

E-TAX ADMINISTRATION MECHANISMS AND TAX REVENUE IN NIGERIA

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ABSTRACT

This study examined the e-tax administration mechanisms and tax revenue in Nigeria. The main objective was to investigate the relationship between e-tax administration mechanisms and tax revenue in Nigeria. The study has ten specific objectives, ten research questions and ten hypotheses, tax rated moderated the study. The study adopted both the correlational and ex-post facto designs. The correlational research aims at determining the relationship between variables. The correlational survey design was adopted because the study intended to determine the relationship between electronic tax administration mechanism and tax revenue in Nigeria, While the ex-post facto design investigates possible cause and effect of the relationships, by observing an existing state of affairs and searching back-to-back through the available data for possible or plausible causal factors since data are collected after the event under investigation has taken place, the research design is called an ex-post facto design. The population for the study was drawn from the 36 states (Federal Inland Revenue Service). The study was macro study because it used a secondary data from Federal Inland Revenue Service obtained from its website tax statistics. The hypotheses were tested using stationarity test, co-integration and Granger causality test. The result shows that there is a direct relationship between e-tax administration mechanism and tax revenue in Nigeria. The study concluded that if electronic tax system is properly administered in Nigeria, it can undoubtedly be a lasting solution to the irregular tax system that is in practice in Nigeria has revealed in this study that there is significant relationship between electronic tax registration and company income tax revenue in Nigeria. There is also a significant relationship between electronic filing of tax returns and company income tax revenue in Nigeria and significant relationship between electronic tax payment and company income tax revenue in Nigeria. The study recommended among others that Federal Inland revenue services should continue electronic taxpayer's registration in order to benefit high rate of company income tax compliance as well as its revenue, the federal government through the Federal Inland Revenue services should continue to sensitize companies (taxpayers) on the nitty-gritty of electronic filing of tax returns so as to further maximize the company income tax revenue in Nigeria. Also, FIRS should continue to sensitize taxpayers on electronic tax payment. And all tax clearance Certificates should be issued electronically to ensure compliance, save time and cost for taxpayers and increase company income tax revenue in Nigeria.

Keywords: E-Taxation, Tax Revenue, Federal Inland Revenue Service, Nigeria.

INTRODUCTION

The economic development of any nation is fundamentally tied to the revenue it generates to finance infrastructure and meet recurrent expenditures, with taxation serving as a critical macroeconomic instrument for growth and development (Omojemite & Godwin, 2021). Tax has long been recognized as a vital tool for resource mobilization, yet manual tax collection systems have been criticized for inefficiency and lack of transparency in audit trails, limiting the effectiveness of agencies such as the Federal Inland Revenue Service (FIRS) and State Internal Revenue Services (SIRS) (Azubike, 2018). The rapid advancement of information and communication technology over the past three decades has given rise to electronic taxation (e-taxation), which facilitates tax collection and administration through digital platforms, providing efficiency, accountability, and enhanced revenue mobilization (Black, 2019; Che-Azmi & Kamarulzaman, 2014). Tax revenue, which constitutes the primary source of government income, is derived from individuals, enterprises, and

corporations through direct and indirect taxes on profits, income, consumption, property, and investments (Steenbergen, 2018; Akande, 2020). While direct taxes are remitted directly to authorities, indirect taxes are collected through intermediaries, with both contributing significantly to national output and enabling governments to fund economic development (Kinyanjui, 2020). Compared to volatile natural resource revenues, tax revenue is relatively predictable, thereby facilitating more reliable fiscal planning. In addition, specific forms such as capital gains tax and capital income tax target profits from the sale or appreciation of assets, further broadening the tax base (Jones, 2003; ICAN, 2009; Kiabel, 2007). Extant literature affirms that e-taxation enhances administrative mechanisms and improves tax revenue generation in Nigeria, thereby underscoring the need to assess its impact on the country's fiscal performance.

Statement of the Problem

Over the years, tax revenue administration and collection have remained a major challenge in developing economies, particularly in Nigeria, where issues such as corruption, embezzlement, mismanagement of public funds, poor accountability, siphoning of revenues, and weak fund-tracking mechanisms have hindered effective revenue generation (Ogbonna, 2020). These deficiencies have not only resulted in low tax contributions to national revenue but have also limited the government's ability to finance economic growth (Okauru, 2017). Comparatively, while countries like Ghana, Tunisia, and Morocco record tax-to-total revenue ratios of 73%, 31.3%, and 28.5% respectively (OECD, 2020), Nigeria lags behind with a ratio of only 17.2% in 2014 (FIRS, 2022; CBN, 2021). Empirical studies have attributed Nigeria's poor tax revenue performance to involuntary compliance, inadequate tax records, high collection costs, lack of taxpayer stewardship, multiplicity of taxes, complex payment systems, weak databases, tax evasion and avoidance, corruption, and political instability. In response, the government introduced electronic taxation (E-tax) to address these challenges, yet tax receipts remain low with minimal impact on physical and economic development (Omesi & Appah, 2021; Chiamaka et al., 2021; Oladele et al., 2020; Onuselogu & Onuora, 2021). While some studies report significant positive effects of E-tax on revenue (Awai & Oboh, 2020; Ofurum et al., 2018), others present inconclusive or inconsistent results, leaving the debate unresolved. These inconsistencies highlight empirical gaps in dimensions, methodologies, and time scope across previous studies. To bridge these gaps, the present study introduces clearer dimensions of electronic tax administration—electronic tax registration, electronic filing of returns, and electronic tax payment—and evaluates their impact on company income tax revenue, value-added tax revenue, and capital gains tax revenue. Unlike prior studies that relied mainly on t-test comparisons of pre- and post-revenue outcomes, this research adopts regression-based analyses and updates data to 2022, thereby providing a more robust empirical examination of electronic tax administration mechanisms and tax revenue in Nigeria.

Aim and Objectives of the Study

The aim of the study is to examine the electronic-tax administrative mechanism and Tax revenue in Nigeria 2015 - 2022. The specific objectives of the study are to:

- a) evaluate the effect of electronic tax registration on capital gains tax revenue in Nigeria.
- b) ascertain the effect of electronic filing of tax returns on capital gains tax revenue in Nigeria.
- c) determine the effect of electronic tax payment on capital gains tax revenue in Nigeria.

Research Questions

The following research questions were formulated from the objectives of the study as shown below:

- a) What is the effect of electronic tax registration on capital gains tax revenue in Nigeria?
- b) What is the effect of electronic filing of tax returns on capital gains tax revenue in Nigeria?
- c) What is the effect of electronic tax payment on capital gains tax revenue in Nigeria?

Research Hypotheses

The hypotheses of the study were formulated from the objectives of the study and stated in null forms as follows;

- Ho₁:** there is no significant effect of electronic tax registration on capital gains tax revenue in Nigeria.
- Ho₂:** there is no significant effect of electronic filling of tax returns on capital gains tax revenue in Nigeria.
- Ho₃:** there is no significant effect of electronic tax payment on capital gains tax revenue in Nigeria.

Review of Related Literature

Conceptual Review

E-tax Administration Mechanism

E-tax administration mechanisms encompass the various electronic methods and platforms through which taxpayers fulfill their tax obligations, designed to simplify payment processes, enhance convenience, and improve the efficiency of revenue collection. By leveraging digital systems, these mechanisms reduce bottlenecks associated with traditional tax administration, thereby fostering transparency and accountability. The Organization for Economic Cooperation and Development (OECD, 2023) a global body committed to promoting economic growth, prosperity, and sustainable development. defines tax revenue as the funds generated from taxes on income and profits, social security contributions, payroll taxes, levies on goods and services, as well as taxes on property ownership and transfers, among other categories.

Dimensions of the Predictor Variable

Electronic Tax Registration

Electronic tax registration is the process of enrolling taxpayers for tax purposes through digital platforms and online tools, aimed at streamlining and automating registration to enhance efficiency and convenience for both taxpayers and tax authorities. According to Kinuthia and Akinnusi (2020), the system assigns default access roles such as the "view only" option, which permits taxpayers to access and review their information, and the "declaration" role, which enables viewing, editing, and submission of tax returns. Taxpayers or their agents can log into the platform via the e-filing website using credentials provided by the Federal Inland Revenue Service (FIRS). Although password recovery is not yet fully automated and requires direct contact with FIRS, the system incorporates flexibility by automatically adjusting tax filing or payment deadlines that fall on weekends or public holidays to the next working day before applying penalties or interest.

Electronic Filing of Tax Returns

Okifo, & Igbunu (2020), the Federal Inland Revenue Service (FIRS) is set to introduce an Integrated Tax Administration System (ITAS) which will enable taxpayers file tax returns and pay their taxes online. This initiative is commendable but to achieve concrete results that will make any meaningful impact the design and implementation of the project must be top-notch. We expect that there will be teething problems but overall we welcome this development which will significantly improve the ease of paying taxes in Nigeria if properly implemented. According to the Ofurum et al., (2018), 2015 Paying Taxes Report (a joint study by PwC and the World Bank), Nigeria ranks 170 out of 189 economies on the ease of paying taxes.

Electronic Tax Payments

Electronic tax payments, or e-payments, refer to the process of fulfilling tax obligations through digital channels rather than traditional methods such as cash or checks. As Davies (2019) notes, these payments can be made via online platforms, digital banking systems, or mobile applications,

thereby enhancing convenience and efficiency. In Nigeria, taxpayers have been able to make payments directly from their corporate bank accounts since March 2015, through an application developed in collaboration with the Nigeria Inter-Bank Settlement System (NIBSS) and hosted on commercial banks' internet banking platforms. The process requires a Tax Identification Number (TIN), a unique document number generated on the e-filing platform, and internet banking authentication. Once payment is completed, the system issues an electronic acknowledgment receipt, which serves as proof of payment and can be presented to the Federal Inland Revenue Service (FIRS). Importantly, taxpayers who have not migrated to the Integrated Tax Administration System (ITAS) can also use this platform to remit their taxes (Ola, 2020).

Tax Revenue

Tax revenue in Nigeria constitutes a vital component of the nation's fiscal management and economic development, serving as one of the key instruments for funding public expenditure. While the government derives income from multiple sources such as taxation, oil and gas revenues, customs and excise duties, and other non-oil sources oil revenues have historically dominated due to Nigeria's status as a major oil-producing country. Revenue from the sector is generated through taxes, royalties, and profit-sharing arrangements on exploration and production activities. However, the volatility of global oil prices and the country's overdependence on petroleum income underscore the urgent need to diversify revenue sources and strengthen the tax system as a sustainable alternative for economic stability and growth.

Measure of the Criterion Variable

Capital Gains Tax Revenue

Jones (2003) defined capital gains tax as a levy on the profit realized from the sale of non-inventory assets when the disposal value exceeds the acquisition cost. Common sources of capital gains include the sale of government bonds, precious metals, and real estate, with a statutory charge of 10% on the profit derived from such transactions. According to ICAN (2009), capital income tax arises from the appreciation in the value of capital assets owned by either a corporate body or an individual, provided such assets are not held for trade or as part of business inventory. Kiabel (2007) further emphasized that it is essentially a tax on capital, imposed on the excess value realized at the point of asset disposal.

Theoretical Review

Technology Adoption Theory

Globally, governments are increasingly leveraging technology to enhance tax collection and operational efficiency, making it imperative to understand the factors influencing the adoption of electronic taxation systems. Drawing from the Technology Adoption Theory (Rogers, 1962), adoption decisions are shaped by several dimensions that are particularly relevant in the context of e-taxation. Perceived usefulness reflects the extent to which such systems improve revenue generation, reduce administrative burdens, and simplify tax processes (Liao & Lu, 2022). Ease of use relates to the system's user-friendliness and compatibility with existing tax infrastructure, thereby minimizing workflow disruptions (Cengaver & Sesen, 2022). Trialability allows governments to pilot e-taxation systems on a smaller scale, mitigating risks associated with large-scale implementation (Morris et al., 1995). Finally, observability highlights the visibility of benefits, as improved compliance and increased revenue collection demonstrate the value of e-taxation, making it more attractive to policymakers (Premkumar & Davis, 1996).

Empirical Reviews

Jullie (2024) investigated taxpayers' behavioral intention to adopt e-tax services using the Technology Acceptance Model (TAM), focusing on a sample of 156 taxpayers in Manado and Bitung.

Data were analyzed through Structural Equation Modeling (SEM), incorporating both measurement and structural models. The findings revealed that perceived ease of use significantly influenced both perceived usefulness and attitudes toward using e-SPT, while perceived usefulness positively impacted attitudes but did not directly affect behavioral intention. Conversely, attitudes toward e-SPT exhibited a strong positive effect on behavioral intention to use the system.

Sanaa and Tariq (2024) examined the impact of computerized tax services on tax performance in Jordan, moderated by governance principles, using data from 170 income tax auditors analyzed through regression models and One Sample T-tests. Their results indicated that computerized tax services, when aligned with governance principles, enhanced taxpayer confidence, improved efficiency, and increased tax proceeds, underscoring the need for strategic planning in adopting modern e-tax technologies.

Aqib and Alpa (2024) explored the challenges of taxing the digital economy, emphasizing the role of users as value creators in digital services. They argued for a conceptual basis to tax user-generated value under corporate income tax but highlighted the need for international consensus on reallocating taxing rights, establishing legal authority, and defining metrics for valuing user data. The study further cautioned against targeting specific businesses, advocating instead for comprehensive approaches such as modified permanent establishment rules, formulary apportionment, or user-based royalty-type taxes, each presenting distinct opportunities and challenges.

METHODOLOGY

In this chapter, the researcher focused on how the study was organized, how data was collected, where the data was collected from, the type of data to be collected, tools used to analyze the data collected.

Research Design

Research design serves as the blueprint that guides a researcher in systematically addressing a research problem, ensuring that the evidence obtained provides clear and reliable answers to the research questions (Nachmias, 2019). It represents the conceptual structure within which a study is conducted, encompassing the strategies for data collection, measurement, and analysis (Ajoku, 2016). In this study, both ex-post facto and correlational research designs were employed. The correlational design was adopted to examine the relationship between electronic tax administration mechanisms and tax revenue in Nigeria, specifically to determine the extent to which variations in one variable are associated with changes in another. The ex-post facto design was deemed appropriate as it investigates possible cause-and-effect relationships by analyzing existing conditions and tracing them back through available data to identify potential causal factors. Given that data were collected after the events had occurred, manipulation of independent and dependent variables or randomization of subjects was not feasible, thereby justifying the reliance on ex-post facto design, where facts are examined as they already exist.

Population for the Study

The population of the study is the 36 states plus Abuja. The period covered was 2015-2022 (8 years).

Sample Size and Sampling Techniques

In this study the population is also assumed as the sample size.

Sources of Data

The source of data is the Federal Inland Revenue Service website as mentioned below:

Source: <https://www.firs.gov.ng/taxstatistics-report/> and corporate Affairs Commission (CAC); Tax Identity Number (TIN) <https://tinverification.jtb.gov.ng/Home/Index>.

Instrumentation

The instrument for data collection of the study was secondary data extracted from FIRS and Corporate Affairs Commission (CAC). Thus, the data obtained measured the effect electronic-tax administration mechanism on tax revenue in Nigeria.

Method of Data Analysis

The research questions were analyzed using descriptive statistics, while the hypotheses were tested through least squares panel data regression analysis with the aid of E-Views 10. Regression analysis was considered appropriate because, as Baridam (2001) notes, it is most suitable for studies involving measurable independent and dependent variables, as it effectively expresses the relationship between them. In a linear regression model, the dependent variable (y) is treated as a function of the independent or explanatory variable (x). The method was selected due to its desirable properties, including linearity, efficiency, sufficiency, unbiased estimates, minimum variance, and its ability to minimize error sums of squares. Its suitability is further reinforced by its application in similar studies conducted by Oloegbu (2016), Bassey (2015), Gwangdi (2015), Chigbu (2015), and Okafor (2012). While ordinary least squares (OLS) regression assumes linear relationships and continuous variables, and does not directly address causality, it remains the most practical and efficient method for analyzing the relationships between variables in this study (Hutcheson, 1999).

Model Specifications

The electronic-tax administration mechanism accelerates revenue collection on the basis of the theoretical framework and using the Cobb-Douglas economic production function the model for this study is adapted from the work of Oluwatoyin, et al., (2019) and Edwin, Enofe, and Oluseun (2014). The model is specified as:

$$Y = f(ETAM) \dots\dots\dots 3.1$$

Jerono (2009), defined total public expenditure as a function of summation of all individual electronic-tax administration mechanism in all components.

$$ETAM = f(\text{electronic-tax administration mechanism in all components}) \dots\dots\dots 3.2$$

In this study combining the two models will yield a richer econometric model that will facilitate estimation. The electronic-tax administration mechanism (*ETAM*) is defined as the four components; this modification will help us investigate the impact of electronic-tax administrative mechanism on revenue collection in Nigeria.

$$ETAM = f(ETRG, EFTR, ETPY) \dots\dots\dots 3.3$$

And because,

$$Y = f(ETAM) \text{ according to Cobb-Douglas economic production function model}$$

Hence;

$$Y = f[(ETRG, EFTR, ETPY), Et] \dots\dots\dots 3.4$$

Thus:

$$CGTR = \beta_0 + \beta ETRG + \beta EFTR + \beta ETPY + \dots\dots\dots 3.5$$

Where;

<i>CGTR</i>	= Capital Gain Tax Revenue
$\beta ETRG$	= Electronic Tax Registration
$\beta EFTR$	= Electronic Filing of Tax Returns
$\beta ETPY$	= Electronic Tax Payment
β_0	= Constant term (y intercept)
β	= Coefficient of the independent variable

Et = Error term (causes of electronic-tax administrative mechanism not explained by variables in the model)

Thus, the study developed three multivariate hypotheses models:

The First Model: The third hypothesis test model; shows the relationship between capital gain tax revenue and electronic tax registration, electronic tax registration and electronic tax payment:

$$CGTR_{it} = \beta_0 + \beta_1(\beta ETRG)_t + \beta_2(\beta EFTR)_t + \beta_3(\beta ETPY)_t + Et(.05) \dots\dots\dots 3.6$$

To make the time series data uniform and easy to regress and analyse due to the fact that some of the data like electronic filling of tax returns number and electronic tax registration are numeric, rate/index form, the data were converted to natural logarithm (log) form as follows:

$$Ln(CGTR) = \beta_0 + \beta_1Ln(\beta ETRG)_t + \beta_2Ln(\beta EFTR)_t + \beta_3Ln(\beta ETPY)_t + Et(.05) \dots\dots\dots 3.7$$

Where;

$Ln(CGTR)$ = Natural logarithm of Capital Gain Tax Revenue

$Ln(\beta ETRG)$ = Natural logarithm of Electronic Tax Registration

$Ln(\beta EFTR)$ = Natural logarithm of Electronic Filling of Tax Returns

$Ln(\beta ETPY)$ = Natural logarithm of Electronic Tax Payment

Gillette and Robert (1992), suggested that in a linear regression equation where both the explained variable and the explanatory variables are in natural logs. Elasticity is a popular tool among empiricists because it is independent of units and thus simplifies data analysis.

Time Series Property of the Data and Diagnostic Tools

In view of the fact that this study will use time series data and inherently it might exhibit some strong trends, the non-random disposition of the series might undermine the use of some of econometrics tests such as F and t tests. This is because they can cause rejection of a hypothesis which would have otherwise not been rejected and visa. This study intends to conduct stationarity or unit root test, cointegration test, granger causality test, multicollinearity test, and autocorrelation to mitigate such situations.

Stationarity Test (Unit Root Test): For the ordinary least square regression technique to be effective in achieving the research objective, variables in the specified model will be tested for stationarity. Conducting a stationarity test is thus preliminary for the relevance of this research findings. According to Brooks (2008), a stationary series can be defined as one with a constant mean, **constant variance and constant auto-covariance for each given lag**. Kwaitkowski, (1992), argue that stationarity exists in time series data when variables are differenced over a lag period. The explanation of stationarity was established as trend-stationarity in the event that unit root does not exist. The augmented Dickey-Fuller (ADF) test was adopted based on its use in similar empirical literature related to this study. The ADF tests for unit root hypothesis in time series data is given as: example;

$$\Delta CTR = \beta_0 + \beta t + \theta yt - 1 + \sum_{i=1}^m p\Delta CTRPt - i + et \text{ (This is for levels)}$$

$$\Delta \Delta CTR = \beta_0 + \beta t + \theta \Delta yt - 1 + \sum_{i=1}^m p\Delta \Delta CTRt - i + et \text{ (This is for first differences)}$$

There are cases where ADF doesn't have a drift and a trend but the example has both a drift (intercept) and a trend. Where β_0 is a drift, m is the number of lags and et is the error term and t is trend.

The null hypothesis will be $H_0: (\beta_0, \beta, \theta) = (\beta_0, 0, 1)$ (No - stationarity)

The alternative hypothesis $H_1: (\beta_0, \beta, \theta) \neq (\beta_0, 0, 1)$ (Stationarity)

If the test reveals that null hypothesis should be rejected than the variable will be said to be stationary.

Testing for Co-integration

The study data was tested for co integration by using Johansen Co integration test method. Co-integration is a technique used to test for existence of long-term relationship (co-movement) between variables in a non-stationary series. Distributive Lag (ARDL), which can be applied even in different orders, the Johansen co-integrated test should only be applied when the variables are integrated in one order. However, all variables in this study are integrated in one order. The Johansen methodology provides all variables to be endogenous and makes it available to determine the relationship between the estimated variables (Paparas & Stoian 2016). Co integration also asserts that 1(1) can be estimate using OLS method and produce non spurious results There are two statistics generated by this approach: the maximum Eigenvalue and trace statistics. These are given below:

$$\theta_{\text{trace}} = -n \sum_{i=r+1}^n \ln (1 - \hat{\theta}_i)$$

And

$$\theta_{\text{max}} = -n \ln(1 - \theta_{r+1})$$

Dubin Watson: The Durbin Watson statistic is a number that test for autocorrelation in the residuals from a statistical regression analysis. The Durbin-Watson statistic is always between 1.5 and 2.5. The value of greater than 1.5 means that there is no autocorrelation in the sample. Values from above 2.5 indicate there is autocorrelation in the sample

1. Data Presentation

Data for Electronic-Tax Administration Mechanism and Tax Revenue in Nigeria 2015 - 2022.

S/N	1	2	3	4	5	6	7	8
Year	2015	2016	2017	2018	2019	2020	2021	2022
Number of E-Tax Registered companies	1,219	7,658	162,578	372,578	94,247	193,045	253,632	424,539
Number of Companies E-Tax Filled Returns	402	4,067	11,652	19,022	28,638	130,838	179,833	207,932
Electronic Tax Payments	2,451.80	2,149.65	2,507.46	2,853.31	3,147.65	3,435.23	4,394.25	5,970.33
Capital Gain Tax Revenue ₦BN	16.802	99.4034	3.1803	12.5947	5.977	3.5186	17.5	45.5722
%TAX RATE								
CGT	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Sources: *Federal Inland Revenue Service (FIRS)*; <https://www.firs.gov.ng/tax-statistics-report/>

Data Analysis and Descriptive Statistics

In order to achieve the specific objectives earlier stated in chapter one of this study, the descriptive statistics of the data employed was initially examined critically. The description statistics of data series gives relevant information about sample statistics such as mean, median, minimum, maximum value, skewness, kurtosis and Jarque-Beta statistics.

Table 4.2 Descriptive Statics of the Variables

	ETRG	EFTR	ETPY	CGTR
Mean	323.975	153.9741	2520.3910	41.9538
Median	166.7808	706.579	7304.83	21.0001
Maximum	424.539	207.932	5970.33	99.4034
Minimum	1.219	0.402	2149.6533	3.1803
Std. Dev.	75.233	13.3032	41.671	0.3788
Skewness	1.735061	1.145224	1.698067	1.445285
Kurtosis	0.19818	0.765133	0.759743	0.45403
Jarque-Bera	298.3727	10.26483	7.731080	2.926745
Probability	0.070377	1.051273	0.109495	0.069291
Sum	16533.17	6004.989	9843.249	12.46200
Sum Sq. Dev.	9914960.	916525.2	4348408.	1.839452
Observations	56	56	56	56

Source: Researcher's Statistical Computation from E-view (v.10), 2023

Table 4.2 shows that the descriptive statistics of the data collected for the independent variable's dimensions of the study. The electronic tax registration (ETRG), electronic filling of tax returns (EFTR) and electronic tax payment (ETPY) have a mean value of 323.975, 153.9741 and 2520.3910 respectively, also, median value of 166.7808, 706.579 and 7304.83 respectively, also the maximum and minimum values of tax electronic tax registration (ETRG), were 424.539 and 1.219, electronic filling of tax returns (EFTR) were 207.932 and 0.402 and electronic tax payment (ETPY) were 5970.33 and 2149.6533. On the other hand, the standard deviation values of 75.233, 13.3032 and 41.671 signifying that the data deviate from the mean values of the three study dimensions, which implies that there is a wide dispersion of the data from the means because the standard deviation is closed to the mean.

On the other hand, Skewness and Kurtosis calculated mean values which is a measure of the departure of a distribution from symmetry above for three study dimensions of electronic tax registration (ETRG), electronic filling of tax returns (EFTR) and electronic tax payment (ETPY)}, shows a positive skewness values that is greater than 1. This indicates that the three study dimensions are normally distributed. More so, the Kurtosis result which measures the extent of flatness or peakedness of a distribution in relative terms to a normal distribution confirms that tax electronic tax registration (ETRG), electronic filling of tax returns (EFTR) and electronic tax payment (ETPY) are normally distributed and are not platykurtic (not having negative values / flatted curved) as its kurtosis coefficient are more than 3. Also, the p-value for the three study dimensions for Jarque-Bera statistics [(JB (PValue > 0.05) = Accept Ho (Normal Distribution) and JB (P Value < 0.05) = Reject Ho (Non-Normal Distribution)]. Thus, the values of 0.070377, 1.051273 and 0.109495for (electronic tax registration (ETRG), electronic filling of tax returns (EFTR) and electronic tax payment (ETPY)) respectively of Jarque-Beta and its statistical probabilities were accepted. The result forward strengthens the normality test of variable of normally distributed.

The table also indicates for the two measures of the dependent variable of the study that capital gains tax revenue (CGTR) have a mean value of 4283.79 and 41.9538 respectively, also, median value of 1300.5590, 2242.4105 and 21.0001 respectively, also the maximum and minimum values of capital gains tax revenue (CGTR) were 99.4043. Capital gains tax revenue (CGTR) were 3.1803. On the other hand, the standard deviation values of 0.3788 signifying that the data deviate from the mean values of the two study measures, which implies that there is a dispersion of the data from the means because the standard deviation is closed to the mean.

Demographic Analysis

The study uses secondary data from Federal Inland Revenue Service - **Federal Inland Revenue Service (FIRS)**; <https://www.firs.gov.ng/tax-statistics-report/>. Therefore, there was no need for demographic analysis.

Univariate Analysis

Data Diagnostic and Robustness Tests

Result Summary of Unit Root (Stationary) Test

The study carried out the unit root test using the Augmented Dickey Fuller (ADF) unit root test due to the fact that the data involves time series. According to Gujarat & Porter 2009, the unit root test is performed to ascertain that the time series data are stationary and co-integrated.

Table 4.2 Summary Stationary Test Result

Variables	ADF T-Statistic	1% Critical Values	5% Critical Values	10% Critical Values	Prob. Value	Order Diff. Intercept	Stationary?
CGTR	-3.896746	-3.621023	-2.943427	-2.610263	0.0009	1(1)	Yes
ETRG	-14.66566	-3.626784	-2.945842	-2.611531	0.0087	1(2)	Yes
EFTR	-9.462277	-3.621023	-2.943427	-2.610263	0.0073	1(2)	Yes
ETPY	-3.763333	-3.679322	-2.967767	-2.622989	0.0000	1(1)	Yes

Source: Researcher's Statistical Computation from E-view (v.10), 2023

In table 4.2, the summary of unit root (stationary) test statistic of the variables is presented. The results of the unit root test adopting ADF at 1%, 5% and 10% critical levels indicated that some of variables are stationary at first difference 1(1) except electronic tax registration (ETRG), and electronic filling of tax returns (ETRG) that are stationary at second difference (1(2)). The critical values at the selected levels showed signs/p-values that are significant and consistent. The test statistic values (ADF' T-statistic) are also greater than the corresponding critical value levels. This confirms to a large extent the stationarity and the co-integration of the data set/variables. The result implies that the adopted variables are consistent, reliable and very appropriate in explaining and measuring the relationship between electronic-tax administration mechanism and tax revenue in Nigeria.

Diagnostic tests of Data

Table 4.: Summary of Diagnostic tests of Data

S/N	Test	F-statistics			P-value		
		Model1	Model2	Model3	Model1	model2	Model3
1	Serial correlation: Breusch-Godfrey serial correlation LM test	1.250751	6.555268	4.522424	0.3083	0.3256	0.1049
2	Autoregressive conditional heteroscedasticity: ARCH LM test	0.002146	0.150756	0.294710	0.9633	0.0743	0.5906

Source: Researcher's Statistical Computation from E-view (v.10), 2023

The table 4.3 above the serial correlation test, the null hypothesis of no serial correlation between the variables was not rejected since the p value is greater than 5% as shown in the table. Lastly the null hypothesis of no heteroscedasticity was not rejected too because the p-value is greater than 5% as shown in the table. Therefore, the diagnostic tests indicated that the residuals are normally distributed, homoscedastic and serially uncorrelated.

Results of Co-integration Test

Table 4.4 **Johansen Co-integration Test**

Date: 11/21/23 Time: 11:17

Sample (adjusted): 1015 2022

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic
None *	0.927382	213.9790
At most 1 *	0.701693	116.9449
At most 2 *	0.589188	72.18849
At most 3	0.343881	39.27260
At most 4	0.274016	23.68030
At most 5	0.221138	11.83187
At most 6	0.067475	2.584785

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic
None *	0.927382	97.03411
At most 1 *	0.701693	44.75639
At most 2	0.589188	32.91589
At most 3	0.343881	15.59230
At most 4	0.274016	11.84842
At most 5	0.221138	9.247090
At most 6	0.067475	2.584785

Ln(β ETRG)	Ln(β EFTR)	Ln(β ETPY)	Ln(CGTR)
-1.390683	1.342835	-0.612753	-1.372253
3.819675	-0.765515	-0.803988	-0.316718
-1.225733	0.883785	2.199199	-0.199685
0.493099	3.066347	-3.826089	0.440369
-1.396324	1.884816	0.011480	-0.127470
-2.662293	-2.756010	3.275821	-0.492354
1.506847	-1.098966	-0.381838	0.155597

Source: Researcher's Statistical Computation from E-view (v.10), 2023

In table 4.4, the Johansen method of testing for co-integration among variables was employed in this study because the variables captured in the model specification as further revealed in the ADF unit root test are integrated. The lag interval of 1 to 1 was adopted with a linear deterministic test assumption. The result of co-integration test on Table 4.4 above indicate the of 3 co-integrating equations between the predictor and the criterion variables at 0.05 (5%) level of significance; as trace statistic values was compared to the critical value at 5% and found to be significant. The unrestricted Rank Test and the maximum Eigenvalue tests supported and confirmed the trace result. This suggests the presence of a long run relationship between electronic-tax administrative mechanism and revenue collection in Nigeria. The null hypothesis of no co-integration or no

existence of almost one co-integrating vector is not accepted; as the result shows the existence of at most 6 co-integrating equations in the formulated model. We can therefore conclude that the variables are co-integrated in the long-run. Any perceive short run effects will still endure in the long-run relationship.

Bivariate (Correlation) Analysis

Table 4.

Correlation Analysis: Ordinary

Date: 11/22/23 Time: 06:11

Sample: 2015 2022

Included observations: 56

Correlation Probability	Ln(β ETR _G)	Ln(β EFTR)	Ln(β ETPY)	Ln(CGTR)		
Ln(β ETR _G)	1.000000 -----					
Ln(β EFTR)	0.635136 0.0000	1.000000 -----				
Ln(β ETPY)	0.594059 0.0002	0.902255 0.0000	1.000000 -----			
Ln(CGTR)	0.628408 0.0001	0.780149 0.0000	0.899085 0.0000	0.507879 0.0018	0.955542 0.0000	1.000000 -----

Source: Researcher's Statistical Computation from E-view (v.12), 2023.

Table 4.5 above indicates that the correlation between the predictor variables and the criterion variables are strong, positive and significant. The positive and statistically significant association of the variables explains the impact of investigate electronic-tax administrative mechanism and revenue collection in Nigeria. Only electronic tax payment and value added tax revenue of the pairs of correlations among the predictor variables is linearly perfectly correlated. This signifies the absence of multi-collinearity.

Multiply Regression Analysis

Regression analysis is the prediction/estimation of the mean value of the criterion variable on the basis of the observed fixed values of the predictor variables. A total of twelve null hypothesized associations was postulated in the study and were transformed into three equation models. In an attempt to actualize the eclectic objective of the research work, we employ regression analysis as a prerequisite in testing our hypotheses considering the fact that it gives a synchronize account of the relationship between the variables under investigation.

Summary of Null Hypotheses Result Findings of the First Model Tested at 0.05 Level of Significance

- Ho₁:** there is significant relationship between electronic tax registration and capital gains tax revenue in Nigeria.
- Ho₂:** there is no significant relationship between electronic filling of tax returns and capital gains tax revenue in Nigeria.
- Ho₃:** there is significant relationship between electronic tax payment and capital gains tax revenue in Nigeria.

Summary Findings (Results)

From the summary of hypotheses table above the result of the hypotheses

Table 10 Summary Computation of Hypotheses Results

Hypotheses	Coefficient	Std. Error	T-Stat	P-Value 0.05	Statistical Decision	Remark
H0 ₁	5.079987	0.188226	5.737726	0.0721	Insignificant	Accept H0 ₇
H0 ₂	23.375033	0.247528	9.151140	0.0390	Significant	Reject H0 ₈
H0 ₃	17.837734	0.216097	13.87663	0.0035	Significant	Reject H0 ₉

Source: Researcher's Computation, 2023

From the summary of hypotheses table above the result of the hypotheses of the study were presented in line with the statistical decision rule: 'if the probability value (PV) in is less than 0.05 alpha level, we Reject the null hypotheses and accept significant relationship. Meanwhile, if the probability value (PV) is greater than 0.05 alpha level, we accept the null hypothesis and accept insignificant relationship'. Hence:

- Ho₁:** there is significant relationship between electronic tax registration and capital gains tax revenue in Nigeria.
- Ho₂:** there is no significant relationship between electronic filling of tax returns and capital gains tax revenue in Nigeria.
- Ho₃:** there is significant relationship between electronic tax payment and capital gains tax revenue in Nigeria.

Discussion of Findings

H0₁: there is significant relationship between electronic tax registration and capital gains tax revenue in Nigeria.

The result of the descriptive statistics analysis of table 4.1 for electronic tax registration and capital gains tax revenue result show mean of 323.975 and 41.9538, respectively. On the other hand, null hypothesis one was rejected with a (P-Value of 0.0021 < 0.05 and coefficient value of 5.079987). Hence, there is significant relationship between electronic tax registration and capital gains tax revenue in Nigeria. This result is in line with Ndayisenga and Shukla (2019), evaluated the effect of electronic tax management system on tax collection efficiency in Rwanda. The research aimed to examine the effect of electronic tax management system on revenue collection by Rwanda Revenue Authority. Data were gathered through the means of structured questionnaires. Pearson's correlation analysis and regression. On the basis of findings, the study concluded that tax reforms improve the revenue generating machinery of government to undertake socially desirable expenditure that will translate to economic growth in real output and per capital basis. The study recommended that sustainable economic growth cannot be attained with tax reform processes except obsolete tax laws and rates are reviewed in line with macroeconomic objectives, corrupt free and efficient tax administrative machinery with personnel's and accountability and transparency of government officials in the management of tax revenue.

Ho₂: there is no significant relationship between electronic filling of tax returns and capital gains tax revenue in Nigeria.

The result of the descriptive statistics analysis of table 4.1 for electronic filling of tax returns and capital gain tax revenue result show mean of 153.9741 and 41.9538, respectively. On the other hand, null hypothesis one was accepted with a (P-Value of 0.0790 > 0.05 and coefficient value of 23.375033). Hence, there is no significant relationship between electronic filling of tax returns and capital gains tax revenue in Nigeria. Nnubia, et al Ogan (2020) analyzed the impact of e-tax assessment on income generation in Nigeria. The assessment applied optional information obtained

from Federal Inland Revenue Service charge report and CBN Statistical delivery and Quarterly Economic Reports. These data were time arrangement data covers the time frame from first quarter of 2020 to second quarter of 2018. The information gathered were analyzed using Ordinary Least Square Method. The results show a hopeful gigantic effect of pre (before the starter of echarge evaluation) organization personal expense and value added tax on income generation in Nigeria and an opposite irrelevant effect of post association yearly obligation pay and worth included.

Ho₃: there is significant relationship between electronic tax payment and capital gains tax revenue in Nigeria.

The result of the descriptive statistics analysis of table 4.1 for electronic tax payment and capital gains tax revenue result show mean of 2520.3910 and 41.9538, respectively. On the other hand, null hypothesis one was accepted with a (P-Value of $0.0035 < 0.05$ and coefficient value of 17.837734). Hence, there is significant relationship between electronic tax payment and capital gains tax revenue in Nigeria. The finding was in line with Unuigbokhai et al. (2023). They studied a comprehensive description of the relevant literature related to the e-tax payment and revenue generation in Nigeria. It is obvious that the Nigeria's revenue from oil can no longer fully support her development objectives due to the serious decline in price of oil in recent years which has led to a decrease in the funds available to the Government. Therefore, there is the need for government to generate revenues internally to help finance her public expenditures. So, the main objective of this study was to bridge this gap and try to enrich existing literature on e-tax payment by examining the subject matter. The study conclusion that there is a bothersome irrelevant impact of pre and post capital gains charge income on income generation in Nigeria. It is suggested that more empirical review should be conducted by other researchers on the impact of e-tax payment and revenue generation in Nigeria and also relationship between e-tax collection and revenue generation in Nigeria.

SUMMARY, CONCLUSION/RECOMMENDATION

This study investigated the extent of relationship between electronic-tax administrative mechanism and revenue collection in Nigeria 2015 - 2022. Three objectives, three research questions and three hypotheses were formulated to guide the study. Studies related to this study were critically reviewed under three under headings of; conceptual reviews, theoretical framework and empirical studies. The conceptual reviewed electronic-tax administrative mechanism, electronic filling of tax returns, electronic tax payment, revenue collection, Capital Gains Tax Revenue and. Theoretical framework, covered the Technology Acceptance Model (TAM) by Fred Davies in (1980) and tabulated analyses of methodologies, findings and recommendations, etc.

The study adopted both correlational and ex-post facto designs. The population of the study is the 36 states and federal capital territory federal Inland Revenue Service FIRS. Covering eight (8) years (2015-2022) FIRS electronic tax system adopted years in Nigeria. Specifically, eight (2) years FIRS and CAC compiled number of e-tax registered companies, number of companies' e-tax filled returns and electronic tax payments. The formulated research questions were analyzed with descriptive statistics. The hypotheses were tested using the least square panel data regression analysis with the aid of E-view (10).

CONCLUSION/RECOMMENDATION

The Nigerian tax system has long been undermined by inefficiencies, rising administrative costs, and persistently low revenue yields, largely due to its reliance on manual tax administration characterized by poor record-keeping, lack of reliable statistics, complex payment processes, and limited technological adoption by both taxpayers and tax authorities. Reports from the Federal Inland Revenue, published in *This Day* (2013) and *Punch* (2015), indicated that approximately ₦12 billion is lost annually through revenue leakages in the manual system. In contrast, electronic

taxation, as successfully practiced in other countries, has proven effective in reducing compliance time, enhancing accuracy, providing reliable tax data, and improving overall efficiency. This study established that with respect to capital gains tax revenue, electronic tax registration and electronic tax payment were found to be significantly related, while electronic filing of returns showed no significant effect. Accordingly, full adoption of electronic taxation by the Joint Tax Board, State Internal Revenue Services, and the Federal Inland Revenue Service is critical to eliminating leakages, boosting revenue generation, and fostering sustainable tax compliance across all levels. Based on these insights, it is recommended that the Federal Inland Revenue Service (FIRS) sustain and strengthen the electronic tax registration and payment processes to improve capital gains tax revenue, while providing incentives to companies offering electronic tax filing services to encourage taxpayer compliance and enhance overall tax performance in Nigeria.

Contribution to Scholarship

1. The study contributes to knowledge by introducing electronic tax registration, electronic filling of tax returns and electronic tax payment which have not been studied to the best of our knowledge in previous empirical studies in Nigeria.
2. This study developed three panel regression models for capturing the casual relationships between dimensions of electronic tax administration mechanism (electronic tax registration, electronic filling of tax returns and electronic tax payment) and tax revenue variables (company income tax revenue, value added tax revenue, capital gain tax revenue) in Nigeria.
3. The study developed a heuristic structural model in illustrating the effect of electronic tax administration mechanism and Tax Revenue in Nigeria.

Suggested topics for further studies:

Future research could explore E-Tax administration mechanism and tax revenue in Rivers State. E-Tax administration mechanism and tax revenue in Lagos State. E-Tax administration mechanism and tax revenue in Kano State. E-Tax administration mechanism and stamp duties collection in Nigeria.

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