



RESEARCH ARTICLE

BRIDGING THE TAX GAP: DIGITAL INNOVATIONS AND AI-DRIVEN TAX COMPLIANCE IN NIGERIA

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ABSTRACT

This study examines the role of digital innovations and artificial intelligence (AI) in bridging the tax gap in Nigeria, focusing on how technology influences tax compliance behavior. Grounded in the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), the research investigates three core dimensions: the adoption of digital tax tools, the use of AI in tax auditing and monitoring, and the perceived ease of use and accessibility of digital tax platforms. These theories explain how perceived usefulness, ease of use, and behavioral intentions drive technology adoption and tax compliance. A quantitative research design was adopted using a structured questionnaire distributed to 150 tax professionals, administrators, and registered taxpayers across Nigeria. Data were analyzed using descriptive statistics, Pearson correlation, Ordinary Least Squares (OLS) regression, and Augmented Dickey-Fuller (ADF) unit root tests to ensure stationarity of variables. The regression model showed that all three independent variables—adoption of digital tax tools ($p = 0.0044$), AI in auditing ($p = 0.0000$), and ease of use/accessibility ($p = 0.0000$)—have significant positive effects on tax compliance level in Nigeria. Based on the findings, the study recommends intensified investment in AI-powered tax monitoring and auditing infrastructure; user-friendly digital platforms to enhance accessibility and engagement across all taxpayer categories; and national policy initiatives to increase digital literacy and taxpayer education. These actions are crucial to strengthening Nigeria's tax system and ensuring a more equitable, transparent, and efficient tax regime through technology-driven compliance strategies.

Keywords: Tax compliance, digital tax tools, artificial intelligence, technology acceptance model

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1.0. INTRODUCTION

Nigeria continues to face a persistent and widening tax gap, marked by low tax compliance, widespread evasion, and a significant informal economy. Despite various reforms, the disparity between actual and potential tax revenues remains substantial. As of 2023, Nigeria's tax-to-GDP ratio was approximately 10.86%, significantly below the OECD average of 34% and behind several African peers (OECD, 2021; FIRS, 2024). This persistent shortfall underscores the urgency for innovative strategies that can enhance revenue generation and reduce reliance on oil revenues.

In recent years, digital innovations and artificial intelligence (AI) have emerged as transformative tools capable of revolutionizing tax administration. Globally, tax authorities are increasingly adopting AI-driven systems to streamline operations, strengthen enforcement, and improve taxpayer engagement (IMF, 2022). Nigeria is following this trend, with the Federal Inland Revenue Service (FIRS) launching the Tax Pro Max platform—a comprehensive online tax administration system that integrates registration, filing, payment, and dispute resolution (FIRS, 2024). However, the deployment of AI technologies remains nascent.

Artificial intelligence, encompassing machine learning, natural language processing, and predictive analytics, has vast potential to address tax compliance challenges. These tools can automate fraud detection, enable risk-based audits, and provide tailored support services, thereby improving efficiency and voluntary compliance (World Bank, 2023; UNCTAD, 2022). AI-driven chatbots and virtual assistants are increasingly being used to simplify interactions with taxpayers and improve accessibility (KPMG, 2023). Nonetheless, several challenges constrain the adoption of digital and AI technologies in Nigeria's tax ecosystem. Key issues include limited digital literacy among taxpayers, inadequate ICT infrastructure, fragmented data systems, and significant cyber security risks (Ajayi & Fagbemi, 2022). The quality and availability of reliable data—a prerequisite for effective AI systems—remain weak due to poor inter-agency coordination and the prevalence of cash-based transactions (PwC Nigeria, 2024). Moreover, the use of AI in taxation raises concerns related to data privacy, algorithmic bias, and transparency, which can erode public trust if not properly addressed (OECD, 2023). Despite these hurdles, policy developments indicate growing institutional awareness and readiness for digital transformation.

The National Digital Economy Policy and Strategy 2020–2030 emphasizes cross-sectoral digital integration, including tax administration (NITDA, 2021). The Finance Act 2023 also introduced provisions to improve digital tax compliance, especially within the fast-growing digital economy (FIRS, 2024). Public-private collaborations and initiatives like the Tax Identification Number (TIN) system and the Voluntary Assets and Income Declaration Scheme (VAIDS) have also utilized digital platforms to expand the tax base (World Bank, 2023).



Additionally, early-stage pilot projects exploring AI-based risk profiling and targeted audits suggest a gradual move toward intelligent tax administration (KPMG, 2024). Efforts such as the launch of the FIRS Digital Academy in 2024 further demonstrate commitment to capacity building and digital upskilling (FIRS, 2024). In summary, bridging Nigeria's tax gap through digital and AI innovations is not only a technological endeavor but a strategic necessity for sustainable economic development. To succeed, Nigeria must combine technology adoption with regulatory reforms, institutional strengthening, and public trust-building to realize the full benefits of an AI-driven tax system.

1.1. Statement of the Problem

Despite numerous reforms, Nigeria continues to struggle with a persistently wide tax gap, reflecting significant inefficiencies in revenue mobilization and tax compliance. The country's tax-to-GDP ratio remains critically low, hovering around 10.2% in 2023 compared to the African average of 16.5% (FIRS, 2024; World Bank, 2023). This underperformance undermines the government's ability to finance public services, invest in infrastructure, and achieve sustainable development goals. Traditional tax administration methods, which are often paper-based and manually intensive, have proven insufficient in addressing issues such as tax evasion, underreporting, and the dominance of the informal sector, which accounts for nearly 57% of Nigeria's economy (PwC Nigeria, 2023). Furthermore, the increasing complexity of economic transactions, fueled by digital platforms and cross-border e-commerce, poses new challenges to conventional tax systems (OECD, 2022). While digital innovations and AI-driven solutions present unprecedented opportunities to transform tax administration, their adoption in Nigeria faces considerable barriers.

Infrastructure deficits, limited digital literacy among taxpayers, cyber security vulnerabilities, and the absence of comprehensive data governance frameworks impede the effective deployment of these technologies (Chukwuemeka & Adeyemi, 2024; Ndukwe & Bello, 2024). Moreover, skepticism about the efficiency and transparency of tax authorities further discourages voluntary compliance, even in the face of technological upgrades (Transparency International, 2023). Although initiatives such as the FIRS Tax Pro Max platform and partnerships for AI-based tax intelligence signify important progress, their impact has been constrained by inconsistent implementation and a lack of integration across government agencies (FIRS, 2023; Guardian Nigeria, 2022). The global success stories of AI-enhanced tax systems, as seen in countries like Singapore and Estonia, highlight the gap between technological possibilities and Nigeria's current realities (OECD, 2023). These cases demonstrate that technology alone cannot bridge the tax gap without parallel investments in institutional reform, capacity building, and citizen engagement (World Economic Forum, 2024). In Nigeria, the rapid digitalization of the economy has not been matched with equally dynamic tax policies and enforcement mechanisms, leading to significant revenue losses from digital transactions (UNCTAD, 2024). Therefore, there is an urgent need to critically examine how digital innovations and AI can be more effectively leveraged to enhance tax



compliance, close the tax gap, and build a fairer, more efficient tax system in Nigeria. Without such efforts, the country risks continued fiscal fragility, deepening inequality, and missed opportunities for inclusive economic growth.

1.2. Objectives of the study

The specific objectives of this study include to:

- 1) Determine the effect of the Adoption of Digital Tax Tools on tax compliance level in Nigeria
- 2) Ascertain the effect of the use of AI in Tax Auditing and Monitoring on tax compliance level in Nigeria
- 3) Evaluate the effect of Perceived Ease of Use and Accessibility of Digital Tax Platforms on tax compliance level in Nigeria.

1.3. Research Hypothesis

H₁: Adoption of digital tax tools have significant effect on tax compliance level in Nigeria.

H₂: The use of AI in Tax auditing and monitoring, affects tax compliance level in Nigeria.

H₃: The Perceived Ease of Use and Accessibility of Digital Tax Platforms have significant effect on tax compliance level in Nigeria.

2.0 CONCEPTUAL FRAMEWORK

Concept of Digital Innovation

Digital innovation has emerged as a central pillar in transforming public sector efficiency and responsiveness, particularly in tax administration. It is defined as the application of digital technologies to create new or improved processes, products, or services, digital innovation enhances transparency, reduces administrative burdens, and strengthens service delivery (Okonkwo & Yusuf, 2025). In the context of tax compliance, digital innovations such as automated filing systems, electronic payment platforms, and cloud-based data storage play a vital role in minimizing human error, increasing taxpayer convenience, and enabling real-time monitoring by authorities (Adeleke et al., 2024). The integration of technologies like blockchain, big data analytics, and digital identity verification has further advanced governments' capacity to detect fraud, identify tax evaders, and encourage voluntary compliance (Nwosu & Ibrahim, 2023). These tools not only streamline internal processes but also improve taxpayer engagement through personalized communication and intuitive interfaces. However, the effectiveness of digital innovation depends on several factors,



including infrastructure availability, user digital literacy, inter-agency collaboration, and regulatory alignment (Emeka & Oladipo, 2025). Thus, digital innovation is not merely a technical solution but a systemic enabler that requires institutional readiness and strategic governance to fully unlock its potential in addressing tax compliance challenges and reducing the tax gap.

Concept of AI-Driven Tax Compliance in Nigeria

AI-driven tax compliance in Nigeria centers on leveraging artificial intelligence technologies to enhance the efficiency, accuracy, and effectiveness of tax administration. Tools such as predictive analytics, machine learning, robotic process automation, and natural language processing are being deployed to detect evasion patterns, streamline audits, and improve taxpayer services (Deloitte, 2024; KPMG Nigeria, 2024). The Federal Inland Revenue Service (FIRS) has adopted AI features in systems like TaxPro Max to facilitate taxpayer profiling, risk assessment, and digital communication (FIRS, 2024). These innovations contribute to better compliance outcomes—such as increased registration, timely filings, and higher revenue generation—by enabling data-driven enforcement and minimizing manual inefficiencies (World Bank, 2023; OECD, 2023). However, the framework acknowledges that the success of AI applications is influenced by factors like data quality, cyber security strength, user digital literacy, and regulatory oversight (Chukwuemeka & Adeyemi, 2024; Ndukwe & Bello, 2024). Without reliable data and proper safeguards, AI may produce flawed outputs or raise privacy concerns, potentially weakening public trust (World Economic Forum, 2024). Thus, the model calls for simultaneous investment in digital infrastructure, staff training, ethical regulation, and public engagement to fully harness AI's potential for narrowing Nigeria's tax gap and promoting fiscal sustainability.

2.1 Theoretical Framework

The Technology Acceptance Model and the Theory of Planned Behavior (TPB) provides conceptual foundation for understanding how digital innovations and AI can influence taxpayer behavior and compliance with tax laws.

The Technology Acceptance Model (TAM), introduced by Davis (1989), explains how individuals come to accept and use new technologies. It identifies two critical determinants: Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). These factors shape a user's intention to adopt technology. In the Nigerian tax context, TAM provides insight into how AI-driven innovations—such as automated tax filing, real-time fraud detection, and personalized taxpayer services—can enhance tax compliance. When taxpayers perceive digital tax platforms as user-friendly and beneficial in simplifying processes, they are more inclined to engage with them, thereby increasing voluntary compliance (Deloitte, 2024). Given Nigeria's historical challenges with bureaucratic inefficiencies and low trust in tax institutions, the perceived utility and ease of AI-based tax systems can shift public perception positively (KPMG, 2024), promoting greater adoption and helping to bridge the tax gap.



The Theory of Planned Behavior (TPB), developed by Ajzen (1991), expands on behavioral intention by including three components: attitude toward the behavior, subjective norms, and perceived behavioral control. In relation to AI-driven tax compliance in Nigeria, TPB helps to understand how individual attitudes, social expectations, and confidence in using technology influence taxpayers' willingness to comply. Digital literacy levels and belief in one's ability to navigate AI systems are crucial in determining compliance behavior (Ndukwe & Bello, 2024). Additionally, societal pressures and modernization norms can reinforce positive compliance behavior, especially when institutional reforms support transparency, accessibility, and trust (Transparency International, 2023). TPB thus supports a holistic approach to promoting AI-driven tax compliance in Nigeria.

Empirical Review

Ndukwe & Bello (2025) explored the role of AI-driven systems in identifying tax evasion patterns in Nigeria. The research examined AI algorithms, taxpayer data analysis, and fraud detection systems as key variables. Using machine learning models and correlation analysis, the study revealed that AI technology significantly reduced tax evasion and increased revenue generation. The authors recommended integrating more sophisticated AI tools and ensuring continuous staff training in data analytics to improve the system's effectiveness.

Folarin & Osuji (2025) assessed the influence of digital payment systems on tax compliance behavior in Nigeria. The study focused on mobile payment platforms, taxpayer participation, and compliance rates. Data was analyzed using survey results and correlation analysis. The findings revealed that mobile payment platforms improved tax collection rates by facilitating easier and quicker payments. The study recommended expanding mobile payment infrastructure to reach underserved populations.

Okafor & Aliyu (2024) conducted a study on the role of digital innovations in enhancing tax compliance in Nigerian SMEs. The study focused on SME tax compliance, e-filing systems, and taxpayer education. The data was analyzed using descriptive statistics and regression analysis. Findings indicated that the adoption of e-filing and digital payment systems led to a 25% increase in tax compliance among SMEs. The study recommended increasing government initiatives for digital training to enhance the adoption of these technologies by small businesses.

Chukwuemeka & Adeyemi (2024) conducted a study to examine the impact of digital tax administration systems on tax compliance in Nigeria. The study focused on variables like taxpayer registration, tax filing, and payment timeliness. Data was analyzed using regression analysis and descriptive statistics. The study found that digital tax systems, such as TaxPro Max, significantly improved taxpayer compliance by simplifying the process and reducing human error. They recommended that tax authorities should enhance infrastructure and digital literacy to further increase tax compliance rates in rural areas.



Umar & Waziri (2023) explored the potential of AI in monitoring tax compliance in Nigeria's banking sector. The study focused on AI-based risk management systems, taxpayer compliance behavior, and banking transactions. Using data mining and machine learning algorithms, the study found that AI-driven systems could identify tax discrepancies and potential fraud in real time. The study recommended further integration of AI tools to strengthen compliance monitoring across different sectors.

Adebayo & Agboola (2023) conducted research on the effectiveness of AI-based tools in improving tax filing accuracy in Nigeria. The study considered automated tax filing, error reduction, and taxpayer compliance as key variables. Data was analyzed using content analysis and regression techniques. The study concluded that AI-driven tools reduced filing errors by 30%, thereby improving compliance rates. The authors recommended further development of AI systems to handle more complex tax issues, particularly for corporate taxes.

Ajayi & Ogunleye (2023) examined how blockchain technology, combined with AI, can improve tax compliance and reduce fraud in Nigeria. The research focused on blockchain integration, AI-based fraud detection, and tax compliance. The data was analyzed through network analysis and comparative case studies. Findings showed that blockchain-enabled traceability and AI's fraud detection capabilities reduced tax fraud by 40%. The study recommended developing a national blockchain framework for tax administration.

Akinmoladun & Bamidele (2023) explored the influence of AI on tax audit effectiveness in Nigeria. Key variables in the study included AI tools for tax audit, audit accuracy, and taxpayer compliance. The study employed structural equation modeling (SEM) for data analysis. The results indicated that AI-driven audits increased audit accuracy and reduced tax evasion by 35%. The study recommended the widespread adoption of AI audit tools across Nigeria's tax authorities.

Onyeji & Mohammed (2023) examined the impact of AI-enabled systems on reducing the cost of tax administration in Nigeria. The research considered AI cost reduction, tax administration efficiency, and compliance outcomes. Data was analyzed using cost-benefit analysis and regression techniques. The study found that AI could reduce tax administration costs by up to 20%, with increased compliance rates as a result of faster processing times. The authors recommended continued investment in AI infrastructure to ensure scalability and long-term cost savings.

Ibrahim & Ijaduola (2022) investigated the role of e-governance and AI technologies in bridging the tax gap in Nigeria. The study focused on. Data analysis was conducted using mixed methods, e-taxation, AI adoption, and digital literacy including regression analysis and interviews with tax officials. Findings showed that e-governance initiatives, supported by AI technologies, improved both taxpayer compliance and administrative efficiency. The study



recommended enhancing digital literacy programs to ensure all citizens can participate in digital tax systems.

3.0. METHODOLOGY

The research adopts a quantitative descriptive research design to explore the role of digital innovations and AI-driven tax compliance in bridging the tax gap in Nigeria. This design is suitable for examining the relationship between variables, such as the impact of AI adoption and digital tax tools on tax compliance. The area of study is Nigeria, with a focus on major urban areas and states with higher tax compliance activities. Specifically, the study will examine the performance of tax authorities such as the Federal Inland Revenue Service (FIRS), which oversees tax collection at the national level, and some states like Lagos, Rivers, and Abuja, known for their higher levels of economic activities and digital infrastructure. The population for this study includes taxpayers (individuals and businesses), tax administrators, and IT experts working in tax-related systems across Nigeria.

The population is chosen due to their direct involvement with or impact on the use of digital innovations and AI systems for tax compliance. The study will focus on a cross-section of tax compliance stakeholders from different sectors (e.g., SMEs, corporate bodies, and informal sectors) within these urban areas. A stratified random sampling technique will be used to select respondents from the identified target groups. This technique is chosen to ensure that each subgroup (e.g., SMEs, corporate taxpayers, tax administrators, IT experts) is adequately represented in the sample. The sample size of 150 includes:

- 50 taxpayers from small, medium, and large enterprises.
- 50 tax administrators from federal and state revenue services.
- 50 IT experts involved in the development and maintenance of digital tax tools.

The study will use both primary and secondary sources of data. Primary data will be collected through structured questionnaires and interviews. The questionnaire will be designed to capture the perceptions, experiences, and attitudes of respondents towards digital innovations and AI in tax compliance. Secondary data will be obtained from published reports, government publications (such as FIRS annual reports), academic journals, industry reports, and other relevant sources on digital tax compliance systems and AI applications in Nigerian tax administration.

The data collected will be analyzed using Descriptive Statistics (mean, frequency, percentages) to summarize respondents' characteristics and general patterns of digital tool adoption and Regression Analysis (Multiple Linear Regression) to examine the relationship between independent variables (such as digital innovations and AI systems) and the dependent variable (tax compliance level). The regression model will help determine the extent to which digital innovations and AI tools influence tax compliance in Nigeria.



A multiple regression model will be used to assess the impact of digital innovations and AI-driven tax compliance on tax compliance in Nigeria. The general form of the regression model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Where:

Y = Tax Compliance Level (dependent); X₁ = Adoption of Digital Tax Tools (independent)

X₂ = Use of AI in Tax Auditing and Monitoring (independent variable)

X₃ = Perceived Ease of Use and Accessibility of Digital Tax Platforms (independent)

β_0 = Intercept term; $\beta_1, \beta_2, \beta_3$ = Coefficients of the independent variables; ϵ = Error term

The dependent and independent variables will be measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

- Tax Compliance Level (Y): Measured as the frequency and accuracy of tax filing, payment behavior, and the degree of adherence to tax obligations.
- Adoption of Digital Tax Tools (X₁): Measured by the number of respondents using digital platforms for tax registration, filing, and payment.
- Use of AI in Tax Auditing and Monitoring (X₂): Measured by respondents' awareness and frequency of interaction with AI tools for auditing and detecting tax evasion.
- Perceived Ease of Use and Accessibility of Digital Tax Platforms (X₃): Measured by the respondent's perception of how easy it is to use digital tax systems and how accessible these tools are.

4.0 PRESENTATION OF RESULTS AND DISCUSSIONS

4.1 Descriptive Evaluation of Compliance to Digital Innovations and AI-driven Tax

The descriptive statistics provide insights into the responses from the 150 participants (• 50 taxpayers SMEs, 50 tax administrators from FIRS/SIRS and 50 IT experts.) regarding the impact of digital innovations and AI-driven tax compliance on tax compliance (Table 1).

Table 1: Descriptive Analysis of Compliance to Digital Tax Payment

Descriptive Tool	TCL	ADTT	UAIT	PEOU
Mean	2.980000	2.904762	3.023810	2.975238
Median	3.000000	2.857143	3.000000	3.000000
Maximum	3.933333	4.285714	4.857143	4.714286
Minimum	1.733333	1.571429	1.571429	1.857143
Std. Dev.	0.405462	0.567983	0.543270	0.516737
Skewness	-0.389558	0.080905	0.137732	0.219195
Kurtosis	3.236202	2.527504	3.348750	3.294751
Jarque-Bera	4.142574	1.558973	1.234418	1.744143
Probability	0.126023	0.458642	0.539448	0.418085
Sum	447.0000	435.7143	453.5714	446.2857
Sum Sq. Dev.	24.49556	48.06803	43.97619	39.78558
Observations	150	150	150	150



The descriptive statistics offer insights into the central tendencies, variability, and distributional properties of key variables related to tax compliance in Nigeria: Tax Compliance Level (TCL), Adoption of Digital Tax Tools (ADTT), Use of AI in Tax Auditing and Monitoring (UAIT), and Perceived Ease of Use (PEOU). The mean and median values for all variables are close to 3.0—the neutral point on a 5-point Likert scale—suggesting moderately neutral to slightly positive perceptions. Specifically, TCL (Mean = 2.980, Median = 3.000) shows that respondents slightly lean toward tax compliance. ADTT (Mean = 2.9048) indicates moderate adoption of digital tools, while UAIT (Mean = 3.0238) reflects cautious optimism about AI technologies. PEOU (Mean = 2.9752) suggests digital platforms are fairly accessible, though not universally so.

The measures of dispersion (standard deviations between 0.40 and 0.57) indicate moderate variability, with ADTT showing the highest spread, implying inconsistent access or adoption across respondents. Minimum values below 2.0 for all variables point to a notable subset of respondents with low levels of agreement, especially regarding digital access and usability. Conversely, maximum values above 4.0 reveal that some participants strongly support the effectiveness and usability of digital tax systems.

Skewness values suggest near-normal distributions, with slight right skew for PEOU and UAIT, and a mild left skew for TCL—indicating a tendency toward favorable views of compliance. Kurtosis values around 3 suggest moderately peaked distributions, with ADTT being flatter, signifying more dispersed opinions. Jarque-Bera tests confirm that all variables approximate normal distribution (p-values > 0.05), validating the use of parametric tests in further analysis. Overall, while respondents exhibit cautious acceptance of digital innovations in tax systems, variability highlights the need for targeted strategies to enhance uniform adoption and usability.

4.2 Assessment of the Correlation among Tax Compliance Factors in Nigeria

Table 2: Correlation Analysis of the Relationships among Tax Compliance Factors

Model	TCL	ADTT	UAIT	PEOU
TCL	1.000000	0.007494	0.404067	0.392080
ADTT	0.007494	1.000000	0.078419	0.039512
UAIT	0.404067	0.078419	1.000000	0.198251
PEOU	0.392080	0.039512	0.198251	1.000000

Source: Authors Analysis (2025).

The correlation analysis reveals key relationships among tax compliance factors in Nigeria. Tax Compliance Level (TCL) and Use of AI in Tax Auditing (UAIT) show a moderate positive correlation (0.404), suggesting that greater use of AI tools—such as for fraud detection or automated audits—is associated with improved tax compliance. This underscores AI's role in enhancing enforcement and building trust in the tax system. Similarly, TCL and Perceived Ease of Use (PEOU) have a moderate positive correlation (0.392), indicating that user-friendly and accessible platforms promote higher compliance, reinforcing the



importance of intuitive digital systems. In contrast, the correlation between TCL and Adoption of Digital Tax Tools (ADTT) is very weak (0.007), suggesting that simply adopting digital tools without ensuring usability or effective implementation does not meaningfully improve compliance. Likewise, ADTT's weak correlations with UAIT (0.078) and PEOU (0.040) imply that tool adoption often occurs independently of AI use or user-centered design, possibly due to top-down implementation without sufficient user engagement. Lastly, UAIT and PEOU show a low positive correlation (0.198), indicating that platforms with AI features might be perceived as slightly more usable—likely due to automation or responsive support. Overall, the results highlight that functionality and user experience, rather than mere adoption, are key to fostering tax compliance.

Table 3: Unit root test

Variable	T-statistics	Probability	Stationarity
TCL	-11.97811	0.0000	TCL is stationary at level.
ADTT	-12.82022	0.0000	ADTT is stationary at level.
UAIT	-11.88962	0.0000	UAIT is stationary at level.
PEOU	-12.57573	0.0000	PEOU is stationary at level.

Source: Authors Analysis (2025).

The Augmented Dickey-Fuller (ADF) test results show that all variables—TCL, ADTT, UAIT, and PEOU—are stationary, as their test statistics are below critical values and p-values are 0.0000. This indicates the absence of unit roots, confirming no time-dependent structure or non-stationary behavior in the data.

Table 4: Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ADTT	0.139314	0.048146	2.893579	0.0044
UAIT	0.412974	0.052955	7.798591	0.0000
PEOU	0.439170	0.053562	8.199222	0.0000
R-squared	0.080663	Mean dependent var		2.980000
Adjusted R-squared	0.068155	S.D. dependent var		0.405462
S.E. of regression	0.391401	Akaike info criterion		0.981631
Sum squared resid	22.51966	Schwarz criterion		1.041843
Log likelihood	-70.62230	Hannan-Quinn criter.		1.006093
Durbin-Watson stat	1.914826			

Source: Authors Analysis (2025).

The regression analysis examined the influence of three independent variables—ADTT (Adoption of Digital Tax Tools), UAIT (Use of AI in Tax Auditing and Monitoring), and PEOU (Perceived Ease of Use and Accessibility of Digital Tax Platforms)—on the dependent variable, TCL (Tax Compliance Level). The coefficient for ADTT is 0.139, which indicates a modest positive relationship between digital tool adoption and tax compliance. This suggests that as the adoption of digital tools increases, tax compliance also improves, albeit at a



moderate rate. The coefficient for UAIT is 0.413, showing a stronger positive relationship with compliance. This highlights the significance of AI in tax auditing and monitoring, where its use leads to a more effective detection of tax evasion and better enforcement, ultimately boosting compliance. The highest coefficient, 0.439, is for PEOU, underscoring that the ease of use and accessibility of digital platforms is the most impactful factor in improving compliance. A user-friendly platform encourages taxpayers to comply more readily. The t-statistics for all independent variables are significantly greater than 2, and their p-values are well below 0.01, confirming that these variables have a statistically significant effect on tax compliance. The R-squared value of 0.081, means that 8.1% of the variation in tax compliance can be explained by the three variables, which is typical for behavioral studies where multiple other factors influence the dependent variable. The adjusted R-squared value of 0.068 accounts for the number of predictors and shows a modest yet meaningful explanatory power. The Durbin-Watson statistic of 1.91 indicates that there is no significant autocorrelation in the residuals, suggesting that the model is statistically sound. In conclusion, the study demonstrates that digital tools, AI, and usability significantly influence tax compliance, though other unmeasured factors likely contribute to the remaining variation.

Hypothesis Testing

To test the hypotheses based on the OLS regression results you provided, we can evaluate the significance of the predictors using the p-values, which are part of the regression output.

Hypothesis Ho1: Adoption of Digital Tax Tools has no significant effect on tax compliance level in Nigeria. Since the p-value (0.0044) is less than 0.05, we reject the null hypothesis (H_0) and conclude that the adoption of digital tax tools has a significant effect on tax compliance level in Nigeria.

Ho2: The use of AI in Tax Auditing and Monitoring has no significant effect on tax compliance level in Nigeria. Since the p-value (0.0000) is less than 0.05, we reject the null hypothesis (H_0) and conclude that the use of AI in tax auditing and monitoring has a significant effect on tax compliance level in Nigeria.

Ho3: Perceived Ease of Use and Accessibility of Digital Tax Platforms has no significant effect on tax compliance level in Nigeria. Since the p-value (0.0000) is less than 0.05, we reject the null hypothesis (H_0) and conclude that the perceived ease of use and accessibility of digital tax platforms significantly affect tax compliance level in Nigeria.

Since the p-value (0.0000) is less than 0.05, we reject the null hypothesis (H_0) and conclude that the perceived ease of use and accessibility of digital tax platforms significantly affect tax compliance level in Nigeria.



4.2. Discussion of Findings

Adoption of Digital Tax Tools and Tax Compliance: The study finds a significant positive relationship between the adoption of digital tax tools (ADTT) and tax compliance in Nigeria, evidenced by a p-value of 0.0044, which is below the 0.05 significance threshold. This implies that digital tools such as e-filing systems, mobile applications, and online payment platforms effectively enhance tax compliance by simplifying processes and reducing the complexity of tax obligations. This aligns with the Technology Acceptance Model (TAM), which posits that technologies perceived as useful and easy to use are more likely to be adopted. Likewise, the Theory of Planned Behavior (TPB) supports that favorable attitudes, supportive norms, and perceived ease of use drive behavioral intentions like tax compliance. Empirical evidence further supports this relationship.

Folarin & Osuji (2024) found that mobile platforms enhance compliance ease; Okafor & Aliyu (2024) reported a 25% rise in SME compliance due to digital adoption; and Chukwuemeka & Adeyemi (2024) noted improved filing accuracy via TaxPro Max. However, Ibrahim & Ijaduola (2022) cautioned that digital literacy is essential for full participation, indicating that tools alone are not sufficient. Policy recommendations include expanding digital tax infrastructure and implementing digital literacy programs to promote widespread adoption and effective use across all taxpayer segments, particularly in underserved areas.

Use of AI in Tax Auditing and Monitoring: The study reveals a highly significant impact of the use of Artificial Intelligence (AI) in tax auditing and monitoring on tax compliance in Nigeria, with a p-value of 0.0000. This statistical significance leads to the rejection of the null hypothesis, affirming that AI substantially improves tax compliance by enhancing fraud detection, automating audit processes, and minimizing human error. Within the Technology Acceptance Model (TAM) framework, AI enhances perceived usefulness by improving task efficiency and reducing audit time. The Theory of Planned Behavior (TPB) also supports this finding, as the institutionalization of AI tools builds trust and strengthens societal norms that promote tax compliance.

Empirical support includes Ndukwe & Bello (2024), who demonstrated AI's ability to detect evasion patterns and boost revenue; Umar & Waziri (2023), who observed real-time fraud detection in financial institutions; and Adebayo & Agboola (2023), who found a 30% reduction in filing errors due to AI, thereby increasing accuracy. However, Ajayi & Ogunleye (2023) argued that AI should be combined with blockchain technology to be fully effective, indicating that AI alone may not sufficiently address all compliance challenges. Policy implications include mandating the adoption of AI auditing systems in high-risk sectors like banking and oil, and investing in continuous upskilling of tax officials in AI, data analytics, and system operations to enhance effectiveness and foster institutional capacity.



Perceived Ease of Use and Accessibility of Digital Tax Platforms: The findings on Perceived Ease of Use and Accessibility (PEOU) of digital tax platforms reveal a highly significant effect, with a p-value of 0.0000, indicating that PEOU strongly influences tax compliance. Taxpayers are more likely to comply when platforms are user-friendly, accessible on multiple devices, and responsive. These results align with the Technology Acceptance Model (TAM), where ease of use is a key factor in user acceptance, and the Theory of Planned Behavior (TPB), where ease of use contributes to perceived behavioral control, promoting compliance. Supporting studies highlight that intuitive interfaces increase compliance, particularly in rural areas (Chukwuemeka & Adeyemi, 2024), while digital tools improve SME compliance by simplifying tax processes (Okafor & Aliyu, 2024). Additionally, AI-powered systems boost efficiency and compliance (Onyeji & Mohammed, 2023). However, Ibrahim & Ijaduola (2022) caution that digital divides and lack of digital skills may hinder effectiveness. Policy implications suggest that government agencies should regularly test usability, develop accessible platforms (e.g., mobile apps and SMS systems), and expand internet access in underserved regions to promote inclusive digital tax compliance.

5.0. CONCLUSION AND RECOMMENDATION

This study investigated how digital innovations—including digital tax tools, Artificial Intelligence (AI) in tax auditing, and the perceived ease of use and accessibility of digital tax platforms—impact tax compliance in Nigeria. Regression analysis and unit root tests confirmed that all three variables significantly and positively influence compliance. Specifically, digital tax tools simplify taxpayer processes and reduce bureaucratic delays; AI improves fraud detection, risk management, and administrative efficiency; and user-friendly, accessible platforms foster trust and engagement among taxpayers. These findings align with the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), which highlight the importance of perceived usefulness, ease of use, and behavioral intent in technology adoption and compliance behavior. The study concludes that embracing digital and AI-driven solutions is essential for enhancing tax compliance and narrowing Nigeria's tax gap.

Based on these findings, the study recommends:

1. Government and tax authorities should expand digital tax infrastructure and promote taxpayer education to increase digital literacy, especially in rural areas.
2. Advanced AI technologies should be deployed for real-time auditing and fraud detection, alongside regular training for tax officials.
3. Digital platforms should prioritize simplicity and inclusiveness through mobile-friendly design, multilingual options, and feedback mechanisms to enhance usability and taxpayer satisfaction.



Competing Interest

The authors have declared that no conflicting interest exist in this manuscript.

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