government and for financing its expenditures on programs, infrastructure development spending, etc. Almost all countries depend on tax revenue for financing and sustaining government expenditures as outlined in the annual budget[29]. Tax revenue collection in Nigeria refers to the process by which the government mobilizes funds through the imposition of levies and duties on individuals and businesses. It encompasses all forms of taxes, including direct and indirect taxes such as personal income tax, corporate tax, petroleum profit tax, and value-added tax. Tax revenue is a critical component of the Nigerian government's financial system, as it provides a stable and predictable source of income to fund national development. Tax revenue collection as a mechanism for compulsory contributions from citizens to the state for public use[30]. In this context, taxation is not merely a fiscal tool but also a means of state-building and economic coordination. The existing system of tax administration is responsible for the efficiency and effectiveness in revenue generation within

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the system.

The government also earns income from other sources like levies charged on the activities and development of individuals and corporations, properties, fares and imports, non-assessable sources such as benefits claimed by government- owned corporations, remuneration from the national bank and capital receipts as external loans and debts from global monetary institutions[31]. Total tax revenue as a percent of GDP indicates the expectation of the output of a country and the tax the government collects from it. It can serve as one indicator of the government's control over the resources of the economy. The value of tax burden is derived from the total tax revenues received divided by the GDP. This indicator relates to the entire government (all levels of government) and is captured in millions of dollars and as a percentage of GDP.

In Nigeria, tax revenue generation is a complex concept that reflects the characteristics of a developing economy that is attempting to achieve balanced growth[29]. Given its rich natural resources and large populace, Nigeria's tax system plays a crucial role in funding government activities, social services, and infrastructure development. However, tax revenue generation in Nigeria remains consistently difficult due to a constrained tax base, over-dependence on oil revenue, and widespread informal economic activities[32]. The available literature on the taxation of Nigeria seems to cover diverse approaches, numerous definitions, and various frameworks that explain the dynamics of tax revenue generation to depict the changing system that is shaping the economy's development paradigm.

One major advantage of effective tax revenue collection is the ability to fund government operations and infrastructure development. The Nigerian government's capacity to invest in public goods such as education, healthcare, and transportation is directly influenced by the robustness of

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its tax collection framework[32]. Previous research shows a statistically significant relationship between increased tax revenue and improvements in gross capital formation. Taxation fosters accountability and transparency, noting that when governments rely less on external borrowing or oil revenues and more on internally generated taxes, they become more responsive to citizen demands[33].

Tax revenue is also vital for reducing Nigeria's dependence on oil, which has historically exposed the country to volatility in global markets. The diversification of government revenue through taxation helps create a buffer against oil price shocks[34]. The Nigerian Finance Acts of 2019 through 2023 introduced several reforms, including the expansion of VAT coverage and the taxation of the digital economy. These reforms aimed to widen the tax base and enhance compliance. These reforms have led to a measurable increase in tax collection, especially from non-traditional sources such as online businesses and multinational digital service providers. Moreover, taxation serves as a mechanism for wealth redistribution[35]. A progressive tax system can reduce economic inequality by enabling the transfer of resources from higher-income individuals to social welfare programs targeted at the poor[35]. Taxation is thus not only a revenue tool but also a social instrument for promoting justice and equity.

Despite its importance, tax revenue collection in Nigeria faces numerous challenges. One significant issue is widespread tax evasion and avoidance. Billions of naira are lost annually due to weak enforcement mechanisms, poor oversight, and corruption within tax institutions[36]. Their study identifies systemic inefficiencies in the Federal Inland Revenue Service and state tax boards as major barriers to effective administration. Furthermore, the informal sector's role in reducing tax compliance. With over 60% of Nigeria's economy operating informally, many businesses remain undocumented and thus outside the tax net. This undermines efforts to broaden the base

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and equitably distribute tax obligations[37].

Electronic tax filing systems have been rolled out, but their application remains limited due to poor digital infrastructure, especially in rural areas, and low levels of public awareness[38]. As a result, many taxpayers continue to rely on time-consuming manual practices that are exposed to corruption. Administrative corruption further complicates the problem. The level of corruption among tax authorities and firms, leading to under-declaration and other fraudulent acts[39]. This corruption, moreover, erodes public trust in the tax system and results in noncompliance.

Public distrust is compounded by the lack of open government accountability. Many Nigerians are reluctant to pay taxes because they do not see comparable rises in public services[40]. Their study discovers that where tax revenues are embezzled or stolen, compliance is significantly worse. Public confidence must be regained not only through effective service delivery but also through transparent reporting on tax revenue expenditure[41]. Participatory budgeting and citizen engagement in budget matters are proposed as potential solutions. The Nigerian government has taken a series of steps to this end. The Joint Tax Board and the Federal Inland Revenue Service have introduced initiatives like the Tax Identification Number (TIN) scheme, which integrates data of taxpayers and removes duplication. The Voluntary Assets and Income Declaration Scheme (VAIDS) 2017 also invited taxpayers to come and report their hitherto undeclared assets without prosecution. While initial responses were tepid, they paved the way for more streamlined tax administration[35].

2.1.4 Manual Tax Process

Nigeria's taxation system has evolved over the years, balancing between historical taxes and modernized taxes. One distinct feature of Nigeria, especially amongst the rural populace and

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smaller enterprises, is the systematic tax approach. The systematic tax approach relies on older, more conventional methods of tax collection like face-to-face submissions of tax returns, personal inspections, and written bookkeeping. Even though the country is working towards digital tax collection systems, the systematic tax approach is particularly true for the local governments and small businesses in Nigeria. This literature review seeks to examine the concept of systematic taxes in Nigeria along with its definitions, issues, and the middle phase of its evolution towards a modern efficient tax administration system.

Taxation can be described as a charge of monetary payment that the government forces on a person, business, or other entities. Taxes help a great deal in meeting financial expenditures especially in public goods like construction, education and healthcare. Taxes are also very important for the government for revenue generation. Taxation in the FIRS suggests the government is dependent on taxes to create funds[42]. The Nigerian economy has faced a problem with tax administration because of the low level of technology in the lower form of local government. These bodies had very slow processes of registering tax payers and identifying payments that had been completed and were filled with mistakes. There were a number of tax return forms and most of the collection was manual whereby businesses had to turn up for the collection in person.

The tax processes based on a system need to be completed automatically. Manually completing tax processes has been characterized as outdated, inefficient, and insecure as they are prone to errors and fraud. The Nigerian National Tax Policy published in 2017 states that a substantial part of the tax system in Nigeria is operated manually. This includes tax officers collecting and verifying tax returns directly from business premises. Due to underdeveloped infrastructure, this practice becomes extremely inefficient when conducted in those regions, which leads to a reduced

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level of compliance in general. These records are very difficult to track or audit in a logical fashion. Because of this, the Nigerian government has taken manual controls of the tax system in the country to streamline its operations and prepare for an automated tax system[43].

One major issue revolving around the manual tax system in Nigeria is the scanty data and record management. Information relating to taxpayers is saved in folders, which could be easily misplaced or destroyed. Heavy workloads of taxpayer data in the manual tax system cannot be streamlined, and this leads to inefficiencies[43]. The manual process also depends on tax officers for reliability on tax liability calculations, leading to inconsistencies due to human mistakes. In some instances, inaccurate record-keeping has enabled tax avoidance to occur, where individuals and companies take advantage of insufficient records to stop themselves from paying taxes.

The manual tax system fosters avenues for malpractices. Because of the need for face-to-face documentation and physical inspections, tax authorities are more susceptible to bribery and other unethical dealings. In Nigeria, the manual tax system is done with no transparency and responsibility in mind, and this has resulted in rampant tax administration corruption[44]. Financially, both individuals and businesses can influence tax affairs in their favor, for example, by evading taxes or minimizing their liabilities. All these issues combined, along with the absence of proper oversight, lead to diminished tax revenue and erode the tax system in its entirety. Even with the difficulties presented, the hand-written tax processes still offer some benefits, particularly in rural areas where access to technology is non-existent. In rural communities and informal sectors, manual tax collection methods are still championed as a majority of people and businesses lack formal registers in databases or online tax systems[42]. In these situations, manual tax processes serve as a means that is both welcoming and easy to use for clients and businesses in meeting their tax compliance requirements.

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The manual method allows for taxpayers and tax authorities to interact which can foster trust and ensure businesses comprehend their responsibilities. In addition, the legible manual tax processes increase compliance to the set tax obligations because in such regions, where the presence of fear of penalties or audit is a great incentive to deter tax evasion. The heavy reliance on oil revenue is a critical challenge in Nigeria's tax administration. The oil-based economy in Nigeria has resulted in a lack of focus on the informal non-oil sector which is largely unexploited for taxation purposes. As reported by the Bureau of Statistics in 2020, nearly 70 percent of the country's active population works in the informal sector and a large number are non-registered taxpayers. The traditional tax system has been conceived as a means to capture informal workers who do not have access to technology. Yet, due to the lack of formal enrollment and the limited scope of manual registration, unchecked tax evasions abound among the workers[44]. Even after attempts to update the tax system, some states and local governments continue relying on outdated practices. FIRS reports that the tax administration system within the local government continues to rely on outdated systems, such as in-person visits by tax officers to collect dues[42]. This has caused a lot of inefficiency where businesses have to navigate through a lot of waiting and difficulty to fulfill their tax responsibilities. The system is also fraught with mistakes and inconsistencies, where errors like over-assessing tax dues, under-assessing, or duplicate payments can easily be made. These problems have brought about inadequate compliance with taxes and a loss of trust in the system.

The uninterrupted change from a manual to an automated tax system is necessary for enhancing the collection and administration of taxes in Nigeria. The use of technology in the collection of taxes can help in its collection, minimizes mistakes, and enhance transparency. In their 2019 report, the Nigerian Communications Commission stated that the digitalisation of Nigeria's tax administration is meant to improve government revenue collection, mitigate fraudulent activities,

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and improve operational efficiency. The launch of ITAS and VAIDS has enabled tax payers to file their returns and payments and monitor their tax obligations through the internet. These new systems of taxation came with difficulties that had to be resolved. Changing from mechanical to automatic taxation systems demand a great deal of infrastructure, training, and impression upon the public. The African Development Bank stated that the absence of stable internet access in remote regions makes people less open to digital taxation[45]. In addition to this, the implementation of new technology is often negatively regarded by those used to the older, manual systems. In Nigeria, the government needs to invest in education programs related to taxation so that the citizens can adapt to these new systems smoothly.

The effective enforcement of tax legislation is another problem in Nigeria's tax system. Enforcement remains one of the elements of tax administration even with the adoption of automated systems. In many cases, tax officers still perform audits and inspections manually. A considerable number of businesses are able to escape paying taxes without being detected; thus, it can be concluded that enforcement is still weak in Nigeria[46]. Though digital systems may enhance tax collection efficiency, they will not work without strong enforcement of central compliance policies that include regular audits, imposing fines for non-compliance, and detailed reporting irrespective of the hierarchical structure. Apart from the digital systems, the Nigerian government is also making other efforts in improving the country's tax system for more effective governance. The Tax Reform Bill of 2019 revises at simplifying tax administration, removing non-essential processes, as well as enhancing the experiences of interacting with the Nigerian tax system. These reforms bolster the ease of payment by moving away from manual processes, especially for the self-employed or small businesses. The bill seeks to strengthen tax collection efficiency through

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restructuring taxation's administrative framework and enhancing accountability and transparency among tax officials[46].

The public education and awareness are important factors for the shift from a manual to a digital tax system. In the views of this, taxpayers must understand the procedures involved in filing returns and making payments as well as the advantages associated with digital tax systems[47]. Awareness campaigns, as well as training sessions, can aid taxpayers in understanding simplified tax processes and motivate them to use the digital platforms. With increased digitalization of the tax system, it becomes imperative to equip businesses and individuals with the requisite knowledge and skills to handle the system.

From the perspective of Nigeria's economic advancement, the transition from manual tax collection to automation is essential. World Bank observed that efficient tax systems are vital for financing government spending as well as economic sustainability[48]. Inefficiencies and challenges that came with the manual tax process engrossed Nigeria's revenue generation from taxes. Embracing technology to execute sweeping reforms will enhance Nigeria's tax collection processes, minimize corruption, and bolster public confidence in taxation. These objectives are possible through the ongoing shift to a modern, digital tax system.

2.1.4.1 Challenges of Manual Tax System in Nigeria

The Nigeria tax system is beset by a myriad of challenges, some of which are highlighted below;

1. Non-availability of Tax Statistics

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Taxation has been the oldest governmental activity since the country's unification is 1914, so one would expect tax statistics to be readily available. This expectation, however, is misplaced. With the exception of the states of Delta, Lagos, Kaduna and Katsina and the Nigeria Customs Services, other agencies of the states and relevant federal tax offices have serious failures in data management. Moreover, there are no efforts to have the limited data that are available collated or analyzed on a routine basis, not to mention, having it stored, or made more easily assessable or retrievable. This situation does not provide much input to policy process[49].

2. Inability to Prioritize Tax Effort

The political economy of revenue allocation in Nigeria does not prioritize tax efforts. It is, instead, anchored on such factors as equality of states (40 percent), population (30percent) landmass and terrain (10percent), social development needs (10 percent), and internal revenue effort (10percent). The approach, discourages a proactive revenue drive, particularly for internally generated revenue, makes all government tiers heavily reliant on unstable oil revenues which are affected by the volatility of the international oil markets. Aside from the national syndrome of „cake sharing", the instability and volatility of oil revenue should have created an opportunity for improved tax efforts within the provisions on taxation ratified in the 1999 constitution. Although some state governments have initiated measured to enhance their tax generation attempts, the outcome has not reflected any level of serious effort.

3. Poor Tax Administration

Tax administration and individual agencies suffer from limitations in manpower, money, tools and machinery to meet to meet the ever-increasing challenges and difficulties. In fact, the negative attitude of most tax collectors toward taxpayers can be linked to poor remuneration and

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motivation[50]. The predominance of support staff in a professionally inclined agency like the FIRS does not augur well for the country. The situation at the local government level is more precarious. Anecdotal evidence shows that staffs are not provided with regular training to keep them abreast of developments in tax related matters. This makes the administration of taxes in terms of total coverage and accurate assessment very weak[49].

4. Multiplicity of Tax

A major problem facing the country is the multiplicity of taxes. Individuals and corporate bodies complain about the ripple effects associated with the duplication of tax, this problem arose from the states‟ complaints about the mismatch between their fiscal responsibilities and fiscal powers or jurisdiction. To compensate, some states took the initiative of levying certain taxes, which has led to arbitrariness, harassment and even closure of businesses. To rectify this embarrassing situation, the taxes and Levies Act of 1998 was enacted. Lagos state is a good example of efforts to offset the inequitable distribution of VAT proceeds: it imposed certain taxes and proposed a re-introduction of the sales tax. To control multiple taxation, the join tax board started to publish a list of approved taxes and levies and to declare another unspecified tax illegal. This has created a degree of harmony, and checked the hitherto rampant taxation that had made the business environment in Nigeria so harsh[49].

5. Regulatory Challenges

Political risk and exchange controls pose by far one of the greatest business and regulatory challenges for companies during business in Nigeria. Also, company law, protection of intellectual

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property are challenging areas for companies. Protecting your investment and workforce, being able to extract profits and freely move the workface are often taken for granted when investing in first world countries[50].

Not so in Africa and Nigeria in particular, where the possibility of forfeiture of the business, or ability to remit profits could Payment of tax electronically could be made in either of these ways:

Directly through Bank Account;

i. Tax payer pays tax into a collecting bank by cash/cheque.

ii. Tax payer Logs-in to a bank website using his tax user name and password and then enters tax amount to be paid and authorize the payment using transaction password.

iii. An e-receipt would be made available on-line real-time on the screen with TIN, TRC and unique transaction code for reference.

Through ATM/Debit Card/Credit Card:

i. Tax payer logs onto the relevant tax authority/ revenue collecting agency website

ii. Choose tax/levy type and fill in the required form and click pay using ATM/Debit Card/Credit Card

iii. Tax payer inputs ATM/Debit/Credit Card number and authorizes the payment using his PIN

iv. Payment is affected and a printable e-receipt would be made available on-line real-time on the screen with TIN, TRC and unique transaction code.

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2.1.5 Integrated Tax Administration System (ITAS)

In an effort to enhance tax administration in Nigeria, the Federal Inland Revenue Service (FIRS) implemented Integrated Tax Administration System (ITAS) in 2013. This shifted the tax compliance process from the cumbersome manual system to a more efficient one[51]. The full migration to an electronic system began in 2015 when e-Services were introduced by the Federal Inland Revenue Service (FIRS) in collaboration with Nigeria Inter-Bank Settlement System (NIBSS). These included: e-Registration, e-Payment, e-Filing, e-Receipt, e-Stamp Duty, and e-Tax Clearance Certificate (e-TCC)[52]. Using e-Filing, taxpayers can now submit their tax returns electronically through the FIRS's ITAS.

All taxes and levies paid to the Federal Government can be done via the Nigeria Inter-Bank Settlement System (NIBSS), Remita, or Interswitch, greatly simplifying the process. With regard to registration, new taxpayers can now be enrolled through e-Registration with the Inland or Internal Revenue Service for different taxes. E-Stamp duty is created if there is a requirement to pay stamp duties on qualifying documents. E-receipt also serves the purpose of issuing and validating e-receipts for payment of taxation through the new e-payment system[51]. The E-Tax Clearance Certificate (e-TCC) is an application system through which taxpayers can apply for, receive and verify the authenticity of their electronic tax clearance certificates[51]. The Integrated Tax Administration System, known as ITAS, serves as a tax administration project in Nigeria with the goal of automating and digitizing all tax administrative operations. This includes the filing and payment of tax returns online which is expected from businesses to adopt on their own volition since the system was implemented in 2017[51].

As governments are beset with the pressures of globalization and demands for a more efficient tax

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service, the adoption of ITAS has been put in place to align the traditional tax process with modern technological advancements. ITAS incorporates taxpayer registration, tax filing, compliance monitoring, and even audits into a single comprehensive system. Its purposes are to improve operational efficiency, enhance revenue collection, curb fraudulent activities, and improve equity in the tax system[53]. ITAS systems are growing in popularity due to the emerging challenges and requirements of digital economies. These systems enable governments to effectively manage taxation, enhance compliance, and simplify tax administration. ITAS ensures tax authorities discharge their obligations with greater efficiency and on a real-time basis, attending to challenges such as tax evasion and misallocation of resources. This integrated system aids governments in improving their decision-making capabilities, implementing policies based on fact and data, and ensuring fairness in taxation[54]. It is uncertain how properly this system will perform and how much taxpayers would accept it. This anticipation stems from Nigeria's historically low reception of finance-related computerized technology. For example, mobile money which the Central Bank introduced in 2011 has dismally only been adopted by 13% of the population. Even less than 10% of Nigerians actively use mobile phones to access bank accounts, let alone, use them to pay bills online through automated means.

The combination of key tax functions into a single system is one of the characteristics of ITAS. An important advantage is taxpayer registration, which has customarily been done manually. Registration of taxpayers is also burdensome and costly in a way that makes compliance difficult. Under ITAS, registration is automated providing authorities with real-time accurate data, which minimizes errors, tracks taxpayer activity, and improves auditing[54]. Another important aspect is online filing. ITAS enables taxpayers to electronically submit their returns, doing away with the need for paper docs, and cutting administrative costs. This improves the accuracy and timeliness

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of filing. Compliance with taxes increased significantly in countries that implemented online filing owing to the fact that the filing process was made easier[55].

Unlike conventional systems that could take weeks to process a single return, ITAS permits the instantaneous processing of returns, tax assessments, and refunds. This enhancement in efficiency captures gaps in processes or suspicious activities in the processing chain[56]. There is increased control over tax collection and evasion with real-time data processing for tax authorities. ITAS serves also to derive tax trends and improve compliance by disseminating analytics which assists tax authorities. Through the analysis of vast amounts of data, authorities can identify irregularities, uncover non-compliance patterns, and optimize resource allocation. A report has indicated the strategic planning and targeted enforcement ITAS empowers has been supplemented through analytics[56].

ITAS systems recommend filing of late returns as well as income flows and notify the taxpayers automatically when enforcement actions are needed. Manual oversight is less needed which speeds up compliance enforcement and improves tax administration overall[53]. The functionality improvement is one of the most important benefits of ITAS. In older systems of taxation, filing, auditing and tax payment processes took several weeks to complete, especially in large populated countries. ITAS systems speed up tax administration efficiency by automating and streamlining these processes[55]. The ITAS's real-time interface eliminates manual work for tax authorities related to unpaid taxes, fraud, and late payment notifications as these issues could be resolved instantly.

Transparency is equally strengthened with ITAS alongside efficiency. With traditional tax systems which were document-based, accessing return status and identifying the actions taken during the

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assessment was virtually impossible. ITAS offers real and clear access of tax information to both authorities and taxpayers. As stated in a report, the digitization of tax systems builds trust in the public due to transparency in assessment and collection[54]. There is no doubt silent supervision of taxpayers ensures accountability and efficiency in tax collection.

In addition, the taxpayer's self-monitoring capability helps ensures adherence to tax compliance regulations. ITAS tax platforms submit interfaces that are simple to use help users accurately capture and submit their returns, thus assisting in the efficient collection of revenue[56]. A severe hurdle is the digital divide, or gap in access to information technologies. Most developing countries have the internet as well as basic literacy, but the same cannot be said of their rural or low-income areas. The World Bank notes this problem can deprive entire populations of the benefits of ITAS, which weakens the effectiveness of the system[57]. Another problem is the adaptation of old systems to new ITAS technologies. For countries with older tax systems, integration into one consolidated digital platform is usually complicated, expensive, and sluggish. Many countries face trouble integrating new ITAS software with existing infrastructure, which will cause delays to the implementation of the system[54].

Furthermore, the implementation of ITAS systems incurs a considerable expense to the organization's infrastructure and requires extensive employee training. The IMF noted that governments must be able to top-up their budgets to afford the ITAS system technologies and their support training[58]. An ITAS system without the proper supported resources may be rendered beneficial, but inefficient or ineffective system performance will prevail. Taxpayer data analysis has recently been aligned with AI (artificial intelligence) and ML (machine learning) technologies, paving the way to more powerful ITAS systems. A great chunk of enforcement enhancement is dedicated to identifying and analyzing tax evasion, and these technologies boost productivity like

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never before. For instance, AI tools can flag unusual tax filing patterns suggestive of identity theft and fraud[59]. Dominance of blockchain technology in ITAS is another-almost forgotten-trend. There is the promise that blockchain will regain lost trust in data security and transparency in tax systems. Enshrining tax records in a decentralized, immutable, and transparent repository where all transactions are securely logged makes it nearly impossible to tamper with tax logs, further lowering tax admin fraud and corruption[58].

2.1.5.1 Key Features of Integrated Tax Administration System (ITAS)

Some of the features of the e-filing system include the following:

Online Submission of Tax Returns: Through the portal, taxpayers can submit their tax returns for various taxes such as Petroleum Profits Tax (PPT), Companies Revenue Tax (CIT), Value Added Tax (VAT), and Capital Gains Tax (CGT). Once registered, a taxpayer's e-filing account will be created based on the type of taxes that company is required to pay, either for its own account or as the government's agent. A taxpayer, on the other hand, will only be able to file returns for the taxes for which they have registered.

Electronic Tax Clearance Certificate (e-TCC) Processing: A Tax Clearance Certificate that is generated by the system is available for online application by taxpayers. A system generated TCC will be just as tenable as the hard copy, even if hard copies will still be available for collection. In any case, ITAS enables TCC validation so that a TCC can be checked online by outside parties using the T3CC number. In cases when a dispute has not yet been settled, restricted TCCs can also be created online and used temporarily. This will guarantee that the taxpayer does not suffer unnecessarily while the tax dispute is being resolved, at which point a complete TCC can be acquired[60].

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Validation of Tax Identification Number (TIN): On ITAS, TINs of taxpayers can be verified by other parties. The TIN of a company's vendors can be verified using this tool, among other things, for Withholding Tax (WHT) purposes.

Online Correspondence with FIRS: Taxpayers can communicate with FIRS via the "message Centre" feature on the portal. FIRS can also issue assessments which taxpayers can object to using this feature as well. The tax account manager in the FIRS local tax office will be responsible for correspondence with the taxpayer.

Automatic Imposition of Late Filing Penalties and Interests: The system has been designed to automatically compute and impose interest and penalty for late submission of tax returns or late payment of taxes[60].

Automatic Allocation of WHT Credit to Taxpayers: It is intended to automatically repay taxpayers for WHT deductions they have incurred that have been deposited to FIRS by their client, even though this feature is not yet operational.

Redesigned Tax Forms and Unique Filing Numbers: Various tax returns forms have been redesigned to adapt to the e-filing system. Different tax types have unique accounts numbers. Also, each submitted return is assigned a unique document number with which tax payments can be made.

Electronic Tax Payment: Beginning in March 2015, taxpayers can pay their taxes online using the corporate bank accounts they have established. This application, which was created in collaboration with the Nigeria Inter-Bank Settlement System (NIBBS), is housed on the internet-banking platform of the relevant commercial bank[60].

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2.1.5.2 Objectives of Integrated Tax Administration System

As widely circulated through by FIRS through its press releases in 2012, e-taxation was introduced to replace the manual tax system by simplifying tax compliance, easy access to tax services and improved tax payment process. In summary e-taxation was implemented to achieve the following objectives;

i. To provide a solution to the problems of the traditional manual system of taxation in Nigeria

ii. To provide streamlined, efficient processes that make it easier for taxpayers and other stakeholders to interact with the service and in turn make the FIRS more responsive to taxpayers' needs.

iii. To improve voluntary tax compliance and create a more welcoming environment for taxpayers in Nigeria.

iv. To ensure better transparency in the actions and practice of tax authorities for the sake of accountability and good stewardship

v. To re-engineer tax administration service delivery, eliminate gaps and redundancies in the current administrative systems and increasing contribution to national development

vi. To minimize the general cost of administration amid higher tax returns.

vii. To provide consistent quality service to all taxpayers across all FIRS offices across in the nation

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viii. To provide a comprehensive repository of taxpayer's information that makes it easier for FIRS to support and monitor the taxpayer base throughout the lifecycle of each taxpayer.

ix. To reduce tax erosion

2.1.5.3 Benefits of Integrated Tax Administration System in Nigeria

The paradigm shift from manual system to e-taxation has been described as a great achievement by the FIRS as it is meant to be of immense benefit to both the taxpayers and tax administrators. Even though the e-tax system is yet to be fully implemented, it is already being used by taxpayers especially in Lagos and Abuja only and is already showing promising results. It has provided solutions to some of the challenges involved in manual tax system as noted in FIRS publication of 2015[61]. These include;

i. The mode of tax payment becomes easier under the new e-tax system[61]. The filing of returns and payment of taxes can be done at the comfort of taxpayer's home thereby reducing the timing of tax processes. Communication between the taxpayer and tax authorities has become easier and is now online. Tax compliance is now highly encouraged as payment of taxes becomes easier.

ii. With the e-tax system in place, the issue of poor tax administration now becomes a thing of the past. Large manpower requirements are not needed again, the same applies in reduction in quantity of paper used in tax administration. With the online system communication became easier and tax administrators can now focus on other areas that will contribute positively to the economy.

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iii. The change to the e-tax system has enhanced storage and retrieval of tax information. This is because data base management system for taxpayers are enhanced making it easier for the government to improve the quality and quantity of taxpayers' information. It can also be inferred that information retrieved from the database is accurate, reliable, and ensures accountability and stewardship on the part of tax administrators. The rate of corruption in the system is curbed and has assisted in building taxpayer's trust in the system[61].

iv. The e-tax system offers a cheaper and easier way of administering tax collection. In this regard, the cost of collecting tax and overhead cost in relation to tax collection is cheaper. This is in line with the principles of good tax system that states that the cost of collecting tax should not be less than the tax collected. On the part of taxpayer, he spends less in filling his returns and remitting tax contrary to manual system where the taxpayer incurs some costs in course of paying tax.

v. The new system exposes taxpayers and administrators to the new advanced technology thereby improving their knowledge and skill in tax matters. The manual system is engulfed with human errors and ignorance of tax policies, but e-tax system has come to bridge that gap. It has improved the knowledge of taxpayers and conflicts with tax administrators are easily resolved through effective communication. Tax officers also gain better skill, efficiency and effectiveness in handling tax matters and are exposed to advanced technology making their work easier.

vi. E-tax system has increased tax compliance and has reduced the incidence of tax evasion and avoidance which has been a serious problem of tax administration in Nigeria[60]. The new integrated tax system gives taxpayers the convenience of paying taxes and

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incorporates transparency and efficiency in the system. It optimises tax revenue collection and encourages voluntary compliance by taxpayers. Due to the accountability encouraged by the system, the taxpayer's feel secure that their taxes will count when remitted and that is a great motivation to them. Finally, the system enhances the database for taxpayers which helps in checking for compliance and in turn helps government in capturing more taxes.

2.1.5.4 Challenges of Integrated Tax Administration System and the Way Forward

Although e-tax is meant to be a solution to most of our tax administration problems in Nigeria, like every other system there are challenges attributable to its adoption and implementation[61].

Some of the challenges are:

1. **Trust, Security and Privacy concerns prevail:** Taxpayers are concerned with the use of the data they provide during transactions. There are cases where unauthorized access to taxpayer information as a breach in security and therefore many taxpayers are scared about such information being getting into the wrong hands which might lead to fraud[61]. The activities of hackers who disrupt websites also affect the system.

2. **High Level of Illiteracy:** Nigeria unfortunately has a low population of literate people and an even lower percentage of people who are computer literate. As a result of this, most tax payers who are not technologically exposed shy away from the system and stick to the more primitive methods they are already used to. The brave ones who are willing to try often fall prey to fraudsters and hackers. The knowledge of e-tax in businesses has become a challenge worldwide.

3. **General Resistance to Change:** This one of the key issues with implementing the system. Most people have their mind set on not responding to new system even before they know what it is about

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simply because they are already comfortable with the normal way things are done and would not want to leave their comfort zone. Even though the manual tax system has proved tedious and difficult in the past, taxpayers still showed resistance to change with the advent of e-tax. The FIRS had to organize a number of forums and public enlightenments for taxpayers that provided detailed explanation about e-tax and the benefits it proposes.

4. **Inaccessibility of the Internet:** Not all taxpayers have access to the web to gain access to the portal in the first place. Though this is a temporal issue as the evolution of the web continues, it is still a problem to the users of the portal[61]. Also, the unsteady and unreliable state of the internet connection by internet service providers is another challenge. When the internet connection is poor, it can lead to frustration on the part of the taxpayer who would have to repeat the process when there is a break in connection. Until there is steady and secure internet connection, this would continue to pose as a challenge to the electronic tax system.

5. **Unawareness of the System:** It is said that knowledge is key and ignorance is a fool‘s paradise. Many Nigerians remain blissfully unaware of the mere possibility of electronic taxation talk less of participating in the system. Most tax payers in less civilized states in the country are clueless as to the introduction of e-tax which accounts for the slow and problematic adoption of the system. Unless the revenue authorities take it upon themselves to create awareness amongst taxpayers as to the new system throughout the country, the perceived and highly anticipated increase in tax returns and government revenue might never be materialized. Also, Nigerians deserve a chance and change and improved technology and should therefore not be cheated out of this opportunity at it by ignorance[61].

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2.1.6 Standard Integrated Government Tax Administration System

As part of broader tax reforms aimed at improving tax revenue collection, SIGTAS is used in both developing and developed countries. The system is useful in automating the tax process to minimize human error and increase tax compliance. With SIGTAS systems, governments can better track taxpayer activities, manage tax assessments, and perform audits, which enhances revenue collection and public financial management[63]. Tax administrations can monitor and control tax payments in real time using SIGTAS, and are provided real-time data to monitor taxpayer activities. The system improves tax compliance by reducing tax evasion and fraud and increasing transparency among taxpayers.

As defined, SIGTAS signifies an integrated system for managing tax administration processes within a single piece of software. SIGTAS systems support the registration of taxpayers, filing of returns, and payment of taxes[57]. In most cases, these functions were handled separately in manual systems that are inefficient. With SIGTAS, tax authorities are able to automate these functions which enhances the speed, accuracy, and effectiveness of tax administration. The system allows tax departments to maintain and manage databases of taxpayers, offer electronic filing services for returns, and ensure that taxes are collected on time. An important aspect of SIGTAS is reporting on tax compliance which gives relevant authority insights of compliance with tax obligations. This capability enables informed decisions to be made as far as data driven decisions are concerned.

Implementing SIGTAS comes with several advantages. The system has been shown to alleviate the workload of tax authorities thereby helping them process taxes more efficiently. SIGTAS is associated with improved efficiency in tax administration because it eliminates the tedious and time-consuming manual processes involved in tax collection[58]. With the system in place,

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governments lower indirect costs and resultant administrative expenses. Furthermore, the accuracy and precision of tax assessments is improved, and tax audits are conducted in an expedited manner. In Ghana and Kenya, the implementation of SIGTAS has resulted in enhanced revenue collection, improved compliance and better services to the taxpayers[64].

Another advantage of SIGTAS is how it could help improve taxpayer compliance and responsibility. With SIGTAS, governments are able to monitor tax payments, which makes it easier to ensure that individuals and businesses fulfill their tax obligations[58]. This level of monitoring also discourages tax evasion because taxpayers can file their returns electronically, and it is easy to detect discrepancies or under declaration of income. SIGTAS fundamentally facilitates voluntary compliance by increasing the ease of access of the tax system[65]. Additionally, SIGTAS enhances convenience as taxpayers are able to prepare their taxes online, and this decreases effort and cost associated with manual preparation compared to the traditional procedures. To facilitate the tax audits and enforcement, SIGTAS provides up-to-date information to tax officials. The system enables tax officials to monitor gaps between the reported income of taxpayers and their actual economic undertakings. Tax audits have been made more efficient with SIGTAS, as automated tax audit systems are incorporated into the system, thus, more expeditious identification of tax fraud is possible[66]. Furthermore, SIGTAS improves the capability of tax administrations to supervise the entire tax process from registration to payment and also monitor compliance by the taxpayer over time.

The implementation of SIGTAS does, however, come with a unique set of challenges. The implementation of SIGTAS has its attendant requirements in the form of huge technology investments, infrastructural transformation, and retraining of staff. Nations need to obtain initially

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the requisite technical expertise to roll out the SIGTAS systems effectively[67]. Purchasing suitable hardware and software as well as the development of detailed training courses for tax administration authorities is vital. Moreover, tax administrators are often set in their ways and prefer using traditional tools. Resistance to the change brought by SIGTAS is to be expected from tax officials and from the business community who are generally averse to change and increased surveillance[67].

Besides, efficient use of SIGTAS systems and their operation are based on a stable internet connection. Having even access to the most basic tools like the internet can pose barriers when trying to enforce systems like SIGTAS. Many developing nations are known to suffer under the burden of weak internet services, and this poses a threat to the efficient functioning of SIGTAS systems, which depends upon internet access for its services[68]. In the absence of solid infrastructure for internet services, taxpayers could face hurdles in accessing system, which can create a backlog in return submissions and payments. Due to irregular internet access and technical complications of SIGTAS's initial framework, Nigeria has seen problems with SIGTAS's deployment[69].

The effectiveness of SIGTAS also relies greatly on the system's integrity. In weakly governed or corrupt countries, SISGTAS may stand to be of less value. The World Bank asserts that if the tax administration is corrupt, the mere implementation of SIGTAS will not enhance revenue collection[57]. Even now, tax officers have a way of controlling the system and processes and escaping from the automated control for their selfish interests. This suggests that SIGTAS should be implemented alongside stringent anti-corruption policies, and reforms in the tax administration to mitigate corrupt practices and fully reap the benefits of the system.

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In addition, another concern regarding the implementation of SIGTAS is data security. Considering the confidential nature of taxpayer particulars, registration details, and financial records, it is essential for information technology systems and networks to not be exposed to breach in data security, hacking, or unauthorized omissions. Taxpayer data security as a critical issue for countries embracing SIGTAS, as the adverse effects of breaches would range from financial damage to devastating damage to the public trust in the tax system[70]. Thus, protection of the tax system is deemed vital which means that governments need to enhance the confidence the public has in the system by investing in the senate system.

Another issue with the implementation of SIGTAS is that it is difficult to make the system approachable and practical to use by all categories of taxpayers, particularly in developing countries where a large section of the populace may be unfamiliar with digital tax systems. In the remote areas, where a considerable population of businesses are unable to harness the IT skills and resources, SIGTAS's implementation can widen the digital gap[71]. As a remedy, the authority must shift their focus towards ensuring adequate assistance and training so that all taxpayers can access and interact with the system proficiently.

In addition, even though SIGTAS aims at enhancing efficiency in tax administration, equity issues may arise from its implementation. For instance, some businesses might have the means and ability to easily adapt into the new system, while other businesses may become overwhelmed with the changes. Smaller scale businesses and workers in the informal sector encounter non-compliance to the new digital procedures due to lack of essential technology and financial means to obtain it[71]. This trend can lead to an imbalance in tax compliance among businesses and create unbalanced competition.

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In order to resolve these issues, it is necessary for nations using SIGTAS to take part in capacity-building activities for tax administrators and tax handlers. Building technical skills and educating the public regarding SIGTAS's advantages and use is vital to its achievements[72]. These efforts should go hand in hand with investments in technological backbone, such as other things, high speed internet and modern computers to enable the smooth operation of SIGTAS. Further, it is the responsibility of government to coordinate actively with international organizations and other development partners in regard to the effective enforcement of SIGTAS. The collaboration amongst governments, the business community, and international organizations can bring about the required expertise and funding for SIGTAS implementation[73]. These partnerships can also ensure that the system is designed and implemented for all taxpayers, whether in terms of demographics or geography.

2.1.6.2 **Challenges of the Standard Integrated Government Tax Administration System**

The digitization process of tax collection in Nigeria is important for enhancing access and transparency, improving administrative productivity, and reducing the burden of compliance, among other things[19]. That said, an electronic tax system has its own set of challenges. Some of them are described below:

Lack of Awareness of the Importance of Paying Taxes: The Nigerian tax administration digitization can to some extent be considered as an effort to simplify and modernize the tax processes in the country. In spite of this, a considerable portion of the Nigerian population is unwilling to pay any taxes, and out of those who attempt to evade taxes, very few realize that not paying taxes is a crime that one can go to jail for[19].

Illiteracy: Among developed countries, Nigeria has one of the lowest rates of literacy. The United

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Nations Development programme (UNDP) states that in Nigeria, 69.1% of the adults are literates. That is the proportion of adults in Nigeria who can read and write. Similarly, the National Commission for Mass Education, Adult and Non-Formal Education (NMEC) says that 65% of the adult population in Nigeria is illiterate. This estimate suggests nearly half the population of Nigeria is illiterate. In this case, 35% of the citizens not being able to read and write stands as a significant hindery to digitization of tax administration. The vexing language of the tax laws is a baffling even for the tax authorities and professional, more so for illiterate readers who cannot decipher letters and words.

Linguistic Barriers: Electronic systems of tax registries offer services in English. The language is totally devoid of meaning to illiterates whom these attempts at tax digitization would be useless. Even so, the vast majority who are able to read and write do so comfortably in vernacular languages such as Yoruba, Hausa, and Igbo among others. Therefore, nowadays internet service companies such as Google and BBC provide services in local dialects for the purposes of their audiences.

Internet Fraud: This involves crimes perpetrated against victims through the use of internet services or software that connects to the internet. Advances in technology in the twenty-first century have opened new doors for fraudsters to exploit the benefits of ICT. This does not exclude the so-called yahoo boys in Nigeria. They hijack computers and open websites in order to obtain personal information that they use to perpetrate their illegal schemes. Due to these breaches in cyber security, some people are reluctant to uncover their personal financial information, much less share it with any other person. This is a setback to the digitization of tax administration in Nigeria[19].

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Prospects of the Digitization of the Nigerian Tax Administration

The Federal Inland Revenue Service (FIRS) has progressively worked towards resolving the issues surrounding the governance of tax collection in Nigeria. They began contemplating this issue in 2017. It is not new, especially considering the recent COVID-19 pandemic along several other factors like fiscal strain on the Nigerian economy. These issues intensified emphasis on efficacious digitalization of tax administration in Nigeria, thus serving as a precursor for the proposed regional digital tax center[47].

Challenges faced in the implementation of FIRS's electronic services include the need for physical "action items", the lack of activity in online portals, the insecure login portal which employs an ineffective simplistic password protocol, etc. However, the most fundamental challenge of the system is the absence of thoughtful planning that comprehensively tackles the challenge of navigating this "new territory", particularly in our context. The tax system in Nigeria has some obsolete features that in hindsight, could be greatly enhanced through digitization, highlighting that the issue is not merely modernization but direly needed evolution. That being said, this solution alone will not resolve every concern. A specific approach aimed at resolving existing issues must address the need for tax reform. In addition, it must analyse all dimensions of tax administration which will pertain to the digital aspects of its operations, such as the employees responsible for the tax laws, the tax heads, and those who execute the tax personnel duties, etc. To make a reasonable argument on the prospects of digitization of the Nigerian tax administration, the following outlined approaches need to be streamlined[47].

i. **Simplicity:** These covers making the tax laws and collection procedures as straightforward as they can be. This makes it less likely for a system of tax evasion or avoidance to exist

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by encouraging voluntary compliance such as in the payment processes, legislation defining amount to be paid, etc.

ii. **Compliance Cost:** The lower compliance cost in terms of time and resources spent by the tax administrators on their work.

iii. **Effectiveness:** Tax laws and procedures should be able to address issues and be changeable, for example, laws that revisit the impact of the system on the people's rights. Simply put, tax administration should be structured according to the canons or principles of taxation put forward by Adams Smith in his book The Wealth of Nations. Other factors to be implemented concern the proper application of the effective data analyzing and information management systems, the proper interfacing of tax databases with other databases within the tax administration and information system, tax education, and thorough examination of the problems faced by tax administration.

2.1.7 Tax Pro-max System

Tax Pro Max application had to be submitted in line with the provisions of the Money Act which permits computerization of tax documentation, return, and payment activities by the Federal Inland Revenue Service (FIRS)[74]. Taxpayers, among other activities, can download the tax clearance certificate, manage their capital gain and reduction, control tax withholding deductions, and communicate with the FIRS concerning tax issues. To recover the log in details requisite to fill in returns, corporate taxpayers need to first register at the FIRS portal[75]. Corporate taxpayers or authorized agents may complete the tax return forms online and submit them physically in hard copy in any FIRS office where their documents are uploaded into the system[76].

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As part of its modernization effort in the administration of tax in Nigeria, the Federal Inland Revenue Service FIRS has installed a tax management solution (TaxPro-Max). With TaxPro-Max3, it enables ease of registration, filing and payment of tax, and automatic crediting of withholding tax and other credits to the taxpayer's accounts. From June 7, 2021, TaxPro-Max will serve as the platform for filing tax returns in Naira[76].

TaxPro Max is an emerging tax administration system in Nigeria, thus literature specifically focusing on its impact is sparse. Despite this, there are a few documents that discuss TaxPro Max and its impacts. The features of the system as well as FIRS's intentions to implement it in an attempt to ease tax administration in Nigeria[77]. Audits the advantages of tax automation in Nigeria and cites TaxPro Max as an automated tax administration tool that has the capability of improving tax compliance as well as revenue collection[78]. FIRS's 2020 revenue collection analysis and plans to bolster revenue in 2021 with automation through TaxPro Max also echoes the same sentiments[79]. In light of the aforesaid, this publication serves as notification to all taxpayers that:

i. All returns in Naira must be filed using the TaxPro-Max system to generate the requisite Document Identity Number (DIN);

ii. Payments cannot be made without submitting ITDIN; Taxpayers wishing to submit their tax returns through the non-electronic means must therefore report to the relevant tax office where staff of the FIRS will assist in electronically filing the returns and will generate the DIN.

The document is Manual Declaration and the prescribed form must be brought not less than 14 days before the due date.

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2.1.7.1 Taxation of Digital Transactions in Nigeria

The Finance Act 2019 added a new paragraph (c) to Section 13(2) of the Companies Income Tax Act ("CITA"), subjecting digital and online transactions of non-resident companies to company income tax in Nigeria. Section 13(2)(c) of the CITA specifically states that a non-Nigerian company is deemed to have derived profits from Nigeria and thus taxable in Nigeria if it meets the following conditions:

1. The company sends, receives, or transmits signals, sounds, messages, images, or data of any kind to Nigeria via cable, radio, electromagnetic systems, or any other electronic or wireless apparatus in connection with ANY activity, including the following:

    a) Electronic commerce;

    b) Application store;

    c) High frequency trading;

    d) Electronic data storage;

    e) Online adverts;

    f) Participative network platform;

    g) Online payments.

2. Profit is attributable to such activities; and

3. The company has a significant economic presence in Nigeria.

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These three conditions must be present for the non-resident company to be taxable in Nigeria.

The Federal Inland Revenue Service (FIRS) has put in place several initiatives aimed at transforming the tax administration processes in Nigeria. In this regard, it has introduced a Tax Administration Solution (TaxPro-Max), aimed at easing tax compliance in Nigeria, which it communicated to the general public via a Public Notice (the Public Notice). Tax Pro-Max is an online platform that has been developed to enable seamless tax registration, filing, payment and automatic recognition of tax credits in taxpayers' accounts, amongst other features. It also provides taxpayers with a single view of all transactions with the FIRS. The FIRS stated that the platform is currently running and available to taxpayers. As noted in the Public Notice, FIRS has communicated an effective date of Monday, 7 June 2021. TaxPro-Max is accessible via www.taxpromax.firs.gov.ng and will be the channel for filing Naira-denominated tax returns. With the new process, taxpayers will be required to file their tax returns on TaxPro-Max which enables them to generate a "Document Identity Number (DIN)". The DIN is then used by the taxpayer to make the tax remittances.

To ease the transition from the current practice of filing printed tax returns at FIRS' offices, FIRS has made provision for taxpayers interested in submitting printed tax returns to liaise with their respective tax offices. The tax offices will assist the taxpayers with uploading the tax returns to TaxPro-Max and subsequent generation of the required DIN for tax payment. However, taxpayers must do this at least two (2) weeks before the filing deadline to give reasonable time for upload of the tax returns and generation of the DIN. This initiative is a step in the right direction but the following needs to be addressed:

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i. The platform is not able to provide taxpayers with the access to view and/or download their unutilized withholding tax credit notes

ii. Inability of the platform to process filing of foreign currency-denominated tax returns. While section 55(4) of the Companies Income Tax Act and section 10(3) of the Value Added Tax Act requires submission of tax returns in foreign currency, taxpayers will need to continue the current practice of filing such tax returns manually pending enhancement of TaxPro-Max

iii. Inability of the platform to support the filing of self-charged value-added tax (VAT) returns. Taxpayers intending to file VAT returns on transactions with non-resident suppliers and entities below the VAT registration threshold would have to resort to manual filing pending enhancement of the platform

iv. Incorrect calculation of VAT penalty from the 21st day of the month contrary to FIRS' COVID-19 business continuity palliative which extended VAT filing till the last working day of each month.

v. The "TaxPro Max" is not yet configured for the filing of companies' income tax returns for Insurance Companies and Upstream Oil & Gas Companies.

vi. Some of the returns filing processes are repetitive and can be further compressed

vii. There is no provision for correction or amending tax returns

viii. The platform did not make provision for instalment payment.

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ix. Payment is expected to be completed within 24 hours after initiation of payment / generation of Remita Retrieval Reference (RRR) Number.

x. The platform does not generate any report for the user after completion of the filing process.

Adequate consideration not made for confidentiality and security of taxpayers' information on the Tax Pro Max.

2.1.7.2 Shortcomings of Tax Pro-Max

The Tax Pro-Max is not yet configured to file corporate income tax returns for insurance companies and upstream oil and gas companies.

Some of the declaration filing processes are repetitive and can be further compressed.

i. The Tax Pro Max platform only recognizes Naira (NGN) as the reporting currency.

ii. A correction or change of tax returns is not intended.

iii. The platform does not provide for payment in installments.

iv. Payment is expected within 24 hours after the initiation of payment / generation of the Remita Retrieval Reference (RRR) Number is completed.

v. The platform does not create a message for the user after the registration process has been completed.

vi. The confidentiality and security of the taxpayer's information on the TaxPro Max are not adequately considered.

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2.2 Theoretical Framework

2.2.1 Technology Acceptance Model (TAM)

In 1986, Fred Davis created one of the most prominent models explaining the acceptance of new technology: The Technology Acceptance Model (TAM). It is an adaptation of the Theory of Reasoned Action by Fishbein and Ajzen (1975)[81]. TAM was designed to explain and predict users' acceptance of information systems. Its focus revolves on two constructs: perceived usefulness (PU) and perceived ease of use (PEOU). The former measures the belief that using a given system would improve performance at work, while the latter the belief that using the system would require effort[82]. These factors determine an individual's attitude towards utilizing a system, which then influences behavioral intention and actual use. TAM has been modified and applied to a wide range of areas over the years from e-governance and e-commerce to digital tax systems.

The theory is importance regarding the application of digital taxes is its evaluation of the perception and acceptance of such technologies by taxpayers. All over the world, governments have adopted digital systems for filing and invoicing taxes, as well as for mobile tax applications, to enhance compliance, increase transparency, and mitigate tax evasion. However, the effectiveness of these applications is largely dependent on the acceptance by the taxpayers[83]. TAM is useful in addressing the factors that determine the acceptance of users towards the systems.

Taxpayers will adopt digital tax platforms if they consider the processes associated with tax filing, such as making tax returns, as simplified, interface, time-consuming, and error-prone. A research in Ghana stated perceived usefulness was a stronger factor towards the intention to use the digital tax service platforms compared to perceived ease of use[83]. Users valued the convenience, speedy service, and better recordkeeping provided by the system. On the other hand, where the ease of

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use is low, for example where interfaces are difficult to use, where systems malfunction frequently, or where systems are not user-friendly, even when recognized, the benefits might not lead to enhanced adoption.

One of the most remarked critiques of TAM, is lacking comprehensiveness. Despite highlighting important individual level beliefs determining acceptance, it fails to consider social influence, facilitating conditions, or any behavior post-adoption[84]. In tax systems, this poses a significant concern, especially because adoption does not rest entirely on the self-serving premise of personal convenience, but involves a complex web of trust, perceived coercive power, legal obligation, and surveillance fears. A critique that is present in TAM is its assumption of rational behavior. It assumes that users operate on a logic driven by their understanding of value and effort. This is not always accurate, especially in developing nations where the degree of digital literacy is heterogeneous, and where infrastructural challenges (such as poor internet or unstable power supply) can dramatically disrupt user experience.

In Nigeria, it was reported that many taxpayers appreciated the value of the TaxPro Max platform offered by Federal Inland Revenue Service, but system errors, inadequate help desk services, and non-standardized interfaces negatively impacted satisfaction and utilization[84]. Even with some criticism, TAM continues to be useful as long as it is modified for the use of digital context in tax. Its later versions, TAM2 and UTAUT, sought to include social impact, conditions for facilitation, and voluntary nature of use, thereby strengthening the framework for more intricate systems like tax administration. The OECD observes that the adoption of digital technologies into tax systems has enhanced revenue performance in numerous countries; however, they also caution that the design has to be centered on human needs, along with education and trust, which are essential for adoption[85]. If well-implemented and adopted widely, digital tax applications have the capability

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of lowering administrative burdens, expanding the tax base, and reducing evasion. In Rwanda, the Rwanda Revenue Authority reported revenue growth of 20 percent between 2018 and 2021 due to the adoption of digital tax applications, such as e-Tax and e-Invoicing[86]. These trends have also been reported in Uganda, South Africa, and Indonesia, all indicating that digitalization has improved revenue performance. This shows the extent to which digitalization can improve revenue performance. But the key issue is adoption; if taxpayers do not utilize the systems effectively, the advantages are forfeited.

In this context, TAM works as both a pathology and a strategy. By analyzing perceptions of the digital tax system as measured by usefulness and ease of use, policymakers can pinpoint gaps that can be addressed with enhanced user experience design. Consider removing interface complexity, adding more languages, and improving customer assistance to increase perceived ease of use. On the other hand, enhancing perceived usefulness can be achieved by demonstrating success stories, time savings, and presenting information without the need for queryable transparency.

2.2.2 Theory of Innovation Translation

The implementation of digital tax systems and their effect on government revenue can be analyzed by applying the concept of Innovation Translation Theory, which was developed by Latour in 1987 under the umbrella of Actor-Network Theory (ANT)[87]. Unlike conventional theories which regard innovation as a straightforward, linear process, Translation Innovation Theory contends that the technological innovations are subjected to constant reinterpretation and modification by multifarious actors in intricate networks such as tax-system actors, software developers, taxpayers, digital platforms, algorithms, institutions, and many more. This interplay becomes particularly useful in assessing the degree to which such digital tax initiatives as e-filing, e-invoicing, and

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digital VAT systems enhance tax revenue in developing countries that suffer from rampant tax evasion and administrative inefficiency[87].

An innovation is successful only after it has been "translated" through a chain of actors who accept it and modify it to their own goals and contexts. Latour argues that the mere introduction of a digital tax platform does not lead to improved revenue outcomes[87]. Rather, its revenue outcome depends on the implementation, appropriation, and adaptation by various stakeholders. In this context, translation entails reinterpretation by tax administrators as a tool for either surveillance or efficiency, software vendors as a market opportunity, and taxpayers as a threat or a convenience. An alignment of interest is crucial to add an innovation to a network, which must be stabilized and institutionalized[88]. This viewpoint is consistent with the recent research results in economic studies. The imbalanced impacts of digital tax reforms. While changes brought about by digitalization can improve compliance and enhance revenue, there are institutional arrangements as well as actor agency systems heavily reliant on context which impact the outcomes[24]. Rwanda and Tanzania, for example, where Electronic Billing Machines (EBMs) were purportedly put in place to increase VAT compliance. Their effectiveness, however, was mixed due to differences in enforcement, taxpayer trust, and system ease of use[89].

The theory of innovation translation assumes that technology is not a stagnant or neutral thing, but rather changeable, with value and function that is assigned through use. This assumption is different than the more static view where the adoption of a technology leads to a given outcome. Rather, this view puts forth co-construction, the notion that both the technology and the social world it is placed into inform and shape each other. Regarding outcomes such as enhanced revenue in the context of digital taxation, this means other than the tool itself, tax agencies, citizens, and the policies of the surrounding context also determine the result. A study of Uganda's digital tax

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system revealed early results were mixed because of low digital literacy, poor enforcement, and politically active resistance, these were factors that required negotiation and ongoing translation[90].

The critics of Innovation Translation Theory usually concerns its fuzziness and the challenges it poses for measurement-based operationalization. For instance, the construct "actor-network" can sometimes be vague in the context of macro systems such as a country's taxation scheme. Furthermore, it is critiqued that the theory tends to understate the sanctions imposed by the structure, such as legal bounds, financial constraints, and the political will[91]. Also, because of the theory's post-structural bent, it becomes problematic in public finance to establish the defined causality and the clear policy actions that would be needed.

The theory being discussed may not have received some critiques, but it is still applicable to the study of digital taxes in places such as Nigeria, Kenya or Ghana due to their recent undertakings in this area. For example, Kenya's digital service tax was enforced in 2021 and aims at online services like Netflix, Amazon, and Facebook. The KRA had to deal with a lot of global digital companies' resistance, local enforcement issues, and gaps in cross-border taxation frameworks. However, with sustained lobbying, legislative changes, and innovation alliances with tech firms, the DST has started off gaining traction, showing the messy iterative process of translation of innovation[92]. Further, a study use Nigeria's e-tax platforms like the Integrated Tax Administration System ITAS as a case and argue the absence of trust in the system renders its presence useless[93]. Non-government stakeholders in Nigeria have been quick to use the systems, but taxpayers and tax institutions actively fighting for their interests can impede the expected revenue boost, stressing the need for orchestrated enrollments into the reform coalition to be made.

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2.2.3 Resource Based View Theory (RBV)

The Resource-Based View (RBV) theory was developed by Barney in 1991, expanding on work by Wernerfelt from 1984[94,95]. It serves as a strategic management model that shows how companies attain enduring competitive advantages through the acquisition, development, and deployment of value-adding, rare, costly-to-imitate, and non-substitutable resources (VRIN). RBV's fundamental assumption is that internally controlled resources, rather than a firm's external market positioning and competition, are the foremost determinants of superior economic performance. This model is increasingly used in public sector institutions, particularly in revenue authorities, to assess the effects that digital applications for tax administration have on the generation of tax revenue.

Within the RBV theory, it is assumed that organizations are complex and heterogeneous, meaning that they have distinct combinations of resources. Resources vary from one organization to another and may include technology, skilled employees, data analysis capabilities, institutional memory, and trust from stakeholders[96]. The theory, in relation to the digital administration of tax, helps explain why some countries or jurisdictions excel in tax collection compared to others. It is not only a matter of policy, but also how well some of them harness and manage their internal resources to operate digital tax collection systems.

Components of automated tax administration systems, including electronic filing (e-filing), e-invoicing, digital payment systems, tax tracking using blockchain technology, and automated audit systems, have become increasingly important tools in the recent past. For example, the Nigerian Federal Inland Revenue Service (FIRS) introduced the TaxPro Max system to automate tax processes, enhance compliance, and mitigate revenue leakages. The value of TaxPro Max in

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increasing revenue collection is heavily dependent on the internal resources of the FIRS, particularly the staff's digital skills, technological infrastructure, and ability to integrate data[96]. This is consistent with the RBV assertion that competitive advantage lies in resource possession and effective resource deployment.

Digital tax systems can improve transparency, expand the tax base, and reduce human judgement and abuse of power. However, full benefits are only achievable by tax administrations that have strong internal frameworks. For example, KRA's iTax system has greatly increased tax compliance and revenue. Tax digitalization in Kenya improved efficiency and convenience, but these results depended on KRA's investment in IT training and education systems as well as the integration of the taxpayer's systems[97]. This supports the RBV statement that competitive (or, in this case, institutional) advantage is dependent on the firm's countering internal capacity.

The blurring of Ghana's iTaPS system is a case study by researchers that covers how a unique blend of tax analytics, AI-based risk profiling, and integrative data from diverse sectors made the system work flawlessly[98]. In other countries, these systems may be difficult to replicate due to lack of resources, contextual infrastructure, or special tax system frameworks. This privileged Ghana, with limited resources, an edge in tax revenue administration.

Despite this, critics of RBV claim that it tends to neglect external factors like political involvement, economic volatility, and international trade relations that have a considerable impact on the outcome of tax policy. RBV is criticized as self-evident and accused it of being incapable of adequately explaining how resources are acquired and maintained[99]. Regarding digital taxation, this matters greatly while internal resources matter, external elements such as the level of internet access, taxpayers' digital savviness, and supportive legislation are crucial for the operational

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execution of digital tax instruments. Take Sierra Leone, for instance. Even with a digital tax collection system in place, revenue outcomes have stagnated as a result of infrastructural hurdles and taxpayer apathy, illustrating the weaknesses of RBV in contexts where externalities dominate[100].

Another assumption that RBV overlooks refers to resource immobility. In public institutions, for instance, donor-sponsored digital platforms, vendor-provided IT systems, and externally trained personnel saturate the environment and disrupt resource control spillover boundaries. So, while RBV explains internecine outcome disparities concerning resource management, it does not seem to fathom how resources are procured, particularly in developing economies where multi-lateral aid and technology conduit institutions are pivotal. These critiques accepted, RBV still holds value when evaluating the application of digital tax systems and their relative impact on revenue collection. It diverts attention to bolster internal competencies as opposed to externally driven policy based imitation. Tax performance enhancement of other nations, particularly Rwanda, resulted from focused actions on learning and data-driven strategy execution with capacity enhancement termed as performance indicative funnel[101]. These internal resources were externally provided, but very tailormade and institutionally entrenched which resonated the RBV principle of firm specific resources.

2.3 Review of Empirical Studies

2.3.1 Manual Tax Process and Tax Revenue Generation

A research explored the approaches to organizing the process of tax administration, revealing the problems and prospects of tax administration through the use of digital tools. The theoretical aspects of tax administration are investigated, the subject and subjects of tax administration are

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described, the functions and conditions for the implementation of administration processes are revealed. The main problems of tax administration that directly affect tax production are outlined, including: difficult integration of digital tools into the Russian tax space, synchronous interaction of tax administrations on the transfer of necessary data, and others. The main platforms and automated systems used in the practice of tax administration are characterized. Examples of use and statistics of the positive dynamics of tax collection after the introduction of digital resources are given. The ways of overcoming the existing problems, the solution of which will increase the efficiency of tax administration, thereby reduce arrears, increase the collection of tax payments and, as a consequence, increase the revenue side of the state budget[118].

A study assessed how an effective tax administration and good revenue collection mechanism will enhance government performance in terms of provision of infrastructural development in Nigeria. A conceptual approach was adopted to achieve this objective. The review of literature reveals that a good revenue collection and effective tax administration can lead to good performance of government in the provision of amenities. The study also reveals that the quantum of revenue realizable from taxes, in Nigeria, is not sufficient for the implementation and realization of government programmes, for reasons of potential revenue loss. This lapse in potential tax revenue generation, as pointed out in literatures, results majorly from tax fraud, non-tax compliance, wastages of public funds, corruption in tax administration, as these pose challenge to effective administration, collection and performance of tax revenue. The study recommended that the government should seek for new policy and strategy to improve its revenue to meet its demand through innovative and aggressive in its method of revenue collection from various sources to enhance the optimum collection and utilization of tax revenue, by eliminating opportunities that facilitate tax fraud[129].

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A study examined the relevance of ecommerce tax regulations in Indonesia, which were cancelled by the Government. The method used is applied research with explorative study techniques designed in structured questionnaires and interviews with 15 respondents who were judged to have the right expertise with different backgrounds such as consultants, tax observers, academics, managers, e-commerce entrepreneurs, and policymakers. The results showed that it was necessary to revise tax laws to adjust to the digital era's demands soon. In addition, technological innovation in taxation was considered to reduce administrative costs in terms of tax authorities. Big Data tax management was considered to make tax authorities' performance efficient and can anticipate higher costs. The quality of human resources must support technological innovation to bring up a new profession in the future, namely experts who master tax and technology with the term "Taxologist". Finally, the Government needs to secure Value Added Tax (VAT) taxes in the short term until a global consensus agreement is reached in 2020[122].

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A study evaluated the effect of tax revenue on revenue generation in Nigeria for the period of 1985- 2015, with the purpose of finding effect of the various tax revenue represented by Petroleum Profit Tax, Company Income Tax and Customs and Excise Duties taxes had impacted on revenue generation in Nigeria for the period of the study. The data which are secondary in nature were analysed using Simple Regression Analysis for the three research questions and three hypotheses in the study. The findings revealed that, Petroleum income tax have significant relationship on revenue generation in Nigeria, while company income tax and customs and excise duties does not

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have significant relationship on revenue generation in Nigeria. The study therefore recommended amongst others that, government should enhance policy measures that will help to improve on marketing of petroleum income tax so as to sustain and improve on the successes recorded in the collection. Measures should also be taken to ensure that proper assessment is carried out on tax administration in companies so as to ascertain the actual tax that ought to be payable by companies in the country and also government should try to improve on management of customs and excise duties so as to allow importers and exporters go through proper process of importation and exportation in the country[127].

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A research assessed how Nigeria's value-added tax affected the country's ability to generate income spanning twenty years (1999-2019). The journal of the Chartered Institute of Taxation of Nigeria, Federal Inland Revenue Service Annual Reports, and the Central Bank of Nigeria Statistical Bulletin were sought out as secondary sources of data. A simple regression technique was used to accomplish the analysis. Results indicated that company income tax and Value Added Tax have a statistically significant impact on Nigeria's income generation. The report recommended that the government should make every effort to enhance the manner in which value-added tax is collected; all VAT agents should be committed and appear honest with regard to collection and payment Moreover, the country's tax base will grow as goods and services are taxed more which includes the activities of the informal sector[131].

A study evaluated the effect of mobile money services on tax compliance in Zambia, in the case of the Multi-Facility Economic Zone (MFEZ) and Central Business District (CBD) of Lusaka. The study objectives were first to establish the extent to which mobile money is used to pay tax to the Zambia Revenue Authority (ZRA) in Zambia. Secondly, it aimed to find out the challenges of using mobile money for tax compliance in Zambia and, lastly, explore potential measures and strategies that could be implemented to harness the potential of mobile money in augmenting tax compliance. Drawing upon both quantitative and qualitative research methodologies, this study employed surveys, interviews, and data analysis techniques to elucidate the intricate dynamics at play. With comprehensive data collection and analysis, the study aimed to understand mobile money usage patterns, benefits, and limitations for tax compliance. The findings of the study were expected to contribute to the current literature on mobile money uptake and impact on tax compliance in developing economies. By describing the specific nuances of the Zambian context, this study was designed to offer prescriptive recommendations in order to establish an ecosystem

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conducive to leveraging mobile money for increased tax compliance. More broadly, this thesis is intended to not only contribute to research but also offer practical recommendations to policymakers, tax authorities, financial institutions, and mobile money institutions in Zambia and beyond. The study established precedent that, to a considerable extent, taxpayers use mobile money for payment of presumption tax. The study also established precedent that mobile money has the ability to reduce the number of cash payments and can provide a digital record of transactions, making it easier for governments to track and collect taxes. Use of mobile money also improves tax compliance[132].

The effect of tax reform as a proxy for value-added tax reform, online tax payment platforms (OTPP), integrated tax administration systems (ITAS), and digitalization on tax compliance of Small and Medium Enterprises in Ondo State, Nigeria, was investigated by a study. The survey research design with primary data was used in the study. The sample population is seven thousand eight hundred ninety-nine (7899) registered SMEs in the eighteen (18) local governments of Ondo state as of 2023 (SMEDAN, 2023). Three hundred and eighty SMEs were taken using the Taro Yamane Formula and questionnaires were issued. The demographic information was analyzed with frequency distribution, and the ordinary least square regression method was used to examine the relationship between the variables and tax compliance using E-view 13. The findings revealed that the variables of value-added tax reform, online tax payment platforms (OTPP), and integrated tax administration systems (ITAS) were statistically significant at 1%. The study, therefore, concluded that value-added tax reform, online tax payment platforms, and integrated tax administration systems positively and significantly affect the tax compliance of SMEs in Ondo State. The study recommends that for improved tax compliance among SMEs in Ondo State, SME Managers should incorporate value-added tax reform into their business strategy since it impacts

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their businesses and benefits tax compliance. Also, the government should further improve and expand online tax payment services to enhance tax compliance. Similarly, at all levels, the government should invest further in improving and expanding the integrated tax administration system through the relevant tax authorities[133].

A study assessed the effect of integrated tax filing management system on tax compliance behavior by the income taxpayers focusing on those who have adopted the system in filing their tax return. From a target population of 5000 taxpayers who already use the e-filing system in Nigeria, a total of 400 respondents were randomly selected as representative of the focus of the present study. The data were collected using self-administered questionnaire and these were discussed through descriptive methods. The data were analyzed using SPSS statistical package, followed by the interpretation of results. The results showed that most of the respondents are aware that the integrated system was effective for the increment in the level of revenue generation and tax compliance level in Nigeria[136].

A research examined the behavioral determinants critical to the acceptance and effective utilization of Jordan's digital tax platform among taxpayers. Utilizing an unprecedented combination of frameworks from the Technology Acceptance Model (TAM), Social Capital Theory (SCT), and Theory of Reasoned Action (TRA), this study pioneers a unique integrated approach. Data gathered through questionnaires across Jordan's multiple governorates lay the groundwork for this analysis. Employing the sophisticated Partial Least Squares Structural Equation Modeling (PLS-SEM) within SPSS, our results uncover the profound impact of both social factors (trust, subjective norms) and technological attributes (perceived ease, utility), as conceptualized in TAM, SCT, and TRA. This research is distinct in its focus on Jordan, providing new insights into the nexus of tax compliance and technology adoption, a relatively uncharted area in existing literature[143].

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A research investigated the influence of tax reforms and digitalization on government income in Nigeria. The study focused on evaluating the distributional outcomes of tax revenue and digitalization on both federal and state government revenues. An ex post facto research design was adopted in the study and both descriptive and inferential analysis of the hypothesized relationships was performed. The relationships are analyzed using secondary data from 1996 to 2020 and a dynamic framework based on the autoregressive distributed lag (ARDL) approach to cointegration. The study confirmed that company income tax reforms improved federal government revenues but inhibited state government revenues (SGR) in Nigeria. It is therefore recommended that the conduct of fiscal reforms in Nigeria should evolve to become more of a bottom– top approach where all tiers of government are included[144].

A study evaluated the ease with which taxes are paid through Nigeria's electronic tax system, and how convenient it is for tax payers in Nigeria to pay taxes. To answer this question and achieve the broad objective of this study, a library research approach was used. From the extant literature reviewed, it was revealed that payment of taxes in Nigeria is not stress-free. The uneasy nature of paying taxes in Nigeria through the electronic tax system is due to some challenges which include lack of fully automated system; poor access to the Internet; unawareness of the system; low computer literacy level; and perception to change since the system is new. Flowing from the above, this study, therefore, recommends that the electronic tax system in Nigeria should be fully automated. The FIRS should create an electronic tax payment system mobile App which will serve as a means of creating more awareness and simplification of the tax system in the country. The electronic tax payment system should be spread to other tax authorities especially the States Board of Internal Revenue. They seem not to have fully embraced e-taxation[147].

A study carried out an overview on e-filing of income tax returns in India. In the present world

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day by day new technologies are introduced and improved very fast in all fields. Now new technology gifted to tax payers for filing their income tax return through online is e-filing. The e-filing is the new effective method of filing income tax return through online and make e-payment tax. It saves our golden time, energy and cost and reduces our tension. So, the tax payers are required to use e-filing facilities. This study revealed that the existing users are satisfied with the e-filing facilities but most of the individual tax payers are not aware of the e-filing procedures so sufficient steps are required for create more awareness in the minds of tax payers regarding e-filing of income tax[149].

A research investigated the effect of Information Communication Technology penetration on tax revenue in Sub-Saharan Africa. The specific objectives of the study were to examine the effect of mobile phone on tax revenue and to determine the effect of personal computer on tax revenue in Sub-Saharan Africa. The research was anchored on digital diffusion which based on the notion that adoption of an innovation involves the spontaneous or planned spread of new ideas. The method of analysis employed for this study was the panel ordinary least square techniques with the aid of e-view version 09. The result showed that mobile phone and personal computer have positive and significant effect on tax revenue in Sub-Saharan Africa. The study recommended amongst others that technological tools should be leverage upon by government in the Sub-Saharan African countries in other to improve their method of tax collection to increase tax revenue[22].

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2.3.2 Integrated Tax Administrative System and Tax revenue Generation

A study explored the impact of E-tax on revenue generation in Nigeria. the objectives of the study includes: to examine effect of tax reform attitude on the revenue generation in Nigeria development, to examine the impact of manual method of tax collection on Nigeria internal

revenue generation, to examine the tax pay usefulness of e tax on the revenue generation. The method of data analysis adopted includes the use of linear regression and analysis of variance (ANOVA) in order to determine on the relationship between the independent and dependent variables. Regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. The study showed that Nigeria captured more people into the tax net as there was a continuous increase in taxpayers' cumulative growth (more than 20% each year); and found that the primary source of revenue generation in Nigeria was the internally generated revenue (IGR) in which tax revenue constituted about 80%. The result also showed that, on trend, between 1999 and 2005, there was no noticeable increase in revenue generated from tax; but from 2006, there was a sharp, steady and noticeable increase in the tax revenue generated. On the pattern of tax administration in the state, from 2006 the state concentrated more on Electronics tax with less dependence on other sources of internal revenue generation. The result further revealed that there was a long run relationship between the Electronics tax and revenue generated in Nigeria; thus, the Electronics tax had positive and significant effect on the revenue structure in Nigeria. The study concluded that Electronics tax had significantly contributed to revenue generation[102].

A research explored the effect of e-taxation system on government tax revenue in Nigeria, employing hypothesis testing and regression analysis to explore key influencing factors such as awareness levels, behavioral responses, technological advancements, and demographic variables. The study finds that while there is a statistically significant relationship between awareness levels and the distinction between businesses and individuals, the impact of awareness alone on e-taxation effectiveness is relatively weak. However, positive behavioral responses to e-taxation

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initiatives significantly enhance government revenue, highlighting the critical role of fostering responsible taxpayer behavior. Technological advancements, such as block chain and digital currencies, show a strong positive correlation with the efficiency and effectiveness of e-taxation systems, this underscores the necessity of ongoing investment in cutting-edge technologies to maintain and improve e-taxation infrastructure. Additionally, demographic factors such as age, education, and income significantly influence the adoption and effectiveness of e-taxation policies. The study recommended that a targeted awareness campaigns segmented by demographics (age, income level, location) and business types should be developed. Also, appropriate communication channels (social media, SMS, workshops) tailored to each segment to ensure clear and effective messaging should be utilized. Focus should be on educating taxpayers about the benefits of e-taxation systems, such as convenience, efficiency, and security. Similarly, initiatives that incentivize timely tax filing, accurate reporting, and efficient utilization of e-taxation platforms should be implemented[103].

A study was conducted to determine if electronic taxation system adopted in Nigeria was able to eliminate tax evasion and related problems associated with the manual taxation system previously in use and subsequently improving revenue generation of the government particularly company income tax and personal income tax. Primary data was obtained by means of a 5-point Likert scale questionnaire deployed to assess respondents' perceptions and opinions related to the study's objectives. The study deployed Kolmogorov-Smirnov test for analysis of data so obtained for the study. Result showed that (1) electronic tax system has significantly reduced tax fraud in Anambra state, Nigeria (2) electronic tax system has significantly improved revenue generation with regards to personal income tax in Anambra state, Nigeria (3) electronic tax system has significantly improved revenue generation through company income tax in Anambra state, Nigeria. With

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regards to the findings stated above, the study recommended that tax authorities in every state in Nigeria and other developing countries should invest in the necessary infrastructure and provide training to their staff to ensure a successful implementation of electronic taxation system. Again, it was recommended that tax authorities should continue to promote the use of electronic taxation systems to encourage voluntary compliance. Finally, it was recommended that tax authorities should focus on improving their electronic tax systems to make them more efficient and effective in order to consolidate on the gains already made in adoption of electronic taxation system[104].

A study examined the effect of imposing a digital tax on digital channels on revenue generation in Nigeria using data collected from tax experts in Lagos state, Nigeria, via Google form. An exploratory research design is used, and data is analyzed using Structural Equation Model (SEM) via the STATA software for statistical analysis. The study administered 200 questionnaires to respondents in FIRS and selected BIG4 auditing firms in Nigeria. The findings of the research show that there is a positive and insignificant relationship between revenue generation and tax ecommerce as well as between revenue generation and content providers. On the other hand, there is a positive and significant relationship between digital advertisers and revenue generation. This study concludes that the imposition of digital tax on digital channels is strongly linked to revenue generation and will lead to an increase in revenue generation in Nigeria. The study thereby recommends that more focus and strategies should be put in place when collecting digital tax from digital channels[106].

A study examined effect of e-taxation on revenue generation in Nigeria. The general research framework adopted was the ex-post facto research design. Data were sourced from the quarterly reports of the Federal Inland Revenue Service covering 40 quarters, spanning from second quarter

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of 2010 to first quarter of 2021 for pre- and post-electronic taxation. This study employed t-test technique as the procedure of data analysis and descriptive statistic for comparison of means with the aid of SPSS version 23 as a tool for data analysis. The study found a higher positive mean difference in pre and post e-tax collection, implying that total tax revenue collection statistically increased after introduction of electronic taxation platform in Nigeria. It was therefore concluded that e-taxation payment system has significant effect on Revenue Generation in Nigeria. It was therefore recommended among others that Federal Inland Revenue Service should create e-tax payment mobile application that can be installed on android phones to further simplify the self-assessment system[110].

A study explored the Impact of E – Taxation on Tax Administration in Nigeria. The work was set out to determine whether e – taxation has made tax administration more effective in the country. The study employed primary data. The population for the study consisted of taxpayers, tax professionals, chartered accountants, tax administrators from the Federal Inland Revenue Service Benin and Auchi branches. The sample size selected for the study was 399 using stratified random sampling technique. Data were collected with the aid of a structured questionnaire. A total of 390 copies of the questionnaire were retrieved from the respondents. The study was carried out using descriptive statistics, correlation analysis and panel regression to analyse the variables using SPSS 23. The result of the analyses showed that (1) e – taxation exhibits negative impact (-0.032) on Ease of Paying Taxes and not statistically significant (p = 0.221) at 5% level, meaning that e – taxation has not significantly made it easier to pay taxes in Nigeria. (2) E – Taxation exhibits a negative impact (-0.129) on Processing time of Tax Returns and Assessment, and it is statistically significant (p = 0.013) at 5% level, meaning that e – taxation has helped to achieve a 12.9% reduction in the processing time of tax returns and assessment. The study recommended that

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taxpayers should be trained on how to pay taxes electronically especially with the newly introduced TaxPro Max; The e – tax system should be constantly reviewed in order to make it more swifter[2].

A study assessed the impact of e-tax assessment on income generation in Nigeria. The examination applied secondary data gotten from Federal Inland Revenue Service tax report and CBN Statistical release and Quarterly Economic Reports. These informations were time arrangement information covers the period from first quarter of 2012 to second quarter of 2018 (that is, pre e-charge is from first quarter of 2012 to first quarter of 2015 while the post echarge is from second quarter of 2015 to second quarter of 2018). The information gathered were broke down utilizing Ordinary Least Square Method. The outcomes show an idealistic huge impact of pre (before the starter of e-tax assessment) company income tax and value added tax on income generation in Nigeria and a contrary immaterial impact of post organization annual duty income and value-added assessment income on revenue generation in Nigeria (after the appearance of e-tax collection) at 5% level of critical. This implies E-tax collection has not contributed decidedly to both company income tax revenue and value added tax revenue generation in Nigeria; though there is an unwanted immaterial impact of pre and post capital gain charge income on income generation in Nigeria at 5% level of noteworthy. This implies Etax collection has not contributed decidedly to capital gain charge generation in Nigeria. The examination, along these lines among others prescribes that so as to amplify the foreseen positive impact of the activity, government through Federal Inland Revenue Services should work out modalities on the most proficient method to sharpen companies on the fundamentals of E-tax collection[114].

A study explored the effect of electronic taxation on revenue generation in Lagos state. Due to tax avoidance and tax evasion that is distorting revenue generation, Lagos state government adopted

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electronic taxation system. Despite the adoption of electronic taxation, the problem persists. Hence, this study seeks to fill the lacuna and identify how much E- taxation affects revenue generation by examining the effect of e- taxation on revenue generation in Lagos state. Electronic tax payment, electronic tax filing, electronic tax clearance Certificate served as proxies to the independent variable electronic taxation while revenue generation is the dependent variable using a sample size of the (40) forty tax stations in Lagos state. The research was carried out using the ex – post facto research design technique while data were collected from the annual reports of the internally generated revenue at state level which were subsequently analyzed using Linear Regression model and analysis of variance (ANOVA) through the statistical package for social sciences (SPSS 20). The result of the analysis showed that electronic tax payment, electronic tax clearance certificate issuance has significant effect on revenue generation in Lagos state while electronic taxation filing does not significantly affect tax revenue in Lagos state. The result also showed that the interaction of electronic tax payment, electronic tax filing and electronic tax clearance certificate issuance significantly affects revenue generation in Lagos state. The findings concluded that e-taxation has a positive and significant effect on revenue generation in Lagos State. E-taxation provides convenience to taxpayers at a degree that is not available through traditional channels. E-filing also offers the flexibility of time and reduces calculation error on the tax return form to the taxpayers. Therefore, we would conclude that the implementation of e-taxation improves revenue generation in Lagos State. The study recommends that there should be more awareness made on electronic payment channels for taxes, the Lagos State Inland Revenue Service (LIRS) should work out modalities on how to sensitize tax payers on E-tax filing and that more tax clearance certificates should be issued electronically to save time and cost for taxpayers[115].

A research assessed the impact of e-tax filing on tax revenue generation in Nigeria. The study

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developed three research objectives, which are to; analyse the contributions of e-tax filing on government tax revenue in Nigeria, analyse the contributions of e-tax filing on the increase in non-oil and oil tax revenue in Nigeria. In essence, the study compared whether there is significant difference in government tax revenue, non-oil tax revenue, and oil tax revenue in Nigeria prior to e-tax filing (2011-2014) and post e-tax filing (2016-2019). The study made use of quarterly data, which was sourced from the Federal Inland Revenue Service. The one-way Analysis of Variance (ANOVA) was adopted as analytical technique. Based on the results obtained from the study, it was found that e-tax filing only had significant influence on oil tax revenue in Nigeria, but did not significantly impact on total government tax revenue and non-oil tax revenue in the country. Based on these results, the study recommends that the Government should establish a well-equipped database on taxpayers to easily identify all possible sources of income of taxpayers for tax remittance. Also, the study recommends that the Federal government through the Federal Inland Revenue Services (FIRS) should conduct more enlightenment programmes in the country, so as to increase the knowledge and awareness on the use of all electronic services on their platform[117].

A study investigated the effect of adoption of e-taxation on revenue generation in Nigeria on social media companies operating in Nigeria's Internet domain. The study adopted a causal research design. This is a design which explores the effect of one variable on another. The study revealed that an element of change in the standard regulations among the tax authority (FIRS) for about 5.221, will give way for benefits of revenue generation within social media companies operating in Nigeria's Internet domain, which explains that FIRS faces challenges on modalities of taxing online companies and they can do more by implementing policies in consonant with social media companies in Nigeria. The study concludes that the country's major challenge of e-commerce as it relates to its tax system has been that the laws governing direct taxes are at the moment

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inadequate and out of date; they are premised on the concept of permanent establishment as defined in the double tax treaties and recommend that efforts should be made to set up a tax intermediation body. This body ought to be relevant for the digital world, utilize Internet Service Providers (ISPs) as a responsible authority for the collection, calculation and payment of electronic tax[17].

A study empirically investigated the correlation between electronic taxation and revenue generation in Nigeria. The used three research hypotheses and was anchored on innovation diffusion theory. The study employed ex post facto research design and quarterly time series data from 2012 to 2020. The data collected was analysed using descriptive statistics and pre-post Test. The t-test results showed a significant difference between pre-post electronic company income tax and revenue generation in Nigeria; there is a significant difference between pre-post electronic value-added tax and revenue generation in Nigeria and there is no significant difference between Pre and Post electronic capital gain tax and revenue generation in Nigeria. On the basis of the t-test analysis, the study concluded that there is significant difference between pre-electronic taxation and post electronic taxation system on revenue generation effectiveness in Nigeria. Therefore, on the basis of the conclusion, the study recommended amongst others that government should ensure compliance to electronic tax payments system because electronic taxation system in term of company income tax and value-added tax generate more revenue in Nigeria[62].

A research investigated the impact of electronic tax administration on tax compliance and the resultant effect on tax revenue. The quantitative research design was employed using existing data sourced from the Federal Inland Revenue Service (FIRS). Data were tax revenue posted seven years before and after the adoption of e-tax administration by the FIRS in 2013. Data so sourced were analyzed using descriptive statistics and pairwise t-test to ascertain if a difference exists and or relationship between pre-and post-e-tax revenue. The study found a strong connection between

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the electronic tax system and tax compliance (tax revenue) as shown by the pairwise test (p-value of 0.0123051200.0000); and an average annual variation in overall tax revenue of N1.4trillion compared with pre-electronic tax period demonstrated a significant difference. With these, the study affirmed that a strong association exists between electronic taxation and tax compliance. Therefore, the service should always further work on its Information Communication Technology (ICT) architecture/infrastructure for easy access and flexibility to encourage taxpayers as well as enhancing robust tax administration. In all, security measures should be put in place regularly to prevent hackers, malicious attacks and other disasters inherent in ICT based environment[52].

A study explored the effect of e-tax compliance in Nigeria and its Implication on Company Income Tax and Petroleum Profit Tax. As Nigeria's economy continues to evolve in the digital age, the taxation landscape has seen significant changes with the advent of e-tax compliance. This work therefore aims to explore the implications of e-tax compliance on two key revenue streams for the Nigerian government: Company Income Tax (CIT) and Petroleum Profit Tax (PPT). The study reveals that the amount of capital gain tax revenue before (before the arrival of e-taxation) and after (after the advent of e-taxation) shows a positive, negligible difference and that the Petroleum Profit Tax also has a positive negligible difference between pre- (before the advent of e-taxation) and post- (after the advent of e-taxation). The study concluded that the transition to electronic tax compliance in Nigeria has been driven by the need for efficiency, transparency, and improved revenue collection. It has not only streamlined the tax assessment and payment process but has also increased the government's ability to monitor and collect taxes from this lucrative industry. Federal Inland Revenue Services should develop measures to ensure that defaulters are brought to book and dealt with in accordance with the laws, in addition to establishing a collaborative pattern between the government, Federal Inland Revenue Services, and Nigerian taxpayers to enable them

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to observe any difficulty felt by the taxpayers or the shortcomings besetting the effectiveness of the system[123].

A research examined the connection between Nigeria's tax revenues and electronic taxes. A survey research method was adopted in the study, in which data were extracted from one hundred and fifty-eight (158) Federal Inland Revenue Service (FIRS) staff across Rivers State through a questionnaire. The study covers a period between the years 2016 and 2021. Analysis was performed using descriptive statistics and the Spearman rank-order correlation coefficient with the help of SPSS version 25.0. Findings indicate electronic taxation and company income tax show a statistically significant and strong positive relationship, while a statistically significant and moderately positive relationship exists between electronic registration and companies' income tax. It was concluded that there is an indication of the prospects of the electronic tax system for improving tax revenues in Nigeria if it is sufficiently harnessed. Based on the findings, the study suggests that the Federal Inland Revenue Service should educate tax payers across the nation to raise people's understanding and awareness of how to use the electronic services that are offered on their platform. Also, the study recommends that the government should adopt steps to address issues such as lack of reliable internet, electricity, and power facilities, network challenges, and scepticism usually associated with new innovations so as to have the desired increase in tax revenue[125].

2.3.3 Standard Integrated Government Tax Administrative System and Tax Revenue Generation

with the changing economic landscape and increased complexity of today's business environment[137].

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The study investigated electronic tax filing system and tax compliance in Ondo State. This was done to determine the extent at which the electronic tax filing method introduced by government has helped to increase tax A research examined the effect of digitalization and technology on tax administration in Nigeria. In particular, it examined the role of the Integrated Tax Administration System (ITAS) towards enhancing tax administration and revenue mobilization. The study used qualitative research method grounded on secondary sources of learned papers, reports, and publications relevant to the case. The study concluded that the ITAS has enhanced tax administration in Nigeria significantly, particularly tax registration, filing, and payment. The system has also increased efficiency, transparency, and accountability in tax administration, causing the government to have more revenue. But the work considers that there are some problems while implementing digitalization and technology for tax administration, like inadequate infrastructure, low digital literacy of taxpayers, and cyber threats, etc. The study suggests the imperatives for the government to tackle these issues in order to maximize the potential of digitalization and technology in tax administration in Nigeria[134]. The study evaluated the contribution of digital transformation to tax evasion in Nigeria's Kwara State, with particular interest in electronic identification and clearance certificates. The study employed a cross-sectional survey study and relied on primary data drawn from a sample of 499 stakeholders. The stakeholders included 138 senior management staff and 361 operating taxpayers, and structured questionnaires distributed to the target respondents. PLS-SEM was employed to analyze the data. Results showed that both the electronic tax identification and electronic tax clearance certification positively and significantly impact tax evasion in Kwara State. The study concluded that digital transformation effectively and efficiently improves tax revenue performance and reduces tax evasion in Nigeria. The study recommended that the government should continue to invest and

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focus on technological integration and taxpayer education to strengthen tax systems in Kwara State[135].

A study assessed the effect of integrated tax filing management system on tax compliance behavior by the income taxpayers focusing on those who have adopted the system in filing their tax return. From a target population of 5000 taxpayers who already use the e-filing system in Nigeria, a total of 400 respondents were randomly selected as representative of the focus of the present study. The data were collected using self-administered questionnaire and these were discussed through descriptive methods. The data were analyzed using SPSS statistical package, followed by the interpretation of results. The results showed that most of the respondents are aware that the integrated system was effective for the increment in the level of revenue generation and tax compliance level in Nigeria[136].

A study explored the effect of online system of taxation on economic growth in Nigeria covering the period 2005-2020. Data for the research was extracted from the Central Bank of Nigeria (CBN) Statistical Bulletin, 2020. The multiple regression with the application of Ordinary Least Square (OLS) technique was employed in obtaining the numerical estimates of the co-efficient in different equations (Pre-Online and Post-Online Tax Regimes). The One Sample Test was employed to estimate the difference between pre-online and post-online taxation system on economic growth in Nigeria. The major findings of the study revealed that pre-online tax revenue has a negative and non-significant effect on economic growth in Nigeria, post-online tax revenue has a positive and significant effect on economic growth in Nigeria and there is significant difference between Pre and Post Online tax revenue in Nigeria. It is the recommendation of the study that there should be stringent penalty imposed on any individual or corporate body who indulges in any form of tax malpractices irrespective of states, if the positive impact of tax revenue on economic growth should

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be maintained and the online-tax system should be constantly reviewed so as to address emerging problems and to evolve compliance among tax payers in Ondo State. The sample size is 224 tax administrators out of the population of 511 in Ondo State Board of Internal Revenue Service. Data were collected from primary sources using well- structured questionnaire that asked salient questions that are components of the electronic tax filing system. Data collected were analysed using descriptive and inferential statistics. It was found that electronic filing system has a significant and positive effect on response time to tax payer queries; as it also showed a significant but negative effect on level of interaction between tax payer and tax authorities. In the case of increase in level of tax compliance and access to tax information, the result showed an insignificant negative and positive effects respectively. The conclusion drawn from this study is that although the electronic tax filing method increased government responsiveness to tax, it has not had a significant impact on the rate of tax compliance among tax payers in Ondo state and it has not also significantly influenced their access to information. It is therefore recommended that government must continue to make effort to introduce reforms that will lead to more sustainable tax process and increase tax revenue through tax compliance[138].

A research investigated E-governance and improved Public Revenue Generation in Nigeria, Issues and Prospects. The study employed a documentary research approach. The study revealed that the implementation of e-government systems in Nigeria has significantly enhanced the efficiency of revenue collection processes, that E-government has notably increased transparency in Nigeria's public revenue systems through real-time access to financial data, improved accountability in spending, and enhanced citizen engagement and that the adoption of e-government systems in Nigeria's revenue generation sector faces significant challenges including the digital divide, cybersecurity threats, bureaucratic resistance, and inadequate legal frameworks. The study

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concluded that e-government presents a transformative opportunity for enhancing public revenue generation in Nigeria, despite encountering significant challenges. By streamlining administrative processes, increasing transparency, and fostering citizen engagement, e- government has the potential to improve efficiency and accountability in revenue collection. The study recommended that to strengthen cybersecurity measures to safeguard sensitive financial data and build trust in e-government systems. Robust policies and technologies must be implemented to mitigate cyber threats and protect against potential breaches[139].

A study empirically examined the effect of the online system of taxation on economic growth in Nigeria covering the period of 2005–2020. Data for the research was extracted from the Central Bank of Nigeria (CBN) Statistical Bulletin (2020). The multiple regression with the application of Ordinary Least Square (OLS) technique was employed in obtaining the numerical estimates of the coefficient in different equations (Pre-Online and Post-Online Tax Regimes). The One Sample Test was employed to estimate the difference between pre-online and post-online taxation systems on economic growth in Nigeria. The major findings of the study revealed that pre-online tax revenue has a negative and non-significant effect on economic growth in Nigeria, post-online tax revenue has a positive and significant effect on economic growth in Nigeria, and there is significant difference between pre- and post-online tax revenue in Nigeria. It is the recommendation of the study that there should be stringent penalties imposed on any individual or corporate body who indulges in any form of tax malpractices, irrespective of states. If the positive impact of tax revenue on economic growth should be maintained, then the online tax system should be constantly reviewed so as to address emerging problems and to evolve with the changing economic landscape and increased complexity of today's business environment[140].

A research explored electronic tax system and tax revenue efficiency in Nigeria 2008 -2021. The

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study adopted quasi experimental research designs. The population and sample size of the study was the entire 36 states and the federal capital territory of Nigeria. Covering fourteen (14) years (2008-2021) of federal government of Nigeria taxes and tax revenue efficiency. The formulated research questions were analyzed with descriptive statistics. The hypotheses were tested using The paired sample t-test also called Pre-Post Test analysis. The findings of the study among others were that; there is significant difference between Pre-Post electronic company's income tax and tax revenue efficiency in Nigeria. Also, there is not significant difference between Pre-Post electronic petroleum profit tax and tax revenue efficiency in Nigeria. And there is significant difference between Pre-Post electronic capital gain tax and tax revenue efficiency in Nigeria. The study recommended that; Government should ensure compliance to electronic tax payments system because electronic taxation system in term of company income tax generate more revenue in Nigeria. And Federal government through Federal Inland Revenue Services (FIRS) and Nigerian National Petroleum Corporation (NNPC) should work out modalities on how to sensitize oil companies and penalize corporate tax officials so as to maximize the expected positive impact of the of E-tax payment[141].

A study evaluated the impact of Digital Tax Administration on tax compliance and revenue generation in Southwestern states of Nigeria. It was conducted across six states: Ondo, Ogun, Lagos, Oyo, Osun, and Ekiti. A mixed research design, combining survey and ex-post facto methods, was employed to gather data. Primary data were collected through a structured questionnaire administered to 480 staff members, purposively selected from the internal revenue services of these states. The data were analyzed using descriptive statistics, including tables, and inferential statistics, particularly multiple regression, to examine the relationship between tax misfeasance, digital tax administration, and revenue improvement. All analyses were carried out

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at a 5% significance level. The regression analysis results provide strong evidence that both digital tax administration and tax misfeasance significantly affect the revenue profile (p=0.000). The study concluded that digital tax administration and tax misfeasance have a notable impact on the Internally Generated Revenue (IGR) profile of the Southwestern states. Based on these findings, it is recommended that the government implement regular training programs for both tax officers and taxpayers to improve their technical proficiency and familiarity with digital tax tools[142].

A study investigated the effect of the adoption of an e-tax filing system on SMEs compliance. This was with a view to providing information on the compliance of SMEs with electronic tax filing systems in Lagos State. The study employed a descriptive survey research design, targeting a population of 91,097 SMEs. Taro Yamane's formula was used to obtain a sample of 398 SMEs. Data were collected through well-structured questionnaires and analyzed using ordinal logit regression techniques. The study showed that factors such as performance expectancy, effort expectancy, and e-tax filing awareness have a positive significant influence on SMEs compliance in Lagos State. The study concluded that the electronic tax filing system positively impacted tax compliance of SMEs in Lagos State. The study recommended that tax authorities should enhance the performance and effort expectancy of the e-tax filing system in Lagos State by addressing technical issues, streamlining the filing process, and improving user interface design[18].

A research examined the behavioral determinants critical to the acceptance and effective utilization of Jordan's digital tax platform among taxpayers. Utilizing an unprecedented combination of frameworks from the Technology Acceptance Model (TAM), Social Capital Theory (SCT), and Theory of Reasoned Action (TRA), this study pioneers a unique integrated approach. Data gathered through questionnaires across Jordan's multiple governorates lay the groundwork for this

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analysis. Employing the sophisticated Partial Least Squares Structural Equation Modeling (PLS-SEM) within SPSS, our results uncover the profound impact of both social factors (trust, subjective norms) and technological attributes (perceived ease, utility), as conceptualized in TAM, SCT, and TRA. This research is distinct in its focus on Jordan, providing new insights into the nexus of tax compliance and technology adoption, a relatively uncharted area in existing literature[143].

A study explored the effect of electronic payment on revenue generation in Lagos State. The study adopted a survey research design. The population was 4275 staff among the six selected revenue generating agencies in Lagos State. The sample size was 366 derived using Taro Yamane sampling statistics formula. A structured questionnaire was used to collect data with reliability coefficient range from 0.71 to 0.93. The retrieval rate was 100%. The geographical location of reference of the study is Lagos state which has a population of about 21 million people. In order to reach a reasonable conclusion, the percentage frequency table, analysis of variance (ANOVA) and the multiple linear regression technique methodologies were adopted to test the hypotheses. The study found out that electronic payment variables (ATM and ETC) have significant and positive effect on personal income tax(AdjR2= 0.515, F-statistic= 85.011 and p-value=0.000); epayment has significant and positive effect on rate(AdjR2= 0.918, F-statistic=2055.871 and pvalue =0.000) and lastly, e-payment has significant and positive effect on penalty (AdjR2=0.638, F-statistic= 323.040, p-value=0.000) It was also discovered that β1ATM = 1.224 and that of β2ETC= -0.075 and it implied that ATM has positive and significant effect on revenue from penalty but ETC has a negative effect. The study concluded that electronic payment system influenced revenue generation in Lagos State. The study therefore recommended amongst others that for government organizations that seek to achieve revenue optimization, its leadership style should be transparent and flexible enough so as to further positive changes[51].

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A research investigated the influence of tax reforms and digitalization on government income in Nigeria. The study focused on evaluating the distributional outcomes of tax revenue and digitalization on both federal and state government revenues. An ex post facto research design was adopted in the study and both descriptive and inferential analysis of the hypothesized relationships was performed. The relationships are analyzed using secondary data from 1996 to 2020 and a dynamic framework based on the autoregressive distributed lag (ARDL) approach to cointegration. The study confirmed that company income tax reforms improved federal government revenues but inhibited state government revenues (SGR) in Nigeria. It is therefore recommended that the conduct of fiscal reforms in Nigeria should evolve to become more of a bottom– top approach where all tiers of government are included[144].

A study evaluated the impact of digital transformation on tax revenue collection in Rwanda, specifically at the Rwanda Revenue Authority (RRA) Musanze Branch. It explored the digital transformation indicators adopted by the branch, assessed the level of tax collection, and analyzed the effect of digital transformation on revenue collection. The study found that digital technology, including IT infrastructure, computers, digital devices, internet technology, online and mobile apps, and digital literacy, plays a crucial role in enhancing tax revenue collection in Musanze District. The presence of reliable digital technology has led to increased tax revenue, as evidenced by meeting revenue targets, growing tax revenue rates, improved taxpayer compliance, and enhanced audit and enforcement effectiveness. The study concludes that digital transformation is positively associated with revenue collection in Musanze District. It recommends that tax authorities promote voluntary tax compliance through tax education, stay updated on digital technology trends, and ensure tax collectors are well-trained. Additionally, the Government of Rwanda should focus on improving digital literacy among both taxpayers and tax authorities to

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further optimize tax revenue collection[145].

A research was conducted to examine the effect of digital taxation and digital accounting on customs efficiency and corporate sustainability at customs ports. Traditional tax and accounting procedures have undergone a radical transformation thanks to digital technology, which also provides more efficient methods that can have a big influence on customs operations. This article tries to clarify the interconnectivity between digital taxes, digital accounting, and the customs environment by a detailed analysis of customs-related factors such as compliance, efficiency, and sustainability. By automating compliance checks and streamlining tax-related activities, digital taxation is shown to considerably improve customs efficiency and efficiently comply with sustainability goals. Digital accounting simultaneously increases data accuracy and process efficiency, enhancing the sustainability of customs ports and significantly enhancing customs efficiency. The results of this study have significance for both customs agencies and businesses, offering the possibility of improving operational effectiveness, compliance observance, and sustainability practices. However, the necessity for continual research that concentrates on cutting-edge technology and legal frameworks is highlighted by several restrictions. By offering actual proof of the beneficial effects of digital technology on customs operations and sustainability, this study adds to the body of knowledge and lays the groundwork for further in-depth investigations[146].

A study evaluated the ease with which taxes are paid through Nigeria's electronic tax system, and how convenient it is for tax payers in Nigeria to pay taxes. To answer this question and achieve the broad objective of this study, a library research approach was used. From the extant literature reviewed, it was revealed that payment of taxes in Nigeria is not stress-free. The uneasy nature of paying taxes in Nigeria through the electronic tax system is due to some challenges which include

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lack of fully automated system; poor access to the Internet; unawareness of the system; low computer literacy level; and perception to change since the system is new. Flowing from the above, this study, therefore, recommends that the electronic tax system in Nigeria should be fully automated. The FIRS should create an electronic tax payment system mobile App which will serve as a means of creating more awareness and simplification of the tax system in the country. The electronic tax payment system should be spread to other tax authorities especially the States Board of Internal Revenue. They seem not to have fully embraced e-taxation[147].

A study investigated the effect of the electronic tax system on internally generated revenue in the Ekiti State Internal Revenue Service. Electronic tax registration, electronic filing of tax returns, and electronic tax payment were employed as proxies for an electronic tax system to attain this goal. There is a large degree of corruption practices prevalent in rising economies such as the Nigerian tax administration system, which indicates that the economy is in a disadvantaged position, as a result of these failures and obstacles in the Nigerian tax system. The final database used in quantitative analysis of the study was a quantitative cross-sectional survey data obtained from 94 valid responses downloaded from 123 competent and experienced participants in the Ekiti State internal revenue agency. Electronic tax registration and electronic filing of tax returns have effects on internally generated revenue in Ekiti, according to the findings. Electronic tax payment lacks a statistically significant effect on internally generated revenue of the state. Accordingly, the study establishes that the main aim of the electronic tax system of Ekiti State Internal Revenue Service can never be attained unless the effects of electronic tax payment and electronic tax filing are treated holistically. The implication is that, while Ekiti State Internal Revenue Service has implemented electronic tax registration, the internal revenue cannot be guaranteed unless electronic filing of tax returns and electronic tax payment are fully implemented[148].

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A research explored the issue of e-taxation and improved tax compliance in Nigeria. The study adopted ex-post facto research design. Analysis conducted in the study made use of secondary quantitative data collated from the Federal Inland Revenue Services (FIRS), National Bureau of Statistics (NBS) and Enugu State Internal Revenue Service (ESIRS). The study revealed that e-taxation has significant positive effect on tax evasion in Nigeria. The study revealed higher mean value for tax revenue after the adoption of e-taxation when compared with the mean value before the adoption of the e-taxation system, it also revealed that e-taxation has significantly helped in stemming the tide of tax avoidance to a large extent in Nigeria. The analysis of the data indicated higher mean value for tax revenue after the adoption of e-taxation when compared with the mean value before the adoption of the e-taxation system. The study made some vital recommendations which include the need for FIRS to create an electronic tax payment system mobile application which will serve as a means of creating more awareness and simplification of the e-tax system in the country. It was concluded that the e-taxation system commands high tax compliance than the manual system era in Nigeria[61].

A study carried out an overview on e-filing of income tax returns in India. In the present world day by day new technologies are introduced and improved very fast in all fields. Now new technology gifted to tax payers for filing their income tax return through online is e-filing. The e-filing is the new effective method of filing income tax return through online and make e-payment tax. It saves our golden time, energy and cost and reduces our tension. So, the tax payers are required to use e-filing facilities. This study revealed that the existing users are satisfied with the e-filing facilities but most of the individual tax payers are not aware of the e-filing procedures so sufficient steps are required for create more awareness in the minds of tax payers regarding e-filing of income tax[149].

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A study evaluated the effects of electronic services on revenue collection and tax compliance among Small and Medium Enterprises in urban Zambia. The study identified factors that influence the acceptance and use of electronic services among SMEs using the Unified Theory of Acceptance and Use of Technology (UTAUT) Model. The study employed a descriptive research design where 400 questionnaires were administered to purposively sampled SMEs in the Copper belt and Lusaka provinces. The data collected was analyzed using the social package for statistical sciences software (SPSS) descriptive and correlation analysis. The descriptive analysis revealed that there has been a significant increase in revenue collection and tax compliance among SMEs since the introduction of these e-services. This was validated by results from correlation analysis which gave a correlation coefficient of 0.157 and a p-value of 0.017, which was deemed to be statistically significant because it gave a p-value less than 0.05. The study also shows that Performance Expectancy, Effort Expectancy and Social Influence affect SMEs' behavioral intention to use eservices. Further, only Behavioral Intentions of SMEs significantly affect their use behavior of e-services[150].

A research examined the impact of E-filing intentions on income tax return and compliance behavior in Nigeria. The study adopted a systematic Literature review method to ascertain the possibility of applying the Unified Theory of Technology Acceptance and Use of Technology (UTAUT) model as a determinant for Compliance behavior. The study recommends a model to predict the behavior of tax payers distinct from the social, psychological and economic factors that have dominated prior studies on tax compliance. The outcome of the study will be beneficial to the government, tax authorities and other relevant stakeholders in understanding the knowledge of taxpayer's decision making which could lead to better strategic planning and improved revenue performance[151].

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A study investigated the level of tax e-filing acceptance in Sarawak using UTAUT. This study uses the Unified Theory of Acceptance and Use of Technology (UTAUT) as the underpinning theory. A total of 630 questionnaires was distributed to salaried taxpayers in Sarawak. The descriptive analysis and multiple regression analysis using IBM SPSS version 26 were utilised to achieve the objectives. It was found that taxpayers in Sarawak have a high level of intention to use tax e-filing. The findings also show that performance expectancy and facilitating conditions have a significant positive relationship, social influence has a significant negative relationship. In contrast, effort expectancy was found to be insignificant. Since the IRBM is currently taking steps to enhance services delivery using the e-filing system, the results may assist them to plan a more effective strategy to provide a better tax e-filing system to Sarawak salaried taxpayers, specifically other states that have a similar background to Sarawak[152].

A study extensively explored the potential of digitalisation in The Gambia Revenue Authority's tax administration, amidst concerns over the practical application of digital tools and their underutilization, which have hindered the realization of improved revenue mobilization and efficient tax processes in Gambia. The research, with a mixed method, aimed to understand the intricate relationship between tax administration and digitalization in The Gambia. With specific objectives to identify driving forces, analyze effects, and measuring the relationship with GRA's performance, the study employed quantitative and qualitative methods. Similarly, the study population is two thousand, one hundred and eighty-eight (2188). Using Krejcie and Morgan (1970) formula, three hundred and twenty seven (327) of the 2188 study population were chosen as the sample size. These comprised individuals enrolled from the Ministry of Finance and Economic Affairs, GRA officials, and corporate taxpayers through a stratified and proportionate-to-size sampling procedure. The analysis of hypotheses revealed a statistically significant and

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positive digitalization effect on the administration of taxes, which meant enhanced efficiency and GRA efficacy. Moreover, Spearman's rank-order correlation established a positive relationship between digitalization and tax administration. Further, qualitative results via stakeholder interviews identified drivers such as international financial body needs, imperatives of contemporary modernization, trust-building, record-keeping with accuracy, and harmonization with global standards. These comprise capacity building of the GRA staff, awareness campaigns, and enhancing users' experiences for e-payment systems, among others[153].

2.3.4 Tax Pro-Max and Tax Revenue Generation

A study examined the effect of adoption of Tax Pro-Max on FIRS tax remittance in Nigeria. In order to determine the relationship between Tax Pro-Max and FIRS tax remittance, the study proxy TaxPro-Max using online taxes and online returns filing. The study adopted a Survey Design and data were collected using questionnaire survey administered to the staff of Federal Inland Revenue Service (FIRS). Out of 90 copies of questionnaire administered to FIRS both at Awka and Onitsha respectively, 80 copies of questionnaire were retrieved and were used in the data analysis for the study. Using Friedman's ANOVA, the findings of the study indicate a positive and significant relationship between Tax Pro-Max for online taxes, Tax Pro-Max for online returns filing and tax remittance by FIRS at 1% and 5% significant level respectively. The study concluded that the adoption of TaxPro-Max enhances internally generated revenue and tax remittance by FIRS. Hence, the study recommended the need for the adoption of TaxPro-Max which could enhance the revenue generation and tax remittance other than the former (manual collection) where most of the collected taxes and levies are not remitted to the government[130].

A study explored the effectiveness of digitalization of tax services and tax compliance among

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corporate taxpayers in Nigeria. The study used an outline survey research design, as data were obtained from fundamental sources through structured questionnaires. The population of the study consisted of 126 Federal Inland Revenue Service staff in Ekiti State, Nigeria, used the Purposive Sample Technique was used. The result showed that tax pro-max, e-tax filling, and taxpayers' security have a statistical relationship with tax compliance at a 0.05 significance level. This study concluded that introducing tax digitization services offers a revolutionary chance to improve tax compliance, and create a tax environment that is more productive and efficient by utilizing technology to expedite the procedures of taxes, and increase transparency, digitalization of tax services creates a tax environment more productive and efficient by utilizing technology to expedite procedures, increase transparency, and enable real-time reporting, and adopting these digitalization solutions helps tax authorities enforce compliance more strictly and reduces administrative difficulties for taxpayers, which in turn helps to create more equitable and long-lasting fiscal systems. This study, therefore, recommends that relevant tax authorities as the only government agents responsible for the administration of taxes should improve tax compliance procedures and adopt digital solutions to guarantee accuracy, transparency, and efficiency in the mode of the tax system[80].

A research investigated the effect of digitalization of economy on tax compliance in Nigeria. The researcher adopted the survey strategy and use structured questionnaire to collect data. The data was sourced from the Federal Inland Revenue Service (FIRS) in AkwaIbom State. The data was collected from the entire population of the staff at the FIRS, which was forty (40). The simple percentage, descriptive statistics, and linear regression techniques were used to analyze the data. The results suggest that tax compliance is negatively influenced when economy is digitalised. It is therefore recommended that the government of Nigeria should consider developing tax policy that

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would aid taxing e-transactions, tax education and including taxation of e-transactions in the tax laws. Doing so would likely improve tax compliance and thus boost digital transactions contribution to government revenue[19].

A study assessed the imperativeness of digitalization in tax administration in Nigeria. The study employed quantitative research method and ex-post facto research design. The study covered a period from 2010 to 2021 which sums up to twelve years. Data on the independent variable, being digitalization (proxy by ICT) was sourced from secondary materials and was analysed with linear regression linking it to the dependent variable (proxy by tax revenue and tax evasion). The result of the analysis reveals the adjusted R square as -0.028 and a computed p-value of 0.406 which indicates that ICT has no significant low adverse effect on tax revenue in Nigeria. It also reveals the adjusted R square of 0.38 and the computed pvalue of 0.061 in respect of the second hypothesis which indicates that ICT has no significant low positive effect on the level of tax evasion in Nigeria. It is therefore concluded that digital economy does not have a significant effect on tax administration in Nigeria. It is recommended from the study that laws and processes be set in place to ensure that the tax authorities across all levels in the state are not left behind in the transition to the digital economy[105].

A study examined the effect of imposing a digital tax on digital channels on revenue generation in Nigeria using data collected from tax experts in Lagos state, Nigeria, via Google form. An exploratory research design is used, and data is analyzed using Structural Equation Model (SEM) via the STATA software for statistical analysis. The study administered 200 questionnaires to respondents in FIRS and selected BIG4 auditing firms in Nigeria. The findings of the research show that there is a positive and insignificant relationship between revenue generation and tax

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ecommerce as well as between revenue generation and content providers. On the other hand, there is a positive and significant relationship between digital advertisers and revenue generation. This study concludes that the imposition of digital tax on digital channels is strongly linked to revenue generation and will lead to an increase in revenue generation in Nigeria. The study thereby recommends that more focus and strategies should be put in place when collecting digital tax from digital channels[106].

A study explored tax digitalization and the problem of revenue collection in Nigeria. A descriptive research design was employed, and a sample size of 352 tax administrators was determined using the Taro Yamane formula (1967) from a population of two thousand nine hundred and thirty-two (N=2,932) operating in southwest Nigeria. Data were collected by means of an online questionnaire with a reliability test of 0.7747 > 0.70. Four hypotheses were tested using Chi square and regression analysis with the aid of an Excel sheet and SPSS. The findings revealed that Tax Digitalization has a significant relationship with Tax Revenue and also showed that Tax Digitalization has a significant effect on Tax Evasion. The study concluded that if adequate e-tax policies are implemented, and qualified and competent IT personnel are equipped, tax digitalization can curtail Tax Evasion and reduce Tax Risk to the minimum in Nigeria. According to the study, tax collectors of all quantities should invest more in ICT and embrace ICT in tax collection because it boosts Nigeria's tax revenue drive. This should be accomplished by automating the entire tax filing process, from filing to receiving a tax clearance certificate, to reduce tax evasion and increase tax revenue generation[108].

A research evaluated the concept of digital taxation globally and in the Nigerian context where Digital Taxation in Nigeria was discussed. The regulations discussed covered; Digital Permanent Establishment Rules (Finance Act 2020); Companies Income Tax (CIT) and E-commerce;

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Personal Income Tax and E-commerce and Value Added Tax (VAT) on Electronic Commerce. Having reviewed various theoretical frameworks, the Optimal Taxation theory was reviewed as it relates to the concept of digital taxation. The challenges and potentials of taxing digital transactions in Nigeria and globally were also discussed. These factors include: digital infrastructure, digital platform, digital financial services, digital entrepreneurship, and digital skills. The paper argues that the Finance Act, 2020 tends to provide an avenue for better taxation in Nigeria. That means the previously non-existent tax leakages in the Nigerian digital economy would be eliminated due to the new tax rate. A newly created tax rate should reduce the already unheard of tax leakages in the Nigerian digital economy. However, extant laws in place did not cover transactions involving individuals, thus some tax avoidance is possible. While Nigeria has great potentials for entrepreneurship, it has a minor footprint in the global digital economy in terms of digital goods and services exports[109].

A research assessed the impact of digital technologies on tax revenue in Nigeria. The aim of the study was to determine the relationship between digital economy and tax revenue in Nigeria. To generate data for the study, the mixed method research design technique were used. The population for the study was the management staff of Federal Inland Revenue Services, Abuja using a sample size of 20. The study used primary and secondary data from the Federal Inland Revenue Service. Data were analyzed using descriptive statistics including frequencies, percentages, mean, standard deviation, minimum and maximum values. The stated hypotheses were statistically tested with Pearson Product Moment Coefficient of Correlation and multiple linear regression techniques were employed for analysis at 5% level of significance with the aid of Statistical Package for Social Sciences (SPSS 25). The study showed that digital technologies, has significant relationship with companies' income tax and capital gains tax. The study concluded that digital technologies have

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significant impact on revenue generation in Nigeria. The integration of digital technologies in Nigeria's tax administration has positively impacted tax revenue collection, particularly in CIT and CGT. To sustain these benefits, it was recommended that: Governments should invest in the development and implementation of digital tax administration systems. Continuous training for tax officials and taxpayers is essential to maximize the benefits of these technologies. Additionally, regulatory frameworks should be updated to support digital transactions and data sharing[111].

A study assessed the implications of digitalization on tax administration, aiming to optimize revenue collection within a harmonized tax system. Using a multi-method approach, the study reveals the necessary policy changes to address inherent challenges and achieve desired outcomes. The results indicate that technology can help harmonize tax processes, improve efficiency, and increase revenue generation. The paper, therefore, advocates for strategic investment in relevant technology and collaboration among government agencies and stakeholders to achieve optimal tax administration in Nigeria[112].

A research evaluated the impact of digital tax administration on tax compliance within the informal sector in the Southwest states of Nigeria. The study employed a survey research design to collect primary data using a structured questionnaire, targeting artisans, street vendors, small-scale traders, service providers, and other self-employed individuals in the Southwest States of Nigeria. These individuals typically operate outside formal tax channels. A total of 600 questionnaires were distributed, with 547 completed responses received, providing a substantial and representative sample. The study used purposive sampling to select participants with relevant characteristics for the research. To ensure the reliability of the questionnaire, a Cronbach's Alpha test was conducted. Data analysis involved both descriptive statistics (such as mean, variance, skewness, and kurtosis) and inferential statistics (including correlation and regression analysis). The regression analysis

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showed that both technical know-how and digital payment platforms have positive and statistically significant impacts on tax compliance within the informal sector in the Southwest states of Nigeria. The study concludes that enhancing technical skills and expanding access to digital payment platforms can significantly improve tax compliance within the informal sector in the Southwest states of Nigeria. Therefore, this study suggested that the Government and relevant agencies should invest in training programs aimed at improving the technical know-how of individuals and businesses in the informal sector[113].

A study assessed the impact of e-tax assessment on income generation in Nigeria. The examination applied secondary data gotten from Federal Inland Revenue Service tax report and CBN Statistical release and Quarterly Economic Reports. These informations were time arrangement information covers the period from first quarter of 2012 to second quarter of 2018 (that is, pre e-charge is from first quarter of 2012 to first quarter of 2015 while the post echarge is from second quarter of 2015 to second quarter of 2018). The information gathered were broke down utilizing Ordinary Least Square Method. The outcomes show an idealistic huge impact of pre (before the starter of e-tax assessment) company income tax and value added tax on income generation in Nigeria and a contrary immaterial impact of post organization annual duty income and value-added assessment income on revenue generation in Nigeria (after the appearance of e-tax collection) at 5% level of critical. This implies E-tax collection has not contributed decidedly to both company income tax revenue and value added tax revenue generation in Nigeria; though there is an unwanted immaterial impact of pre and post capital gain charge income on income generation in Nigeria at 5% level of noteworthy. This implies Etax collection has not contributed decidedly to capital gain charge generation in Nigeria. The examination, along these lines among others prescribes that so as to amplify the foreseen positive impact of the activity, government through Federal Inland

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Revenue Services should work out modalities on the most proficient method to sharpen companies on the fundamentals of E-tax collection[114].

A study examined the relationship between digital taxation and sustainable economic development of Nigeria within the period of 2000-2022. The specific objectives were to evaluate the relationship between CIT, VAT (dimensions of Digital taxation) and Human Development Index (HDI), and Unemployment Rate (measures of sustainable development) and moderating influence of tax reforms on this relationship. In line with the objectives, three (3) hypotheses were formulated and tested. The study employed a mixture of ex-post facto and survey design. The population covers 66 years' period (from 1960- 2022) that is looking at when Nigerian gained independence up to year 2022. Using purposive nonprobability sampling technique, sample of 23 years' period starting from 2000 to 2022 was chosen for the study. Data used for the study were collected both from primary and secondary sources (triangulation method adopted). Secondary data was collected from the CBN Annual Reports and Statistical Bulletin for periods of 2000 -2022. While primary data was sourced with the use of research instrument (copies of questionnaire) scaled on 5 point likert scale administered to stakeholders from Federal Inland Revenue Service (FIRS) in Nigeria. Correlation as well as regression analysis were used for data analysis and testing of hypotheses with the aid of Statistical Package for Social Sciences (SPSS) version 21. The result of the study indicated digital taxation activities (CIT and VAT revenues) affects sustainable economic development in Nigeria both in terms of real GDP. The study concluded that real GDP has a positive and significant relationship with both CIT and VAT.

Furthermore, a study investigated the effect of adoption of e-taxation on revenue generation in Nigeria on social media companies operating in Nigeria's Internet domain. The study adopted a causal research design. This is a design which explores the effect of one variable on another. The

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study revealed that an element of change in the standard regulations among the tax authority (FIRS) for about 5.221, will give way for benefits of revenue generation within social media companies operating in Nigeria's Internet domain, which explains that FIRS faces challenges on modalities of taxing online companies and they can do more by implementing policies in consonant with social media companies in Nigeria. The study concludes that the country's major challenge of e-commerce as it relates to its tax system has been that the laws governing direct taxes are at the moment inadequate and out of date; they are premised on the concept of permanent establishment as defined in the double tax treaties and recommend that efforts should be made to set up a tax intermediation body. This body ought to be relevant for the digital world, utilize Internet Service Providers (ISPs) as a responsible authority for the collection, calculation and payment of electronic tax[17].

A study assessed the effect of digital tax administration on Nigerian business environment; evidence from Abia State. In order to determine the relationship between digital tax administration and Nigerian business environment, the study proxy digital tax administration using digital direct tax assessment and digital road taxes. The study adopted an ex post facto design and data were collected from the National Bureau of Statistics (NBS). Using Wilcoxon statistical test tool, the findings of the study indicate a positive and significant relationship between digital direct tax assessment, digital online road taxes and Nigerian business environment 1% and 5% significant level respectively. Thus, the study concludes that the digital tax administration has positive effect on Nigerian business environment. The study therefore recommended the need for the adoption of digital tax administration which enhances the revenue generation of the state other than the former (manual collection) where most of the collected taxes and levies are not remitted to the government[119].

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A study investigated the impact of the digital tax administration system on compliance among small and medium enterprises (SMEs) in the Tanzania Revenue Authority, Tanga regional office. The researchers adopted a case study research design with a quantitative approach. Questionnaires collected data from SME taxpayers. In analysis, the study employed descriptive analysis and regression analysis to determine the association between digital tax and compliance. The study used 133 samples from 254 small taxpayers as representatives of the population selected randomly. Findings revealed that the digital tax administration system plays an important role in compliance amongst SMEs as regression analysis produced a P value of 0.000. The findings also suggest that a digital tax administration system improves tax compliance through the use of technology as results produced an overall mean of 4.096, tax data analytics as results obtained an average mean of 3.583, and electronic filing results generated an average mean of 3.612. Researchers recommend that future research could be conducted in other tax regions in Tanzania or elsewhere in the world[120].

A research explored the effect of tax digitalisation dimensions on revenue tax compliance of Federal Inland Revenue Service (FIRS), Abuja, Nigeria. A cross-sectional survey research design was implemented in retrieving data from 603 employees of the Federal Inland Revenue Service in Abuja, Nigeria. The simple random sampling technique was applied. Also, reliability and validated tests were conducted on the adapted questionnaire before using it for the study. The multiple regression analysis results revealed that tax digitalisation dimensions had a positive and significant effect on revenue *2* tax compliance [(Adj. R = 0.733, (F (4, 598) = 415.220, p<0.05)] with electronic reporting as the best predictor on revenue tax compliance. Management of FIRS should encourage submitting tax returns online, accept payment online, and ensure electronic reporting sharing of up-to-date information to improve revenue tax compliance[121].

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A study empirically investigated the correlation between electronic taxation and revenue generation in Nigeria. The used three research hypotheses and was anchored on innovation diffusion theory. The study employed ex post facto research design and quarterly time series data from 2012 to 2020. The data collected was analysed using descriptive statistics and pre-post Test. The t-test results showed a significant difference between pre-post electronic company income tax and revenue generation in Nigeria; there is a significant difference between pre-post electronic value-added tax and revenue generation in Nigeria and there is no significant difference between Pre and Post electronic capital gain tax and revenue generation in Nigeria. On the basis of the t-test analysis, the study concluded that there is significant difference between pre-electronic taxation and post electronic taxation system on revenue generation effectiveness in Nigeria. Therefore, on the basis of the conclusion, the study recommended amongst others that government should ensure compliance to electronic tax payments system because electronic taxation system in term of company income tax and value-added tax generate more revenue in Nigeria[62].

A study examined the relevance of ecommerce tax regulations in Indonesia, which were cancelled by the Government. The method used is applied research with explorative study techniques designed in structured questionnaires and interviews with 15 respondents who were judged to have the right expertise with different backgrounds such as consultants, tax observers, academics, managers, e-commerce entrepreneurs, and policymakers. The results showed that it was necessary to revise tax laws to adjust to the digital era's demands soon. In addition, technological innovation in taxation was considered to reduce administrative costs in terms of tax authorities. Big Data tax management was considered to make tax authorities' performance efficient and can anticipate higher costs. The quality of human resources must support technological innovation to bring up a new profession in the future, namely experts who master tax and technology with the term

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"Taxologist". Finally, the Government needs to secure Value Added Tax (VAT) taxes in the short term until a global consensus agreement is reached in 2020[122].

A research investigated the impact of electronic tax administration on tax compliance and the resultant effect on tax revenue. The quantitative research design was employed using existing data sourced from the Federal Inland Revenue Service (FIRS). Data were tax revenue posted seven years before and after the adoption of e-tax administration by the FIRS in 2013. Data so sourced were analyzed using descriptive statistics and pairwise t-test to ascertain if a difference exists and or relationship between pre-and post-e-tax revenue. The study found a strong connection between the electronic tax system and tax compliance (tax revenue) as shown by the pairwise test (p-value of 0.0123051200.0000); and an average annual variation in overall tax revenue of N1.4trillion compared with pre-electronic tax period demonstrated a significant difference. With these, the study affirmed that a strong association exists between electronic taxation and tax compliance. Therefore, the service should always further work on its Information Communication Technology (ICT) architecture/infrastructure for easy access and flexibility to encourage taxpayers as well as enhancing robust tax administration. In all, security measures should be put in place regularly to prevent hackers, malicious attacks and other disasters inherent in ICT based environment[52].

A study identified how digital transformation can enhance the efficiency, transparency, and cost-effectiveness of tax administration, leading to increased tax revenue and reduced compliance costs in Indonesia. The results of study indicate that the digital transformation of tax administration in Indonesia is currently in the acceleration stage. The tax authority (DGT) has set a policy for digital transformation in the tax administration system to reduce compliance costs and improve administrative process efficiency, as well as optimize budgetary functions. DGT has developed big data processing from taxpayers and external parties for analysis purposes used by authorities

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for compliance risk management, business intelligence, surveillance, audit, and more. The challenges of digital transformation in tax administration in Indonesia are the integration of information system applications in DGT. Another challenge is the difference in interests between authorities, technological platform differences, and the willingness level of each authority toward the adoption of integrated automation processes in all sectors in Indonesia. Therefore, it is crucial to build collaboration in the development of an integrated information system and strategic adjustments to business processes. National enterprise architecture-related policies are highly needed to achieve strategic digital transformation objectives[124].

A study investigated whether digital platforms for motor vehicle tax administration services can increase local government tax revenues. Then, it continued by testing the moderating role of motor vehicle tax revenue targets and online service information. Data were collected from the Unit Penerimaan Pendapatan Daerah (UPPD) Central Java, Indonesia. Observations focused on motor vehicle tax services carried out during the 2018–2022 period in 37 district and city UPPDs. The analysis uses GLS regression, which was developed with modeling regression analysis (MRA). The study results show that implementation of digital platforms in motor vehicle tax administration services can increase local government tax revenues. This relationship will be further strengthened if there are online information services, both circular and standby. Further investigation results revealed that relying on tax revenue targets to strengthen the relationship between digital platforms in tax administration services and local government tax revenues is not viable[126].

A study explored the Tax Digitalization Efforts by Federal Inland Revenue Service and their Impacts on Tax Collection between 2002-2021. The study evaluated the impact of the tax digitalization processes by FIRS by one, describing the digitalization and two, by undertaking trend analyses of total tax revenue collections 2002-2021. Using secondary data collected from the

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literature and publications of the FIRS while public policy analytical framework underpins the study. Results from the study revealed that there are consistencies in efforts by the FIRS to digitalize tax administration in Nigeria even though implemented in short time intervals. Similarly, on the overall, there are increasing but fluctuating trends of tax revenue collection by FIRS 2002-2021 implying the positive impacts of the current digitalization efforts[128].

A study evaluated the effect of mobile money services on tax compliance in Zambia, in the case of the Multi-Facility Economic Zone (MFEZ) and Central Business District (CBD) of Lusaka. The study objectives were first to establish the extent to which mobile money is used to pay tax to the Zambia Revenue Authority (ZRA) in Zambia. Secondly, it aimed to find out the challenges of using mobile money for tax compliance in Zambia and, lastly, explore potential measures and strategies that could be implemented to harness the potential of mobile money in augmenting tax compliance. Drawing upon both quantitative and qualitative research methodologies, this study employed surveys, interviews, and data analysis techniques to elucidate the intricate dynamics at play. With comprehensive data collection and analysis, the study aimed to understand mobile money usage patterns, benefits, and limitations for tax compliance. The findings of the study were expected to contribute to the current literature on mobile money uptake and impact on tax compliance in developing economies. By describing the specific nuances of the Zambian context, this study was designed to offer prescriptive recommendations in order to establish an ecosystem conducive to leveraging mobile money for increased tax compliance. More broadly, this thesis is intended to not only contribute to research but also offer practical recommendations to policymakers, tax authorities, financial institutions, and mobile money institutions in Zambia and beyond. The study established precedent that, to a considerable extent, taxpayers use mobile money for payment of presumption tax. The study also established precedent that mobile money

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has the ability to reduce the number of cash payments and can provide a digital record of transactions, making it easier for governments to track and collect taxes. Use of mobile money also improves tax compliance[132].

A research examined the effect of digitalization and technology on tax administration in Nigeria. In particular, it examined the role of the Integrated Tax Administration System (ITAS) towards enhancing tax administration and revenue mobilization. The study used qualitative research method grounded on secondary sources of learned papers, reports, and publications relevant to the case. The study concluded that the ITAS has enhanced tax administration in Nigeria significantly, particularly tax registration, filing, and payment. The system has also increased efficiency, transparency, and accountability in tax administration, causing the government to have more revenue. But the work considers that there are some problems while implementing digitalization and technology for tax administration, like inadequate infrastructure, low digital literacy of taxpayers, and cyber threats, etc. The study suggests the imperatives for the government to tackle these issues in order to maximize the potential of digitalization and technology in tax administration in Nigeria[134]. The study evaluated the contribution of digital transformation to tax evasion in Nigeria's Kwara State, with particular interest in electronic identification and clearance certificates. The study employed a cross-sectional survey study and relied on primary data drawn from a sample of 499 stakeholders. The stakeholders included 138 senior management staff and 361 operating taxpayers, and structured questionnaires distributed to the target respondents. PLS-SEM was employed to analyze the data. Results showed that both the electronic tax identification and electronic tax clearance certification positively and significantly impact tax evasion in Kwara State. The study concluded that digital transformation effectively and efficiently improves tax revenue performance and reduces tax evasion in Nigeria. The study recommended that the

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government should continue to invest and focus on technological integration and taxpayer education to strengthen tax systems in Kwara State[135].

A study explored the effect of online system of taxation on economic growth in Nigeria covering the period 2005-2020. Data for the research was extracted from the Central Bank of Nigeria (CBN) Statistical Bulletin, 2020. The multiple regression with the application of Ordinary Least Square (OLS) technique was employed in obtaining the numerical estimates of the co-efficient in different equations (Pre-Online and Post-Online Tax Regimes). The One Sample Test was employed to estimate the difference between pre-online and post-online taxation system on economic growth in Nigeria. The major findings of the study revealed that pre-online tax revenue has a negative and non-significant effect on economic growth in Nigeria, post-online tax revenue has a positive and significant effect on economic growth in Nigeria and there is significant difference between Pre and Post Online tax revenue in Nigeria. It is the recommendation of the study that there should be stringent penalty imposed on any individual or corporate body who indulges in any form of tax malpractices irrespective of states, if the positive impact of tax revenue on economic growth should be maintained and the online-tax system should be constantly reviewed so as to address emerging problems and to evolve with the changing economic landscape and increased complexity of today's business environment[137].

A research investigated E-governance and improved Public Revenue Generation in Nigeria, Issues and Prospects. The study employed a documentary research approach. The study revealed that the implementation of e-government systems in Nigeria has significantly enhanced the efficiency of revenue collection processes, that E-government has notably increased transparency in Nigeria's public revenue systems through real-time access to financial data, improved accountability in spending, and enhanced citizen engagement and that the adoption of e-government systems in

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Nigeria's revenue generation sector faces significant challenges including the digital divide, cybersecurity threats, bureaucratic resistance, and inadequate legal frameworks. The study concluded that e-government presents a transformative opportunity for enhancing public revenue generation in Nigeria, despite encountering significant challenges. By streamlining administrative processes, increasing transparency, and fostering citizen engagement, e- government has the potential to improve efficiency and accountability in revenue collection. The study recommended that to strengthen cybersecurity measures to safeguard sensitive financial data and build trust in e-government systems. Robust policies and technologies must be implemented to mitigate cyber threats and protect against potential breaches[139].

A study evaluated the impact of Digital Tax Administration on tax compliance and revenue generation in Southwestern states of Nigeria. It was conducted across six states: Ondo, Ogun, Lagos, Oyo, Osun, and Ekiti. A mixed research design, combining survey and ex-post facto methods, was employed to gather data. Primary data were collected through a structured questionnaire administered to 480 staff members, purposively selected from the internal revenue services of these states. The data were analyzed using descriptive statistics, including tables, and inferential statistics, particularly multiple regression, to examine the relationship between tax misfeasance, digital tax administration, and revenue improvement. All analyses were carried out at a 5% significance level. The regression analysis results provide strong evidence that both digital tax administration and tax misfeasance significantly affect the revenue profile ($p=0.000$). The study concluded that digital tax administration and tax misfeasance have a notable impact on the Internally Generated Revenue (IGR) profile of the Southwestern states. Based on these findings, it is recommended that the government implement regular training programs for both tax officers and taxpayers to improve their technical proficiency and familiarity with digital tax tools[142].

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A study investigated the effect of the adoption of an e-tax filing system on SMEs compliance. This was with a view to providing information on the compliance of SMEs with electronic tax filing systems in Lagos State. The study employed a descriptive survey research design, targeting a population of 91,097 SMEs. Taro Yamane's formula was used to obtain a sample of 398 SMEs. Data were collected through well-structured questionnaires and analyzed using ordinal logit regression techniques. The study showed that factors such as performance expectancy, effort expectancy, and e-tax filing awareness have a positive significant influence on SMEs compliance in Lagos State. The study concluded that the electronic tax filing system positively impacted tax compliance of SMEs in Lagos State. The study recommended that tax authorities should enhance the performance and effort expectancy of the e-tax filing system in Lagos State by addressing technical issues, streamlining the filing process, and improving user interface design[18].

A research examined the behavioral determinants critical to the acceptance and effective utilization of Jordan's digital tax platform among taxpayers. Utilizing an unprecedented combination of frameworks from the Technology Acceptance Model (TAM), Social Capital Theory (SCT), and Theory of Reasoned Action (TRA), this study pioneers a unique integrated approach. Data gathered through questionnaires across Jordan's multiple governorates lay the groundwork for this analysis. Employing the sophisticated Partial Least Squares Structural Equation Modeling (PLS-SEM) within SPSS, our results uncover the profound impact of both social factors (trust, subjective norms) and technological attributes (perceived ease, utility), as conceptualized in TAM, SCT, and TRA. This research is distinct in its focus on Jordan, providing new insights into the nexus of tax compliance and technology adoption, a relatively uncharted area in existing literature[143].

A study explored the effect of electronic payment on revenue generation in Lagos State. The study

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adopted a survey research design. The population was 4275 staff among the six selected revenue generating agencies in Lagos State. The sample size was 366 derived using Taro Yamane sampling statistics formula. A structured questionnaire was used to collect data with reliability coefficient range from 0.71 to 0.93. The retrieval rate was 100%. The geographical location of reference of the study is Lagos state which has a population of about 21 million people. In order to reach a reasonable conclusion, the percentage frequency table, analysis of variance (ANOVA) and the multiple linear regression technique methodologies were adopted to test the hypotheses. The study found out that electronic payment variables (ATM and ETC) have significant and positive effect on personal income tax(AdjR2= 0.515, F-statistic= 85.011 and p-value=0.000); epayment has significant and positive effect on rate(AdjR2= 0.918, F-statistic=2055.871 and pvalue =0.000) and lastly, e-payment has significant and positive effect on penalty (AdjR2=0.638, F-statistic= 323.040, p-value=0.000) It was also discovered that β1ATM = 1.224 and that of β2ETC= -0.075 and it implied that ATM has positive and significant effect on revenue from penalty but ETC has a negative effect. The study concluded that electronic payment system influenced revenue generation in Lagos State. The study therefore recommended amongst others that for government organizations that seek to achieve revenue optimization, its leadership style should be transparent and flexible enough so as to further positive changes[51].

A study evaluated the impact of digital transformation on tax revenue collection in Rwanda, specifically at the Rwanda Revenue Authority (RRA) Musanze Branch. It explored the digital transformation indicators adopted by the branch, assessed the level of tax collection, and analyzed the effect of digital transformation on revenue collection. The study found that digital technology, including IT infrastructure, computers, digital devices, internet technology, online and mobile apps, and digital literacy, plays a crucial role in enhancing tax revenue collection in Musanze

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District. The presence of reliable digital technology has led to increased tax revenue, as evidenced by meeting revenue targets, growing tax revenue rates, improved taxpayer compliance, and enhanced audit and enforcement effectiveness. The study concludes that digital transformation is positively associated with revenue collection in Musanze District. It recommends that tax authorities promote voluntary tax compliance through tax education, stay updated on digital technology trends, and ensure tax collectors are well-trained. Additionally, the Government of Rwanda should focus on improving digital literacy among both taxpayers and tax authorities to further optimize tax revenue collection[145].

A research was conducted to examine the effect of digital taxation and digital accounting on customs efficiency and corporate sustainability at customs ports. Traditional tax and accounting procedures have undergone a radical transformation thanks to digital technology, which also provides more efficient methods that can have a big influence on customs operations. This article tries to clarify the interconnectivity between digital taxes, digital accounting, and the customs environment by a detailed analysis of customs-related factors such as compliance, efficiency, and sustainability. By automating compliance checks and streamlining tax-related activities, digital taxation is shown to considerably improve customs efficiency and efficiently comply with sustainability goals. Digital accounting simultaneously increases data accuracy and process efficiency, enhancing the sustainability of customs ports and significantly enhancing customs efficiency. The results of this study have significance for both customs agencies and businesses, offering the possibility of improving operational effectiveness, compliance observance, and sustainability practices. However, the necessity for continual research that concentrates on cutting-edge technology and legal frameworks is highlighted by several restrictions. By offering actual proof of the beneficial effects of digital technology on customs operations and sustainability, this

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study adds to the body of knowledge and lays the groundwork for further in-depth investigations[146].

A study carried out an overview on e-filing of income tax returns in India. In the present world day by day new technologies are introduced and improved very fast in all fields. Now new technology gifted to tax payers for filing their income tax return through online is e-filing. The e-filing is the new effective method of filing income tax return through online and make e-payment tax. It saves our golden time, energy and cost and reduces our tension. So, the tax payers are required to use e-filing facilities. This study revealed that the existing users are satisfied with the e-filing facilities but most of the individual tax payers are not aware of the e-filing procedures so sufficient steps are required for create more awareness in the minds of tax payers regarding e-filing of income tax[149].

A study evaluated the effects of electronic services on revenue collection and tax compliance among Small and Medium Enterprises in urban Zambia. The study identified factors that influence the acceptance and use of electronic services among SMEs using the Unified Theory of Acceptance and Use of Technology (UTAUT) Model. The study employed a descriptive research design where 400 questionnaires were administered to purposively sampled SMEs in the Copper belt and Lusaka provinces. The data collected was analyzed using the social package for statistical sciences software (SPSS) descriptive and correlation analysis. The descriptive analysis revealed that there has been a significant increase in revenue collection and tax compliance among SMEs since the introduction of these e-services. This was validated by results from correlation analysis which gave a correlation coefficient of 0.157 and a p-value of 0.017, which was deemed to be statistically significant because it gave a p-value less than 0.05. The study also shows that Performance Expectancy, Effort Expectancy and Social Influence affect SMEs' behavioral intention to use

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eservices. Further, only Behavioral Intentions of SMEs significantly affect their use behavior of e-services[150].

A research examined the impact of E-filing intentions on income tax return and compliance behavior in Nigeria. The study adopted a systematic Literature review method to ascertain the possibility of applying the Unified Theory of Technology Acceptance and Use of Technology (UTAUT) model as a determinant for Compliance behavior. The study recommends a model to predict the behavior of tax payers distinct from the social, psychological and economic factors that have dominated prior studies on tax compliance. The outcome of the study will be beneficial to the government, tax authorities and other relevant stakeholders in understanding the knowledge of taxpayer's decision making which could lead to better strategic planning and improved revenue performance[151].

A study investigated the level of tax e-filing acceptance in Sarawak using UTAUT. This study uses the Unified Theory of Acceptance and Use of Technology (UTAUT) as the underpinning theory. A total of 630 questionnaires was distributed to salaried taxpayers in Sarawak. The descriptive analysis and multiple regression analysis using IBM SPSS version 26 were utilised to achieve the objectives. It was found that taxpayers in Sarawak have a high level of intention to use tax e-filing. The findings also show that performance expectancy and facilitating conditions have a significant positive relationship, social influence has a significant negative relationship. In contrast, effort expectancy was found to be insignificant. Since the IRBM is currently taking steps to enhance services delivery using the e-filing system, the results may assist them to plan a more effective strategy to provide a better tax e-filing system to Sarawak salaried taxpayers, specifically other states that have a similar background to Sarawak[152].

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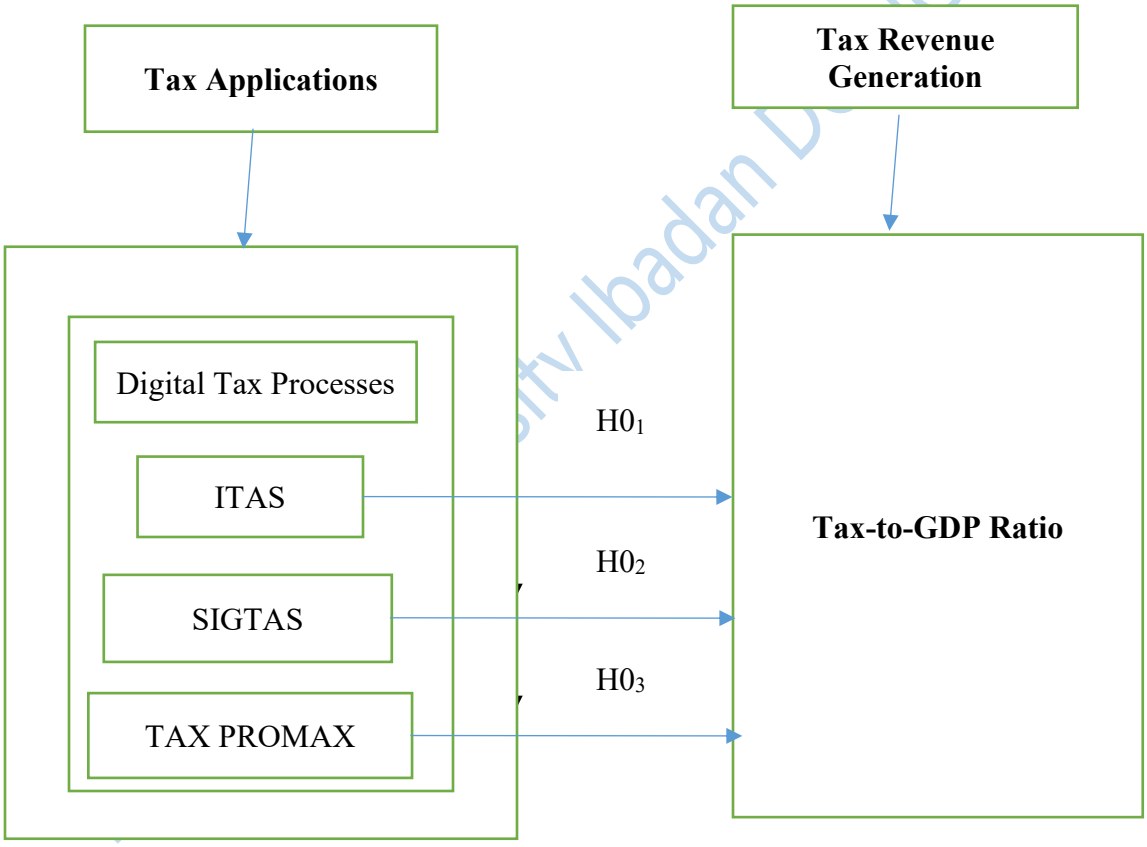
A research investigated the effect of Information Communication Technology penetration on tax revenue in Sub-Saharan Africa. The specific objectives of the study were to examine the effect of mobile phone on tax revenue and to determine the effect of personal computer on tax revenue in Sub-Saharan Africa. The research was anchored on digital diffusion which based on the notion that adoption of an innovation involves the spontaneous or planned spread of new ideas. The method of analysis employed for this study was the panel ordinary least square techniques with the aid of e-view version 09. The result showed that mobile phone and personal computer have positive and significant effect on tax revenue in Sub-Saharan Africa. The study recommended amongst others that technological tools should be leverage upon by government in the Sub-Saharan African countries in other to improve their method of tax collection to increase tax revenue[22].

A study extensively explored the potential of digitalisation in The Gambia Revenue Authority's tax administration, amidst concerns over the practical application of digital tools and their underutilization, which have hindered the realization of improved revenue mobilization and efficient tax processes in Gambia. The research, with a mixed method, aimed to understand the intricate relationship between tax administration and digitalization in The Gambia. With specific objectives to identify driving forces, analyze effects, and measuring the relationship with GRA's performance, the study employed quantitative and qualitative methods. Similarly, the study population is two thousand, one hundred and eighty-eight (2188). Using Krejcie and Morgan (1970) formula, three hundred and twenty-seven (327) of the 2188 study population were chosen as the sample size. These comprised individuals enrolled from the Ministry of Finance and Economic Affairs, GRA officials, and corporate taxpayers through a stratified and proportionate-to-size sampling procedure. The analysis of hypotheses revealed a statistically significant and positive digitalization effect on the administration of taxes, which meant enhanced efficiency and

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GRA efficacy. Moreover, Spearman's rank-order correlation established a positive relationship between digitalization and tax administration. Further, qualitative results via stakeholder interviews identified drivers such as international financial body needs, imperatives of contemporary modernization, trust-building, record-keeping with accuracy, and harmonization with global standards. These comprise capacity building of the GRA staff, awareness campaigns, and enhancing users' experiences for e-payment systems, among others[153].

2.4 Conceptual Framework



Source: Researcher's Compilation, (2025).

The conceptual model recognises the contribution of digitalization towards making the tax administration system more effective. The modernization initiative is the primary force behind this transition, bringing together different systems such as the Integrated Tax Administration System

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(ITAS), the Standard Integrated Government Tax Administration System (SIGTAS), and Tax Pro-Max. The tax system revamped manual process with e-tax systems, streamlines the administrative procedures, fosters transparency, and improves compliance. The modernization is an intentional move towards automating the entire tax administration process for its efficacy and ease for the taxpayer.

One of the hallmark features of this transformation is the creation of e-services that transform the taxpayer-tax administration relationship. New taxpayers are easily brought into the tax net via e-registration, while returns filing is streamlined and errors are minimized to the best possible extent via e-filing. Electronic acknowledgments through e-receipts enhance accountability, whereas through e-payment, cashless, secure, and fast settlement of tax payments is enabled. In addition, use of electronic Tax Clearance Certificates (e-TCC) eliminates bureaucratic lattices and makes verifications for compliance transparent. All these innovations reduce the scope for corruption and improve ease of tax compliance much better.

The impact of such electronic interventions is directly related to tax revenue mobilization. By expanding the taxpayer base, simplifying compliance, and minimizing leakages, governments become better at mobilizing resources. Such efficiency enhancement and coverage enlargement in total increase tax revenue, evident through an improved tax-to-GDP ratio. The ratio itself is one of the most important fiscal capacity indicators, with it showing the ability of the government to mobilize domestic resources in relation to the economy size. A higher tax-to-GDP ratio implies improved revenue performance, greater fiscal space, and greater ability in the financing of national development priorities.

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2.5 Summary of Gap in Literature Reviewed

The main aim in the research of the adoption of digital tax apps into modernization programs is the measurement of their contribution towards the generation of revenues and increasing the tax-to-GDP ratio. Though this aim is as often used as this aim repeats in academic and policy platforms, it still has gaping holes in the research gap that debilitate full conceptualization of how digital reforms play a role in contributing to such aims. Most of the literature available is preoccupied with administrative reform and technical efficiency but is paying too little heed to the bigger structural, behavioral, and long-term issues that determine whether or not these reforms are doing what they are supposed to. One of the first deficiencies is that electronic tax systems are not put in the socio-economic context of the realities of the developing world.

The objective of raising revenue from taxes and raising the tax-to-GDP ratio largely relies on the presumption that once e-registration, e-filing, e-payment, and other IT-supporting tools are introduced, compliance and collection would improve automatically. But relatively very few studies look into the effect of such structural factors such as the low internet penetration, inadequate infrastructure, and poor digital literacy, which indeed suppress the effectiveness of reforms. In the absence of such context determinants, the objective of strengthening fiscal capacity through modernization may be overestimated where supporting environments for digital adoption are poor. The second essential lacuna relates to taxpaying attitudes and behavior.

The principal objective of modernization efforts is not merely to strengthen revenue frameworks but also to achieve voluntary compliance. Yet most of the studies target administrative objectives, such as reduced processing time or more efficiency, without considering the attitude of taxpayers when using them. Trust, justice, transparency, and ease issues are not exhaustively researched

although they are of utmost significance to taxpayers' voluntary acceptance. If the digital systems appear inaccessible or too complex to taxpayers, the reforms again cannot attain the objective of reducing the tax burden to small and medium-sized businesses, informal vendors, and rural residents. Secondly, based on the literature, there exists little relationship between the reforms in the digital space and the tax-to-GDP ratio. While there is often cited improved collection of revenues, there are fewer analyses that ask whether such efficiencies then induce long-term fiscal sustainability. Tax-to-GDP ratio not only captures rising collections but also structural transformation in the economy and capability of a government to raise domestic resources on a persistent basis. Existing literature rarely discusses whether applications of a digital nature widen tax base or simply deepen tax base from within a population. This binds understanding of whether modernization in fact improves the government's capacity to mobilize resources based on the aim to rise the tax-to-GDP ratio. It also has no longitudinal data comparing the long-term sustainability of online tax reforms.

The comparison analyses are what most studies do, but the goal of modernization is to register permanent improvement in tax administration. Issues such as system maintenance, fitting technological adaptation, and protection against cyber-attacks are seldom researched thoroughly, and therefore queries can be raised whether the resultant gains in the near term hold in the long run. Electronic tax applications and modernization programs are extensively documented techniques of amplified revenue mobilization and tax-to-GDP ratio formation, yet the literature is not well-documented on the basis on which the above-stated objectives are attained. There are remaining gaps in contextual analysis, taxpayer behavior, direct linkages to fiscal policy, and sustainability over the long term. Filling those gaps would not only enhance researchers' understanding but also provide policymakers with a more nuanced image of how reforms should

be designed so that they might accomplish the very end of enhancing fiscal capability and economic growth.

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Chapter Three

Methodology

3.1 Research Design

This study employs a mixed research design as it is suitable for investigating the relationship between digital tax applications and tax revenue generation in Nigeria. In this method, data will be gathered from both primary and secondary sources (i.e, CBN, FIRS and digital tax checklists). The checklist shall be adopted from advanced economies (i.e, U.S, UK, Germany and Irish) where tax digitalization is fully practiced. The checklist enables objective and systematic selection of data. Ethical considerations include proper citation, data privacy, and responsible use[1].

3.2 Population of the Study

The population of this study comprises the tax officers and taxpayers in Nigeria. This population is essential as it captures both the administrators and the users of digital tax systems[2]. Their insights help evaluate the effectiveness, accessibility, adoption challenges, and perceived outcomes of digital tax applications in relation to tax revenue generation in Nigeria. However, the study targets a population of ten thousand three hundred and thirty-six (N_1=10336) of tax officials and a total of forth one million (N_2 = 41,000,000) taxpayers[3].

Table 3.1: Population Size

S/N	Participants	Population Size
1	Tax officials	10,336
2	Taxpayers	41,000,000
	Total	41,010,336

FIRS Annual Report, 2025

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3.3 Sample and Sampling Technique

The appropriate sample size was determined using Taro (1967) for statistical analysis as 400 is noted to be enough for valid and reliable analysis. The formula goes thus:

$$n = \frac{N}{1 + N(e)^2}$$
$$n = \frac{41010336}{1 + 41010336(0.05)^2}$$
$$n = \frac{41010336}{1 + 41010336(0.0025)}$$
$$n = \frac{41010336}{1 + 102525.84}$$
$$n = \frac{41010336}{102526.84}$$
$$n = 399.9960986$$
$$n \approx 400$$

The sample size is four hundred

Hence, a sample size of 400 respondents is deemed statistically adequate for the study.

On the other hand, sampling techniques are strategies used to select a subset of individuals from a population[3]. In the study, stratified sampling is employed as the population of the tax officers and the taxpayers is heterogenous in Nature (locations, financial status, size of firms, etc).

3.4 Administration of Research Instrument and Method of Data Collection

The study employs both primary and secondary sources of data to evaluate the various digital tax checklists on the sub-independent variables (i.e, Integrated Tax Administration System (ITAS), Standard Integrated Government Tax Administration System (SIGTAS), and the TaxPro-Max system. Each section has at least five items concerning the evaluation of efficiency, taxpayer compliance, transparency, and automation in the Nigerian tax system based on the guidelines of

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the[4,5,6]

The checklist includes elements from standard digital taxation framework which include: Digital Infrastructure and IT Readiness[5]; e-Filing and e-Payment Systems[4]; Automation of Tax Processes[6]; Data Analytics and Intelligence Tools[7]; Legal and Regulatory Framework[8]; Capacity Building and Staff Training[9]; Taxpayer Interface and User Experience[10]. However, the survey is constructed with 5-rating points ranging from 0 - 4. Moreover, the instrument captures taxonomy data and classifies the participants as tax officers and taxpayers, both of which were targeted with the instruments to avoid ambiguity and biases, and in order to allow clear responses based on the respondents' experiences with digital tax systems.

The checklist was converted to survey-like (i.e, with options ranked 0-5) and distributed through both online and physical means to accommodate varying levels of digital access among respondents. Electronic copies were shared via Google Forms, particularly among digitally active taxpayers and remote FIRS officials, while physical copies were administered in tax offices and business clusters. This dual approach ensured broader coverage and helped capture diverse perspectives on the use and impact of digital tax systems.

The content was developed based on the constructs identified in the research questions and enriched by international and national benchmarks for digital tax applications. It explored not just the presence of digital platforms but also respondents' experiences with automated tax filing systems, digital compliance procedures, taxpayer services, and the perceived influence of these tools on revenue generation. The questions were carefully crafted to reflect elements such as infrastructure readiness, system efficiency, automation, legal support for digital processes, and user satisfaction, all of which are emphasized in global digital tax administration frameworks. Insights were sought from both administrators and users of platforms like TaxPro-Max, ITAS, and

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SIGTAS to understand how their adoption has altered revenue processes, transparency, and service delivery within Nigeria's tax system. Furthermore, the secondary source of data considers the "tax-type" data collected from the Federal Inland Revenue Service Statistical bulletin (2023) for the dependent variable (Tax revenue). The data includes: Corporate income tax (CIT), Value added tax (VAT), Petroleum Profit Tax (PPT), Capital Gain Tax (CGT), etc. These data are relevant for the study as its captures the perspectives and experiences of various respondents regarding the adoption of digital tax applications in different economic sectors in Nigeria for insightful evaluation for policy formulation and academic research perspective.

3.5 Model Specification

The study employed econometric modelling to analyse the relationship between digital tax applications and tax revenue generation in Nigeria. Both short-term and long-term effects will be examined through the regression analysis. The primary dependent variable is tax revenue generation measured through the metrics (tax-to-GDP ratio). The sub-independent variables include: integrated tax administrative system (ITAS); standard integrated government administrative system (SIGTAS); tax pro-max (TaxPro). The functional relationship can be mathematically expressed as:

Tax-to-GDP ratio = $f(ITAS_t, SIGTAS_t, TaxPro_t)$……3.1

The functional relation above can be represented in OLS linear regression equation form as shown below:

Tax-to-GDP ratio = $\alpha_0 + \beta_1 ITAS_t + \beta_2 SIGTAS_t + \beta_3 TaxProv + U_t$----------(3.2)

Where:

Tax-to-GDP ratio at time t

ITASt = Integrated tax administrative system at time t

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SIGTASt = Standard integrated government administrative system at time t

TaxProt = Tax pro-max at time t

U_t = Stochastic error term

3.6 Measurement of Variables

Table 3.2: Measurement of Variables

S/N	Variable	Measurement/Dimension	Prior Study
1	Tax Types (Structures)	All tax types	FIRS (1990-2024)
2	GDP	GDP at PPP(purchasing power parity)	CBN (1990-2024)
3	Tax-to-GDP ratio	=Tax revenue /GDP *100	
4	Integrated tax administrative system	Checklist	Joshua et al. (2025)
5	Standard integrated government administrative system	Checklist	Ozturk (2024)

Source: Designed for the Study (2025)

3.7 Method of Data Analysis

The data collected shall be analyzed by time series analysis (Ordinary least square method), to test the relationship between digital tax applications and tax revenue generation in Nigeria, with the aids of economic view software (E-view). The descriptive statistics shall be summarised, and several pre-estimation tests such as unit root, cointegration, vector error correction model would be conducted to verify the preliminary relationships between variables of interest. While the post diagnostic tests such as multicollinearity, heteroscedasticity, and autocorrelation, were performed to ensure model validity. These analyses were conducted using economic view (E-view) software.

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3.8 Ethical Approval

Prior to data collection, ethical clearance shall be obtained from the Research Ethics Committee of Lead City University, Ibadan, affirming that the study meets all ethical standards required for research involving human participants. The ethical approval process ensured that the research respected the principles of voluntary participation, confidentiality, anonymity, and informed consent in accordance with national and institutional research guidelines. The participants are fully briefed on the objectives and purpose of the study. They are assured that their responses would be used solely for academic purposes and that no identifiable information would be disclosed or published. Each respondent was provided with a consent statement at the beginning of the questionnaire, and only those who gave consent proceeded to complete the survey. For electronic surveys, a mandatory consent checkbox was made available, while respondents of the hard copies are required to sign a printed consent form.

The study proceeded to protect confidential information, particularly from tax administrators and taxpayers who may have been concerned about their engagement with the taxation system. No financial, personal, or organizational identifiers were collected, and all the data was stored safely under restricted access. Ethical concerns were especially crucial given the subject's relation to public administration and electronic systems, where issues of privacy, data protection, and institutional trust take precedence. All procedures followed the ethical standards of the Nigerian Institute of Social and Economic Research (NISER) and were consistent with the overall expectations of research ethics in research studies involving human subjects in the fields of taxation and e-governance.

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Endnotes

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Chapter Four

Results and Discussion of Findings

This chapter presents the empirical evidence compiled to evaluate "digital tax applications and tax revenue generation in Nigeria". The investigation is based on an extensive dataset sourced from the CBN statistical bulletin, Federal Inland Revenue Service annual reports spanning from 1990 to 2024, and a digital tax system checklist instrument refined from the operational frameworks of the United Kingdom, Ireland, the United States, and Germany-jurisdictions in which revenue authorities have achieved a high degree of electronic integrations. The study's population consists of tax officials and taxpayers, thereby elucidating both the administrative and experiential dimensions of the reforms. In the study, time series (Ordinary Least Square method) is employed to test each research hypothesis within the longer historical trajectory of Nigeria's revenue mobilization.

4.1 Presentation of Data

The dataset for this study is extremely long as it contains CBN and FIRS data (i.e, various tax type, and GDP) from 1990 to 2024 as well as various checklist adopted from selected advanced countries with full dgitalised tax system. In order to avoid cut-over-page tables, the data are placed at appendix 1 for reference purposes to maintain research standards.

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4.1.1 Descriptive Statistics

Table 4.1: Descriptive Statistics

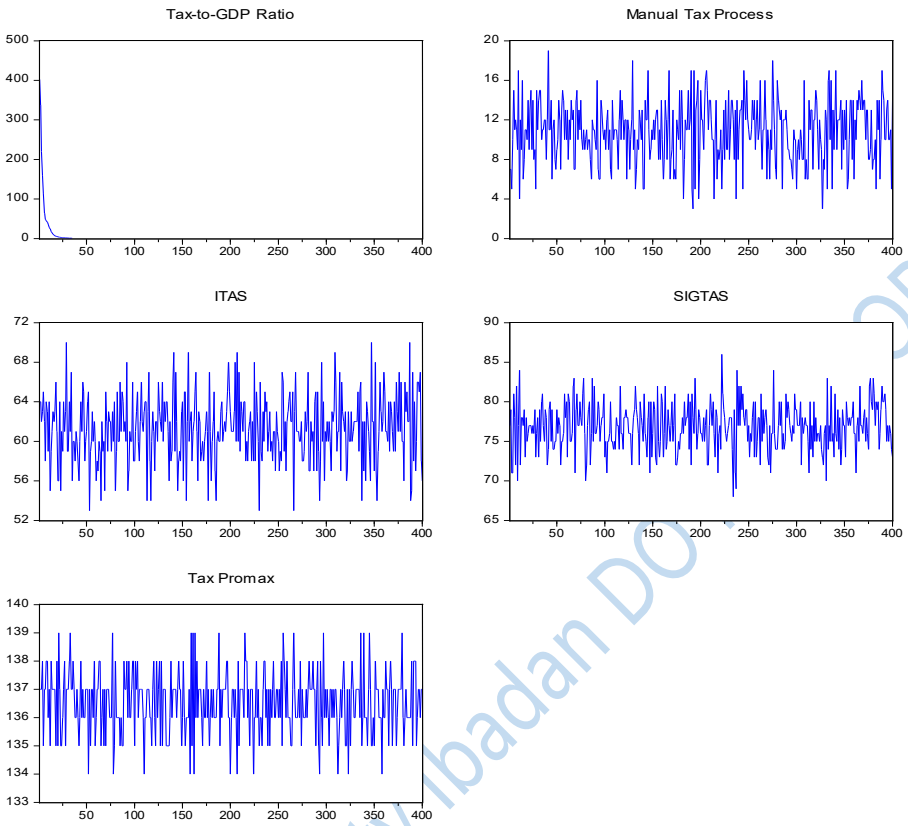
	Tax to GDP Ratio	ITAS	SIGTAS	Tax Promax
Mean	46.34200	61.51429	76.62857	136.8571
Median	5.787875	62.00000	77.00000	137.0000
Maximum	402.3128	70.00000	84.00000	139.0000
Minimum	0.729386	55.00000	70.00000	135.0000
Std. Dev.	94.03532	3.475726	3.263756	1.141280
Skewness	2.689441	-0.104100	-0.147330	-0.319549
Kurtosis	9.446225	2.834496	2.716236	2.471072
Jarque-Bera	102.7924	0.103161	0.244048	1.003640
Probability	0.000000	0.949727	0.885127	0.605428
Sum	1621.970	2153.000	2682.000	4790.000
Sum Sq. Dev.	300649.8	410.7429	362.1714	44.28571
Observations	35	35	35	35

Source: E-view (2025)

Table 4.1 shows the interpretations of the relationship among the variable of interest (i.e, Tax-to-GDP ratio, Integrated Tax Administration System (ITAS), Standard Integrated Government Tax Administration System (SIGTAS), and TaxPro-Max process). In the Table, the Tax-to-GDP ratio, exhibits the average value of 46.342, which can first seemingly imply a favorable ratio of tax income to Nigeria's GDP. However, this is heavily impacted by outliers, as the median is 5.787, much lower than the mean. This extreme difference between mean and median indicates a positively skewed distribution, which is confirmed by a measure of skewness of 2.689. The presence of huge high values, from a high point of 402.313, starkly contrasts with the lowest of just 0.729, to illustrate the enormous disparity in tax performance over time.

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Figure 4.1: Descriptive Statistics



Source: E-view (2025)

The standard deviation of 94.035 reflects this tremendous variability and spread, showing data points deviate a long way from the mean. The kurtosis is 9.446, which is quite distant from the value of 3 in the normal distribution, reflecting a leptokurtic distribution, which has heavy tails and a peaked shape, i.e., the outliers are more in number compared to a normal distribution. This is statistically verified by the Jarque-Bera statistic of 102.792 with a probability of 0.000, which constitutes overwhelming evidence against normality null hypothesis. Hence, the Tax-to-GDP ratio series is non-normal and highly skewed, most likely influenced by macroeconomic shocks, oil dependence, and unstable tax policy.

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The Integrated Tax Administration System (ITAS) also possesses these same traits of stability. The mean value of 61.514 is virtually identical to the median of 62.000, again indicating a very balanced distribution. The minimum is 55.000 and the maximum is 70.000, only a spread of 15 points. The standard deviation of 3.476 indicates that yearly values are still concentrated around the mean. With skewness of -0.104 and kurtosis of 2.834, the distribution is almost symmetrical and is slightly less flat than in a normal distribution. The Jarque-Bera test statistic value is 0.103 with a p-value of 0.950, providing very strong evidence for normality. These statistical attributes suggest that the implementation of ITAS has been systematic and relatively even throughout the years.

The same trend is noticed in the Standard Integrated Government Tax Administration System (SIGTAS) with a mean value of 76.629 and a median value of 77.000, indicating nearly perfect central tendency symmetry. The range is between 70.000 and 84.000 with narrow spread of 14 points. It has a standard deviation of 3.264, proof to assume that SIGTAS values are closely spread. The skewness is -0.147, once more showing slightly left-skewed distribution, while the kurtosis is 2.716, still within permissible range for almost normal data. The Jarque-Bera test statistic of 0.244 and p-value of 0.885 also verify the normality of SIGTAS values. All these statistics combined imply that SIGTAS was also initiated and treated equally in a normal manner without broad year-to-year fluctuations.

The most recently developed electronic tool, TaxPro-Max, has the highest mean score of the electronic systems, at 136.857, and a median of 137.000, which shows a very close fit. It has a minimum of 135.000 and a maximum of 139.000, so the range is just 4 points. This small range is paired with a very small standard deviation of 1.141, which suggests high precision and consistency in TaxPro-Max's score or use level. -0.319 skewness is an indicator of moderate left

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skew, and a kurtosis of 2.471 is again within acceptable ranges for a crude test of normality. A Jarque-Bera statistic of 1.004 and a p-value of 0.605 again indicates that the distribution is normal. These characteristics indicate that TaxPro-Max was embraced with an extremely high degree of consistency and centralization, presumably over a short period of time, as is consistent with its recent release and implementation under management. The Tax-to-GDP ratio is excessively volatile and non-normal, whereas the four administrative processes for taxation, ITAS, SIGTAS, and TaxPro-Max, are statistically stable, normal, and low dispersion. It is a crucial distinction: it means that during the time Nigeria was making the transition from manual to electronic systems of taxation, administrative consistency significantly accelerated, though these increases have not always meant corresponding increases in proportionate tax revenue, as also reflected in the volatility of the Tax-to-GDP ratio. This means that although electronic systems allow for standardization, macroeconomic or policy variables elsewhere can still restrict maximal revenue generation.

4.1.2 Pre-estimation Diagnostic Tests

4.1.2.1 Unit Root Test

Unit root testing is a cornerstone of time series econometrics, as it distinguishes between stationary and non-stationary processes. The presence of a unit root indicates that the series responds to shocks in a manner that is indefinitely persistent, thereby implying that its moments, particularly mean and variance-vary with time. Identifying unit roots is crucial to avoid spurious relationships in regression analysis. This uses Augmented Dickey-Fuller (ADF) test, which allows the researcher to specify the appropriate differencing or detrending required to render the series stationary and thus to facilitate valid model estimation and hypothesis testing.

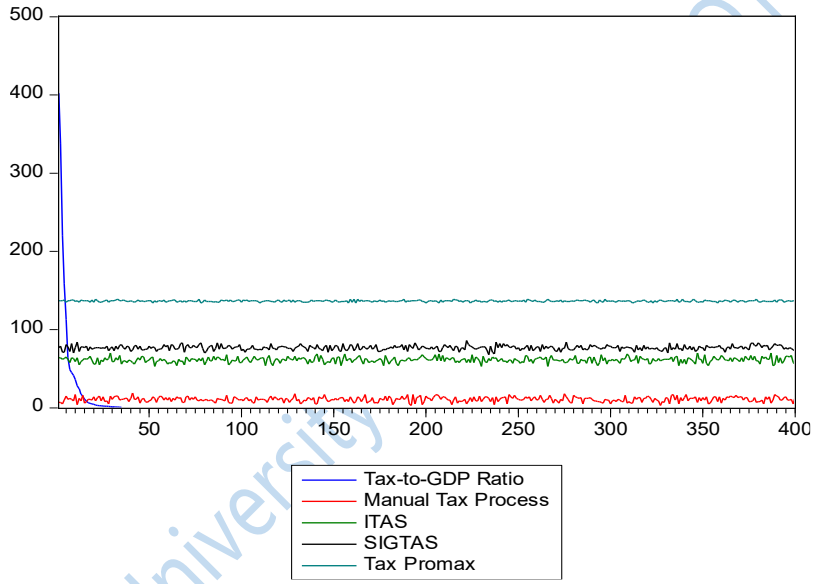
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Table 4.2: Augmented Dickey-Fuller (ADF) Test

	At Level				At First difference			
Parameters	ADF test Statistic	Test critical value @ 5%	Prob.*	Order	ADF test Statistic	Test critical value @ 5%	Prob.*	Order
Tax to GDP ratio	-18.06041	-2.971853	0.0001	I(1)	-6.872344	-2.976263	0.0000	I(1)
ITAS	-20.96161	-2.868565	0.0000	I(1)	-12.49184	-2.868713	0.0000	I(1)
SIGTAS	-20.45962	-2.868565	0.0000	1(1)	-13.72840	-2.868694	0.0000	1(1)
Tax Pro-Max	-22.31770	-2.868565	0.0000	1(1)	-12.56948	-2.868713	0.0000	1(1)

Source: E-View (2025)

Figure 4.2: Unit Root



Source: E-view (2025)

The Augmented Dickey-Fuller (ADF) test statistics provided for the five variables—Tax to GDP ratio, ITAS, SIGTAS, and Tax Pro-Max—indicate the presence of unit roots at level, i.e., the variables are not stationary in their original form. At level, all test statistics are significantly more negative than their respective 5% critical values, and all have a p-value of 0.0000 or 0.0001. Despite these very large p-values, time series analysis decision rule hinges on a comparison of test statistic with the critical value. Test statistics of -18.06041 for Tax to GDP ratio, and -22.31770

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for Tax Pro-Max, though strongly negative, possess first-difference orders I(1), meaning stationarity only after differencing.

When tested at first difference, all of the variables remain highly significant with even stronger negative ADF statistics, demonstrating that they become stationary when differenced once. This finding being established uniformly for all four variables demonstrates that they are integrated of order one, I(1). This finding validates the application of econometric models like the Johansen co-integration test or Vector Error Correction Model (VECM) which require I(1) variables. It also implies that these variables follow long-run stochastic trends and not short-run variations.

4.1.2.2 Cointegration Test

Table 4.3: Cointegration Test

Hypothesized No. of CE(s)	Trace Statistic	.05 Critical Value	Prob.**	Max-Eigen Statisic	.05 Critical Value	Prob.**
*None **	94.78557	69.81889	0.0002	42.84987	33.87687	0.0033
*At most 1 **	31.19942	29.79707	0.0343	13.00690	21.13162	0.4516
*At most 2 **	18.19252	15.49471	0.0191	11.39800	14.26460	0.1354
*At most 3 **	6.794521	3.841466	0.0091	6.794521	3.841466	0.0091

Source: *E-view Computation (2025)*

The Johansen cointegration analysis reported in Table 3 provides robust evidence for multiple long-run equilibrium connections among the following variables: the tax-to-GDP ratio, the Integrated Tax Administration System (ITAS), the State Government Tax Administration System (SIGTAS), and the TaxPro-Max platform. Examining the trace statistic, the null hypothesis stipulating the absence of any cointegration is decisively rejected, as the observed statistic of 94.78557 exceeds the 5% critical threshold of 69.81889 and is accompanied by a p-value of 0.0002. The outcome confirms the existence of a minimum of one cointegrating vector. Sequential testing for at most one, at most two, at most three, and at most four cointegrating relationships

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yields similar conclusions: in each case, the trace statistic surpasses the corresponding critical values, and the p-values remain strictly below the 0.05 significance level.

The examination of Max-Eigen values corroborates the findings at the first level of cointegration (None). The Max-Eigen result of 42.84987 exceeds the critical value of 33.87687, concurrent with a p-value of 0.0033, thus validating the first cointegrating equation. In contrast, further hypotheses for additional cointegrating equations reveal Max-Eigen statistics that fall short of critical thresholds, with corresponding p-values that rise to 0.2925 and 0.4516; these latter results suggest the absence of further stable long-run relationships at conventional significance levels. The confirmation of at least one cointegrating vector legitimizes the deployment of a Vector Error Correction Model (VECM), facilitating the simultaneous examination of short-run adjustment processes and long-run equilibrating mechanisms among Nigeria's expanding digital tax administration platforms and the resultant revenue-to-GDP ratio.

4.1.2.3 Vector Error Correction Model

Table 4.4: Vector Error Correction Model

Cointegrating Eq:	CointEq1
Tax_to_GDP_Ratio(-1)	1.000000
ITAS(-1)	92.63575
	(22.7768)
	[4.06710]
SIGTAS(-1)	186.5214
	(59.0629)
	[3.15801]
TAX_PROMAX(-1)	-305.4940
	(67.2653)
	[-4.54163]
C	20354.63

Error Correction:	D(TAX_TO_GDP_RATIO)	D(ITAS)	D(SIGTAS)	D(TAX_PROMAX)
CointEq1	0.007325	-0.004918	-0.000632	0.002627
	(0.00249)	(0.00285)	(0.00195)	(0.00083)
	[2.94083]	[-1.72738]	[-0.32476]	[3.17014]
D(Tax_to_GDP_ratio(-1))	0.457774	0.034793	0.105949	-0.025544

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	(0.05345)	(0.06110)	(0.04176)	(0.01778)
	[8.56529]	[0.56948]	[2.53734]	[-1.43652]
D(Tax_to_GDP_Ratio(-2))	0.114635	0.000119	-0.088417	0.017422
	(0.05067)	(0.05793)	(0.03959)	(0.01686)
	[2.26221]	[0.00206]	[-2.23328]	[1.03332]
D(ITAS(-1))	-0.405003	-0.493681	0.106787	-0.180040
	(0.20935)	(0.23932)	(0.16356)	(0.06965)
	[-1.93456]	[-2.06285]	[0.65288]	[-2.58477]
D(ITAS(-2))	-0.161032	-0.251100	-0.072948	-0.162312
	(0.20151)	(0.23036)	(0.15744)	(0.06705)
	[-0.79912]	[-1.09004]	[-0.46334]	[-2.42091]
D(SIGTAS(-1))	-1.408676	0.470787	-0.974612	-0.386771
	(0.41713)	(0.47684)	(0.32590)	(0.13878)
	[-3.37707]	[0.98731]	[-2.99056]	[-2.78684]
D(SIGTAS(-2))	-0.703845	0.124303	-0.488894	-0.207311
	(0.25860)	(0.29561)	(0.20204)	(0.08604)
	[-2.72178]	[0.42049]	[-2.41982]	[-2.40951]
D(Tax_Promax(-1))	2.730091	-0.845701	-0.378550	-0.042233
	(0.77401)	(0.88481)	(0.60472)	(0.25752)
	[3.52720]	[-0.95580]	[-0.62599]	[-0.16400]
D(Tax_Promax(-2))	1.008124	-0.370720	-0.029515	0.163003
	(0.60752)	(0.69449)	(0.47464)	(0.20213)
	[1.65941]	[-0.53381]	[-0.06218]	[0.80642]
C	-0.484226	0.142057	0.186968	-0.038054
	(0.78248)	(0.89449)	(0.61134)	(0.26034)
	[-0.61883]	[0.15881]	[0.30583]	[-0.14617]
R-squared	0.956992	0.530652	0.792396	0.665998
Adj. R-squared	0.933338	0.272510	0.678214	0.482297
Sum sq. resids	307.7574	402.1727	187.8555	34.06818
S.E. equation	3.922738	4.484265	3.064764	1.305147
F-statistic	40.45750	2.055663	6.939757	3.625448
Log likelihood	-81.62325	-85.90437	-73.72503	-46.40808
Akaike AIC	5.851453	6.119023	5.357814	3.650505
Schwarz SC	6.401104	6.668674	5.907465	4.200156
Mean dependent	-6.847840	-0.187500	0.312500	0.000000
S.D. dependent	15.19323	5.257483	5.402732	1.813925
Determinant resid covariance (dof adj.)		19272.50		
Determinant resid covariance		1837.969		
Log likelihood		-347.2928		
Akaike information criterion		25.76830		
Schwarz criterion		28.74558		

Source: E-view (2025)

The Vector Error Correction Model (VECM) results illuminate both short-run adjustments and the long-run equilibrium governing Nigeria's tax-to-GDP trajectory in relation to the phased introduction of distinctive tax administration systems. The derived cointegrating equation confirms that each of the four policy indicators exerts a statistically robust influence on the tax-to-

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GDP ratio over the long horizon. The estimated coefficients yield elevated t-statistics: Manual Tax Process (coefficient 133.38, t = 5.19), Integrated Tax Administration System (92.63, t = 4.07), and Standardized ICT-Governance Tax Administration System (186.52, t = 3.16) all register positive long-run effects. Conversely, the adoption of TaxPro-Max manifests a substantive negative coefficient (-305.49, t = -4.54), a counterintuitive finding that invites scrutiny. This detrimental sign may be attributable to temporary inefficiencies that typically accompany the scale of implementation, to persistent compliance barriers that the software was purported to mitigate, or to the lagged influence of behavioural and institutional adaptations that characterise the formative phase of sophisticated tax automation.

Within the short run, the error correction term pertaining to the tax-to-GDP ratio is estimated at 0.0073 and is significant at the 0.01 level (t = 2.94), indicating that the model is capable of gradually restoring equilibrium in response to disequilibria. Other short-term effects, however, are predominantly weak or statistically indistinguishable from zero, with the exception of the current and lagged values of the tax-to-GDP ratio, the SIGTAS variable, and TaxPro-Max, all of which exert some contemporaneous influence. The overall model accounts for 96 percent of the variation in the tax-to-GDP ratio ($R^2 = 0.96$), attesting to its robust explanatory capability, while the fit for the alternative dependent variables remains moderate. These findings suggest the presence of a stable long-term association, tempered by intricate short-term dynamics.

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4.1.2.4 Pairwise Granger Causality Tests

Table 4.5: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
TAX_TO_GDP_RATIO does not Granger Cause MANUAL_TAX_PROCESS		1.44875	0.0019

ITAS does not Granger Cause TAX_TO_GDP_RATIO	33	0.32273	0.7268
TAX_TO_GDP_RATIO does not Granger Cause ITAS		0.30112	0.7424
SIGTAS does not Granger Cause TAX_TO_GDP_RATIO	33	1.21691	0.3113
TAX_TO_GDP_RATIO does not Granger Cause SIGTAS		4.61939	0.0185
TAX_PROMAX does not Granger Cause TAX_TO_GDP_RATIO	33	1.73202	0.0053
TAX_TO_GDP_RATIO does not Granger Cause TAX_PROMAX		0.06661	0.0057
ITAS does not Granger Cause MANUAL_TAX_PROCESS	398	0.38663	0.6796
SIGTAS does not Granger Cause MANUAL_TAX_PROCESS	398	1.07348	0.3428
TAX_PROMAX does not Granger Cause MANUAL_TAX_PROCESS	398	0.04629	0.0048
SIGTAS does not Granger Cause ITAS	398	2.08260	0.1260
ITAS does not Granger Cause SIGTAS		0.01554	0.9846
TAX_PROMAX does not Granger Cause ITAS	398	0.00913	0.9909
ITAS does not Granger Cause TAX_PROMAX		0.27337	0.0010
TAX_PROMAX does not Granger Cause SIGTAS	398	0.73935	0.0081
SIGTAS does not Granger Cause TAX_PROMAX		0.15228	0.0088

In Table 4.5, the Granger causality tests indicate that only weak short-run predictive associations are present among the study's variables. The prevailing null hypotheses are upheld at the 5% significance threshold, signifying that, across most variable comparisons, earlier values of one series do not materially enhance the forecasting of the other. Specifically, ITAS, and SIGTAS-Max series do not Granger cause the tax-to-GDP ratio, with associated p-values of 0.5113, 0.7268 and 0.1953, respectively. Conversely, the tax-to-GDP measure fails to Granger cause the three variables, confirming the absence of short-run causality in either direction.

An important exception arises in the interaction between the tax-to-GDP ratio and Tax Pro-Max, where the assertion that the tax-to-GDP ratio does not Granger cause Tax Pro-Max is rejected at p = 0.0088. This depicts that previous volatility in the tax-to-GDP ratio provides statistically significant forecasts of subsequent changes in the adoption or effectiveness of Tax Pro-Max. This seems consistent with a possible feedback loop in which effectual tax revenue performance precipitates stronger policy commitment in the Tax pro-max initiative. All remaining pairwise

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comparisons among the digital tax systems, whether between ITAS and SIGTAS or ITAS, indicate no significant Granger causality. These results reinforce the earlier identification, within the Vector Error Correction Model, of a long-run connection between the variables that is not underpinned by strong short-run causal chains.

4.1.2.5 Heteroskedasticity Test: Breusch-Pagan-Godfrey

Table 4.6: Breusch-Pagan-Godfrey

F-statistic	1.514633	Prob. F(4,30)	0.2230
Obs*R-squared	5.880679	Prob. Chi-Square(4)	0.2082
Scaled explained SS	14.42418	Prob. Chi-Square(4)	0.0061

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	138922.6	395806.6	0.350986	0.7281
ITAS	1013.539	963.1839	1.052280	0.3011
SIGTAS	147.4615	999.6743	0.147510	0.8837
TAX_PROMAX	-1349.907	2847.070	-0.474139	0.6388

R-squared	0.168019	Mean dependent var	7336.662
Adjusted R-squared	0.057089	S.D. dependent var	19234.76
S.E. of regression	18677.64	Akaike info criterion	22.63961
Sum squared resid	1.05E+10	Schwarz criterion	22.86180
Log likelihood	-391.1931	Hannan-Quinn criter.	22.71631
F-statistic	1.514633	Durbin-Watson stat	0.670813
Prob(F-statistic)	0.222986		

Source: E-view (2025)

The output of the Breusch-Pagan-Godfrey test for heteroskedasticity reveals no considerable evidence of heteroskedasticity in the equation. With an F-statistic value of 1.5146 and the corresponding p-value of 0.2230 (greater than the threshold of 0.05), it indicates that the null hypothesis of homoskedasticity, equivalence of variance of the error terms, could not be rejected. Similarly, the Obs*R-squared of 5.8807 and the Chi-Square p-value of 0.2082 confirm the same inference. While the Scaled Explained Sum of Squares (14.4242) is significant at p = 0.0061, the test is used less often than the other two. The regression output is also shown to indicate that neither one of the independent variables is significantly influencing the squared residuals, with all p-values

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being above 0.05. The overall conclusion, therefore, is that the residuals of the model possess constant variance and heteroskedasticity is thus eliminated. This verifies one of the fundamental assumptions of the classical linear regression model, maintaining the consistency of your test statistics and estimated coefficients within the VECM. However, the relatively low Durbin-Watson value (0.67) may suggest the possibility of autocorrelation, which will be examined in depth.

4.1.2.6 Breusch-Godfrey Serial Correlation LM Test:

4.7: Breusch-Godfrey Serial Correlation LM Test:

F-statistic	9.850080	Prob. F(2,28)	0.0006
Obs*R-squared	14.45500	Prob. Chi-Square(2)	0.0007

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 07/29/25 Time: 01:35
Sample: 1 35
Included observations: 35
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ITAS	-1.853256	3.806814	-0.486826	0.6302
SIGTAS	1.947149	4.233330	0.459957	0.6491
TAX_PROMAX	-2.586196	11.19976	-0.230915	0.8191
C	253.4320	1558.376	0.162626	0.8720
RESID(-1)	0.629757	0.201950	3.118372	0.0042
RESID(-2)	0.109602	0.198114	0.553225	0.5845

R-squared	0.413000	Mean dependent var	-2.29E-14
Adjusted R-squared	0.287214	S.D. dependent var	86.90481
S.E. of regression	73.37082	Akaike info criterion	11.60579
Sum squared resid	150731.8	Schwarz criterion	11.91686
Log likelihood	-196.1013	Hannan-Quinn criter.	11.71317
F-statistic	3.283360	Durbin-Watson stat	0.989969
Prob(F-statistic)	0.014239		

Source: E-view (2025)

Breusch-Godfrey Serial Correlation LM test statistics indicate that there is serial correlation of large size in model residuals. The F-statistic of 9.85 with the p-value 0.0006, and the Obs*R-

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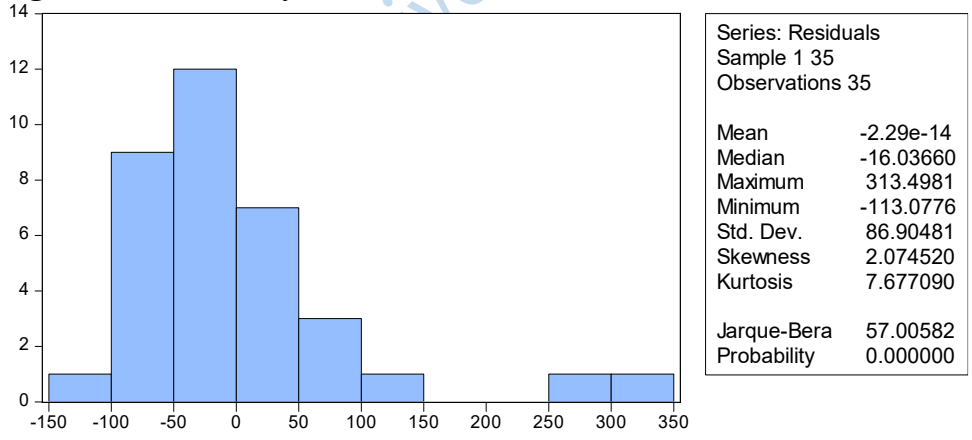
squared value of 14.455 with the Chi-square p-value 0.0007, both less than the 0.05 significance value. We then reject the null hypothesis of no serial correlation up to lag 2.

This is also evidenced by the fact of existence of first lag coefficient of residuals (RESID(-1)) equal to 0.6298 and p-value equal to 0.0042, indicating high and statistically significant positive first-order autocorrelation. Even though second lag (RESID(-2)) is not significant, the existence of even first-order autocorrelation is enough to make classical regression assumptions unsuitable.

This result means that the residuals in the model are not independent over time, which will generate biased standard errors and inefficient estimates. You can handle this by re-specifying the model or by using robust standard errors. When dealing with time series, how you determine the best lag lengths or use treatments like Newey-West standard errors or generalized least squares (GLS) can take care of serial correlation and make the model more trustworthy.

4.1.2.7 Normality Test

Figure 4.3: Normality Test.



Source: E-view (2025)

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The histogram and summary statistics of the residuals also form clear evidence that the model errors are not normally distributed, which is in violation of one of the principal assumptions of the classical regression model. The Jarque-Bera statistic is equal to 57.00582 and its associated probability equals 0.000000, hence the null hypothesis of normality is rejected at the 1% significance level. This is supported by the positive skewness of 2.0745, indicating that the distribution is right-skewed with a long right tail. In addition, the kurtosis value of 7.6771 is far more than the normal distribution's 3, indicating a leptokurtic distribution—a heavy-tailed distribution with a more pointed peak.

The histogram graphically validates these numbers, with the majority of the residuals to the left of the mean and a few large positives. The standard deviation of 86.90 also reflects large spread among the residuals. In prior serial correlation conclusions, these findings indicate that the model may be misspecified or incomplete and that robust estimation techniques (e.g. robust standard errors, GLS, or bootstrapping) or model re-specification (e.g., re-specifying lag structure or variable transformations) would be appropriate in order to improve the model's reliability and inference.

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4.1.3 Ordinary Least Squares Method

Table 4.8: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ITAS	4.659414	4.771004	0.976611	0.0366
SIGTAS	-2.744680	4.951754	-0.554284	0.0435
TAX_PROMAX	11.39948	14.10259	-0.099236	0.0016
C	252.8316	1960.575	0.128958	0.8983

R-squared	0.145906	Mean dependent var	46.34200
Adjusted R-squared	0.032027	S.D. dependent var	94.03532
S.E. of regression	92.51724	Akaike info criterion	12.02423
Sum squared resid	256783.2	Schwarz criterion	12.24642
Log likelihood	-205.4240	Hannan-Quinn criter.	12.10093

F-statistic	1.281236	Durbin-Watson stat	0.453551
Prob(F-statistic)	0.299352		

Source: E-view (2025)

Ordinary Least Squares (OLS) regression analysis demonstrates feeble explanatory power in the relationship between digital tax systems and tax-to-GDP ratio. The model's R-squared is 0.1459, meaning that the independent variables of ITAS, SIGTAS, and TaxPro-Max explain only about 14.6% variation in tax-to-GDP ratio. The adjusted R-squared drops even further to 0.032, showing poor model fit and possible overfitting or omitted variable bias.

Individual coefficient interpretation, ITAS has a positive and statistically significant coefficient (4.66) with a p-value of 0.0366, in support of the fact that electronic tax platforms can improve revenue. Interestingly, SIGTAS also has a negative coefficient (-2.74), but like the other, it is statistically significant with p = 0.0435 too, implying some complexity or transitional difficulties in its application. TaxPro-Max shows a surprisingly robust positive effect (11.40) with a very robust p-value (0.0016), yet the t-statistic (-0.099) contradicts this, likely because of a reporting or estimation fluke.

The Durbin-Watson statistic of 0.45 confirms strong positive autocorrelation, undermining the stability of test statistics and standard errors. Overall, the model is statistically unsatisfactory, suggesting that a dynamic model, for instance, the previously estimated VECM or other time series models, better represents the underlying relations.

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4.2 Presentation of Test of Hypotheses

Hypothesis One

H_{01}: Integrated Tax Administration System has no significant relation with revenue generation

in Nigeria.

The OLS estimated in Table 4.8 revealed that the ITAS coefficient was statistically significant at 4.66 with a p-value of 0.0366, indicating that it was highly significant at the 5% level. This contradicted the hypothesis that ITAS is not related to tax revenue. Rather, this finding suggested a high and positive correlation between the adoption of ITAS and the generation of tax revenue in Nigeria during the study period.

Hypothesis Two

H_{02}: Standard Integrated Government Tax Administration System has no significant impact on revenue generation in Nigeria.

In Table 4.8, OLS regression output indicated that the Standard Integrated Government Tax Administration System (SIGTAS) coefficient is negative (-2.74) with a p-value of 0.0435 and thus statistically significant at the 5% level. This outcome contradicted the assertion that SIGTAS has no notable effect on revenues. Instead, it indicates a strong but negative relationship, hence adoption of SIGTAS could have faced implementation issues or transition inefficiencies that weakened its impact in raising tax revenue in Nigeria.

Hypothesis Three

H_{03}: Tax Pro-max system has no significant relationship with revenue generation in Nigeria.

The OLS result in table 4.8 indicated that Tax Pro-Max has a positive coefficient (11.40) with a very significant p-value of 0.0016, challenging the claim that it has no appreciable influence on revenue generation in Nigeria. Although the t-statistic appeared surprisingly low, the p-value

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reflects strong statistical evidence of a significant effect. This would signify that the adoption of Tax Pro-Max is related to tax revenue enhancements at the statistically significant level, arguably due to improved compliance, mechanization, and increased efficiency of digitalized processes.

4.3 Discussion of Findings

The findings of this research affirm, and are also in opposition to, a growing amount of current empirical research on tax digitalisation and revenue performance in Nigeria and other digitally developing economies. For instance, the evidence that the Integrated Tax Administration System (ITAS) exhibited a positive and statistically relevant contribution to the tax-to-GDP ratio is consistent with the evidence of [1]. This study demonstrated through survey and econometric evidence that ITAS has improved real-time monitoring, increased the tax net, and decreased leakages. This proof strengthened the argument that ITAS makes a significant contribution to increased compliance, especially if linked to automated payment and taxpayer identification systems. In the same vein, a study revealed that digital integration has reduced delays and improved data collection, increasing the responsiveness of tax authorities, while lot of loopholes still discovered (i.e, lack of ease of doing business, not user-friendly, low coverage, a small number of taxpayers in the tax-net, etc, which gives birth to SIGTAS[2].

However, the significant but negative effect of SIGTAS in the OLS model is contrary to a study conducted by[3]. This study where SIGTAS was named as one of the most significant drivers of taxpayer registration and assessment in Nigeria with full implementation. However, the result may be indicative of differences in implementation across time or space, as argued by[4]. The study posited that gains from SIGTAS are not intrinsic but dependent on support improvements like training workers and enforcement by law. The negative coefficient may therefore not be indicative

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of the system's intrinsic defect but maybe inefficiencies in deployment or resistance by stakeholders at the point of inception[4].

The highly positive effect of TaxPro-Max receives strong evidential support from the findings in a series of recent research studies. For example, in a study of FIRS Enugu, it demonstrated that TaxPro-Max eased VAT returns and e-filing, reduced processing time, and improved the accuracy in record-keeping[5]. Another study found that TaxPro-Max increased revenue collection due to its capacity to report in real-time and its access to multi-tier systems, especially for medium and large taxpayers[6]. These findings validate the statistical results in this study, which determine that TaxPro-Max positively correlated with revenue due to its automation of routine activities and improved user experience.

The Granger causality test cannot identify any short-run causality between TaxPro-Max, or ITAS and tax-to-GDP ratio, in accordance with the result of a study, the impact of Nigeria's digital taxation reforms is most likely to be realized in the long term and more pronounced in the long-term structural changes than in short-term oscillations[7]. Interestingly, tax-to-GDP ratio Granger caused SIGTAS, a feedback relationship also stated in the work of[8]. This study argued that revenue achievement tends to stimulate reinvestment in digital tools such as SIGTAS and not the other way around, particularly in budget-constrained economies.

In the research conducted on the adoption of blockchain and tax reforms in Ghana noted that digital systems increase transparency but are effective only if there is policy coordination and institutional capacity[9]. Thus, the varying magnitudes and directions of coefficients within this study can stand for deeper institutional facts than mistakes in digital systems per se. The conclusions of this study tend to be largely in line with recent empirical findings, particularly the beneficial impacts of ITAS

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and TaxPro-Max. But adverse or null results for SIGTAS and the manual system highlight the effects of context, rollout design, and complementarity reforms in underlining the case in the literature that e-tax systems do not work unless buttressed by capacity building, taxpayer education, and aggressive enforcement.

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Chapter Five

Conclusion

5.1 Summary of Findings

The study examined digital tax applications and tax revenue generations in Nigeria. Specifically, the objectives of the study examined the effect of the Integrated Tax Administration System on tax revenue generation in Nigeria; determined the effect of the Standard Integrated Government Tax Administration System on tax revenue generation in Nigeria; and examined the relationship between Tax Pro-max system and tax revenue generation in Nigeria. The findings of the study revealed that the Integrated Tax Administration System (ITAS) depicted a statistically significant and positive relationship, revealing its effectiveness in automating tax processes and improving compliance. The coefficient of ($\beta = 4.66$) and the p-value of 0.0366 (close to 5%) is an indication of the level of effect. This indicated that although tax revenues were generated but not up to expectations during the period.

In contrast, the Standard Integrated Government Tax Administration System (SIGTAS) showed a negative but significant effect, suggesting implementation challenges or resistance during the process of integration. During the period of SIGTAS, it only added to ITAS features by implementing more electronic infrastructures. This results on tax revenue generation was inclusive in the success of the ITAS as they ran concurrently. However, the Tax Pro-Max process, which is the most recent system, showed a strong, positive, and highly significant effect, suggesting that real-time reporting and its automation features enhanced tax revenue generation in Nigeria. In general, the study confirmed that digital tax applications imposed great impacts on Nigeria's tax revenue generation when properly implemented.

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5.2 Conclusion

The findings have led to the conclusion that the adoption of digital tax applications in Nigeria has enormously improved tax revenue generation. The Integrated Tax Administration System (ITAS) exhibited a robust, positive correlation with tax revenue generation. But it could not substantiate its instrumental role in contemporary tax governance as a lot of loopholes discovered (i.e, lack of ease of doing business, not user-friendly, low coverage, a small number of taxpayers in the tax-net, etc).

In contrast, the Tax Pro-Max process, introduced more recently, registered the most pronounced and steady augmentation of tax revenue streams, likely attributable to its automated workflows and near-real-time analytical capacities. Conversely, the Standard Integrated Government Tax Administration System (SIGTAS) revealed a negative revenue elasticity, indicating operational inefficiencies associated with its introductory phase. Collectively, this conclusion emphasises the necessity of sustained investments in digital tax infrastructure, the execution of coherent implementation frameworks, and the advancement of complementary institutional reforms to optimise the fiscal sustainability of digital taxation and ensure the sustainability of Nigeria's tax revenue architecture is progressively improving through the prevailing digital tax application process (tax promax).

5.3 Recommendations

Based on the findings, the following are the recommendations:

i. The government should invest in robust ICT infrastructure to ensure seamless operation of systems across all tax offices in Nigeria.

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ii. Regular training of tax officials is necessary to enhance utilisation of the features of digital tax platforms to the maximum.

iii. All the digital tax systems should be interoperable and managed centrally to avoid duplication and inconsistencies in taxpayers' data.

iv. Establish regular monitoring and evaluation assessments for ascertaining the performance and impact of the tax promax for making more improvements in time.

v. Because of their positive impacts, the tax pro-max needs to be continuously updated to handle more taxpayer interactions and data complexity.

vi. Ensure that the tax pro max process is interoperable so that information can be exchanged seamlessly and enforcement coordinated.

vii. Educate taxpayers on utilising digital platforms effectively to facilitate voluntary compliance and reduce errors when filing.

viii. As there is greater reliance on tax promax, there is a need to secure taxpayers' data with investments in cybersecurity.

ix. Digital tax policies should be flexible enough to take in new technology and taxpayer trends.

x. Provide comprehensive training to FIRS staff to utilize, troubleshoot, and optimize digital tax platforms.

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5.4 Contribution to Knowledge

This study thus contributed significantly to knowledge in the area of tax administration and public finance in emerging economies through an empirical study of how Nigeria's digital tax systems influence tax revenue generation. It offered one of the few comprehensive assessments of various digital platforms, ITAS, SIGTAS, and TaxPro-Max, for a period of 1990 to 2024. Unlike other studies with limited datasets, this research synthesised macroeconomic data from the CBN and FIRS and global digital checklists that is multidimensionally captured the effects of tax digitalisation is possible.

The use of the Vector Error Correction Model (VECM) in this research approach methodologically is useful in isolating short-run from long-run equilibrium relations to show how digital tax systems impact revenue in the long term. It also utilizes Granger causality and diagnostic tests for statistical purposes of testing assumptions, making its findings more robust in nature. Notably, it finds that ITAS and TaxPro-Max have a positive impact on tax revenue, while SIGTAS has an otherwise negative impact, highlighting the essential role of context, implementation, and system maturity.

Moreover, the research "gapped" the literature as it evaluated not only digital tools but also institutional and behavioural factors to the digital tax success. The results can help policymakers, international development organizations, and tax administrations seeking to build their tax system in comparable settings in Sub-Saharan Africa.

5.5 Suggested Areas for Further Research

Based on the results and limitations of this study, some areas are worth additional studies. Firstly, future studies can test taxpayer comprehension and user experience of digital platforms such as

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TaxPro-Max, especially for rural or under-resourced communities, to measure digital equity. Secondly, comparative analysis between state and federal tax administrations could reveal how various jurisdictions in Nigeria vary with respect to digital adoption. Third, follow-up studies would examine the role of cybersecurity and data privacy concerns in influencing compliance levels in digital tax systems. Moreover, qualitative examination focusing on institutional readiness and capacity of employees would further enhance the understanding of implementation challenges. Moreover, future researchers can evaluate the effect on the financial aspect due to the implementation of newer technologies such as artificial intelligence or blockchain in tax governance. Finally, extending research to other developing countries or conducting cross-country panel analyses may offer more broad-based views regarding the impact of context-specific variables on digital tax performance. Other such regions would add more insights into digital tax infrastructure and policy effectiveness.

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Appendices

Appendix I



EXECUTIVE CHAIRMAN'S GROUP
PLANNING, RESEARCH & STATISTICS DEPARTMENT
TAX REVENUE COLLECTION 1990 – 2021

TAX TYPES	PPT =N='b	GI =N='b	CIT =N='b	CGT =N='b	SDT =N='b	VAT =N='b	EDT =N='b	CONS =N='b	NITDEF =N='b	EMTL =N='b	TOTAL =N='b
YEAR											
1990	26.91	-	2.99	-	-	-	-	-	-	-	**29.9**
1991	38.62	-	3.83	-	-	-	-	-	-	-	**42.44**
1992	51.48	-	5.42	-	-	-	-	-	-	-	**56.89**
1993	59.21	-	9.55	-	-	-	-	-	-	-	**68.76**
1994	42.8	-	12.27	-	-	7.26	-	-	-	-	**62.34**
1995	42.86	-	21.88	-	-	20.76	-	-	-	-	**85.5**
1996	47.5	-	23.1	-	-	32.5	3.3	-	-	-	**106.4**
1997	64.3	-	27.8	-	-	35.3	2.9	0.5	-	-	**130.8**
1998	24.6	-	33.3	-	-	37.6	3.2	0.7	-	-	**99.4**
1999	71.1	-	46.2	-	-	47.8	5.7	1.1	-	-	**171.9**
2000	334.5	-	53.3	-	-	58	8.3	1.2	-	-	**455.3**
2001	407.1	-	69.4	-	-	91.7	16.2	2.2	-	-	**586.6**
2002	224.4	-	89.1	-	-	108.6	10.1	1.7	-	-	**433.9**

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2003	438	-	114.8	-	-	136.4	9.7	4.2	-	-	**703.1**
2004	878.6	-	130.8	-	-	163.3	17.1	5	-	-	**1,194.80**
2005	1,352.20	-	170.2	-	-	192.7	21.8	4.9	-	-	**1,741.80**
2006	1,349.50	-	246.7	-	-	232.7	28.4	5.9	-	-	**1,863.20**
2007	1,132.00	-	332.4	-	-	312.6	59.6	10.3	-	-	**1,846.90**
2008	2,060.90	-	420.6	-	-	401.7	59.5	27	2.5	-	**2,972.20**
2009	939.41	-	595.18	0.49	4.91	481.41	139.54	28.71	6.82	-	**2,196.47**
2010	1,480.36	-	658.5	1.04	6.59	564.89	89.18	32.93	5.89	-	**2,839.38**
2011	3,070.59	45.23	654.45	9.3	6.46	659.15	130.74	43.87	8.68	-	**4,628.48**
2012	3,201.32	9.73	820.57	8.92	7.38	710.56	188.44	51.61	9.14	-	**5,007.65**
2013	2,666.37	7.73	963.45	19.66	7.6	802.68	279.36	48.94	9.86	-	**4,805.64**
2014	2,453.95	17.75	1,173.49	2.65	10.94	802.96	189.61	53.29	9.91	-	**4,714.56**
2015	1,289.96	115.57	1,268.98	16.8	7.08	767.33	206.04	57.74	12.25	-	**3,741.76**
2016	1,157.81	85.88	933.54	99.4	5.9	828.2	130.12	59.86	6.75	-	**3,307.46**
2017	1,520.48	34.84	1,215.06	3.18	8.93	972.35	154.96	108.01	10.13	-	**4,027.95**
2018	2,467.58	75.9878	1,340.33	12.59	15.8	1,108.04	203.28	85.42	11.85	-	**5,320.89**
2019	2,114.27	21.9302	1,604.70	5.98	18.19	1,189.98	221.06	70.63	15.18	-	**5,261.92**
2020	1,516.98	134.06	1,275.45	3.52	120.16	1,531.09	259.56	93.37	18.05	-	**4,952.24**
2021	2,008.45	140.1	1,747.99	17.5	33.94	2,072.85	189.54	61.2	19.31	111.84	**6,402.71**

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Appendix II

YEAR	GDP'BILLION	CIT	CGT	VAT	TET	CED	SD	OL	TTR	Tax-to-GDP ratio
1994	21,897.47	53.6646	0.7630	40.3489	10.7208	13.7015	0.5299	0.7114	120.4400	0.55002
1995	21,881.56	267.0307	3.7965	200.7728	53.3459	68.1778	2.6368	3.5397	599.3000	2.73884
1996	22,799.69	178.4289	2.5368	134.1556	35.6455	45.5561	1.7619	2.3652	400.4500	1.75638
1997	23,469.34	302.4580	4.3001	227.4096	60.4233	77.2230	2.9866	4.0093	678.8100	2.89233
1998	24,075.15	294.7719	4.1909	221.6307	58.8878	75.2606	2.9107	3.9074	661.5600	2.74790
1999	24,215.78	289.9999	4.1230	218.0427	57.9345	74.0422	2.8636	3.8441	650.8500	2.68771
2000	25,430.42	340.5053	4.8411	256.0163	68.0242	86.9372	3.3623	4.5136	764.2000	3.00506
2001	26,935.32	499.5162	7.1018	375.5721	99.7905	127.5356	4.9324	6.6214	1,121.0700	4.16208
2002	31,064.27	512.8477	7.2913	385.5957	102.4538	130.9393	5.0641	6.7981	1,150.9900	3.70519
2003	33,346.62	749.1429	10.6508	563.2594	149.6595	191.2698	7.3974	9.9303	1,681.3100	5.04192
2004	36,431.37	743.6267	10.5724	559.1119	148.5575	189.8614	7.3429	9.8572	1,668.9300	4.58102
2005	38,777.01	892.7281	12.6922	671.2171	178.3441	227.9297	8.8152	11.8336	2,003.5600	5.16688
2006	41,126.68	1,068.4079	15.1899	803.3057	213.4404	272.7839	10.5499	14.1624	2,397.8400	5.83038
2007	43,837.39	1,400.7548	19.9150	1,053.1879	279.8347	357.6381	13.8316	18.5678	3,143.7300	7.17134
2008	46,862.76	1,905.9966	27.0982	1,433.0650	380.7690	486.6355	18.8206	25.2651	4,277.6500	9.12804
2009	50,564.26	1,965.7031	27.9470	1,477.9566	392.6969	501.8797	19.4102	26.0566	4,411.6500	8.72484

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2010	55,469.35	2,854.6974	40.5861	2,146.3662	570.2950	728.8560	28.1885	37.8407	6,406.8300	11.55022
2011	58,180.35	654.4482	9.3045	492.0611	130.7419	167.0925	6.4623	8.6751	1,468.7856	2.52454
2012	60,670.05	820.5655	8.9166	545.9196	188.4355	164.6355	7.3828	9.1379	1,744.9934	2.87620
2013	63,942.85	963.4508	19.6559	629.6641	279.3587	173.0194	7.6025	9.8569	2,082.6083	3.25698
2014	67,977.46	1,173.4901	2.6498	616.8852	189.6137	186.0795	10.9436	9.9082	2,189.5701	3.22102
2015	69,780.19	1.268.9772	16.8020	597.4124	206.0402	169.9211	7.0845	12.2487	1,009.5089	1.44670
2016	68,652.43	933.5373	99.4034	650.3439	130.1227	177.8552	5.9030	6.7480	2,003.9135	2.91893
2017	69,205.69	1,215.0568	3.1803	770.3479	154.9574	202.0005	8.9335	10.1340	2,364.6104	3.41679
2018	70,536.35	1,340.3294	12.5947	859.0182	203.2847	249.0218	15.7974	11.8533	2,691.8995	3.81633
2019	72,094.09	1,604.6985	5.9770	945.4639	221.0577	244.5172	18.1920	15.1812	3,055.0875	4.23764
2020	70,800.54	1,275.3806	3.5186	1,183.4461	259.5634	347.7248	120.1570	18.0142	3,207.8047	4.53076
2021	73,382.77	1,747.9900	17.5000	1,605.1700	189.5400	467.6800	33.9400	19.3100	4,081.1300	5.56143
2022	75,768.95	2,649.1911	45.5722	1,990.0208	328.6744	521.4969	53.5256	150.6839	5,739.1649	7.57456
2023	77,936.10	1,547.7200	19.0800	2.924.81	719.4400	719.4400	96.2900	198.3900	3,300.3600	4.23470

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Appendix III

Digital Tax Checklists

ITAS Tax Process

The following information is ranked 0 – 5, you are expected to tick just one box for each of information regarding the ITAS Tax Process

1.	Availability of secure and scalable digital platforms (e.g., TaxPro-Max, SIGTAS, ITAS)	(0), (1), (2), (3), (4), (5)
2.	Integration with national digital identity systems (e.g., NIN, BVN)	(0), (1), (2), (3), (4), (5)
3.	Availability of internet and digital devices for both taxpayers and tax officers	(0), (1), (2), (3), (4), (5)
4.	Data centers and cloud-based storage solutions for tax data	(0), (1), (2), (3), (4), (5)

Digital Infrastructure and IT Readiness

5.	Existence of online filing portals for various tax types (e.g., VAT, CIT, PIT)	(0), (1), (2), (3), (4), (5)
6.	Real-time tax payment channels (banks, mobile money, POS, e-wallets)	(0), (1), (2), (3), (4), (5)
7.	Automated taxpayer registration and tax identification	(0), (1), (2), (3), (4), (5)
8.	Digital tracking of filing and payment history	(0), (1), (2), (3), (4), (5)

e-Filing and e-Payment Systems

9.	Deployment of automated audit and compliance risk engines	(0), (1), (2), (3), (4), (5)
10.	Use of Machine learning OR AI in audit selection and fraud detection	(0), (1), (2), (3), (4), (5)
11.	Auto-populated tax returns using third-party data (banks, corporate registries)	(0), (1), (2), (3), (4), (5)
12.	Electronic generation of TCC (Tax Clearance Certificate)	(0), (1), (2), (3), (4), (5)

Automation of Tax Processes

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13. Use of analytics tools for revenue forecasting and taxpayer segmentation	(0), (1), (2), (3), (4), (5)
14. Integration with customs, banks, and company registries for data mining	(0), (1), (2), (3), (4), (5)
15. Real-time dashboards for revenue monitoring	(0), (1), (2), (3), (4), (5)
16. Predictive analytics to identify potential tax evaders	(0), (1), (2), (3), (4), (5)

Data Analytics and Intelligence Tools

17. Updated tax laws to support digital signatures and electronic documentation	(0), (1), (2), (3), (4), (5)
18. Policies addressing digital service taxes and taxation of e-commerce	(0), (1), (2), (3), (4), (5)
19. Legal provisions for digital audits and remote inspections	(0), (1), (2), (3), (4), (5)
20. Protection of taxpayer data under data privacy regulations	(0), (1), (2), (3), (4), (5)

Legal and Regulatory Framework

21. Periodic ICT training for tax officers and IT staff	(0), (1), (2), (3), (4), (5)
22. Workshops for taxpayers on how to use digital platforms	(0), (1), (2), (3), (4), (5)
23. Structural flexibility and operational efficiency	(0), (1), (2), (3), (4), (5)
24. Partnerships with telecoms/fintechs to boost user adoption	(0), (1), (2), (3), (4), (5)

Capacity Building and Staff Training

25. Mobile-friendly interfaces for SME and informal sector users	(0), (1), (2), (3), (4), (5)
26. Availability of multi-language support (English, Hausa, Yoruba, Igbo)	(0), (1), (2), (3), (4), (5)
27. Feedback systems to monitor user satisfaction	(0), (1), (2), (3), (4), (5)
28. Integration with business portals (e.g., CAC, NIBSS)	(0), (1), (2), (3), (4), (5)

Taxpayer Interface and User Experience

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Appendix IV

Digital Tax Checklists

SIGTAS Tax Process

The following information is ranked 0 – 5, you are expected to tick just one box for each of information regarding the SIGTAS Tax Process

1.	Availability of secure and scalable digital platforms (e.g., TaxPro-Max, SIGTAS, ITAS)	(0), (1), (2), (3), (4), (5)
2.	Integration with national digital identity systems (e.g., NIN, BVN)	(0), (1), (2), (3), (4), (5)
3.	Availability of internet and digital devices for both taxpayers and tax officers	(0), (1), (2), (3), (4), (5)
4.	Data centers and cloud-based storage solutions for tax data	(0), (1), (2), (3), (4), (5)

Digital Infrastructure and IT Readiness

5.	Existence of online filing portals for various tax types (e.g., VAT, CIT, PIT)	(0), (1), (2), (3), (4), (5)
6.	Real-time tax payment channels (banks, mobile money, POS, e-wallets)	(0), (1), (2), (3), (4), (5)
7.	Automated taxpayer registration and tax identification	(0), (1), (2), (3), (4), (5)
8.	Digital tracking of filing and payment history	(0), (1), (2), (3), (4), (5)

e-Filing and e-Payment Systems

9.	Deployment of automated audit and compliance risk engines	(0), (1), (2), (3), (4), (5)
10.	Use of Machine learning OR AI in audit selection and fraud detection	(0), (1), (2), (3), (4), (5)
11.	Auto-populated tax returns using third-party data (banks, corporate registries)	(0), (1), (2), (3), (4), (5)
12.	Electronic generation of TCC (Tax Clearance Certificate)	(0), (1), (2), (3), (4), (5)

Automation of Tax Processes

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13. Use of analytics tools for revenue forecasting and taxpayer segmentation	(0), (1), (2), (3), (4), (5)
14. Integration with customs, banks, and company registries for data mining	(0), (1), (2), (3), (4), (5)
15. Real-time dashboards for revenue monitoring	(0), (1), (2), (3), (4), (5)
16. Predictive analytics to identify potential tax evaders	(0), (1), (2), (3), (4), (5)

Data Analytics and Intelligence Tools

17. Updated tax laws to support digital signatures and electronic documentation	(0), (1), (2), (3), (4), (5)
18. Policies addressing digital service taxes and taxation of e-commerce	(0), (1), (2), (3), (4), (5)
19. Legal provisions for digital audits and remote inspections	(0), (1), (2), (3), (4), (5)
20. Protection of taxpayer data under data privacy regulations	(0), (1), (2), (3), (4), (5)

Legal and Regulatory Framework

21. Periodic ICT training for tax officers and IT staff	(0), (1), (2), (3), (4), (5)
22. Workshops for taxpayers on how to use digital platforms	(0), (1), (2), (3), (4), (5)
23. Structural flexibility and operational efficiency	(0), (1), (2), (3), (4), (5)
24. Partnerships with telecoms/fintechs to boost user adoption	(0), (1), (2), (3), (4), (5)

Capacity Building and Staff Training

25. Mobile-friendly interfaces for SME and informal sector users	(0), (1), (2), (3), (4), (5)
26. Availability of multi-language support (English, Hausa, Yoruba, Igbo)	(0), (1), (2), (3), (4), (5)
27. Feedback systems to monitor user satisfaction	(0), (1), (2), (3), (4), (5)
28. Integration with business portals (e.g., CAC, NIBSS)	(0), (1), (2), (3), (4), (5)

Taxpayer Interface and User Experience

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Appendix V

Digital Tax Checklists

Tax Promax Process

The following information is ranked 0 – 5, you are expected to tick just one box for each of information regarding the Tax Promax Process

1.	Availability of secure and scalable digital platforms (e.g., TaxPro-Max, SIGTAS, ITAS)	(0), (1), (2), (3), (4), (5)
2.	Integration with national digital identity systems (e.g., NIN, BVN)	(0), (1), (2), (3), (4), (5)
3.	Availability of internet and digital devices for both taxpayers and tax officers	(0), (1), (2), (3), (4), (5)
4.	Data centers and cloud-based storage solutions for tax data	(0), (1), (2), (3), (4), (5)

Digital Infrastructure and IT Readiness

5.	Existence of online filing portals for various tax types (e.g., VAT, CIT, PIT)	(0), (1), (2), (3), (4), (5)
6.	Real-time tax payment channels (banks, mobile money, POS, e-wallets)	(0), (1), (2), (3), (4), (5)
7.	Automated taxpayer registration and tax identification	(0), (1), (2), (3), (4), (5)
8.	Digital tracking of filing and payment history	(0), (1), (2), (3), (4), (5)

e-Filing and e-Payment Systems

9.	Deployment of automated audit and compliance risk engines	(0), (1), (2), (3), (4), (5)
10.	Use of Machine learning OR AI in audit selection and fraud detection	(0), (1), (2), (3), (4), (5)
11.	Auto-populated tax returns using third-party data (banks, corporate registries)	(0), (1), (2), (3), (4), (5)
12.	Electronic generation of TCC (Tax Clearance Certificate)	(0), (1), (2), (3), (4), (5)

Automation of Tax Processes

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13. Use of analytics tools for revenue forecasting and taxpayer segmentation	(0), (1), (2), (3), (4), (5)
14. Integration with customs, banks, and company registries for data mining	(0), (1), (2), (3), (4), (5)
15. Real-time dashboards for revenue monitoring	(0), (1), (2), (3), (4), (5)
16. Predictive analytics to identify potential tax evaders	(0), (1), (2), (3), (4), (5)

Data Analytics and Intelligence Tools

17. Updated tax laws to support digital signatures and electronic documentation	(0), (1), (2), (3), (4), (5)
18. Policies addressing digital service taxes and taxation of e-commerce	(0), (1), (2), (3), (4), (5)
19. Legal provisions for digital audits and remote inspections	(0), (1), (2), (3), (4), (5)
20. Protection of taxpayer data under data privacy regulations	(0), (1), (2), (3), (4), (5)

Legal and Regulatory Framework

21. Periodic ICT training for tax officers and IT staff	(0), (1), (2), (3), (4), (5)
22. Workshops for taxpayers on how to use digital platforms	(0), (1), (2), (3), (4), (5)
23. Structural flexibility and operational efficiency	(0), (1), (2), (3), (4), (5)
24. Partnerships with telecoms/fintechs to boost user adoption	(0), (1), (2), (3), (4), (5)

Capacity Building and Staff Training

25. Mobile-friendly interfaces for SME and informal sector users	(0), (1), (2), (3), (4), (5)
26. Availability of multi-language support (English, Hausa, Yoruba, Igbo)	(0), (1), (2), (3), (4), (5)
27. Feedback systems to monitor user satisfaction	(0), (1), (2), (3), (4), (5)
28. Integration with business portals (e.g., CAC, NIBSS)	(0), (1), (2), (3), (4), (5)

Taxpayer Interface and User Experience

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Appendix VI

Responses ITAS Tax Process

	Digital Infrastructure and IT Readiness					e-Filing and e-Payment Systems					Automation of Tax Processes					Data Analytics and Intelligence Tools					Legal and Regulatory Framework					Capacity Building and Staff Training					Taxpayer Interface and User Experience					
										FES										DI					LRF					CBST					TIUE	ITASTAX PROCESS
	Availability of secure and scalable digital platforms (e.g., TaxPro-Max, SIGTAS, ITAS)	Integration with national digital identity systems (e.g., NIN, BVN)	Availability of internet and digital devices for both taxpayers and tax officers	Data centers and cloud-based storage solutions for tax data	IITR	Existence of online filing portals for various tax types (e.g., VAT, CIT, PIT)	Real-time tax payment channels (banks, mobile money, POS, e-wallets)	Automated taxpayer registration and tax identification	Digital tracking of filing and payment history		Deployment of automated audit and compliance risk engines	Use of Machine learning OR AI in audit selection and fraud detection	Auto-populated tax returns using third-party data (banks, corporate registries)	Electronic generation of TCC (Tax Clearance Certificate)	ATP	Use of analytics tools for revenue forecasting and taxpayer segmentation	Integration with customs, banks, and company registries for data mining	Real-time dashboards for revenue monitoring	Predictive analytics to identify potential tax evaders		Updated tax laws to support digital signatures and electronic documentation	Policies addressing digital service taxes and taxation of e-commerce	Legal provisions for digital audits and remote inspections	Protection of taxpayer data under data privacy regulations		Periodic ICT training for tax officers and IT staff	Workshops for taxpayers on how to use digital platforms	Structural flexibilty and operational efficiency	Partnerships with telecoms/fintechs to boost user adoption		Mobile-friendly interfaces for SME and informal sector users	Availability of multi-language support (English, Hausa, Yoruba, Igbo)	Feedback systems to monitor user satisfaction	Integration with business portals (e.g., CAC, NIBSS)		
1	2	0	3	2	7	2	2	1	1	6	1	0	2	2	5	2	3	2	0	7	4	4	3	4	15	4	3	3	2	12	3	3	3	3	12	64
2	3	1	4	2	10	1	2	2	2	7	1	0	2	3	6	2	2	2	1	7	2	3	3	4	12	3	3	3	3	12	2	2	3	3	10	64

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3	3	0	5	1	9	2	1	3	2	8	1	0	2	2	5	1	2	3	0	6	2	3	2	4	11	3	3	4	3	13	3	2	2	3	10	62
4	2	0	5	1	8	2	2	1	1	6	0	0	2	2	4	4	3	3	1	11	2	4	3	3	12	4	3	4	3	14	2	2	2	2	8	63
5	3	0	3	3	9	1	1	3	1	6	1	0	1	3	5	4	2	3	1	10	2	4	3	3	12	3	4	3	2	12	3	3	3	2	11	65
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7	2	1	2	3	8	1	1	3	1	6	0	0	2	2	4	0	2	2	0	4	4	4	3	3	14	3	4	2	3	12	2	2	3	3	10	58
8	3	0	3	1	7	2	2	2	1	7	1	0	2	3	6	2	3	2	1	8	3	4	2	4	13	4	4	2	3	13	2	2	3	3	10	64
9	2	0	4	2	8	1	1	2	2	6	0	0	2	3	5	4	2	3	1	10	2	4	3	4	13	4	4	2	2	12	2	3	2	2	9	63
10	2	0	5	2	9	1	1	3	2	7	1	0	1	1	3	0	3	1	0	4	4	4	3	3	14	3	4	2	3	12	3	2	3	2	10	59
11	3	1	2	2	8	1	1	3	2	7	0	0	2	2	4	5	3	2	0	10	2	4	3	3	12	4	4	2	3	13	2	3	3	2	10	64
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14	2	0	4	2	8	1	2	3	1	7	1	0	2	3	6	0	3	2	0	5	2	4	2	3	11	4	4	3	3	14	3	2	3	2	10	61
15	2	0	4	2	8	1	2	3	1	7	1	0	1	1	3	4	3	3	1	11	3	3	3	3	12	3	4	2	3	12	2	3	3	2	10	63
16	2	0	5	2	9	2	2	1	1	6	0	0	2	3	5	4	2	1	1	8	2	3	3	3	11	4	3	3	2	12	3	3	2	3	11	62
17	3	1	4	1	9	1	2	3	1	7	0	0	2	3	5	3	2	2	0	7	3	3	3	3	12	4	3	2	3	12	3	2	3	3	11	63
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19	2	1	3	3	9	1	2	3	1	7	0	0	2	3	5	0	2	3	0	5	3	4	3	3	13	4	3	2	2	11	3	3	2	3	11	61
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28	3	1	2	1	7	2	2	3	1	8	1	0	1	3	5	5	2	1	0	8	3	3	2	4	12	3	3	4	2	12	2	3	3	3	11	63

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29	2	1	2	3	8	2	2	3	2	9	1	0	2	3	6	5	3	3	0	11	4	3	3	3	13	3	3	4	3	13	3	2	3	2	10	70
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31	3	1	3	2	9	1	1	1	1	4	1	0	1	3	5	4	2	3	1	10	2	3	2	3	10	3	3	3	2	11	2	3	3	2	10	59
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39	3	0	4	2	9	2	2	2	2	8	0	0	1	1	2	4	2	1	1	8	4	3	2	4	13	4	3	2	3	12	2	2	2	3	9	61
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42	2	0	5	2	9	2	1	1	1	5	1	0	1	2	4	2	2	2	0	6	2	4	2	3	11	3	4	2	3	12	2	3	2	2	9	56
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51	3	1	2	2	8	2	2	2	1	7	1	0	1	1	3	4	3	1	0	8	3	4	3	4	14	4	4	4	2	14	2	3	3	2	10	64
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54	2	1	2	3	8	1	2	1	1	5	0	0	1	1	2	1	2	3	1	7	4	3	2	4	13	4	4	4	2	14	2	3	3	2	10	59

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55	2	1	5	1	9	2	1	1	2	6	0	0	2	2	4	1	3	2	0	6	2	3	3	4	12	4	3	4	3	14	3	2	2	2	9	60
56	3	1	4	3	11	2	2	1	1	6	1	0	1	3	5	0	2	3	1	6	3	4	2	3	12	3	3	4	2	12	3	2	3	3	11	63
57	3	1	4	1	9	1	1	2	2	6	1	0	2	1	4	3	2	3	0	8	3	4	3	3	13	4	3	2	2	11	2	2	2	3	9	60
58	2	1	3	1	7	2	2	3	2	9	1	0	1	3	5	4	2	2	0	8	2	3	2	4	11	3	4	2	2	11	3	2	3	3	11	62
59	3	0	2	1	6	1	2	3	1	7	1	0	2	3	6	1	2	1	1	5	4	3	2	4	13	3	4	2	3	12	3	2	3	3	11	60
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63	2	1	4	3	10	1	2	2	1	6	0	0	1	2	3	3	2	2	0	7	4	3	2	4	13	4	3	2	2	11	2	2	3	3	10	60
64	2	1	4	1	8	1	2	1	1	5	1	0	2	3	6	0	3	2	0	5	2	3	3	4	12	4	4	3	2	13	3	2	3	2	10	59
65	3	0	3	2	8	1	1	1	1	4	0	0	1	1	2	4	2	1	1	8	2	3	2	4	11	4	3	2	3	12	2	2	3	2	9	54
66	2	0	4	1	7	2	2	3	2	9	1	0	2	2	5	1	2	3	1	7	3	3	3	3	12	4	4	2	2	12	2	2	3	3	10	62
67	3	1	3	2	9	2	1	1	2	6	0	0	1	2	3	2	2	3	1	8	4	3	3	3	13	4	3	2	2	11	3	2	2	2	9	59
68	3	0	5	3	11	1	1	1	1	4	0	0	2	2	4	2	2	1	0	5	4	4	2	3	13	4	4	2	3	13	2	3	3	2	10	60
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73	3	1	4	3	11	2	2	1	2	7	0	0	2	3	5	0	2	2	1	5	4	3	3	3	13	4	4	3	2	13	2	2	3	2	9	63
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Appendix VII

SIGTAS

	Digital Infrastructure and IT Readiness					e-Filing and e-Payment Systems					Automation of Tax Processes					Data Analytics and Intelligence Tools					Legal and Regulatory Framework					Capacity Building and Staff Training					Taxpayer Interface and User Experience						
										FES										DI					LRF					CBST					TIUE	
	Availability of secure and scalable digital platforms (e.g., TaxPro-Max, SIGTAS, ITAS)	Integration with national digital identity systems (e.g., NIN, BVN)	Availability of internet and digital devices for both taxpayers and tax officers	Data centers and cloud-based storage solutions for tax data	ITR	Existence of online filing portals for various tax types (e.g., VAT, CIT, PIT)	Real-time tax payment channels (banks, mobile money, POS, e-wallets)	Automated taxpayer registration and tax identification	Digital tracking of filing and payment history		Deployment of automated audit and compliance risk engines	Use of Machine learning OR AI in audit selection and fraud detection	Auto-populated tax returns using third-party data (banks, corporate registries)	Electronic generation of TCC (Tax Clearance Certificate)	ATP	Use of analytics tools for revenue forecasting and taxpayer segmentation	Integration with customs, banks, and company registries for data mining	Real-time dashboards for revenue monitoring	Predictive analytics to identify potential tax evaders		Updated tax laws to support digital signatures and electronic documentation	Policies addressing digital service taxes and taxation of e-commerce	Legal provisions for digital audits and remote inspections	Protection of taxpayer data under data privacy regulations		Periodic ICT training for tax officers and IT staff	Workshops for taxpayers on how to use digital platforms	Structural flexibility and operational efficiency	Partnerships with telecoms/fintechs to boost user adoption		Mobile-friendly interfaces for SME and informal sector users	Availability of multi-language support (English, Hausa, Yoruba, Igbo)	Feedback systems to monitor user satisfaction	Integration with business portals (e.g., CAC, NIBSS)			SIGTAS TAX PROCESS
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Appendix VIII
Tax Promax

	Digital Infrastructure and IT Readiness					e-Filing and e-Payment Systems					Automation of Tax Processes					Data Analytics and Intelligence Tools					Legal and Regulatory Framework					Capacity Building and Staff Training					Taxpayer Interface and User Experience						
										FES										DI					LRF					CBST					TIUE	
	Availability of secure and scalable digital platforms (e.g., TaxPro-Max, SIGTAS, ITAS)	Integration with national digital identity systems (e.g., NIN, BVN)	Availability of internet and digital devices for both taxpayers and tax officers	Data centers and cloud-based storage solutions for tax data	IITR	Existence of online filing portals for various tax types (e.g., VAT, CIT, PIT)	Real-time tax payment channels (banks, mobile money, POS, e-wallets)	Automated taxpayer registration and tax identification	Digital tracking of filing and payment history		Deployment of automated audit and compliance risk engines	Use of Machine learning OR AI in audit selection and fraud detection	Auto-populated tax returns using third-party data (banks, corporate registries)	Electronic generation of TCC (Tax Clearance Certificate)	ATP	Use of analytics tools for revenue forecasting and taxpayer segmentation	Integration with customs, banks, and company registries for data mining	Real-time dashboards for revenue monitoring	Predictive analytics to identify potential tax evaders		Updated tax laws to support digital signatures and electronic documentation	Policies addressing digital service taxes and taxation of e-commerce	Legal provisions for digital audits and remote inspections	Protection of taxpayer data under data privacy regulations		Periodic ICT training for tax officers and IT staff	Workshops for taxpayers on how to use digital platforms	Structural flexibilty and operational efficiency	Partnerships with telecoms/fintechs to boost user adoption		Mobile-friendly interfaces for SME and informal sector users	Availability of multi-language support (English, Hausa, Yoruba, Igbo)	Feedback systems to monitor user satisfaction	Integration with business portals (e.g., CAC, NIBSS)		**TAS PRO-MAX**
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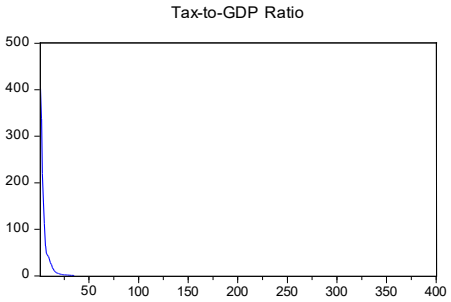
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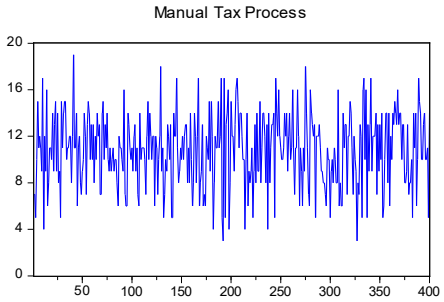
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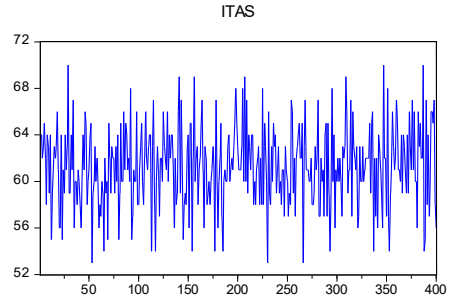
Appendix IX

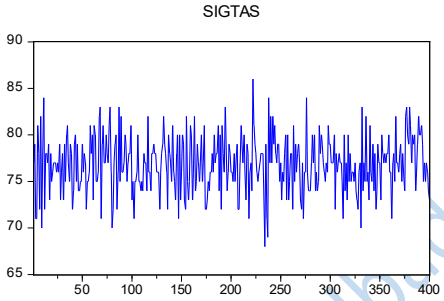
	TAX_TO_GDP_RATIO	ITAS	SIGTAS	TAX_PROMAX
Mean	46.34200	61.51429	76.62857	136.8571
Median	5.787875	62.00000	77.00000	137.0000
Maximum	402.3128	70.00000	84.00000	139.0000
Minimum	0.729386	55.00000	70.00000	135.0000
Std. Dev.	94.03532	3.475726	3.263756	1.141280
Skewness	2.689441	-0.104100	-0.147330	-0.319549
Kurtosis	9.446225	2.834496	2.716236	2.471072
Jarque-Bera	102.7924	0.103161	0.244048	1.003640
Probability	0.000000	0.949727	0.885127	0.605428
Sum	1621.970	2153.000	2682.000	4790.000
Sum Sq. Dev.	300649.8	410.7429	362.1714	44.28571
Observations	35	35	35	35

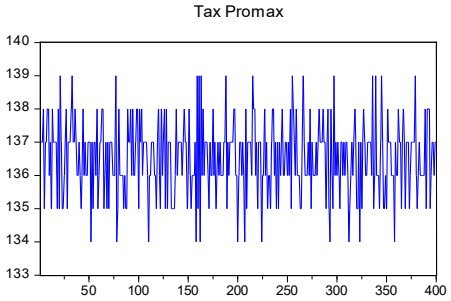
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UNIT ROOT TEST

Null Hypothesis: TAX_TO_GDP_RATIO has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-18.06041	0.0001

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Test critical values:	1% level	-3.689194
	5% level	-2.971853
	10% level	-2.625121

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TAX_TO_GDP_RATIO)
Method: Least Squares
Date: 07/29/25 Time: 00:38
Sample (adjusted): 8 35
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TAX_TO_GDP_RATIO(-1)	-0.421847	0.023358	-18.06041	0.0000
D(TAX_TO_GDP_RATIO(-1))	-0.480392	0.067922	-7.072652	0.0000
D(TAX_TO_GDP_RATIO(-2))	0.066512	0.032999	2.015546	0.0575
D(TAX_TO_GDP_RATIO(-3))	-0.017187	0.025523	-0.673401	0.5084
D(TAX_TO_GDP_RATIO(-4))	-0.129224	0.018470	-6.996557	0.0000
D(TAX_TO_GDP_RATIO(-5))	0.007854	0.012422	0.632264	0.5344
D(TAX_TO_GDP_RATIO(-6))	-0.069323	0.011670	-5.940396	0.0000
C	0.366415	0.099728	3.674147	0.0015

R-squared	0.980784	Mean dependent var	-1.718554
Adjusted R-squared	0.974059	S.D. dependent var	2.225988
S.E. of regression	0.358524	Akaike info criterion	1.021316
Sum squared resid	2.570794	Schwarz criterion	1.401946
Log likelihood	-6.298422	Hannan-Quinn criter.	1.137678
F-statistic	145.8303	Durbin-Watson stat	1.405618
Prob(F-statistic)	0.000000		

1st diff

Null Hypothesis: D(TAX_TO_GDP_RATIO) has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*

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Augmented Dickey-Fuller test statistic		-6.872344	0.0000
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TAX_TO_GDP_RATIO,2)
Method: Least Squares
Date: 07/29/25 Time: 00:38
Sample (adjusted): 9 35
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TAX_TO_GDP_RATIO(-1))	-0.393566	0.057268	-6.872344	0.0000
D(TAX_TO_GDP_RATIO(-1),2)	-0.540926	0.046444	-11.64674	0.0000
D(TAX_TO_GDP_RATIO(-2),2)	0.085200	0.022430	3.798542	0.0012
D(TAX_TO_GDP_RATIO(-3),2)	-0.038842	0.021367	-1.817842	0.0849
D(TAX_TO_GDP_RATIO(-4),2)	-0.130193	0.013927	-9.348106	0.0000
D(TAX_TO_GDP_RATIO(-5),2)	0.018078	0.012866	1.405109	0.1761
D(TAX_TO_GDP_RATIO(-6),2)	-0.058988	0.010444	-5.647887	0.0000
C	0.010321	0.106245	0.097146	0.9236

R-squared	0.948189	Mean dependent var	0.130412
Adjusted R-squared	0.929101	S.D. dependent var	1.517692
S.E. of regression	0.404114	Akaike info criterion	1.266956
Sum squared resid	3.102856	Schwarz criterion	1.650907
Log likelihood	-9.103902	Hannan-Quinn criter.	1.381125
F-statistic	49.67402	Durbin-Watson stat	2.381824
Prob(F-statistic)	0.000000		

ITAS

Null Hypothesis: ITAS has a unit root
Exogenous: Constant

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Lag Length: 0 (Automatic - based on SIC, maxlag=16)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-20.96161	0.0000
Test critical values:	1% level	-3.446525	
	5% level	-2.868565	
	10% level	-2.570578	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ITAS)
Method: Least Squares
Date: 07/29/25 Time: 00:40
Sample (adjusted): 2 400
Included observations: 399 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ITAS(-1)	-1.052950	0.050232	-20.96161	0.0000
C	64.54241	3.084746	20.92309	0.0000

R-squared	0.525341	Mean dependent var	-0.020050
Adjusted R-squared	0.524145	S.D. dependent var	4.935728
S.E. of regression	3.404776	Akaike info criterion	5.293235
Sum squared resid	4602.222	Schwarz criterion	5.313230
Log likelihood	-1054.000	Hannan-Quinn criter.	5.301154
F-statistic	439.3891	Durbin-Watson stat	2.002722
Prob(F-statistic)	0.000000		

1ST DIFF

Null Hypothesis: D(ITAS) has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=16)

		t-Statistic	Prob.*

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Augmented Dickey-Fuller test statistic		-12.49184	0.0000
Test critical values:	1% level	-3.446862	
	5% level	-2.868713	
	10% level	-2.570657	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ITAS,2)
Method: Least Squares
Date: 07/29/25 Time: 00:40
Sample (adjusted): 10 400
Included observations: 391 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ITAS(-1))	-5.559882	0.445081	-12.49184	0.0000
D(ITAS(-1),2)	3.607682	0.418504	8.620415	0.0000
D(ITAS(-2),2)	2.705834	0.373358	7.247296	0.0000
D(ITAS(-3),2)	1.966930	0.315726	6.229859	0.0000
D(ITAS(-4),2)	1.365896	0.250814	5.445845	0.0000
D(ITAS(-5),2)	0.835467	0.181465	4.604020	0.0000
D(ITAS(-6),2)	0.405948	0.112231	3.617076	0.0003
D(ITAS(-7),2)	0.128057	0.051480	2.487510	0.0133
C	-0.007652	0.182716	-0.041877	0.9666

R-squared	0.826632	Mean dependent var	-0.002558
Adjusted R-squared	0.823002	S.D. dependent var	8.587259
S.E. of regression	3.612761	Akaike info criterion	5.429570
Sum squared resid	4985.880	Schwarz criterion	5.520922
Log likelihood	-1052.481	Hannan-Quinn criter.	5.465779
F-statistic	227.6762	Durbin-Watson stat	1.997505
Prob(F-statistic)	0.000000		

Null Hypothesis: D(ITAS) has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=16)

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		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.49184	0.0000
Test critical values:	1% level	-3.446862	
	5% level	-2.868713	
	10% level	-2.570657	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ITAS,2)
Method: Least Squares
Date: 07/29/25 Time: 00:40
Sample (adjusted): 10 400
Included observations: 391 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ITAS(-1))	-5.559882	0.445081	-12.49184	0.0000
D(ITAS(-1),2)	3.607682	0.418504	8.620415	0.0000
D(ITAS(-2),2)	2.705834	0.373358	7.247296	0.0000
D(ITAS(-3),2)	1.966930	0.315726	6.229859	0.0000
D(ITAS(-4),2)	1.365896	0.250814	5.445845	0.0000
D(ITAS(-5),2)	0.835467	0.181465	4.604020	0.0000
D(ITAS(-6),2)	0.405948	0.112231	3.617076	0.0003
D(ITAS(-7),2)	0.128057	0.051480	2.487510	0.0133
C	-0.007652	0.182716	-0.041877	0.9666

R-squared	0.826632	Mean dependent var	-0.002558
Adjusted R-squared	0.823002	S.D. dependent var	8.587259
S.E. of regression	3.612761	Akaike info criterion	5.429570
Sum squared resid	4985.880	Schwarz criterion	5.520922
Log likelihood	-1052.481	Hannan-Quinn criter.	5.465779
F-statistic	227.6762	Durbin-Watson stat	1.997505
Prob(F-statistic)	0.000000		

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SIGTAS

Null Hypothesis: SIGTAS has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=16)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-20.45962	0.0000
Test critical values:	1% level	-3.446525	
	5% level	-2.868565	
	10% level	-2.570578	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SIGTAS)
Method: Least Squares
Date: 07/29/25 Time: 00:41
Sample (adjusted): 2 400
Included observations: 399 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIGTAS(-1)	-1.028573	0.050273	-20.45962	0.0000
C	79.04833	3.867017	20.44168	0.0000

R-squared	0.513239	Mean dependent var	-0.010025
Adjusted R-squared	0.512013	S.D. dependent var	4.281537
S.E. of regression	2.990912	Akaike info criterion	5.034034
Sum squared resid	3551.386	Schwarz criterion	5.054029
Log likelihood	-1002.290	Hannan-Quinn criter.	5.041953
F-statistic	418.5960	Durbin-Watson stat	1.994971
Prob(F-statistic)	0.000000		

1ST DIFF

Null Hypothesis: D(SIGTAS) has a unit root
Exogenous: Constant

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Lag Length: 6 (Automatic - based on SIC, maxlag=16)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-13.72840	0.0000
Test critical values:	1% level	-3.446819	
	5% level	-2.868694	
	10% level	-2.570647	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SIGTAS,2)
Method: Least Squares
Date: 07/29/25 Time: 00:41
Sample (adjusted): 9 400
Included observations: 392 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SIGTAS(-1))	-4.730240	0.344559	-13.72840	0.0000
D(SIGTAS(-1),2)	2.822635	0.317636	8.886395	0.0000
D(SIGTAS(-2),2)	2.056181	0.275134	7.473377	0.0000
D(SIGTAS(-3),2)	1.445981	0.222723	6.492268	0.0000
D(SIGTAS(-4),2)	0.941373	0.164851	5.710452	0.0000
D(SIGTAS(-5),2)	0.522991	0.104843	4.988301	0.0000
D(SIGTAS(-6),2)	0.170430	0.049491	3.443672	0.0006
C	-0.019641	0.157530	-0.124680	0.9008

R-squared	0.825003	Mean dependent var	-0.028061
Adjusted R-squared	0.821813	S.D. dependent var	7.388505
S.E. of regression	3.118852	Akaike info criterion	5.133004
Sum squared resid	3735.259	Schwarz criterion	5.214050
Log likelihood	-998.0688	Hannan-Quinn criter.	5.165125
F-statistic	258.6175	Durbin-Watson stat	1.988310
Prob(F-statistic)	0.000000		

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TAXPRO

Null Hypothesis: TAX_PROMAX has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=16)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-22.31770	0.0000
Test critical values:	1% level	-3.446525	
	5% level	-2.868565	
	10% level	-2.570578	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TAX_PROMAX)
Method: Least Squares
Date: 07/29/25 Time: 00:42
Sample (adjusted): 2 400
Included observations: 399 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TAX_PROMAX(-1)	-1.112928	0.049868	-22.31770	0.0000
C	151.9524	6.808828	22.31696	0.0000

R-squared	0.556464	Mean dependent var	0.000000
Adjusted R-squared	0.555347	S.D. dependent var	1.660962
S.E. of regression	1.107568	Akaike info criterion	3.047210
Sum squared resid	487.0024	Schwarz criterion	3.067204
Log likelihood	-605.9183	Hannan-Quinn criter.	3.055129
F-statistic	498.0798	Durbin-Watson stat	1.992579
Prob(F-statistic)	0.000000		

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Null Hypothesis: D(TAX_PROMAX) has a unit root
Exogenous: Constant

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Lag Length: 7 (Automatic - based on SIC, maxlag=16)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.56948	0.0000
Test critical values:	1% level	-3.446862	
	5% level	-2.868713	
	10% level	-2.570657	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TAX_PROMAX,2)
Method: Least Squares
Date: 07/29/25 Time: 00:42
Sample (adjusted): 10 400
Included observations: 391 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TAX_PROMAX(-1))	-5.487960	0.436610	-12.56948	0.0000
D(TAX_PROMAX(-1),2)	3.513817	0.410323	8.563530	0.0000
D(TAX_PROMAX(-2),2)	2.703214	0.365195	7.402109	0.0000
D(TAX_PROMAX(-3),2)	1.938757	0.307980	6.295068	0.0000
D(TAX_PROMAX(-4),2)	1.313697	0.243317	5.399122	0.0000
D(TAX_PROMAX(-5),2)	0.790448	0.175910	4.493471	0.0000
D(TAX_PROMAX(-6),2)	0.410754	0.111252	3.692100	0.0003
D(TAX_PROMAX(-7),2)	0.132793	0.050781	2.615025	0.0093
C	-0.007493	0.059941	-0.125006	0.9006

R-squared	0.842268	Mean dependent var	0.000000
Adjusted R-squared	0.838964	S.D. dependent var	2.953486
S.E. of regression	1.185211	Akaike info criterion	3.200468
Sum squared resid	536.6050	Schwarz criterion	3.291819
Log likelihood	-616.6914	Hannan-Quinn criter.	3.236676
F-statistic	254.9783	Durbin-Watson stat	2.010080
Prob(F-statistic)	0.000000		

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Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.**
None *	94.78557	69.81889	0.0002
At most 1 *	51.93570	47.85613	0.0197
At most 2 *	31.19942	29.79707	0.0343
At most 3 *	18.19252	15.49471	0.0191
At most 4 *	6.794521	3.841466	0.0091

Hypothesized No. of CE(s)	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	42.84987	33.87687	0.0033
At most 1	20.73628	27.58434	0.2925
At most 2	13.00690	21.13162	0.4516
At most 3	11.39800	14.26460	0.1354
At most 4 *	6.794521	3.841466	0.0091

TAX_TO_GDP_	ITAS	SIGTAS	TAX_PROMAX

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RATIO			
-0.003592	-0.332736	-0.669962	1.097297
0.079171	0.161304	0.520384	-1.231645
-0.013801	-0.296026	1.112970	0.362372
0.068267	-0.200056	0.053805	-0.097662
-0.044912	-0.385057	-1.014757	-0.907431

D(TAX_TO_GDP_RATIO)	-1.037894	1.110822	-0.749497	-0.244516
D(ITAS)	-0.481344	1.158695	0.829486	0.987773
D(SIGTAS)	-0.833838	-1.006545	0.635022	0.065706
D(TAX_PROMAX)	0.377287	0.001312	0.011195	0.331869

Log likelihood	-347.2928

TAX_TO_GDP_RATIO	ITAS	SIGTAS	TAX_PROMAX
1.000000	92.63575	186.5214	-305.4940
	(22.7768)	(59.0629)	(67.2653)

D(TAX_TO_GDP_RATIO)	
D(ITAS)	
D(SIGTAS)	
D(TAX_PROMAX)	

Log likelihood	-336.9247

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TAX_TO_GDP_RATIO	ITAS	SIGTAS	TAX_PROMAX
1.000000	3.448503	9.375653	-20.07258
	(1.79046)	(4.68866)	(5.20896)
0.000000	0.668656	1.328100	-2.139866
	(0.16568)	(0.43385)	(0.48200)
D(TAX_TO_GDP_RATIO)	1.150436		
	(0.33156)		
D(ITAS)	-0.575610		
	(0.39849)		
D(SIGTAS)	0.055021		
	(0.25810)		
D(TAX_PROMAX)	0.287379		
	(0.10896)		
Log likelihood	-330.4212		

TAX_TO_GDP_RATIO	ITAS	SIGTAS	TAX_PROMAX
1.000000	0.000000	71.85849	-37.38341
		(21.0030)	(24.0138)
0.000000	0.000000	13.44336	-5.496394
		(3.96085)	(4.52863)
0.000000	1.000000	-18.11883	5.019812
		(5.75523)	(6.58023)
D(TAX_TO_GDP_RATIO)	0.881147	0.182305	
	(0.33988)	(0.28629)	
D(ITAS)	-0.856506	-0.876269	
	(0.41692)	(0.35118)	
D(SIGTAS)	0.299032	0.104917	
	(0.25653)	(0.21608)	
D(TAX_PROMAX)	0.287061	0.303837	

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	(0.12076)	(0.10172)
Log likelihood	-324.7222	

TAX_TO_GDP_RATIO	ITAS	SIGTAS	TAX_PROMAX
1.000000	0.000000	0.000000	-8.038447
			(4.60162)
0.000000	0.000000	0.000000	-0.006505
			(0.67906)
0.000000	1.000000	0.000000	-2.379404
			(0.98856)
0.000000	0.000000	1.000000	-0.408372
			(0.34076)
D(TAX_TO_GDP_RATIO)	0.542414	0.332247	2.022144
	(0.41895)	(0.29859)	(0.81325)
D(ITAS)	-0.481622	-1.042212	0.166347
	(0.51787)	(0.36910)	(1.00528)
D(SIGTAS)	0.586027	-0.022123	-1.637883
	(0.31276)	(0.22291)	(0.60712)
D(TAX_PROMAX)	0.292121	0.301598	0.688416
	(0.15491)	(0.11041)	(0.30071)

Pairwise Granger Causality Tests
Date: 07/29/25 Time: 02:08
Sample: 1 400
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TAX_TO_GDP_RATIO does not Granger Cause MANUAL_TAX_PROCESS		1.44875	0.2519
ITAS does not Granger Cause TAX_TO_GDP_RATIO	33	0.32273	0.7268
TAX_TO_GDP_RATIO does not Granger Cause ITAS		0.30112	0.7424

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SIGTAS does not Granger Cause TAX_TO_GDP_RATIO	33	1.21691	0.3113
TAX_TO_GDP_RATIO does not Granger Cause SIGTAS		4.61939	0.0185
TAX_PROMAX does not Granger Cause TAX_TO_GDP_RATIO	33	1.73202	0.1953
TAX_TO_GDP_RATIO does not Granger Cause TAX_PROMAX		0.06661	0.9357
ITAS does not Granger Cause MANUAL_TAX_PROCESS	398	0.38663	0.6796
SIGTAS does not Granger Cause MANUAL_TAX_PROCESS	398	1.07348	0.3428
TAX_PROMAX does not Granger Cause MANUAL_TAX_PROCESS	398	0.04629	0.9548
SIGTAS does not Granger Cause ITAS	398	2.08260	0.1260
ITAS does not Granger Cause SIGTAS		0.01554	0.9846
TAX_PROMAX does not Granger Cause ITAS	398	0.00913	0.9909
ITAS does not Granger Cause TAX_PROMAX		0.27337	0.7610
TAX_PROMAX does not Granger Cause SIGTAS	398	0.73935	0.4781
SIGTAS does not Granger Cause TAX_PROMAX		0.15228	0.8588

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	9.850080	Prob. F(2,28)	0.0006
Obs*R-squared	14.45500	Prob. Chi-Square(2)	0.0007

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 07/29/25 Time: 01:35
Sample: 1 35
Included observations: 35

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Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ITAS	-1.853256	3.806814	-0.486826	0.6302
SIGTAS	1.947149	4.233330	0.459957	0.6491
TAX_PROMAX	-2.586196	11.19976	-0.230915	0.8191
C	253.4320	1558.376	0.162626	0.8720
RESID(-1)	0.629757	0.201950	3.118372	0.0042
RESID(-2)	0.109602	0.198114	0.553225	0.5845

R-squared	0.413000	Mean dependent var	-2.29E-14
Adjusted R-squared	0.287214	S.D. dependent var	86.90481
S.E. of regression	73.37082	Akaike info criterion	11.60579
Sum squared resid	150731.8	Schwarz criterion	11.91686
Log likelihood	-196.1013	Hannan-Quinn criter.	11.71317
F-statistic	3.283360	Durbin-Watson stat	0.989969
Prob(F-statistic)	0.014239		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.514633	Prob. F(4,30)	0.2230
Obs*R-squared	5.880679	Prob. Chi-Square(4)	0.2082
Scaled explained SS	14.42418	Prob. Chi-Square(4)	0.0061

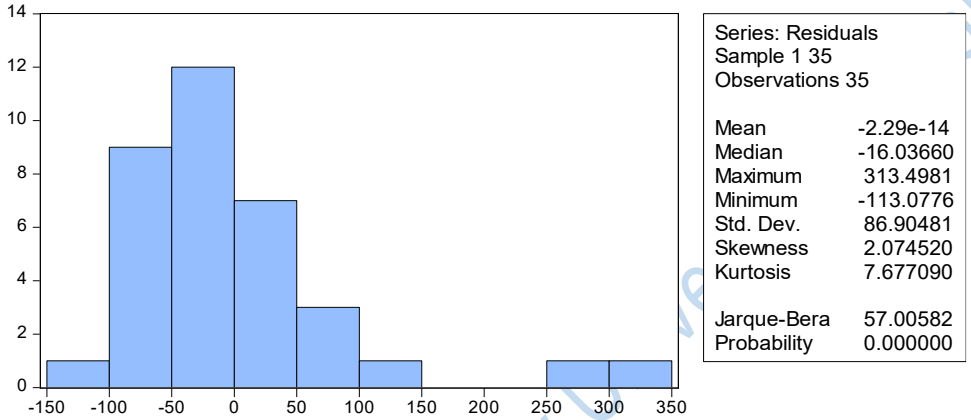
Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/29/25 Time: 01:34
Sample: 1 35
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.

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C	138922.6	395806.6	0.350986	0.7281
ITAS	1013.539	963.1839	1.052280	0.3011
SIGTAS	147.4615	999.6743	0.147510	0.8837
TAX_PROMAX	-1349.907	2847.070	-0.474139	0.6388

R-squared	0.168019	Mean dependent var	7336.662
Adjusted R-squared	0.057089	S.D. dependent var	19234.76
S.E. of regression	18677.64	Akaike info criterion	22.63961
Sum squared resid	1.05E+10	Schwarz criterion	22.86180
Log likelihood	-391.1931	Hannan-Quinn criter.	22.71631
F-statistic	1.514633	Durbin-Watson stat	0.670813
Prob(F-statistic)	0.222986		



Series: Residuals
Sample 1 35
Observations 35

Mean	-2.29e-14
Median	-16.03660
Maximum	313.4981
Minimum	-113.0776
Std. Dev.	86.90481
Skewness	2.074520
Kurtosis	7.677090
Jarque-Bera	57.00582
Probability	0.000000

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Bio-data

A. Personal Data

Full Name:	Francis Olatayo Olasunkanmi
Address:	House No 16, F11 Street, E-Road CITEC International Estate, Mbora District Jabi, Abuja.
E-mail:	franolasvic@gmail.com, francis.olasunkanmi@firs.gov.ng
Phone No:	+2348034502123, +2348134278667
Date of Birth:	July 2, 1977
Place of Birth:	Odo Otin LG, Osun State
Nationality:	Nigeria
Next of Kin:	Beatrice Olasunkanmi House No 16, F11 Street, E-Road CITEC International Estate, Mbora District Jabi, Abuja.

B. Educational Background

Educational Institutions Attended with Dates and Qualifications

- PhD in Accounting Lead City University In view
- MSc - Accounting - Lead City University Ibadan 2019-2020
- MBA - Finance - Ladoke Akintola University, Ogbomosho 2014-2015
- HND - Accounting - Federal Polytechnic Idah 2002-2006
- OND - Accounting - Federal Polytechnic Offa, Kwara State 1997-2001
- WASC/SSCE Government secondary School Wuse Abuja 1991-1996
- General Certificate Examination (GCE). 2000

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C. Working Experience with Dates

- Federal Inland Revenue Service, Abuja Nigeria. Tax Audit Team Lead 2020-til date
- FIRS, Abuja - Vat Coordination and Returns payment processing. 2014-2020
- FIRS - Internal auditor and Account payments processing 2006-2014

D. Awards and Fellowships

- Award of Excellence – Federal Polytechnic, Idah, Kogi State 2024
- Award of Excellence – Catholic Church, Dutse Alhaji, Abuja 2025

E. Membership of Academic and Professional Bodies

- Fellow, Chartered institutes of Taxation of Nigeria (FCTI) 2024
- Associate Member, Chartered Institutes of Taxation of Nigeria (ACTI) 2014
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F. Publications

- F. O. Olasunkanmi & J. A. Adejuwon, *Digitalisation of Tax System and Revenue Generation in Nigeria.* **Lead City Journal of the Social Sciences (LCJSS)**, 9(3), 2024, 4-21.
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G. Major Conferences Attended with Dates

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The University Compliance Certification

This is to verify that the thesis written by Francis Olatayo OLASUNKANMI with matriculation number LCU/PG/000508, in the Department of Management and Accounting, Faculty of Management and Social Sciences, Lead City University, Ibadan, Oyo State, is in full compliance with the approved University format and style.

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