

# Electronic Tax System and Tax Compliance in Nigerian Informal Sector

Muyiwa Emmanuel Dagunduro<sup>1,\*</sup>, Faraj Gheni Abbood<sup>2</sup>, Mustafa Salih Dakhil<sup>3,4</sup>,  
Gbenga Ayodele Falana<sup>1</sup>

<sup>1</sup>Department of Accounting, Afe Babalola University Ado-Ekiti, Nigeria

<sup>2</sup>Department of Accounting, Middle Technical University, Iraq

<sup>3</sup>Department of Accounting, Al-Furat Al-Awsat Technical University, Iraq

<sup>4</sup>Research Laboratory, Ural Federal University, Russia

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**Abstract** The globalization and increasing fiscal scrutiny, tax compliance have become critical issues for governments, businesses, and individuals. This study focused on evaluating the effect of electronic tax systems on tax compliance within Nigeria's informal sector. The study employed a survey research design, using a well-structured questionnaire to collect primary data from artisans, street vendors, small-scale traders, service providers, and other self-employed individuals in Southwest Nigeria. These individuals often operate informally without registering their businesses or paying taxes. A total of 700 questionnaires were distributed, and 651 were completed and returned. The questionnaire utilized a 5-point Likert scale, and a purposive sampling technique was used to target respondents relevant to the study's objectives. The reliability of the questionnaire was confirmed through a Cronbach Alpha test. Data were analysed using both descriptive statistics (mean, variance, skewness, kurtosis) and inferential statistics (correlation and regression analysis) to summarize findings and draw conclusions about the population. Through regression analysis, the study revealed that electronic tax systems, including electronic tax filing, billing, and payments, had a positive and significant impact on tax compliance. The results showed that businesses within the informal sector were more likely to adhere to tax regulations, such as timely filing and payment, when using these systems. This

study concluded that the adoption of electronic tax systems has a substantial and positive influence on tax compliance within Nigeria's informal sector. In line with the findings of this study, it was recommended that government should continue expanding access to electronic tax systems, particularly in the informal sector, by providing digital infrastructure and promoting awareness.

**Keywords** Electronic Tax System, Electronic Tax Filing, Electronic Tax Billing, Electronic Tax Payments, Tax Compliance

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## 1. Introduction

In an age marked by increased globalization and heightened fiscal scrutiny, tax compliance have emerged as a crucial issue for governments, businesses, and individuals worldwide [1, 2]. While the importance of tax compliance is universally recognized, the factors affecting it vary significantly across different regions, influenced by local institutional frameworks, cultural norms, and historical factors [3, 4]. Several elements drive tax compliance, including taxpayers' attitudes, perceptions of fairness, enforcement measures, and the complexity of tax regulations [5]. Taxpayers' willingness to follow tax laws

is shaped by their trust in government institutions, their views on tax administration effectiveness, and their beliefs about the fairness of the tax system [6, 7]. The emergence of digital economies poses substantial challenges to traditional methods of tax enforcement.

In the face of increasing globalization and economic modernization, tax compliance remains a critical concern for governments worldwide [8]. In Nigeria, the informal sector, comprising micro, small, and medium-sized enterprises (MSMEs), plays a significant role in the economy but often faces challenges in tax compliance due to its unique characteristics [9]. This sector, which includes street vendors, artisans, and small-scale traders, frequently operates outside formal regulatory frameworks, resulting in underreported income and tax evasion [7, 10]. The rise of digital technologies presents a potential solution to these challenges. Electronic tax systems (ETS), which include online tax filing platforms and online billing systems, offer new opportunities for enhancing tax compliance by simplifying the tax reporting process and improving access to tax services [11]. These systems promise to bridge gaps between tax authorities and informal sector businesses by streamlining procedures and reducing administrative burdens.

This study assessed the effect of electronic tax systems on tax compliance within Nigeria's informal sector. It examines how the implementation of digital tools influences the adherence to tax regulations among informal sector operators. Specifically, the research investigates the effectiveness of electronic tax systems in improving the accuracy of tax reporting, increasing timely tax payments, and enhancing overall tax compliance. By focusing on the Nigerian context, where informal sector activities are prevalent and digital infrastructure is rapidly evolving, this study aims to provide valuable insights into the role of technology in modernizing tax administration and fostering greater tax compliance.

Through a comprehensive analysis of empirical data, this study seeks to contribute to the understanding of how digital tax solutions can address the persistent challenges of tax compliance in the informal sector. The findings are expected to offer practical recommendations for policymakers and tax administrators on leveraging electronic tax systems to enhance revenue collection and support the growth of Nigeria's informal economy.

## 2. Literature Review and Hypotheses Development

### 2.1. Conceptual Review

This section provides clear definition of variables investigated in this study.

#### 2.1.1. The Electronic Tax System in Nigeria

The electronic tax system in Nigeria has evolved

significantly over the past two decades as part of efforts to improve tax administration, enhance compliance, and broaden the tax base. The Federal Inland Revenue Service (FIRS) spearheaded these reforms, introducing the Integrated Tax Administration System (ITAS) in 2013 to automate tax processes and facilitate seamless interactions between taxpayers and the tax authority [11]. Prior to the adoption of electronic tax systems, Nigeria relied on manual tax filing and collection methods, which were prone to errors, inefficiencies, and corruption. The 2012 National Tax Policy reform paved the way for the automation of tax administration, emphasizing transparency, accountability, and efficiency. ITAS was fully operational by 2016, allowing electronic filing, payment, and processing of Value Added Tax (VAT), Company Income Tax (CIT), and other tax types [12]. As of 2024, FIRS reported that over 1.2 million businesses are registered on the electronic tax platform, with an annual increase of approximately 15% in compliance rates among corporate entities [13]. The adoption rate among small and medium-sized enterprises (SMEs) has also grown due to targeted campaigns and simplified tax registration processes [12].

The electronic tax system covers various tax types, including Personal Income Tax (PIT), VAT, CIT, and Withholding Tax (WHT). It offers features such as e-registration, e-filing, and real-time tax clearance certificate issuance, which have reduced processing times and improved taxpayer experience. Additionally, the system integrates with banks for direct payments and provides an online portal for tracking tax transactions [14]. Despite these advancements, the electronic tax system faces several challenges. Limited digital literacy among taxpayers, especially in rural areas, affects system adoption [8]. Infrastructure deficits, such as unreliable internet connectivity and inconsistent power supply, also hinder seamless operations. Furthermore, resistance to change by some taxpayers and inadequate enforcement mechanisms contribute to compliance gaps [15]. While Nigeria's electronic tax system has modernized tax administration and improved compliance, addressing infrastructural and socio-economic barriers is crucial for its optimal performance and sustainability.

#### 2.1.2. Tax Compliance

Tax compliance is defined as the adherence to tax laws and regulations by accurately reporting income, expenses, and other financial details to the relevant tax authorities [16]. This involves timely filing of tax returns and the correct payment of taxes due. Tax compliance was categorized into voluntary compliance, where taxpayers willingly follow tax laws, and enforced compliance, which arises from the threat of legal penalties and audits [17]. To improve tax compliance, governments use strategies such as simplifying tax regulations, enhancing taxpayer services, and boosting the perceived fairness and transparency of the

tax system. Similarly, [18] characterized tax compliance as the voluntary adherence to tax regulations and administrative processes by taxpayers, a view also supported by [9]. Key indicators of tax compliance include timely submission and accurate reporting of tax returns.

Tax compliance is influenced by various factors such as economic conditions, the complexity of tax laws, enforcement measures, and perceptions of fairness in the tax system. Both intrinsic motivations, like personal morals and ethics, and extrinsic motivations, such as fear of audits, fines, and legal consequences, affect tax compliance [19]. In this study, tax compliance is defined as the adherence to tax laws by individuals and entities, including timely and accurate reporting of income, deductions, and taxes owed. This practice is essential for the effective functioning of government systems, as it ensures the necessary revenue for public spending and services.

### 2.1.3. Electronic Tax System

An electronic tax system refers to a digital platform or software used by tax authorities to facilitate the collection, filing, and management of taxes. It automates the process of tax return submission, payment, and record-keeping, thereby improving efficiency and reducing the potential for errors [20]. An electronic tax system is an online platform that allows taxpayers to file tax returns, make payments, and interact with tax authorities electronically [4]. It streamlines tax compliance by enabling real-time submission and reducing the need for physical paperwork.

An electronic tax system is a technology-driven solution that automates various aspects of tax compliance, including registration, tax calculation, return filing, and payment processing [10]. It is designed to enhance transparency, reduce administrative burdens, and ensure accurate tax reporting. An electronic tax system encompasses a comprehensive digital framework that integrates multiple functions of tax administration, such as taxpayer registration, assessment, audit, and dispute resolution [21]. This system aims to improve accessibility, reduce compliance costs, and foster better communication between taxpayers and tax authorities.

#### 2.1.3.1. Electronic Tax Filing

Electronic tax filing refers to the process of submitting tax returns and associated documents to tax authorities electronically, typically through the internet or other electronic means. This method allows taxpayers to file their taxes digitally, eliminating the need for paper forms and manual submissions [13]. Electronic filing offers various benefits, including faster processing times, reduced errors, and confirmation of receipt from tax authorities. Electronic filing" (e-filing) is the process of submitting tax returns and related documents to the relevant tax authorities electronically, typically over the internet [6]. This method of filing offers several advantages over traditional paper-based filing, including increased accuracy,

faster processing times, and reduced administrative burden for both taxpayers and tax authorities.

E-filing systems often provide built-in validation checks to help taxpayers identify errors or missing information before submission, reducing the likelihood of mistakes and potential delays in processing. Additionally, e-filing can streamline the processing of returns for tax authorities, leading to quicker refunds for taxpayers and more efficient tax administration overall [13]. With electronic filing, taxpayers can use specialized software or online platforms provided by tax authorities to input their financial information, calculate taxes owed, and transmit the returns directly to the appropriate government agencies. Taxpayers may also receive electronic notifications, acknowledgments, and refunds, streamlining the overall tax filing process [28]. The adoption of electronic filing has become increasingly widespread, driven by technological advancements and government initiatives to promote efficiency and cost-effectiveness in tax administration [22]. Many countries have implemented electronic filing systems as part of broader efforts to modernize tax systems and improve compliance with tax regulations.

#### 2.1.3.2. Electronic Tax Billing

Electronic billing defined as the process of generating, sending, and receiving invoices or bills electronically, often through digital platforms or automated systems. This method replaces traditional paper-based billing systems with electronic alternatives, allowing businesses to streamline their billing processes and improve efficiency [6]. Electronic billing systems typically involve the creation of electronic invoices containing detailed information about products or services provided, quantities, prices, and payment terms. These invoices are then transmitted to customers via email, online portals, or other electronic channels. Customers can review the invoices digitally and make payments using electronic payment methods such as credit cards, bank transfers, or online payment platforms [19]. Similarly, electronic billing is defined as to the process of generating, delivering, and receiving invoices and bills electronically, typically through digital means such as email, online portals, or electronic data interchange (EDI) systems. This method replaces traditional paper-based invoicing systems with electronic formats, allowing businesses to streamline billing processes, reduce costs, and improve efficiency [9].

Electronic billing has become increasingly prevalent across industries, driven by advancements in information technology and the growing demand for digital solutions in business operations [10]. The adoption of electronic billing has become increasingly common across industries, driven by advancements in technology and the desire to modernize billing processes. Electronic billing systems offer benefits such as improved accuracy, faster delivery, and greater convenience for businesses and customers alike. Additionally, electronic billing supports sustainability

efforts by reducing paper consumption and environmental impact associated with traditional billing methods [14]. Additionally, electronic billing systems facilitate better tracking and management of billing records, helping businesses maintain accurate financial records and monitor payment statuses more effectively.

### 2.1.3.3. Electronic Tax Payment

Electronic tax payment is defined as software tools that allow merchants to accept online payments from customers [22]. These systems also include digital platforms that enable users to make and receive payments over the Internet [11]. Essentially, these online payment systems facilitate transactions and payment settlements via the Internet [7]. As noted [23], electronic tax payment supports online transactions by enabling users to transfer funds securely through digital connections. These systems use encrypted technology to ensure safe and efficient financial transactions between buyers and sellers, thereby simplifying the process of conducting electronic payments online [24].

In this study, electronic tax payment refers to digital platforms and applications that enable taxpayers to pay their taxes online. These systems allow individuals and businesses to directly make payments to tax authorities through secure, internet-based interfaces. They simplify the payment process by providing a convenient and efficient method for fulfilling tax obligations, accessible from any location with internet access. Automated systems reduce the risk of human error, while real-time processing ensures timely payments, avoiding late fees and penalties. Additionally, secure digital connections safeguard sensitive financial information, enhancing security and preventing fraud. By making the payment process more accessible and efficient, electronic tax payment systems help increase tax compliance and improve tax administration.

## 2.2. Theoretical Review

This study reviewed Tax Benefit Theory and underpinned this study.

### 2.2.1. Tax Benefit Theory

Tax Benefit Theory, introduced by economists [25], suggests that individuals' tax compliance is influenced by the perceived benefits they receive from paying taxes. According to this theory, taxpayers weigh the benefits, such as access to public goods and services, against the costs of compliance. Compliance is more likely when taxpayers perceive tangible benefits in return for their contributions [18]. In emerging economy like Nigeria's informal sector, where access to formal public services is limited, the perceived benefits are crucial in shaping tax compliance behavior [9]. Electronic tax systems can enhance compliance by improving access to government

services, increasing transparency, and streamlining tax processes, thereby boosting taxpayers' confidence in the system's fairness and efficiency [6].

The Nigerian government can boost voluntary tax compliance among informal sector taxpayers by utilizing electronic tax systems to enhance the perceived benefits of paying taxes [19]. However, the success of these systems in promoting compliance is influenced by factors such as system design, access to technology, and trust in government institutions [26]. Tax benefit theory, which emphasizes the role of perceived benefits in tax compliance decisions, offers valuable insights for tax policy and enforcement strategies. Despite its usefulness, the theory is criticized for oversimplifying taxpayer behavior by assuming rational decision-making and failing to account for psychological, social, and cultural influences. Critics argue that tax compliance is shaped by a complex mix of factors that go beyond the economic framework of tax benefit theory [27].

## 2.3. Empirical Review

This section reviews pertinent empirical studies on digital tax administration and tax compliance, organized in alignment with the objectives of this study.

### 2.3.1. Electronic Tax Filing and Tax Compliance

The empirical studies on the impact of electronic filing systems on tax compliance provide valuable insights across diverse contexts. Smith et al. [28] used a robust mixed methods approach in the United States, combining quantitative survey data and qualitative interviews. This dual approach allowed for a comprehensive understanding of the positive effects of electronic filing systems on tax compliance, such as simplifying the filing process and reducing errors. However, their findings also highlighted significant challenges, including concerns about data security and familiarity with technology, which may limit broader adoption. Similarly, Chen and Wu [29] conducted a quasi-experimental study in China that demonstrated an increase in compliance rates post-implementation of electronic filing systems. The pre-post intervention design, complemented by interviews, provided a nuanced understanding of the benefits and challenges of these systems, including improved accuracy and reduced tax evasion, alongside initial resistance and technical support issues. Kumar and Gupta [30] in India utilized a longitudinal study design with administrative data, revealing long-term improvements in compliance rates due to electronic filing adoption. Their inclusion of taxpayer surveys added depth to the understanding of user experiences and perceptions.

Garcia and Rodriguez [31] conducted a cross-sectional survey in Mexico with a focus on SMEs, using stratified random sampling to ensure representation across industries and regions. This method provided a detailed snapshot of

compliance behaviors and the influence of electronic filing adoption. Meanwhile, Nguyen and Tran [32] in Vietnam and Bello and Ibrahim [33] in Nigeria employed qualitative and survey-based approaches, respectively, to explore the factors influencing adoption and readiness for electronic filing systems. Lastly, Wang [34] compared South Korea and Malaysia using a mixed-methods approach, highlighting the cultural, institutional, and technological factors that influence electronic filing adoption and compliance behaviors across different national contexts. These diverse methodologies and contexts underscore the multifaceted nature of electronic filing systems' impact on tax compliance globally.

Existing studies, such as those by [29, 30, 35], have primarily focused on individual taxpayers or SMEs in formal sectors across various countries. However, there is a noticeable lack of research specifically examining the informal sector, which is particularly significant in Nigeria where much economic activity occurs outside formal regulations. Additionally, while previous studies have predominantly used quantitative methods, including surveys and econometric analyses, and some qualitative interviews, they have not adequately explored the cultural, economic, and technological contexts of Nigeria's informal sector. Although [33] addressed the readiness of small businesses for electronic filing in Nigeria, they did not deeply investigate the informal sector. This study aims to fill this gap by investigating electronic filing and tax compliance among the Nigerian informal sector, capturing a more nuanced understanding of the factors influencing electronic filing adoption and tax compliance behaviors in this critical segment of Nigeria's economy. Based on the above facts, this study hypothesizes:

**H1:** *Electronic tax filing has a positive effect on tax compliance in Nigerian informal sectors.*

### 2.3.2. Electronic Tax Billing and Tax Compliance

The evaluation of various empirical studies reveals mixed findings regarding the impact of electronic invoicing and billing systems on tax compliance across different countries. Garcia and Lopez [2] utilized a quasi-experimental design with administrative data in Spain and found a significant positive effect of electronic invoicing on tax compliance, indicating that these systems enhance compliance among businesses. Similarly, Chen and Wu [29] used a qualitative approach with in-depth interviews in China and identified a significant positive impact of electronic billing on compliance behaviors among small business owners. Kumar and Sharma [36] employed regression analysis on survey data from India, corroborating these findings by demonstrating a significant positive effect of electronic billing systems on tax compliance. Nguyen and Phan [37] also found a positive and significant association in Vietnam using logistic regression, further supporting the beneficial role of electronic billing in improving tax compliance.

Contrastingly, Martinez and Silva [38] reported an insignificant negative impact of electronic invoicing on tax compliance in Brazil using panel regression models, suggesting that the expected benefits may not always materialize uniformly across different contexts. Smith and Brown [28] conducted a randomized controlled trial in the United States and found a negative significant effect of electronic billing interventions on tax compliance among small businesses, providing causal evidence that electronic billing may sometimes hinder compliance. Zhang and Wang [39] adopted a mixed method approach in South Korea, combining quantitative regression analysis with qualitative interviews, and found a significant positive effect of electronic invoicing on compliance, highlighting the complexity of the relationship and the influence of contextual factors. These diverse methodologies and mixed results underscore the need for further research to understand the varying impacts of electronic invoicing and billing systems on tax compliance across different countries and sectors.

Previous studies, such as those by [29, 31, 36], have shown the positive impact of electronic invoicing and billing systems on tax compliance in the formal sectors of various countries. However, there is a noticeable lack of research specifically focusing on the informal sector, which is particularly significant in Nigeria, where a large portion of economic activity occurs outside the formal regulatory framework. By concentrating on the informal sector, this study aims to provide insights into the unique challenges and compliance behaviors of informal businesses in adopting electronic billing systems, an area that remains underexplored. Additionally, previous studies have produced mixed results regarding the effectiveness of electronic billing on tax compliance, with some, like [28, 38], reported insignificant or negative impacts in respective regions. These inconsistent findings suggest that the influence of electronic billing on tax compliance may vary significantly across different economic environments and regulatory contexts. The current study intends to fill this gap by investigating the effect of electronic billing on tax compliance specifically tailored to the Nigerian informal sector. In line with the above facts, this study hypothesizes:

**H2:** *Electronic tax billing has a positive effect on tax compliance in Nigerian informal sectors.*

### 2.3.3. Electronic Tax Payment System and Tax Compliance

Chiamaka et al. [10] investigated the impact of electronic tax systems on internally generated revenue in Nigeria, focusing on the Ebonyi State Board of Internal Revenue. Their study utilized electronic tax registration, electronic filing of tax returns, and electronic tax payment as key elements of their analysis. Anchored in the expediency theory of taxation and the Technology Acceptance Model, the research employed a quantitative cross-sectional survey with 94 valid responses out of 124

qualified respondents. The findings indicated that electronic tax registration and electronic filing significantly influenced revenue generation, while electronic tax payment did not show a statistically significant impact. This suggests that while certain aspects of electronic tax systems are effective, the overall impact of electronic tax payments may require further investigation or improvement.

In a complementary study, Adefulu et al. [11] assessed the effects of various aspects of tax digitalization on revenue tax compliance within the Federal Inland Revenue Service (FIRS) in Abuja, Nigeria. Using a cross-sectional survey of 603 employees and employing multiple regression analysis, the study found that all dimensions of tax digitalization (electronic tax filing, payment, audit, and reporting) positively impacted tax compliance.

Additional research reinforces these findings, with Irefe-Esema and Akinmade [40] noted improvements in tax registration and payment compliance due to automation. Awai and Oboh [4] observed that integrating electronic tax processes could enhance Nigeria's tax-to-GDP ratio and overall compliance. Silva [45] and Nguyen and Tran [32] found similar positive effects of digital payment systems on tax compliance in Brazil and Vietnam, respectively. Furthermore, Oladipo and Adekunle [12] in Nigeria and Zhang and Wang [39] in South Korea also confirmed the significant benefits of digital payment platforms in improving tax compliance.

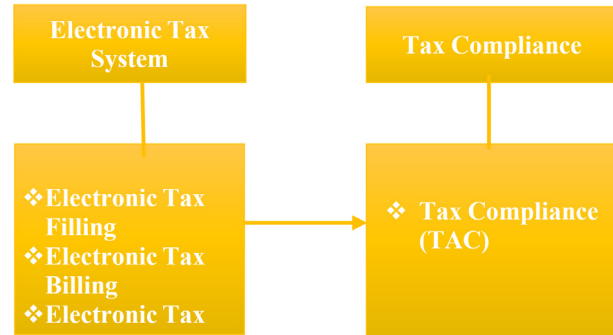
While previous studies, such as [10, 11] and others, have explored the impact of various electronic tax systems and digitalization on revenue generation and tax compliance in different regions, a significant research gap remains regarding the specific effect of electronic tax payment systems on tax compliance in Lagos State, Nigeria. Chiamaka et al. [10] found that electronic tax payment did not significantly impact internally generated revenue in Ebonyi State, suggesting the need for further investigation into this specific aspect of electronic tax systems. In contrast, Adefulu et al. [11] demonstrated a positive impact of various dimensions of tax digitalization on compliance but did not isolate the effect of electronic tax payment systems. This study aims to fill this gap by focusing exclusively on the impact of electronic tax payment systems on tax compliance in Lagos State, Nigeria, providing a more nuanced understanding of how this specific digital tool influences taxpayer behavior in a major economic hub. It is therefore, hypothesized that:

**H3:** *Electronic tax payment has a significant positive effect on tax compliance in Nigerian informal sector.*

## 2.4. Conceptual Framework

Figure 1 below illustrates the relationship between the variables under study; electronic tax system (independent

variable) and tax compliance (dependent variable).



Source: Authors' Concepts (2024)

Figure 1. Conceptual Framework

## 3. Materials and Methods

This study adopted a survey research design, gathering data from primary sources through a well-structured questionnaire. This design was chosen to collect firsthand information directly from the targeted respondents, without any intention of manipulation. The study focused on a population consisting of artisans, street vendors, small-scale traders, service providers, and other self-employed individuals in Southwest Nigeria who engage in economic activities but often do not formally register their businesses or pay taxes. A total of 700 questionnaires were distributed, providing a substantial sample size that offers a representative snapshot of the targeted respondents. The questionnaire used a Likert scale ranging from 1 to 5, and 651 were returned completed. A purposive sampling technique was employed, allowing researchers to specifically select individuals with characteristics relevant to the study's objectives. To ensure the reliability of the research instrument, a Cronbach Alpha test was conducted. The data were analysed using both descriptive statistics (mean, variance, skewness, kurtosis) and inferential statistics (correlation and regression analysis) to summarize the basic features and draw broader conclusions about the population.

### 3.1. Reliability Tests

The study used the Cronbach's Alpha method to assess the validity and reliability of primary data. This approach evaluated the internal consistency of measurement scales as well as the research instrument's reliability. Table 1 summarizes the results of the Cronbach's Alpha test. The results showed that ETF, ETB, ETP, and TAC have values of 0.8351, 0.8422, 0.8364, and 0.8319, respectively. This demonstrates that the survey had a good level of consistency, suitable for high-stakes assessment in accordance with the study's objectives.

**Table 1.** Cronbach's Alpha

Item	Obs	covariance	Alpha
ETF	651	0.3670	0.8351
ETB	651	0.3697	0.8422
ETP	651	0.3710	0.8364
TAC	651	0.3690	0.8319
Test		0.3692	0.8721

Source: Authors' Computation, (2024)

### 3.2. Model Specification

This study adopted the econometric model developed by [11], which initially assessed the impact of tax digitalization on revenue tax compliance in the United States. The modified model is outlined as follows:

$$TAC = \alpha_0 + \beta_1ETF + \beta_2ETR + \beta_3ETP + \varepsilon$$

Where:

TAC= Tax Compliance

ETF= Electronic Tax Filing

ETR= Electronic Tax Billing

ETP= Electronic Tax Payment

$\alpha_0$ = Constant

$\Sigma$ = Stochastic Error Term

$\beta_0$ = Intercept

$\beta_1, \beta_2, \beta_3$ = The Coefficients of the independent variable

The *a-priori* expectation =  $\beta_1, \beta_2, \beta_3 > 0$ .

## 4. Data Analysis and Results

This chapter analyses data from a survey of respondents, testing each variable against three hypotheses. The study's objectives are specified in the variables, and the results are presented.

### 4.1. Descriptive Statistics

This section details the dataset used in the investigation, utilizing descriptive statistics to display raw data and employ various tools for interpretation and understanding.

#### 4.1.1. Demographic Information

As reported in Table 2, this study surveyed 651 respondents. Lagos State accounted for 119 respondents or 18.28% of the population. Furthermore, 90 respondents (13.82% of the population) were from Oyo State. 109 (16.74%) respondents were from Ogun State, while 126 (19.35%) respondents came from Osun State. 95 (14.59%) respondents were from Ondo State, while 112 were from Ekiti State. 126 (19.35%) respondents possessed Primary School Certificates, while 125 (19.20%) possessed O Level certificates. 132 of the respondents had an OND/NCE certificate representing 20.28% of the population. 141 (21.66%) of the respondents had HND/B.SC, while 127

(19.51%) respondents had M.SC.

**Table 2.** Demographic Statistics

Variable	Freq.	Percent	Cum.
State of Origin			
1	119	18.28	18.28
2	90	13.82	32.1
3	109	16.74	48.85
4	126	19.35	68.2
5	95	14.59	82.8
6	112	17.2	100
Education Level			
1	126	19.35	19.35
2	125	19.2	38.56
3	132	20.28	58.83
4	141	21.66	80.49
5	127	19.51	100
Employment Status			
1	143	21.97	21.97
2	126	19.35	41.32
3	126	19.35	60.68
4	135	20.74	81.41
5	121	18.59	100
Digital Tax Proficiency			
1	203	31.18	31.18
2	208	31.95	63.13
3	240	36.87	100

Source: Authors' Computation, (2024)

There were 143 artisans and 126 street merchants. This indicates that 21.97% of the population were artisans whereas 19.35% of respondents are street sellers. On the other side, 126 respondents (19.35% of the total) were small-scale dealers. 135 (20.74%) respondents were service providers, while 121 (18.59%) were employed in other industries. There were 203 respondents who were highly proficient in digit tax, accounting for 31.18% of the overall population. 208 (31.95%) respondents had an intermediate understanding, while 240 had limited awareness of digital tax.

#### 4.1.2. Descriptive Information

As reported in Table 3, this study's variables include ETF, ETB, ETP, and TAC. With a standard deviation of 0.7681, the average ETF was 3.7048. The minimum and maximum values in this distribution varied from 0 to 5. This implies that, on average, respondents agreed on how the numerous variables analysed influenced tax compliance. However, the distribution was negatively skewed at -2.8149, with a kurtosis of 14.5907, indicating that the majority of the data would be distributed to the left of the mean. ETB has a standard deviation of 0.7814 and an average of 3.6974. Despite the small variation, the

distribution was negatively skewed (-2.6810). The kurtosis was 13.5906. The ETP averaged 3.6854, with a standard deviation of .7597. The distribution's minimum and maximum values were 0 and 5 respectively. The distribution is negatively skewed (-2.8717) and has a kurtosis of 14.9134. The average TAC value was 3.7187, with a standard deviation of 0.7520. The distribution's minimum and maximum values were 0 and 5 respectively. The distribution was considerably skewed at the -3.0539 level, with a kurtosis of 16.0302, indicating a heavy-tailed distribution compared to the normal distribution.

#### 4.2. Model Regression Assumptions' Verification and Diagnostics

As reported in Table 4, to avoid bias or specification mistakes, the linear regression model requires an accurate description. The Ramsey reset test was used in the study to determine whether models had been mis-specified. According to the null hypothesis, no variables in the models have been excluded. The other option is that some factors were left out of the models. The null hypothesis is rejected if the test result has a p-value less than 0.05; otherwise, it is rejected. The test findings indicate that the null hypothesis is rejected (p-value = 0.0000, F-statistic = 70.05). As a result, the model includes all essential variables. The study used the variance inflation factor test to assess the degree of multicollinearity among independent variables. The ETP variable has the highest VIF value of 1.93, however, it is still significantly lower than the criterion of 10. This demonstrates that the model's independent variables do not exhibit considerable

multicollinearity. The study compared observations to the constant variance of errors (or the dependent variable). The Breusch-Pagan/Cook-Weisberg test was used to determine heteroskedasticity in error terms. As a result, if the test statistics are not significant, the residual exhibits homoskedasticity; otherwise, it exhibits heteroskedasticity. The Breusch-Pagan/Cook-Weisberg test for heteroskedasticity yielded a p-value of 0.0487 and a chi-value of 3.88. This suggests that there was heteroskedasticity in the data.

Autocorrelation challenges the basic linear regression model's assumption that residuals are independent of one another. As a result, estimators become inefficient, and statistical findings are incorrect. Thus, the purpose of this investigation was to determine whether autocorrelation was present in the data distribution. The Durbin-Watson d-statistic test for autocorrelation was used, and the test statistic values ranged from 0 to 4. While 2 represents no autocorrelation, less than 2 indicates positive autocorrelation, while greater than 2 indicates negative autocorrelation. The Durbin-Watson d-statistic test results of 1.8706 show that the model is autocorrelated. Again, the standard linear regression model assumes that the residuals are normally distributed. This assumption allows for accurate coefficient estimates, hypothesis testing, and the generation of confidence intervals. To determine if the residuals were normal, the study used the Shapiro-Wilk W test for normal data. For the residuals to follow a normal distribution, the p-value must be greater than 0.05. The test findings demonstrate that the residual is not normally distributed (p-value = 0.0000). The variables were then converted to be normally distributed.

**Table 3.** Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
ETF	651	3.7048	0.7681	0	5	-2.815	14.5908
ETB	651	3.6974	0.7815	0	5	-2.681	13.5906
ETP	651	3.6854	0.7597	0	5	-2.8717	14.9133
TAC	651	3.7187	0.7520	0	5	-3.0539	16.0302

Source: Authors' Computation (2024)

**Table 4.** Regression Assumptions' Verification and Diagnostics

Particulars	T-statistic	P-value
Ramsey reset test	70.05	0.000
Breusch-Pagan/Cook-Weisberg test	3.88	0.049
Durbin-Watson d-statistic test	1.87	
Shapiro-Wilk W test	12.90	0.000
VIF		
ETF	1.93	
ETB	1.92	
ETP	1.91	

Source: Authors' Computation (2024)

**4.3. Model Estimation, Prediction and Analysis**

Because of the presence of heteroskedasticity, non-normality and autocorrelation, the study employed robust regression. The F-test determines whether all model coefficients differ significantly from zero. A model is considered acceptable and efficient if the F-test statistic has a p-value less than 0.05. As shown in Table 5, the f-statistics are 242.83, with a p-value of 0.0000. This shows the model is statistically efficient. Nonetheless, Table 5 shows the model's expected parameters as well as their statistical significance. When the dependent variable's value increases by one unit, a positive coefficient indicates that the dependent variable's mean increases by the coefficient of the independent variable. When the independent variable grows by one unit, a negative coefficient suggests that the dependent variable tends to drop by the same coefficient. Two-tail p-values (based on the t-value) test the hypothesis that all coefficients depart from zero. A p-value of less than 0.05 with 95% confidence indicates that the independent factors have a significant effect on the dependent variable.

In this regard, the coefficient of ETF is 0.3211 with a p-value of 0.0000. This implies that for every unit increase in ETF, the Tax Compliance (TAC) increases by 0.3211 units, holding all other variables constant. The p-value is less than the standard significance level of 0.05. This indicates that the relationships between TAC and ETF are statistically significant. The t-value for ETF is 8.52, while its confidence interval ranges from 0.2471 to 0.3951. This indicates that under 95% confidence level the true coefficient for ETF lies between 0.2471 and 0.3951. Also, the ETB coefficient is 0.2256, with a p-value of 0.0000. This indicates that for every unit rise in ETB, the Tax Compliance (TAC) increases by 0.2256 units, assuming all other factors remain constant. The p-value is lower than the conventional significance level of 0.05. This suggests that the association between TAC and ETB is statistically

significant. The t-value for ETB is 6.07, and the confidence interval extends from 0.1527 to 0.2986. This means that at a 95% confidence level, the real coefficient for ETB is between 0.1527 and 0.2986.

Again, ETP's coefficient is 0.3032, and its p-value is 0.0000. This suggests that, while keeping all other factors fixed, the Tax Compliance (TAC) increases by 0.3032 units for every unit increase in ETP. The p-value is below the conventional 0.05 significance level. This suggests that there is statistical significance in the correlations between TAC and ETP. ETP has a t-value of 8.52 and a confidence interval that stretches from 0.2280 and 0.3784. This suggests that the genuine ETP coefficient, at a 95% confidence level, is between 0.2280 and 0.3784. The model suggests that improvements in electronic tax processes can significantly enhance tax compliance.

**4.4. Discussion of Findings**

This study assessed the effect of electronic tax systems on tax compliance within Nigeria's informal sector. The regression analysis showed that electronic tax systems encompassed electronic tax filing, electronic tax billing, and electronic tax payments had a positive and significant effect on tax compliance within Nigeria's informal sector. The analysis found that the implementation of these electronic tax systems had a beneficial impact on tax compliance. In other words, when businesses in the informal sector used these systems, they were more likely to comply with tax regulations, such as filing and paying taxes on time. The use of electronic tax systems is a key factor in improving tax compliance within the informal sector. The regression analysis demonstrated that the adoption of electronic tax systems in Nigeria's informal sector significantly improved tax compliance. The more these systems were used, the more compliant the taxpayers became.

**Table 5.** Robust Regression Analysis

TAC	Coef.	Std. Err.	t-value	P>t	[95% Conf.	Interval]
ETF	0.3211	0.0377	8.5200	0.0000	0.2471	0.3951
ETB	0.2256	0.0372	6.0700	0.0000	0.1527	0.2986
ETP	0.3032	0.0383	7.9100	0.0000	0.2280	0.3784
cons	0.5788	0.1183	4.8900	0.0000	0.3464	0.8111
F	242.83					
p-value	0.0000					

Source: Authors' Computation, (2024)

The findings of this study corroborate with the empirical studies conducted by [35] which found positive effects of electronic filing systems on tax compliance in the United States. Similarly, [29] observed an increase in compliance rates post-implementation of electronic filing systems in China. Kumar and Gupta [30] revealed long-term improvements in compliance rates due to electronic filing adoption in India. Nguyen and Phan [36] also found a beneficial role of electronic billing in improving tax compliance in Vietnam. Adefulu et al. [11] found that all dimensions of tax digitalization (electronic tax filing, payment, audit, and reporting) positively impacted tax compliance in Nigeria. The findings negate the studies conducted by Martinez and Silva [38] found that electronic invoicing had an insignificant negative effect on tax compliance in Brazil, indicating that its anticipated advantages may not be universally realized across various regions. Similarly, Smith and Brown [28] conducted a randomized controlled trial in the United States, revealing a significant negative impact of electronic billing interventions on tax compliance among small businesses. Their findings provide causal evidence that, in certain cases, electronic billing may actually impede compliance. Similarly, Chiamaka et al. [10] found that electronic tax payment did not show a statistically significant impact on internally generated revenue in Nigeria.

The positive and significant effect of electronic tax systems on tax compliance within Nigeria's informal sector aligns with the tax benefit theory. According to this theory, taxpayers are more likely to comply with tax regulations when they perceive a direct benefit from government services funded by taxes [41]. The ease and transparency provided by tools such as electronic tax filing, billing, and payments can be seen as a direct benefit to businesses, as they reduce the complexity and time involved in tax compliance. Consequently, informal sector businesses, which traditionally face barriers to compliance, may feel more inclined to fulfill their tax obligations, recognizing the benefits of an efficient tax system [42]. The study's findings have important implications for government policy, particularly in the informal sector. First, the significant improvement in tax compliance associated with the use of electronic tax systems suggests that governments should prioritize the digitalization of tax administration. Implementing policies that promote the widespread adoption of electronic tax filing, billing, and payment systems could reduce the tax gap, particularly in sectors that are historically difficult to regulate [43]. Additionally, providing incentives for businesses that adopt these technologies, such as tax credits or reduced penalties, can further enhance compliance rates. Governments may also need to invest in public awareness campaigns to ensure that informal sector businesses understand the advantages of using electronic tax systems [44-47].

## 5. Conclusions and Recommendations

Globalization and increasing fiscal scrutiny, tax compliance have become critical issues for governments, businesses, and individuals. This study focused on evaluating the effect of electronic tax systems on tax compliance within Nigeria's informal sector. Through regression analysis, the study revealed that electronic tax systems, including electronic tax filing, billing, and payments, had a positive and significant impact on tax compliance. The results showed that businesses within the informal sector were more likely to adhere to tax regulations, such as timely filing and payment, when using these systems. This study identified the key role of electronic tax systems in enhancing tax compliance within Nigeria's informal sector. This study concludes that the adoption of electronic tax systems has a substantial and positive influence on tax compliance within Nigeria's informal sector. By simplifying processes such as tax filing, billing, and payments, these systems encourage businesses to comply with tax obligations more effectively. The regression analysis demonstrates that as the utilization of electronic tax systems increases, so does the likelihood of compliance. This highlights the importance of integrating technology into tax administration, especially for the informal sector, which has traditionally been a challenging area for tax authorities to regulate.

In line with the findings of this study, it was recommended that government should continue expanding access to electronic tax systems, particularly in the informal sector, by providing digital infrastructure and promoting awareness. Secondly, the government should provide training programs to businesses in the informal sector on how to use electronic tax systems efficiently to foster greater compliance. Thirdly, government should introduce incentives for businesses that consistently use electronic tax platforms, such as reduced fees or tax rebates, to further encourage adoption. Furthermore, tax authorities should ensure that the electronic tax systems are user-friendly, secure, and reliable, making it easier for informal businesses to navigate and comply with tax regulations. Lastly, the government should continuously monitor the adoption and effectiveness of electronic tax systems to identify areas for improvement and ensure sustained compliance in the informal sector.

This study focuses exclusively on Nigeria's informal sector, which may limit the generalizability of the findings to other regions or countries with different socioeconomic, cultural, or technological contexts. The study relies primarily on quantitative data and regression analysis. A mixed method approach, incorporating qualitative insights from taxpayers and tax officials, could provide a more nuanced understanding of the factors influencing compliance. The analysis examines the impact of electronic tax systems over a relatively short timeframe. This may overlook long-term challenges, such as system maintenance, technological obsolescence, and evolving

taxpayer behaviors. The study does not account for external factors like political stability, economic conditions, or government corruption, which could influence the effectiveness of electronic tax systems in improving compliance. The reliance on self-reported data from informal sector businesses may introduce biases, such as social desirability or underreporting of non-compliance.

Future studies could extend the analysis to include other regions of Nigeria or comparable African countries to assess the broader applicability of findings. Research could also examine other sectors beyond the informal economy to explore variations in compliance behaviors. Further research can conduct long-term studies to assess the sustainability of electronic tax systems and their impact on tax compliance over time. This would help identify whether initial benefits persist or diminish. Adding qualitative interviews or focus groups with taxpayers and tax administrators could uncover underlying reasons for compliance or non-compliance and provide deeper insights into the effectiveness of electronic tax systems. Comparative research across countries with similar levels of economic development or tax digitalization could highlight best practices and common challenges in implementing electronic tax systems. Future studies should analyze how external factors, such as economic policies, governance quality, or technological infrastructure, interact with electronic tax systems to influence compliance. Investigate how behavioral nudges, such as reminders, incentives, or penalties, in conjunction with electronic tax systems, affect compliance rates in the informal sector. Future research could examine specific components of electronic tax systems (e.g., electronic filing, billing, or payments) to determine which have the most significant impact and why. By addressing these limitations and expanding the research scope, future studies can provide a more comprehensive understanding of the relationship between electronic tax systems and tax compliance, ultimately guiding policymakers in optimizing tax administration strategies.

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