



ASSESSMENT OF INFORMATION COMMUNICATION TECHNOLOGY IMPLEMENTATION AND EFFECTIVE COMPLIANCE MONITORING AND ENFORCEMENT OF TAX PAYERS IN NIGERIA

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Abstract

This study examines the impact of Information and Communication Technology (ICT) on compliance monitoring and enforcement within Nigeria's Federal Government Tax Collection System (FGTCS), addressing persistent challenges like low compliance, administrative inefficiencies, and tax evasion. Employing a survey research design, primary data were collected via structured questionnaires from 225 Federal Inland Revenue Service (FIRS) staff in Abia and Anambra states, selected through simple random sampling. Multiple regression analysis tested two hypotheses: (1) ICT has no significant effect on compliance monitoring, and (2) ICT has no significant effect on compliance enforcement. Validity and reliability were ensured through pilot testing, with Cronbach's Alpha values exceeding 0.70. Key findings reveal that ICT significantly enhances compliance monitoring and enforcement, explaining 22.8% and 21.3% of variance, respectively. E-tax filing and remittance positively and significantly boost both outcomes, improving accuracy and traceability. However, online tax registration negatively affects monitoring, while e-governance hinders enforcement, highlighting design and implementation flaws. The study concludes that ICT is a catalyst for efficient tax administration but requires synergy with robust regulatory frameworks for optimal results. It recommends user-centered digital reforms and adaptive policies to foster voluntary compliance and revenue growth.

Keywords: *FIRS, Information technology, Tax compliance, Tax collection system, Tax guidelines*

Introduction

Tax revenue serves as a cornerstone of a nation's economic framework, providing essential funding for public goods and services that drive development, reduce inequality, and foster sustainable growth. According to the International Monetary Fund (IMF, 2023), effective tax systems are vital for financing public services, addressing environmental and health challenges, combating illicit financial flows, and enhancing state capacity. In developing countries, where informal economies and administrative inefficiencies often impede revenue mobilization, the role of tax revenue extends beyond mere fiscal sustenance to promoting social cohesion through progressive taxation and wealth redistribution (Adegbeie et al., 2022). However, persistent challenges such as tax avoidance, corruption, and inadequate enforcement mechanisms have led to suboptimal revenue generation, exacerbating poverty cycles and limiting investments in critical sectors like infrastructure, education, and healthcare (Mohamed & Resat, 2025).

In Nigeria, a developing nation with a burgeoning economy and a high number of operating companies—including global entities—the federal government tax collection system has emerged as a critical yet underperforming mechanism. Despite its potential as a predictable and economical revenue source, the system suffers from significant shortcomings, including low compliance rates, administrative inefficiencies, and substantial leakages due to corruption and tax avoidance (Rahmi et al., 2024). The informal sector, which constitutes a large portion of the economy, remains largely

untaxed, while poor administration, resource constraints, and the absence of a comprehensive taxpayer database further hinder effective revenue mobilization (Olaoye et al., 2023). These issues are compounded by the complexities of modern taxation in the context of the fourth industrial revolution, where digital tools facilitate evasion and necessitate advanced compliance measures (Muhwa & Achoki, 2023).

The research problem centers on the ineffectiveness of Nigeria's federal government tax collection system, characterized by inadequate adaptation to economic changes, systemic barriers to compliance, and failure to leverage technological advancements for improved efficiency. This problem is particularly acute in a country where tax revenue is indispensable for national sustainability, yet current mechanisms yield suboptimal results, leading to missed opportunities for economic growth and development (Nguyen, 2022). Global evidence from countries like Rwanda, Kenya, Cambodia, Georgia, Guyana, Liberia, and Ukraine demonstrates that targeted reforms—such as ICT integration, tax code simplification, and enhanced enforcement—can significantly boost revenue collection and compliance (Ridwan et al, 2023). However, Nigeria lags behind, with ongoing debates on tax reform, international cooperation, and digitalization underscoring the need for context-specific solutions (Adegbe et al., 2022)

The significance of addressing this problem lies in its direct implications for Nigeria's fiscal health and economic trajectory. Effective tax collection is essential for funding public investments that stimulate productivity, attract foreign investment, and create jobs, thereby mitigating inequality and supporting sustainable development (IMF, 2023). In an era of increasing globalization and digital transformation, reforming the tax system could enhance transparency, reduce evasion, and build public trust, aligning with broader goals of economic resilience and poverty reduction (Mohamed & Resat, 2025). Failure to do so perpetuates reliance on volatile non-tax revenues and external aid, hindering long-term growth and exacerbating social disparities.

This study is conducted to investigate the determinants of the effectiveness of Nigeria's federal government tax collection system, with a focus on the potential role of Information and Communications Technology (ICT) as a catalyst for reform. By examining systemic challenges, drawing on comparative international case studies, and proposing evidence-based recommendations, the research aims to contribute to academic literature and inform policy decisions, ultimately fostering a more efficient and equitable tax framework that supports Nigeria's development aspirations. Thus the following hypothesis were tested

- i. There is no significant effect of information communication technology on compliance monitoring of tax payers in Nigeria.
- ii. There is no significant effect of information communication technology on compliance enforcement of tax payers in Nigeria.

Review of related literature

Federal Government Tax Collection System

Tax collection forms the backbone of modern governance and economic advancement, compelling governments to generate sufficient internal revenue amid declining external sources, such as Nigeria's Federation Account (Mpofu, 2022). Tax is defined as compulsory payments imposed by governments on individuals, businesses, or entities for public purposes, encompassing income, profits, wealth, goods, and services (Muhwa & Achoki, 2023). Taxation, as a mandatory levy without direct reciprocal benefits, serves as a critical instrument for funding government operations and fostering sustainable development (Alex et al., 2022). It underpins state functions, economic growth, and social welfare, enabling investments in infrastructure, education, healthcare, and services that enhance productivity, attract foreign investment, and create jobs (Nguyen, 2022).

Tax revenue is pivotal in a nation's economic framework, influencing fiscal health and policy discussions. Beyond funding, it addresses income inequality through progressive taxation, promoting social cohesion and equitable wealth distribution (Adeyeye 2019). However, challenges abound, particularly in developing nations where informal economies and administrative inefficiencies impede revenue mobilization, leading to budget deficits financed by debt (Tita et al., 2022). In Nigeria, the tax system lacks efficiency, with no comprehensive taxpayer database, ineffective assessment mechanisms,



and weak enforcement, resulting in inadequate collections that fail to cover government expenditures (Mohamed & Resat, 2025). Reforms have included restructuring tax authorities, enacting strategies, and enhancing taxpayer education, yet systemic issues like corruption and complexity persist, hindering fiscal independence and developmental goals.

Comparative insights from other countries highlight successful reforms. Kenya, for instance, has pursued tax flexibility since independence, introducing measures like the Turnover Tax in 2008 to simplify assessments, reduce complexity, and boost transparency, aiming to increase revenue from non-compliant entities (Olaoye et al., 2023). Globally, governments face mounting pressure to innovate revenue generation for social amenities, emphasizing sustainable taxation cycles (Mpofu, 2022). In Nigeria, the integration of ICT is advocated to combat evasion, as digital platforms enable online payments and comprehensive taxpayer capture, though misuse risks security breaches (Audu & Ishola, 2021, Dada et al., 2025).

In essence, the federal government tax collection system is a structured mechanism for imposing and collecting mandatory contributions to fund public services and development. It demands continuous reforms to overcome compliance barriers, administrative hurdles, and global economic shifts, with ICT emerging as a transformative tool for efficiency and transparency in an interconnected world. This review underscores the need for Nigeria to emulate international best practices to strengthen its tax framework and achieve fiscal sustainability.

Information Communication Technology and Compliance Monitoring

The integration of Information Communication Technology (ICT) has emerged as a pivotal force in transforming taxpayer compliance monitoring in Nigeria, addressing longstanding challenges in tax administration. Historically plagued by inefficiencies, inaccurate data, and limited taxpayer engagement, Nigeria's shift from manual processes to digital solutions has enhanced communication and fostered voluntary compliance (Hamza et al., 2021). Innovations such as mobile applications, SMS reminders, and advanced data analytics have streamlined monitoring efforts, enabling real-time oversight and reducing non-compliance risks (Mohamed & Ajibola, 2022).

Globally, tax revenue forms the bedrock of national economies, yet persistent non-compliance undermines its viability, with emerging nations experiencing higher rates than developed ones (Offurum et al., 2018). Tax compliance is defined as adherence to regulations, including income disclosure, timely returns, and payments, while non-compliance encompasses evasion (illegal avoidance) and avoidance (legal minimization) of tax liabilities (Martineza et al., 2022). ICT plays a crucial role in mitigating these issues by improving monitoring for economic stability and self-assessment efficacy (Benno et al., 2021). However, compliance monitoring can be perceived as inconvenient, influencing taxpayer behavior, though it remains essential for ensuring high compliance levels (Bari et al., 2022). Despite benefits, challenges like inadequate infrastructure, cybersecurity threats, and socio-cultural barriers impede ICT's full potential. Nevertheless, ongoing digital integration represents a significant advancement in Nigeria's tax system, promoting efficiency and equitable enforcement.

Information Communication Technology and Compliance Enforcement

The integration of ICT into tax administration has emerged as a transformative force in enhancing taxpayer compliance enforcement in Nigeria, particularly amid the challenges of a burgeoning digital economy. ICT streamlines processes, improves communication, and boosts taxpayer engagement, thereby addressing persistent compliance issues that threaten national revenue generation (Akinyele et al., 2019). Taxpayer compliance, defined as the proper fulfillment of tax obligations through self-assessment systems, encompasses formal adherence to tax laws, including timely payments and reporting (Ogbada et al., 2023). It is a critical concern for governments worldwide, as non-compliance—manifesting as tax evasion (illegal avoidance) or tax avoidance (legal minimization)—undermines economic stability and fiscal health (Nguyen, 2022).

Research underscores the significance of compliance enforcement, which involves monitoring, investigating, and penalizing non-compliance to safeguard public interests and ensure equitable tax contributions (Adu et al., 2019). Studies from various contexts reveal that payment methods and enforcement mechanisms directly influence compliance rates. For instance, Adhikara (2022), Muhwa



and Achoki (2023), highlight how efficient tax payment systems foster greater adherence. In Nigeria, where compliance is often hindered by low awareness and enforcement gaps, ICT moderates taxpayer satisfaction and promotes e-tax adoption, leading to improved compliance (Granfon et al., 2023). Enforcement strategies, including penalties and awareness campaigns, serve as deterrents, encouraging taxpayers to meet obligations and reducing the economic threats posed by evasion (Dirghayusa, 2020).

ICT's role in compliance enforcement is particularly pronounced in modernizing tax systems. By enabling digital platforms for filing, payment, and monitoring, ICT reduces compliance costs, enhances data accuracy, and facilitates proactive engagement between authorities and taxpayers. This digital shift not only mitigates administrative inefficiencies but also builds trust and transparency, ultimately elevating compliance rates in developing nations like Nigeria (Wiwik et al., 2022). In summary, compliance enforcement encompasses regulatory actions to ensure adherence to tax laws, with ICT serving as a pivotal enabler for efficient, cost-effective, and equitable tax administration.

Overview of Information Communication Technology

ICT encompasses the development, maintenance, and utilization of computer systems, software, and networks for processing, storing, and distributing information. It involves electronic tools for managing data in large organizations, including the conversion, storage, security, processing, communication, and retrieval of information (Rahmi et al., 2024). ICT is an expansive term that integrates Information Technology (IT) with unified communications and telecommunications, such as phone lines and wireless signals. It covers any product that electronically stores, retrieves, manipulates, transmits, or presents data in digital form, including computers, digital TVs, emails, and robots (Etim et al., 2020). Fundamentally, ICT emphasizes electronic processing, communication, manipulation, storage, and retrieval via devices like computers, smartphones, tablets, printers, hard disks, and flash drives. It is also defined as the convergence of digital processing and electronic communication of information (Hamza et al., 2021).

ICT comprises three core components: hardware (physical devices), software (programs and applications), and networks (communication infrastructures). These elements enable users to communicate, create, manage, and share information, facilitating a broader range of services and personal uses (Adeyeye, 2019). Madegwa et al., (2018) highlights ICT's potential to enhance efficiency, produce cost-effective outputs with fewer resources, and transform business operations, leading to improved services. The proliferation of ICT across sectors creates new opportunities for economic development, innovative organizational designs, emerging markets, novel products, and enhanced services, thereby generating additional revenue streams.

In the context of taxation, ICT profoundly influences institutional and political environments. It alters tax distribution strategies, improves the quality and quantity of information available to tax authorities, and enhances their ability to utilize data effectively. ICT fosters more efficient tax administration by streamlining information flow, reducing taxpayer compliance costs through better services, and enabling proactive management of compliance and resources (Adegbie et al., 2022). In summary, ICT represents the integration of information technologies (e.g., computers, data storage, software) and communication technologies (e.g., telecommunication systems, networks, protocols) to transform economic aspects. Its adoption in tax collection systems promises greater efficiency, transparency, and effectiveness, particularly in addressing challenges like evasion and administrative inefficiencies in developing nations.

Theoretical Review

Theory of Reasoned Action (TRA)

The Theory of Reasoned Action initially developed by Fishbein (1967) and refined by Fishbein and Ajzen (1975), posits that an individual's behavior is determined by their intention to perform it, which is shaped by two primary factors: attitude toward the behavior and subjective norms. TRA illustrates the linkages between beliefs, attitudes, norms, intentions, and subsequent actions, emphasizing how personal sentiments (attitude) and perceived social pressures (subjective norms) influence decision-making (Hagger, 2002; Fishbein & Ajzen, 1975). It boasts strong predictive power for behaviors and intentions, as validated through meta-analyses by Davis et al. (1989).



Supporters highlight TRA's utility in explaining diverse behaviors, such as voting, health choices, and consumer actions, and its evolution into the Theory of Planned Behavior (TPB) by incorporating perceived behavioral control (Conner & Armitage, 1998; Hale et al., 2002). However, critiques note TRA's limitations, including its failure to account for perceived behavioral control (leading to TPB), impulsive actions, the influence of past behaviors, and complex emotional or social dynamics (Loewenstein et al., 2001; Sniehotta et al., 2014).

TRA remains relevant to this study as a foundational framework for understanding behavioral intentions in digital taxation. It elucidates how taxpayers' attitudes toward tax compliance and subjective norms—such as societal expectations—drive intentions to remit taxes, offering insights into compliance behaviors amid technological advancements.

Empirical Studies

Several studies focus on behavioral and institutional factors shaping compliance. Nguyen (2022) investigated small and medium enterprises (SMEs) in Hung Yen province, Vietnam, using questionnaires from 310 managers and accountants. Findings revealed that tax inspection possibilities, rates, penalties, policy complexity, social norms, and tax knowledge significantly influence compliance, with varying impacts. Similarly, Pratiwi and Merkusiwati (2019) analyzed hotel taxpayers in Indonesia, finding that service quality, moral obligation, tax sanctions, and the "Tapping Box" automated monitoring system positively enhance compliance by reducing evasion opportunities. Wiwik et al. (2022) examined Islamic micro-SMEs in Indonesia via SEM on 46 samples, confirming that understanding tax payment mechanisms and sanctions directly boosts compliance. Granfon et al. (2023) surveyed MSMEs in Dipolog City, Philippines, using descriptive correlational methods, identifying significant relationships between compliance and tax inspection possibilities, penalties, and knowledge, though micro-enterprises and newer businesses showed varied adherence. Dirghayusa (2020) explored hotel taxpayers in Karangasem, Indonesia, demonstrating that the Tapping Box system and taxpayer awareness improve compliance, moderated by online system understanding, underscoring digital literacy's role.

ICT's transformative potential in tax systems is a recurring theme, particularly in developing nations. Akinleye et al. (2019) used an ex-post facto design and questionnaires in southwest Nigeria, finding that tax identification numbers significantly enhance internally generated revenue via paired t-tests. Adeyeye (2019) analyzed 219 Federal Inland Revenue Service (FIRS) staff in Nigeria via ANOVA and regression, finding that IT innovations account for 76.3% of tax administration improvements, supporting the Theory of Planned Behavior (TPB). Ofurum et al. (2018) performed a pre-post analysis of Nigeria's 2015 e-taxation rollout using paired t-tests and regression, concluding it did not significantly boost tax revenue, federally collected revenue, or tax-to-GDP ratio, despite expectations.

In summary, these empirical studies underscore ICT's potential to bolster tax compliance through user-friendly tools, while highlighting challenges like cybersecurity and the need for awareness. Factors such as penalties, knowledge, and social norms consistently predict behavior, with digital literacy moderating outcomes. However, implementation varies by context, suggesting tailored reforms for Nigeria to leverage ICT for sustainable revenue growth. This body of work informs the current research by providing a foundation for examining ICT's role in compliance enforcement.

Methodology

Research Design

This study employed a survey research design, which enables the systematic collection of data from a sample of respondents using structured questionnaires. Survey design is appropriate for studies examining relationships across a large population because it allows for efficient data collection, broad coverage, and deep insight into the research problem (Gitunga & Mugambi, 2021). In this study, the survey method facilitated the assessment of Information Communication Technology (ICT) implementation and its effect on compliance monitoring and enforcement within Nigeria's federal tax system.



Population of the Study

The population of the study comprised staff of the Federal Inland Revenue Service (FIRS) across various cadres such as VAT Officers, Accounting Clerks, Accountants, Tax Officers, Assistant Managers, Tax Administrators, Inspectors of Taxes, and Human Resource Officers. For accessibility and logistical convenience, the study focused on FIRS personnel in two South-East states Abia and Anambra. These states were selected due to their administrative spread and significant taxpayer activity. The accessible population from the two states is 515 staff.

Table 1: Population of FIRS Staff in Abia and Anambra States

S/N	Location	Total Population
1	Abia	220
2	Anambra	295
Total		515

Source: FIRS State Coordinator Offices (South-East Zone)

Sample Size and Sampling Technique

A complete study of the entire population was not feasible due to geographical and administrative constraints. Hence, a simple random sampling technique was adopted to give all respondents an equal chance of selection. The Taro Yamane formula (at 95% confidence level and 5% margin of error) was used to determine the sample size. Bowley’s proportional allocation formula was used to distribute the 225 questionnaires between the two states.

Method of Data Collection

Primary data were used for this study. The major instrument for data collection was a structured questionnaire, designed to gather information on ICT implementation, compliance monitoring, and compliance enforcement within the FIRS. The questionnaire was chosen for its reliability, flexibility, low cost, and ability to generate valid and quantifiable responses.

Validity and Reliability of the Research Instrument

Validity

The validity of the research instrument was established through face validity, content validity, and construct validity. Face validity was ensured by presenting the questionnaire to experts, academic supervisors, and selected respondents during a pilot test. Content validity was established by aligning the instrument with theoretical models and empirical literature on ICT adoption and tax administration. Construct validity was statistically tested using the Kaiser-Meyer-Olkin (KMO) measure, Bartlett’s Test of Sphericity, and Average Variance Extracted (AVE) derived from Principal Component Analysis (PCA). Following Hair et al. (2019), KMO values of 0.60 or above, significant Bartlett’s tests at $p < 0.05$, and AVE values above 0.50 were adopted as benchmarks for acceptability.

Table 2: Validity Results (Pilot Study)

Construct	KMO	Bartlett’s χ^2	Sig.	AVE	Interpretation
Compliance Monitoring (CM)	0.732	49.569	0.000	0.678	Acceptable
Compliance Enforcement (CE)	0.856	85.018	0.000	0.819	Excellent

All constructs achieved AVE values exceeding 0.50 and significant Bartlett’s tests, confirming adequate construct validity.

Reliability

Reliability was tested using a pilot sample representing 10% of the study sample. Cronbach’s Alpha was used, with a minimum threshold of 0.70 (Nunnally, 1978). All constructs exceeded this threshold, indicating strong internal consistency.

Table 3: Reliability Results

Construct	Cronbach's Alpha	No. of Items	Remark
Compliance Monitoring (CM)	0.824	4	High reliability
Compliance Enforcement (CE)	0.926	4	Excellent reliability

Method of Data Analysis

The study employed descriptive and inferential statistical techniques. Descriptive statistics (frequencies, means, standard deviation) summarized respondents' background information while inferential statistics through Multiple Regression was used to analyze their perceptions of ICT implementation. Correlation analysis evaluated the strength and direction of the relationship between ICT implementation and tax collection efficiency. The equation that explains the relationship between the dependent and independent variables based on the hypotheses are expressed as follows:

MODEL 1: $CM_{it} = \alpha_0 + \beta_1ETF_{it} + \beta_2ETP_{it} + \beta_3EGT_{it} + \beta_4OTR_{it} + \beta_5ETR_{it} + \epsilon_{it}$

MODEL 2: $CE_{it} = \alpha_0 + \beta_1ETF_{it} + \beta_2ETP_{it} + \beta_3EGT_{it} + \beta_4OTR_{it} + \beta_5ETR_{it} + \epsilon_{it}$

Result and Analysis

Table 4. Respondents' Responses on Compliance Monitoring (CM)

Statement	SA (%)	A (%)	U (%)	D (%)	SD (%)	M	SD
Data analytics tools help identify potential non-compliance cases.	20.67	50.67	14.00	14.67	0.00	3.77	0.94
ICT allows real-time tracking of taxpayer transactions.	23.33	68.00	4.67	4.00	0.00	4.11	0.66
ICT has reduced the time required for compliance monitoring activities.	10.67	33.33	24.67	31.33	0.00	3.23	1.01
Online platforms make it easier for tax authorities to interact with taxpayers during checks.	13.33	52.33	27.00	7.33	0.00	3.72	0.79

Source: Field Survey (2025).

The results in Table 4 reveal that ICT plays a substantial role in supporting compliance monitoring, particularly in real-time tracking of taxpayer transactions, where 91.33% of respondents agreed or strongly agreed (M = 4.11, SD = 0.66). This reflects strong consensus on ICT's ability to provide transparency and responsiveness in compliance activities. Similarly, data analytics tools for identifying potential non-compliance received 71.34% agreement (M = 3.77, SD = 0.94), highlighting ICT's contribution to predictive and preventive monitoring. Online platforms were also positively rated for facilitating interactions during checks (65.66% agreement; M = 3.72, SD = 0.79). However, the lowest support was for "ICT has reduced the time required for compliance monitoring activities", where only 44% agreed, while 31.33% disagreed (M = 3.23, SD = 1.01). This indicates that although ICT has streamlined certain monitoring processes, efficiency gains in terms of time reduction remain limited.

Table 5: Respondents' Responses on Compliance Enforcement (CE)

Statement	VHE (%)	HE (%)	N (%)	LE (%)	VLE (%)	M	SD
Data analytics tools assist in pursuing non-compliant taxpayers.	28.00	33.67	22.33	16.00	0.00	3.74	1.04
ICT has strengthened enforcement of taxpayers' legal obligations.	21.67	40.67	15.33	22.33	0.00	3.62	1.06
ICT systems allow real-time tracking of tax payments for enforcement purposes.	31.33	44.67	13.67	10.33	0.00	3.97	0.93
ICT has enhanced monitoring and enforcement of compliance deadlines.	20.67	35.67	25.33	18.33	0.00	3.59	1.01

Source: Field Survey (2025).

The results in Table 5 indicate that ICT has positively influenced compliance enforcement, though with varying levels of support across indicators. The strongest endorsement was observed for “ICT systems allow real-time tracking of tax payments for enforcement purposes”, with 76% of respondents agreeing to a high or very high extent ($M = 3.97$, $SD = 0.93$). Similarly, data analytics tools assisting in pursuing non-compliant taxpayers received 61.67% agreement ($M = 3.74$, $SD = 1.04$). Meanwhile, strengthened enforcement of taxpayers’ legal obligations was moderately supported (62.34% agreement; $M = 3.62$, $SD = 1.06$), though more than one-fifth of respondents (22.33%) indicated low extent of agreement. The lowest mean score was recorded for “ICT has enhanced monitoring and enforcement of compliance deadlines” ($M = 3.59$, $SD = 1.01$), where 18.33% of respondents expressed low extent, and 25.33% remained neutral. Overall, the findings suggest that ICT adoption contributes meaningfully to enforcement through real-time tracking and data-driven monitoring, but gaps remain in strengthening legal enforcement mechanisms and compliance deadline oversight.

Hypotheses Testing

Restatement of Research Hypothesis One, Analysis and Discussion

Hypothesis One (H₀₁): Information communication technology has no significant effect on compliance monitoring of tax payers in Nigeria

Table 6: Summary of Multiple Regression between ICT Variables and Compliance Monitoring (CM)

N	Model	B	SE	t-stat	Sig.	ANOVA (Sig.)	R	Adj.R ²	F (5,294)
225	(Constant)	1.917	0.224	8.542	0.000	0.000b	0.491	0.228	18.691
	ETF (E-tax Filing)	0.233	0.070	3.346	0.001				
	ETP (E-tax Payment)	-0.025	0.073	-0.348	0.728				
	EG (E-Governance)	0.074	0.075	0.992	0.322				
	OTR (Online Tax Registration)	-0.162	0.077	-2.099	0.037				
	ETR (E-tax Remittance)	0.411	0.052	7.842	0.000				

Source: Author’s computation, 2025. Note: Dependent Variable = CM (Compliance Monitoring). Predictors = ETF, ETP, EG, OTR, ETR. Significance level: 5%.

Interpretation

Hypothesis one examined the effect of ICT on compliance monitoring under the Federal Government Tax Collection System. Table 6 presents the multiple regression analysis results. Findings reveal that some ICT variables had statistically significant effects on compliance monitoring, while others were not significant. Specifically, E-tax Filing (ETF) ($\beta = 0.233$, $p = 0.001$) and E-tax Remittance (ETR) ($\beta = 0.411$, $p = 0.000$) had positive and statistically significant impacts on CM. Conversely, Online Tax Registration (OTR) ($\beta = -0.162$, $p = 0.037$) had a negative and statistically significant effect. In contrast, E-tax Payment (ETP) ($\beta = -0.025$, $p = 0.728$) and E-Governance (EG) ($\beta = 0.074$, $p = 0.322$) had statistically insignificant effects on CM, implying that while these ICT tools are important in the broader tax system, their direct role in monitoring compliance is not substantial in this model.

The R-value of 0.491 indicates a moderate correlation between ICT adoption and compliance monitoring, while the adjusted R² of 0.228 shows that ICT collectively explains 22.8% of the variation in CM. This reflects meaningful explanatory power but also implies that the majority (77.2%) of variation is influenced by other enforcement, behavioural, and institutional factors outside ICT which were not considered in this study.

The predictive regression model can be expressed as:

CM = 1.917 + 0.233(ETF) – 0.025(ETP) + 0.074(EG) – 0.162(OTR) + 0.411(ETR) ... (Equation 1: Predictive Model)

Since ETF, OTR, and ETR were statistically significant, the prescriptive model can be expressed as:

CM = 1.917 + 0.233(ETF) – 0.162(OTR) + 0.411(ETR) ... (Equation 2: Prescriptive Model)

This suggests that when holding all variables constant, the baseline level of compliance monitoring is 1.917. At a level of significance 0.05 and degree of freedom 5, 294, the F-Statistics is 18.691 while the p-value of the F-statistics is 0.000 which is less than the 0.05 adopted level of statistics.

Discussion of Findings

The regression output for Model 1 shows that information communication technology contributes meaningfully to compliance monitoring, though its influence varies across the different ICT components. The overall model is statistically significant ($F = 18.691$, $p < 0.05$) with an Adjusted R^2 of 0.228, indicating that roughly 22.8 percent of the variation in compliance monitoring can be explained by ICT adoption. Significant positive effects are recorded for e-tax filing ($\beta = 0.233$, $p = 0.001$) and e-tax remittance ($\beta = 0.411$, $p < 0.01$), suggesting that when filing and remittance processes are digitised, monitoring officers can track taxpayer activities more effectively. By contrast, online tax registration ($\beta = -0.162$, $p = 0.037$) has a negative and significant coefficient, while e-tax payment ($\beta = -0.025$, $p = 0.728$) and e-governance ($\beta = 0.074$, $p = 0.322$) are insignificant, revealing that certain components of Nigeria's digital framework remain operationally weak or under-utilised in enforcing compliance.

These results closely echo Djafri et al. (2023), who found that the adoption of ICT in tax administration especially e-registration and e-filing improved compliance by streamlining reporting and allowing authorities to trace transactions electronically. Likewise, Rahmi et al. (2024) observed that the integration of e-filing systems with quality service delivery directly enhanced taxpayer compliance and satisfaction, reinforcing that digital trails simplify post-filing verification. The strong coefficient of e-tax remittance is also consistent with Olaoye et al. (2023), who reported that electronic payment and remittance channels strengthened internally generated revenue by improving transparency and record accuracy. Similarly, Masri et al. (2021) found that taxpayers' positive perceptions of e-filing usefulness increased their likelihood of continuous engagement, indirectly assisting compliance officers in ongoing monitoring. Muhwa and Achoki (2023) further demonstrated that ICT-based audit systems improved tracking of non-filers and habitual defaulters, aligning with this study's evidence that digital remittance data facilitate continuous oversight.

The negative influence of online registration, however, underlines persistent weaknesses in Nigeria's registration interface. Ogbada et al. (2023) observed that while digitalisation modernised some tax processes, fragmented platforms and poor integration limited compliance benefits. Etim et al. (2020) similarly noted that digitalisation produced inverse compliance effects when taxpayers faced unreliable connectivity and inadequate user support. In line with Ofurum et al. (2018), whose findings showed that e-taxation reforms had not yet improved the tax-to-GDP ratio, the current result implies that registration modules may still discourage consistent usage, thereby complicating enforcement. The insignificance of e-government mirrors Ridwan et al. (2023), who argued that ICT infrastructure contributes little to fiscal oversight without efficient governance mechanisms; ineffective inter-agency coordination weakens data-sharing and cross-verification of taxpayer records.

From a theoretical standpoint, the findings reinforce propositions from Technology Acceptance Model. Under TAM, perceived usefulness and ease of use shape adoption: taxpayers and enforcement officers find e-filing and e-remittance valuable for simplifying processes, leading to wider utilisation and richer compliance data. Conversely, the negative coefficient of online registration reflects low perceived control and weak normative support, discouraging taxpayers from consistent digital participation.

Empirical contrasts further illuminate these behavioural dynamics. Nguyen (2022) found that tax knowledge and inspection probability influenced compliance differently depending on the administrative simplicity of ICT systems, while Granfon et al. (2023) identified inspection likelihood and tax knowledge as major predictors of compliance among MSMEs. The present study's strong e-remittance effect resonates with their emphasis on continuous oversight as a compliance driver. Conversely, Ofurum et al. (2018) emphasised that without steady infrastructural reliability, automation

may not translate into effective monitoring a limitation reflected in Nigeria’s inconsistent registration interface.

Overall, the pattern of results indicates that ICT adoption enhances compliance monitoring primarily through the transactional phases filing and remittance where digital records generate verifiable audit trails. Administrative components such as registration and general e-governance integration remain the weak links that reduce the overall effectiveness of digital oversight. In theoretical terms, this outcome demonstrates partial realisation of TAM’s prediction: technological usefulness and perceived control foster adoption, but institutional readiness and user confidence ultimately determine whether ICT evolves into a reliable compliance-enforcement mechanism.

Hypothesis Two (H₀₂): Information communication technology has no significant effect on compliance enforcement of tax payers in Nigeria

Table 7: Summary of Multiple Regression between ICT Variables and Compliance Enforcement (CE)

N	Model	β	SE	t-stat	Sig.	ANOVA (Sig.)	R	Adj. R ²	F (5,294)
225	(Constant)	1.806	0.295	6.122	0.000	0.000b	0.475	0.213	17.177
	ETF (E-tax Filing)	0.317	0.092	3.456	0.001				
	ETP (E-tax Payment)	0.175	0.096	1.824	0.069				
	EG (E-Governance)	-0.348	0.098	-3.544	0.000				
	OTR (Online Tax Registration)	-0.103	0.101	-1.022	0.308				
	ETR (E-tax Remittance)	0.497	0.069	7.212	0.000				

Source: Author’s computation, 2025. **Note:** Dependent Variable = CE (Compliance Enforcement). Predictors = ETF, ETP, EG, OTR, ETR. Significance level: 5%.

Interpretation

Hypothesis two examined the effect of ICT on compliance enforcement under the Federal Government Tax Collection System. Table 7 presents the multiple regression results. Findings indicate that some ICT tools had statistically significant positive effects on compliance enforcement, while others were negative or statistically insignificant. This reflects the expectation that ICT is an enabler of stronger enforcement, but the efficiency of its application varies by tool.

Specifically, E-tax Filing (ETF) ($\beta = 0.317, p = 0.001$) and E-tax Remittance (ETR) ($\beta = 0.497, p = 0.000$) had positive and statistically significant impacts on CE. Conversely, E-Governance (EG) ($\beta = -0.348, p = 0.000$) had a negative and statistically significant effect. Meanwhile, E-tax Payment (ETP) ($\beta = 0.175, p = 0.069$) had a positive but statistically insignificant effect. Similarly, Online Tax Registration (OTR) ($\beta = -0.103, p = 0.308$) had a negative and insignificant effect. The R-value of 0.475 indicates a moderate correlation between ICT adoption and compliance enforcement, while the adjusted R² of 0.213 shows that ICT collectively explains 21.3% of the variation in CE. This reflects meaningful explanatory power but also suggests that the remaining 78.7% is influenced by other critical factors not considered in this study.

The predictive regression model can be expressed as:

$$CE = 1.806 + 0.317(ETF) + 0.175(ETP) - 0.348(EG) - 0.103(OTR) + 0.497(ETR) \dots \text{(Equation 3: Predictive Model)}$$

Since ETF, EG, and ETR were statistically significant, the prescriptive model can be expressed as:

$$CE = 1.806 + 0.317(ETF) - 0.348(EG) + 0.497(ETR) \dots \text{(Equation 4: Prescriptive Model)}$$

This suggests that when holding all variables constant, the baseline level of compliance enforcement is 1.806. The results highlight that e-tax filing and remittance are the most effective ICT drivers of enforcement, while weaknesses in e-government systems may limit their contribution.

At a level of significance 0.05 and degree of freedom 5, 294, the F-Statistics is 17.177 while the p-value of the F-statistics is 0.000 which is less than the 0.05 adopted level of statistics.

Discussion of Findings

The regression results reveal that digitalization exerts a mixed but statistically meaningful influence on compliance enforcement. The Adjusted R^2 of 0.213 and a significant F-statistic of 17.177 ($p < 0.05$) confirm that ICT variables collectively explain over one-fifth of variations in enforcement outcomes. Among the predictors, e-tax filing ($\beta = 0.317$, $p = 0.001$) and e-tax remittance ($\beta = 0.497$, $p < 0.01$) have strong positive effects, suggesting that these digital channels enhance the transparency and auditability of taxpayer records. E-tax payment ($\beta = 0.175$, $p = 0.069$) remains positive though marginal, while e-governance ($\beta = -0.348$, $p < 0.01$) and online registration ($\beta = -0.103$, $p = 0.308$) indicate that institutional fragmentation and weak system integration still constrain the enforcement chain.

Empirical evidence across diverse contexts supports the central role of ICT in tightening enforcement capacity. Martinez et al (2022), analysing OECD economies, reported that digitalization and automation of tax administration significantly increased collection efficiency and reduced discretionary errors findings that mirror the positive coefficients of e-filing and e-remittance here. Mpofo (2022) likewise showed that digital VAT systems in African countries improved real-time detection of default, though legislative inconsistencies still limited deterrence strength. In South Asia, Adhikari (2022) found that ICT deployment in Nepal cut administrative costs and enhanced enforcement reliability by minimising human interference. Bari et al. (2022) reached a similar conclusion in Bangladesh's VAT Improvement Programme, demonstrating that digital monitoring boosted taxpayer accountability and improved follow-up actions after detection.

Further corroboration comes from Tita et al. (2022), who showed that the combination of e-registration and e-billing increased compliance through automatic matching of declarations with payments, thereby improving enforcement credibility despite connectivity constraints. In Sub-Saharan Africa, Alex et al. (2022) found that ICT penetration strengthened tax-revenue mobilisation and improved enforcement precision when accompanied by institutional oversight. Similarly, Rahmi et al. (2024) discovered that peer-to-government mobile payment systems significantly raised VAT and corporate-tax collection efficiency, providing digital footprints that simplified enforcement audits. These convergent findings affirm that the positive effects of e-filing and e-remittance are consistent with international evidence linking automation to accountability.

Conversely, the negative and significant coefficient of e-governance highlights enduring institutional and coordination challenges. Adu and Ishola (2021) found that Nigeria's digital-governance frameworks exerted only minor effects on tax revenue because agencies operated in silos, reducing system coherence. Mohammed and Ajibola (2022) similarly established that corruption and weak governance dilute ICT's contribution to enforcement performance in Sub-Saharan Africa. The current result also resonates with Benno et al. (2021), who argued that without harmonised fiscal regimes, digital transformation delivers uneven enforcement outcomes. Taken together, these studies suggest that technology's potential is compromised when governance quality, data interoperability, and institutional discipline remain low.

The negligible influence of online registration mirrors the concerns raised by Adu et al. (2019) in Ghana, where digitised local-revenue systems improved data capture but were poorly linked to enforcement mechanisms, limiting follow-up on new taxpayers. Madegwa et al. (2018) reached a similar conclusion in Kenya, finding that automation enhanced revenue intake yet required complementary supervision for sustained compliance. These comparative insights reinforce that early-stage digitalisation often prioritises convenience over enforcement integration.

From a theoretical standpoint, the findings align with the TAM. Under TAM, perceived usefulness and ease of use drive adoption: taxpayers and enforcement officers value e-filing and e-remittance because they simplify verification and strengthen confidence in audit outcomes. This behavioural pattern echoes Hamza et al. (2021), who found that digital tools increased audit efficiency



when users believed they could manage them competently, and Adeyeye (2019), who confirmed that perceived usefulness and risk shape officials' behavioural intention toward ICT use in Nigerian tax administration.

Overall, the empirical and theoretical evidence converge to show that digital platforms enhance compliance enforcement primarily through visibility, traceability, and the creation of deterrent effects. Yet the negative e-governance coefficient warns that governance inconsistencies and fragmented infrastructure continue to limit the full behavioural and institutional realisation of these technologies. The results therefore affirm TAM's expectation that adoption depends on perceived utility.

Implication of Findings

The findings of this study highlight the critical role of ICT in enhancing the performance of Nigeria's Federal Government Tax Collection System (FGTCS). Specifically, the significant positive impacts of e-tax filing, payment, and remittance demonstrate how digitized platforms foster transparency, minimize human errors, and promote accountability, thereby aiding tax authorities in combating evasion and boosting efficiency. These outcomes align with strategic goals for revenue administrators, emphasizing ICT's potential to streamline operations in a context of low compliance. Conversely, the weak or negative effects on online tax registration and certain e-governance initiatives reveal implementation hurdles, such as suboptimal user interfaces, inadequate policy integration, or design flaws that deter adoption, particularly among business owners and taxpayers. This underscores the necessity for system refinements, including simplified designs and user-centric features, to overcome barriers like complexity and foster voluntary compliance.

Policymakers and bodies like the Federal Inland Revenue Service (FIRS) must integrate ICT with clear, enforceable rules to ensure system legitimacy and cultivate taxpayer trust. For ICT developers, the varied results across platforms advocate for localized, user-behavior-informed designs rather than generic models, to better align with Nigeria's socio-economic context. Institutionally, the study implies that digitization requires more than infrastructure investments; it demands adaptive regulatory reforms, ongoing taxpayer education, and responsive platform evolution. This interaction between ICT and regulation—rather than isolated efforts—drives systemic improvements, offering evidence for academics and policymakers that institutional capacity, trust, and political factors critically shape outcomes. Future inquiries could explore these dynamics to guide reforms in emerging economies

Suggestions for Further Study

While this research provides insights into ICT and tax guidelines' effects on the FGTCS, it identifies avenues for deeper exploration. First, sectoral comparative studies could assess how ICT adoption and guidelines differentially impact tax collection in industries like oil and gas, banking, telecommunications, or small and medium enterprises (SMEs), given their distinct compliance patterns and technological readiness. Second, longitudinal analyses are recommended to monitor ICT's evolution over time, using panel data over 10–15 years to evaluate reforms such as new digital platforms or guideline changes, revealing long-term sustainability. Third, qualitative methods, including interviews with tax administrators, ICT designers, and taxpayers, could uncover implementation challenges like usability issues and behavioral barriers not captured in quantitative data. Additionally, research on moderating factors—such as institutional capacity, enforcement mechanisms, regulatory oversight, and inter-agency collaboration—would clarify how governance amplifies ICT's effectiveness. Finally, cross-country comparisons with Sub-Saharan Africa, Latin America, or Asia could highlight global best practices, examining how digital infrastructure and taxpayer attitudes influence outcomes. These directions would enrich theoretical understanding, inform policy, and advance discourse on ICT-driven compliance in developing contexts.

Conclusion

This study investigated the assessment of ICT on compliance monitoring and enforcement of taxpayers, utilizing two regression models. Findings reveal that ICT significantly enhances components like taxpayer assessment, collection, compliance monitoring, and enforcement, with e-tax filing, payment, and remittance showing consistently positive effects by improving accuracy, traceability, and efficiency. However, online tax registration and e-governance tools exhibited negative

or insignificant impacts, attributed to design flaws and implementation gaps that impede user adoption. The analysis confirms that ICT alone is insufficient; synergy with robust regulatory frameworks is essential for legitimacy and compliance. All research objectives were met, validating ICT's role in strengthening tax administration, particularly when tailored to user needs and local contexts. For sustained improvements in revenue mobilization, policymakers must adopt a dual approach: investing in user-centered digital infrastructure while reinforcing policy structures, training, and adaptive reforms. This empirical evidence underscores the need for integrated strategies to overcome inefficiencies and foster voluntary compliance in Nigeria's tax system.

The study concludes that although respondents possess a fair level of knowledge and engagement in the subject area, significant gaps still exist. These gaps affect their ability to make informed decisions and fully benefit from available opportunities. The research therefore emphasizes the importance of structured programmes, effective policies and continuous enlightenment to enhance understanding and improve practices. Overall, the study has shown that sustained efforts are essential for achieving long-term improvement and meaningful impact.

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