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AI-Powered Tax Monitoring Systems: A Solution to Curb Tax Evasion and Improve Compliance in Nigeria

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ABSTRACT:
The need to improve tax collection and gain more revenue for the Nigerian government has been over-emphasized in extant literature. It has become even more critical with the dwindling oil revenues. Hence, using artificial intelligence (AI) to reduce tax evasion and improve tax compliance has become necessary for Nigerian public finance. This study used both secondary and primary data obtained through a structured questionnaire. It was distributed to 130 respondents to capture expert opinions on the relevance of AI-powered tax monitoring systems to curbing tax evasion. Descriptive analyses, paired t-tests, and ANOVA were employed for data analyses, and findings indicate a significant case of tax evasion. The study provided insight into how AI-powered tax monitoring systems can reduce tax evasion and elicit reasonable tax compliance. However, there were significant differences in the results obtained across groups. Therefore, the study concluded that policymakers in Nigeria should carefully consider adopting AI-powered tax monitoring systems as a panacea to the growing underground economy and tax evasion in the country. The study also recommended that the difficulties of AI-powered tax monitoring systems, such as cost, technical expertise, and adequate infrastructure, should be carefully considered before implementation to avoid policy summersault

KEYWORDS: *Tax evasion, tax compliance, artificial intelligence, tax revenue, tax monitoring systems.*

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INTRODUCTION

Tax revenue is a vital source of income for governments worldwide, providing the financial foundation for economic development, infrastructure, healthcare, education, and public administration. In Nigeria, tax evasion and poor compliance undermine effective revenue mobilization. Despite a relatively broad tax base, Nigeria's tax-to-GDP ratio remains below 8%, significantly lower than the sub-Saharan African average of 15% and far below the recommended 20% threshold for sustainable national development (Olaniyi et al., 2023). This persistent revenue shortfall is attributed to inefficiencies in tax administration, coupled with the dominance of the informal sector, also known as the underground economy, corruption, and weak enforcement mechanisms (Falana et al., 2024). Traditional methods of tax monitoring, including manual audits, physical inspections, and static databases, have proven to be inadequate in tackling tax fraud and enhancing compliance. The high cost of administration, lack of transparency, limited access to taxpayer information, and low levels of digital literacy further exacerbate the problem.

To address these challenges, emerging technologies such as Artificial Intelligence (AI) have gained attention as transformative tools for public finance management. AI-powered tax monitoring systems leverage machine learning algorithms, predictive analytics, and natural language processing to enhance taxpayer profiling, detect anomalies, and monitor real-time transaction patterns (Owonifari et al., 2023). These intelligent systems provide capabilities beyond conventional IT solutions by continuously learning and adapting to identify complex tax evasion schemes.

Countries like the United Kingdom, Australia, and Estonia have adopted AI solutions in their tax regimes with impressive outcomes, including improved compliance, early fraud detection, and increased revenue collection. The Nigerian tax administration, while making strides in digitalization through platforms like the Integrated Tax Administration System (ITAS), is still in the early stages of AI adoption. Studies by Ariyibi et al. (2024) and Olabanji et al. (2024) indicate that AI and blockchain technologies have the potential to significantly enhance Nigeria's tax ecosystem by automating detection processes and ensuring transparency. Despite progressive reforms and the deployment of electronic tax filing systems, Nigeria continues to struggle with systemic tax evasion, especially among high-net-worth individuals and the informal sector. Olabanji et al. (2024) submit that the current digital platforms are limited in scope and incapable of handling unstructured data or detecting concealed incomes and transaction manipulations. As Ugo (2023) noted, the prevailing digital infrastructure lacks cognitive capabilities, such as pattern recognition and adaptive analytics, that AI can offer to strengthen compliance.

Previous research has shown that tax evasion is driven by weak enforcement, limited public trust, and a perception of injustice in the tax system (Ajala et al., 2024; Augustine et al., 2023). Nigerian tax authorities are also reactive, discovering irregularities only after lost revenue. This reactive posture leads to inefficient resource deployment and persistent revenue leakage.

While empirical literature acknowledges the promise of AI in enhancing audit efficacy, including tax audit (Owonifari et al., 2023) and boosting compliance through automation (Zhang et al., 2020), research is scarce on its practical implementation in the Nigerian context. Furthermore, cost, data quality, institutional readiness, and legal constraints pose significant barriers to adopting AI-based systems. Consequently, a knowledge gap exists regarding how AI-powered tax monitoring systems can be deployed and scaled effectively in Nigeria to mitigate evasion and encourage compliance.

Specifically, the study aims to:

1. Assess the extent of tax evasion in Nigeria
2. Explore the link between AI technologies and reduction of tax evasion
3. Analyze empirical evidence on the effectiveness of AI-powered tax systems in improving compliance across both formal and informal sectors.
4. Identify practical and institutional challenges to implementing AI technologies in the Nigerian tax ecosystem.

This study offers several important contributions. First, it bridges the gap in academic and policy-oriented literature by providing empirical insights into how AI can be harnessed to reform Nigeria's tax administration. While previous studies, such as those by Olaniyi et al. (2023) and Clement (2022), have discussed enforcement and administrative challenges, this study expands the discussion by focusing on AI as an emerging solution. Second, the study provides valuable recommendations for the Federal Inland Revenue Service (FIRS), State Internal Revenue Services, and policymakers. By exploring successful AI applications from other jurisdictions and assessing local feasibility, this research can help guide investment in next-generation tax infrastructure and workforce training. Third, it informs broader digital transformation strategies in Nigeria's public sector. As Ugo (2023) noted, integrating AI into accounting and auditing practices has already shown promise in improving accuracy and fraud detection. Applying these insights to the tax domain could drive wider adoption of smart technologies across public institutions. Fourth, for taxpayers and civil society, the study underscores the potential of AI to enhance transparency, reduce administrative burden, and promote fairness. Studies by Ajala et al. (2024) and Augustine et al. (2023) have shown that citizens' willingness to comply improves when they perceive the tax system as equitable and efficient. AI tools that ensure consistent enforcement and real-time feedback can rebuild trust in the system. Finally, the study opens avenues for future interdisciplinary research between economists, data scientists, and public administrators. With tax evasion becoming increasingly sophisticated and technology-driven, combating it will require equally advanced and adaptive responses.

LITERATURE REVIEW

Taxation Tax Evasion and Artificial Intelligence

Taxation is a critical aspect of public finance, enabling governments to fund national infrastructure, healthcare, and education systems. In Nigeria, however, the tax system is plagued by widespread tax evasion, non-compliance, and inefficiencies in enforcement (Olaniyi et al., 2023). Despite various reforms, including introducing electronic tax filing systems, Nigeria's tax collection remains suboptimal, with the tax-to-GDP ratio still below international standards (Olabanji et al., 2024). In response to these challenges, Artificial Intelligence (AI) offers a transformative potential to revolutionize tax administration. By leveraging machine learning, predictive analytics, and anomaly detection, AI can help to improve tax

monitoring, enforce compliance, and detect fraudulent activities in real time. This could also offer the needed solution to the issue of low tax revenue by combating tax evasion and widening underground economy.

Tax evasion remains a significant challenge for many developing countries, and Nigeria is no exception. According to a Federal Inland Revenue Service (FIRS) report, the informal sector, which constitutes a large portion of Nigeria's economy, is particularly vulnerable to underreporting and tax evasion (Ajala et al., 2024). Factors such as poor enforcement mechanisms, weak administrative capacity, and the lack of trust in the government contribute to this phenomenon (Bello et al., 2023). Furthermore, Nigeria's tax system has been historically fragmented, with multiple agencies and limited coordination, leading to inefficiencies and a lack of comprehensive data on taxpayers (Ariyibi et al., 2024).

In light of these challenges, AI-based tax monitoring systems can potentially enhance the detection of tax evasion by providing more efficient tools for real-time data analysis, fraud detection, and automated auditing processes (Falana et al., 2024). AI can leverage big data analytics, identify patterns in taxpayer behavior, and highlight irregularities or discrepancies that would otherwise go unnoticed using traditional auditing methods (Owonifari et al., 2023). Integrating AI into Nigeria's tax infrastructure offers the possibility of improving transparency, reducing human error, and ensuring more equitable enforcement of tax laws.

The Role of Artificial Intelligence in Tax Administration

AI has proven to be a game-changer in various sectors, including finance, education, healthcare, and governance. In the tax administration context, AI technologies, including machine learning, natural language processing, and data mining, have demonstrated significant promise in improving the efficiency of tax monitoring and enhancing compliance. One of the key benefits of AI in tax administration is its ability to automate complex processes, such as detecting fraudulent claims and anomalies in large datasets (Owonifari et al., 2023). For example, AI systems can analyze financial transactions in real time, flagging suspicious activities and alerting tax authorities to potential evasion or fraud. This real-time monitoring helps to reduce the time it takes to detect fraudulent activity, enabling quicker interventions and more accurate enforcement.

AI-powered systems also have the potential to improve taxpayer compliance by simplifying the tax filing process, reducing the burden on taxpayers, and ensuring more accurate tax assessments. Using AI algorithms, tax authorities can predict a taxpayer's behavior, evaluate their financial transactions, and create more precise profiles of potential tax evaders (Zhang et al., 2020). Additionally, AI can provide more personalized guidance to taxpayers, reducing human error and enhancing user satisfaction.

Moreover, AI's predictive capabilities can forecast future tax revenues, optimize tax collection strategies, and improve resource allocation for tax authorities. In countries like the United Kingdom and Australia, AI technologies have been integrated into their tax administration systems with promising results. For instance, AI tools have been used to improve audit efficiency, identify discrepancies in income reporting, and enhance compliance monitoring, leading to higher tax revenue collection (Olaniyi et al., 2023).

Artificial Intelligence and the Nigerian Context

The application of AI in tax administration in Nigeria presents both significant opportunities and unique challenges. Nigeria has made progress in digitizing its tax system through initiatives such as the Integrated Tax Administration System (ITAS) and e-filing platforms for tax returns (Olabanji et al., 2024). However, these systems still face limitations in processing large and unstructured datasets, which is a critical aspect of detecting complex tax evasion schemes (Ariyibi et al., 2024). Furthermore, the country's fragmented tax administration, compounded by inadequate data-sharing and communication between agencies, hinders the full realization of AI's potential in monitoring and compliance enforcement (Ajala et al., 2024).

The Nigerian government has recognized the need for greater automation and technological innovation in tax administration to curb evasion and improve revenue generation. Adopting AI can address these challenges by providing a unified and automated approach to tax monitoring. AI can be deployed to enhance taxpayer profiling, detect discrepancies, and automate auditing processes, which could significantly improve the efficiency of Nigeria's tax system (Owonifari et al., 2023). Furthermore, AI tools could be integrated into the existing digital infrastructure to enhance data analytics capabilities, allowing tax authorities to make more informed decisions and ensure more accurate tax assessments.

Despite these advantages, adopting AI-powered systems in Nigeria's tax administration faces several barriers. One of the primary challenges is the lack of technical expertise and infrastructure to implement and maintain these systems (Olabanji et al., 2024). Nigeria faces persistent issues related to internet connectivity, cyber security, and the digital literacy of tax officials, all of which may hinder the successful implementation of AI technologies. Additionally, concerns related to data privacy and the legal implications of using AI in tax enforcement must be addressed before widespread adoption (Ugo, 2023).

Moreover, Nigeria's informal sector, a significant contributor to tax evasion, presents a unique challenge. Many informal businesses operate outside the formal banking system, making it difficult to track transactions and assess taxable income (Falana et al., 2024). AI can help identify patterns in unstructured data, such as cash transactions or mobile money transfers. However, addressing the full extent of informality will require a multi-faceted approach that includes improved data collection, better taxpayer education, and stronger enforcement mechanisms.

AI-Powered Tax Monitoring Implementation and Challenges

Implementing AI in tax monitoring in Nigeria depends on overcoming several challenges. Data privacy issues, taxpayer and tax officials' resistance, and appropriate legal frameworks (Oyedokun & Ayinde, 2023). Public perception of AI in tax administration is also a critical factor that could influence the adoption of AI-powered systems. According to studies by Clement (2022) and Augustine et al. (2023), there is a general lack of trust in the tax system, which extends to digital platforms. Addressing these concerns will require not only technological innovation but also transparent communication and efforts to build public confidence in the system.

Additionally, the high costs associated with AI implementation and the need for continuous investment in infrastructure are major obstacles to its widespread adoption in developing economies like Nigeria (Olaniyi et al., 2023). This financial barrier may limit the ability of tax authorities to implement AI solutions across the entire country, particularly in rural and underdeveloped areas. Nonetheless, strategic partnerships with private sector players, international organizations, and technology providers could alleviate some of these financial constraints.

AI-powered tax monitoring systems have the potential to transform Nigeria's tax administration system, curbing tax evasion and improving compliance. However, their successful implementation depends on overcoming several key challenges, including technical barriers, data privacy concerns, and resistance to change. While the potential for AI to improve tax collection and enforcement is clear, Nigeria's government must invest in building the necessary infrastructure, training personnel, and fostering public trust to ensure the successful integration of AI into the tax system.

Implications of artificial intelligence to tax systems

Ugo (2023) conducted an empirical analysis of the influence of AI on accounting practices in Nigeria. He established that deploying machine learning algorithms and expert systems significantly improved accuracy and efficiency in financial records. Though focused on general accounting, the implication indicates that similar AI applications could be deployed in tax monitoring systems to predict non-compliant behavior and automate the flagging of suspicious transactions. In a related study, Falana et al. (2024) investigated digital tax administration within Nigeria's informal sector. They found that digital platforms like electronic payment systems and tax registration portals enhance compliance when combined with user training. The convergence of both studies indicates that while AI improves accuracy and automation, its effectiveness in tax compliance relies heavily on users' digital literacy.

Governance quality is another critical variable linked to tax compliance. Adekoya et al. (2023) focused on voluntary tax compliance in Lagos State, highlighting that transparency, accountability, and institutional trust drive taxpayers' willingness to comply. Obembe and Adegbite (2021) supported this conclusion, finding a statistically significant relationship between public trust in governance and individual tax compliance. Both studies suggest that even the most sophisticated AI systems may underperform in contexts with low trust in institutions. The need for acceptance raises the concern that AI systems must be implemented alongside governance reforms.

Soyinka and Jinadu (2016) explored the effect of tax audit determinants such as frequency and probability on corporate tax compliance. Their findings showed that audit probability significantly influences compliance decisions, while the severity of penalties had limited effect. Similarly, Ozue (2022) analyzed companies' income tax enforcement and discovered that the threat of enforcement (including AI-enhanced audits) was a strong motivator for compliance. These findings imply that AI could enhance audit selection efficiency, making audit threats more credible and targeted. However, AI's potential may be constrained without the institutional capacity to enforce audit results.

Orumwense and Aiwoho (2021) addressed behavioral and moral elements by analyzing determinants of tax morale in Nigeria. Their study revealed that trust in government and religiosity positively influence tax compliance, while factors like culture and educational attainment had insignificant effects. In contrast, Anyaduba (2012) emphasized the weakness of deterrent measures and advocated moral suasion as a stronger approach. Comparatively, these works show that psychological strategies and civic education must accompany AI tools for maximum impact, particularly in low-trust societies like Nigeria.

Augustine (2024) examined personal income tax compliance across South-West Nigeria and found that employment status, especially formal employment, was significantly correlated with higher compliance. However, factors like age, gender, and education level showed no significant effect. This conclusion partially contradicts Orumwense and Aiwoho (2021), who found age and religiosity significant. A plausible explanation could be regional variations in governance, awareness campaigns, or tax enforcement. AI systems could help reconcile these inconsistencies by segmenting taxpayers based on real-time behavioral data rather than demographic assumptions.

Dibie and Dibie (2020) found that inadequate tax knowledge and poor education levels are barriers to compliance in Nigeria. Their findings align with Falana et al. (2024), who stressed that usage remains low even when digital systems are available without proper training and awareness. Therefore, while AI can make systems smarter, it cannot replace human capacity development. These studies reinforce the idea that effective implementation of AI-powered systems must be accompanied by targeted digital literacy programs and public education.

Looking beyond Nigeria, Nyakundi (2022) explored the role of ICT adoption on tax compliance in Kenya and found that digital systems significantly improved tax reporting and remittance efficiency. Likewise, Gidisu et al. (2025) in Ghana found that integrating AI into tax systems helped to improve tax revenue, reduce audit duration, and improve tax fraud detection. These international insights support the proposition that AI-based tax systems are scalable and adaptable to developing contexts, including Nigeria. However, the success recorded in other jurisdictions was largely due to strong policy frameworks and infrastructural readiness, which are areas Nigeria must still improve.

Mohammed et al. (2023) analyzed Nigeria's Integrated Tax Administration System (ITAS). They concluded that while it has improved compliance marginally, its full potential remains unrealized due to stiff challenges such as parallel initiatives and technical support issues. The application of ITAS in eliciting compliance was further confirmed by Ologun and Oloruntoba (2023) in a study domiciled in Ondo State, Nigeria. Oladele et al. (2024) also conducted a systems-based assessment of taxpayer services in Nigeria and found that simplifying tax filing through digital platforms reduced unintentional non-compliance. Together, these studies suggest that the structure and design of digital systems, including AI components, directly affect their usability and effectiveness.

According to Bello et al. (2023), taxpayer perception of fairness and system reliability plays a crucial role in technology adoption. Their study indicated that taxpayers may resist or find ways to subvert them when AI systems are perceived as biased or overly invasive. This aligns with international research by Chen et al. (2024), who found that AI acceptance in tax administration is closely tied to data privacy and algorithm transparency. These insights underscore the importance of ethical AI deployment and taxpayer engagement in system design.

Folurunsho and Nwankwo (2024) examined the Federal Inland Revenue Service (FIRS) and its readiness for automation. They found that while infrastructure investment has improved, human capacity to manage and interpret AI outputs remains limited. A similar study by Adeagbo et al. (2024) indicated that external resistance among taxpayers due to fear of technology or lack of training slows down the ICT integration of Tax-Pro Max adoption. These studies affirm that even the most technically advanced AI systems will falter without institutional readiness and human adaptation. While these studies provide valuable insights into various factors influencing tax compliance in Nigeria, there is a notable gap in empirical research, specifically examining the integration of AI-powered systems in tax administration. Most studies focus on traditional factors such as governance, enforcement, and taxpayer characteristics, with limited exploration of how AI technologies can be leveraged to enhance compliance.This research focused on empirically assessing the effectiveness of AI-driven tax monitoring systems in Nigeria, considering factors such as taxpayer interaction, linkage with effective tax administration, and the impact on compliance rates. Additionally, the study explored the challenges and opportunities associated with implementing AI technologies in the Nigerian tax context, including infrastructure requirements, data privacy concerns, and the need for capacity building among tax officials.

Theoretical Foundation - Technological Acceptance Model (TAM)

The major theory underpinning this study is the Technology Acceptance Model (TAM), introduced by Davis (1989), which is a fundamental theory in understanding how individuals accept new technologies such as AI and Information and Communication Technology (ICT). According to TAM, perceived ease of use and usefulness are the primary factors influencing technology adoption. In the context of AI-powered tax monitoring systems, taxpayers' decision to adopt such systems will be influenced by their perception of how easy and useful these systems are for fulfilling their tax obligations.

For AI to effectively curb tax evasion in Nigeria, it must be perceived as useful and user-friendly. If taxpayers view the AI system as an efficient tool that simplifies tax filing and ensures accurate assessments, they are more likely to adopt it. Conversely, if taxpayers find the system complex and opaque, adoption rates will be lower. This theory underscores the importance of designing AI-powered systems that are easy to use and directly benefit taxpayers in terms of reducing filing errors, fraud, and audits. It also implies that AI-powered monitoring systems in taxation are likely to curb tax evasion and improve tax compliance if taxpayers perceive it as useful and efficient. So, TAM opines that tax evasion becomes unappealing and expensive when technologically driven taxation methods are acceptable to the masses, thereby effortlessly eliciting compliance with taxation.

METHODOLOGY

The study utilized a mixture of both exploratory and survey designs to explore perceptions, implementation challenges, and institutional readiness, and it also measured the effect of AI-powered tax systems on compliance rates and tax evasion in Nigeria. Both secondary and primary data were used for analyses. The secondary data were projections and actual tax collected by Federal Inland Revenue Services (FIRS) obtained from their official website, www.firs.gov.ng. Primary data are opinions of knowledgeable persons and tax experts from business, academia, and practice, which are extracted through structured questionnaires. The population for this study is infinite as it consists of individuals and professionals directly or indirectly involved in tax administration, compliance, and policy formulation in Nigeria. The study adopted a stratified purposive sampling technique. The population was divided into five relevant strata based on their roles and expertise. A purposive approach was then used to select 26 individual responses from each stratum who are knowledgeable about tax compliance issues or are potential users/implementers of AI systems in tax administration. The strata and sample distribution were as follows:

1. Tax officials will provide insights into the current tax monitoring challenges and their openness to AI solutions.
2. Tax professionals can assess how AI may alter compliance, reporting behavior, and advisory practices.
3. SMEs and informal business operators represent a core group where tax evasion is prevalent.
4. ICT/data professionals help evaluate the practicality of AI adoption.
5. Academics provide theoretical validation and policy implications.

A sample size of 130 respondents was selected equally across the groups. The questionnaire was distributed using Google Forms, and the responses were used to analyze the study's objectives. A sample of the questionnaire is attached as Appendix 1. The method of data analyses adopted was descriptive analysis and ANOVA for primary data and paired sample t-test for secondary data.

RESULTS AND DISCUSSIONS

The data obtained from the respondents were analyzed in three stages: demographics, descriptive analysis, and objectives analyses.

Analyses of Respondents' Demographics

Respondents' roles and gender analysis

The distribution of respondents' roles was equal, as 26 respondents were selected from each of the five groups to ensure equal representation in the study. The respondents' gender, which includes female and male options, also had equal selection in the study.

Respondents' age analysis

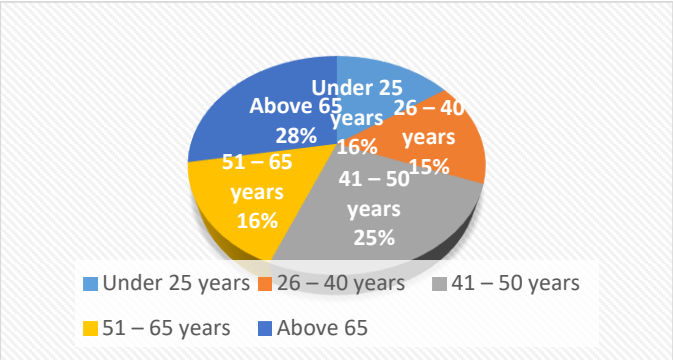

Figure 1: Age Distribution

Respondents' educational status

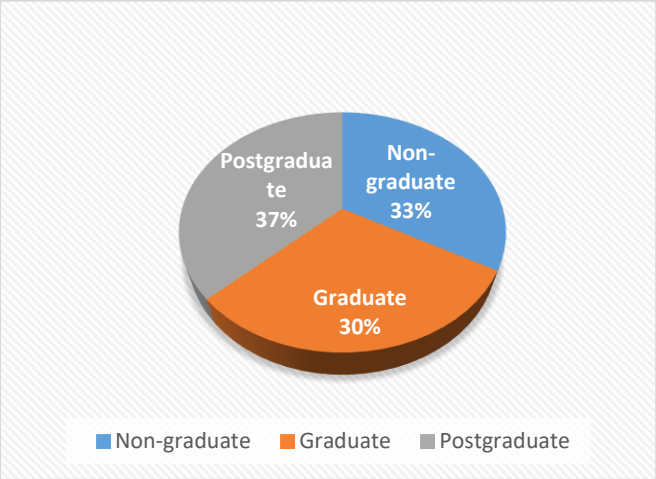

Figure 2: Education Distribution

As shown in Figure 2, the educational status of the respondents shows that most of the respondents are educated because the total number of graduate and postgraduate respondents is 87, which is 67% of the total responses.

Respondents' operational experience

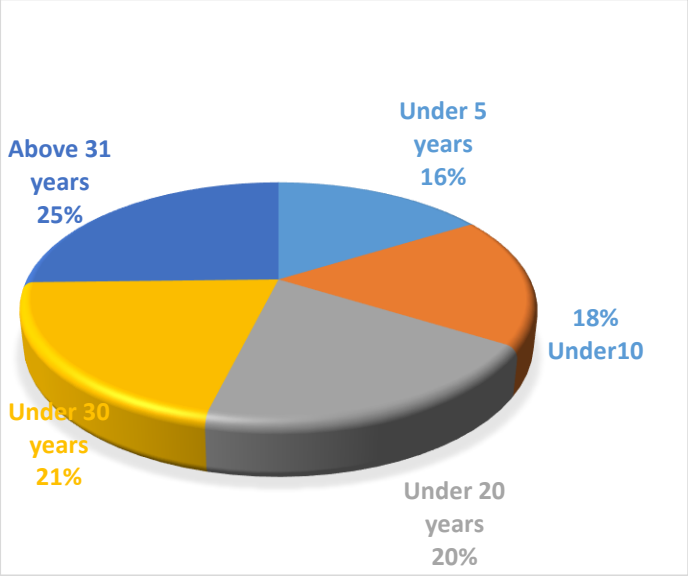

Figure 3: Operational Years of Experience Distribution

The chart in Figure 3 shows that the highest frequency of responses was obtained from the group with the highest years of operational experience, probably the senior citizens identified in the distribution of age section, though it does not exclude the fact that some older people may have lesser operational experience in an industry considering the start-up year. 66% of responses were obtained from persons with more than 10 years of operational experience and 34% from people with less experience.

Descriptive Analyses

The descriptive analyses of the responses obtained were analyzed on a heading basis and presented in Table 1.

Table 1: Descriptive analyses of response

	Ai_W	CMPL	EVN	CHALLGS
Mean	2.308547	3.836364	3.978846	3.464615
Median	2.333333	3.818182	4.000000	3.400000
Maximum	2.888889	4.818182	5.000000	5.000000
Minimum	1.555556	3.000000	2.750000	1.800000
Std. Dev.	0.267292	0.356951	0.519983	0.545149
Skewness	-0.014509	0.036468	-0.317622	-0.038167
Jarque-Bera	0.337186	0.124470	4.401989	1.213326
Probability	0.844853	0.939662	0.110693	0.545167
Observations	130	130	130	130

Source: Research Output 2025

The questionnaire captured the opinions of the five respondent groups, and the mean responses of questions under each heading were taken to describe overall AI awareness, perceptions of AI's capacity to elicit tax compliance and reduce evasion, and anticipated implementation challenges to the Nigerian tax system.

The AI awareness responses have a mean of 2.31, implying that the respondents are generally aware of artificial intelligence and its monitoring applicability to make the tax system more effective. The mean value is symmetrical to the median value of 2.33. When this is considered alongside the standard deviation of approximately 0.27, it can be deduced that most of the respondent agreed on their level of awareness and technical solutions proffered by AI as touching tax administration and collection. The responses are negatively skewed, implying a high level of awareness for a greater number of persons in the survey. The distribution is normal according to the probability of Jarque-Bera.

The responses on CMPL indicate that the average perceptions of the respondents on the capacity of AI tax monitoring to elicit compliance to taxation ranges from a value of 3.00 to a maximum of 4.81. Though the variable is mildly and positively skewed, the mean and median symmetry and Jarque-Bera probability suggesting distribution normality all indicate that the responses are not highly varied. The overall perception of AI to tax monitoring is approximately 4 on average, indicating agreement on the Likert scale.

The results of AI application to tax evasion reduction are comparable to compliance except for the direction and level of skewness. The implication is that more respondents, on average, perceive AI-monitoring tools as more capable of reducing tax evasion, judging from the skewness value of -0.32. However, the variability of the distribution is slightly higher when compared to compliance, considering the standard deviations of 0.52 and 0.36, respectively.

The respondents' perception of the challenges of implementing AI-monitoring tools also has slight variability, which mildly impacts the symmetry of the mean and median. The maximum value of 5.00 suggests that some respondents have agreed that cost, lack of technical expertise, poor infrastructure, resistance, and policy constraints may impede the AI application in Nigeria. The mean value still suggests that greater responses contrasted with the maximum outcome in the series. The distribution is also normal based on the Jarque-Bera probability of 0.54, which is insignificant.

Analyses of Study Objectives

The first objective was analyzed using secondary data on estimated and actual tax collected, but the questionnaire data were applied to study the other three objectives.

Level of tax evasion in the Nigerian tax system

The data collected on estimated and actual tax collected by the FIRS on behalf of the Federal Government of Nigeria were analyzed for possible differences using the paired sample T-test. The results obtained are presented in Table 2.

Table 2: Paired sample t-test result

Criteria	Values
T-statistics	1.9555(0.091)
Shapiro-Wilk statistic:	
Estimated tax	0.904 (0.31)
Actual tax	0.900 (0.29)
Number of years	8
Overall total tax_gap	₦4,792,800,000,000

Source: Research Output 2025

(Note that probability values are in brackets)

The logged values of both estimated and actual tax showed a considerable difference in means. According to the results presented in Table 2, the calculated t-statistics is approximately 1.96, and the result is significant at a 10% significance level. The robustness of the result is drawn from the Shapiro-Wilk statistics, which indicates that both the estimated and actual tax series for the eight years captured were normally distributed because their probability values affirm that the statistic is not significant in both cases. Furthermore, the total tax gap, showing a summation of the difference between higher tax estimates and lower collected tax revenue, stood at 4.79 trillion after 8 years.

This outcome suggests a critical tax evasion case because the FIRS collects more corporate taxes. Corporate taxes are more difficult to evade than personal income taxes collectible by State Internal Revenue Services, which covers a greater percentage of unregistered sole proprietorship businesses and self-employed persons. This possible case of tax evasion highlights the need for AI-monitoring technology to aid real-time effective strategies for tax administration in Nigeria.

Analyzing the link between AI technologies and reduction of tax evasion

The study's second objective explored the possibility of applying AI technologies to reduce tax evasion. The data were obtained from the questionnaire responses of experienced persons selected from five strategic strata of vocation and profession. The implication of their responses, as presented in Table 1, is that AI technologies will reduce the level of tax evasion to a considerable extent because the lowest mean response from the panel of respondents is 2.75. This minimum mean response is above 2.5, which is the midpoint of the 5-point Likert scaling, thereby suggesting that most respondents are positive about the capability of AI-powered monitoring tax system in reducing the level of tax evasion in Nigeria.

The respondent group analyses presented in Table 3 show a significant difference in the responses on AI-powered tax monitoring and reduction of tax evasion.

Table 3: AI-Powered Tax Monitoring and Reduction of Tax Evasion

Criteria	**Results**
F-ratio	7.21(0.00)
Overall mean	3.98
Group 1 mean	4.40
Group 2 mean	3.77
Group 3 mean	3.91
Group 4 mean	3.98
Group 5 mean	3.83
Mean Differences:	
Group 1 → 2.00	0.63(0.00)
Group 1 → 3.00	0.49(0.00)
Group 1 → 4.00	0.42(0.00)
Group 1 → 5.00	0.58(0.00)

Source: Research Output 2025

(Note that probability values are in brackets)

Furthermore, according to results in Table 3, the average respondent agreed that an AI-powered tax monitoring tax system would aid in the reduction of tax evasion judging from the overall mean, which is 3.98, aligning with 4 (agree) on the Likert scale. The analyses of the mean difference showed that the overall significant difference is traceable to the high mean level from group 1, representing tax officials. The mean response of the group is 4.40 and significantly differs from other groups. However, all the groups' responses still indicate that AI-powered monitoring tools will reduce tax evasion in Nigeria.

These responses align with existing literature on the effectiveness of AI applications in reducing tax evasion. Pamisetty et al. (2022) concluded that leveraging AI in Ghana's government financial management will reduce tax evasion as the system detects fraud. The results also support the findings of Gidisu et al. (2025), who held that integrating AI into the Ghanaian tax system has enhanced fraud detection. However, the position of Dibie and Dibie (2020) and Falana et al. (2024) on the need for user training and education in the case of Nigeria's possible adoption remains valid for the results to apply.

Analyzing the effectiveness of AI-powered tax monitoring in improving tax compliance in Nigeria

The results of analyses of responses obtained for questions in the area of improving tax compliance using AI-powered tax monitoring are presented in Table 4.

The overall mean response indicates that our respondents generally believe that applying AI to monitor the tax system will improve the level of compliance with taxes in Nigeria. The questions posed to the respondents tried to elicit their expert opinion on the effectiveness of AI-powered tax monitoring as a strategy for tax collection and administration. So the mean response of 3.84, as shown in Table 4, indicates that the summarized opinion of the respondent on the 5-point Likert scale is approximately 4 and implies that they agree with the outlined effectiveness of AI-powered tax monitoring strategy to bring about tax compliance in both formal and informal sectors of the economy. The analyses of individual group responses show that Group 1 (tax officials) and Group 2 (tax consultants) agree with the questionnaire's proposed questions regarding the effectiveness of AI-powered tax monitoring in strengthening compliance. Group 5 (Academic professionals) has the lowest level of agreement concerning the subject matter.

Table 4: AI-Powered Tax Monitoring System and Tax Compliance in Nigeria

Criteria	**Results**
F-ratio	9.18(0.00)
Overall mean	3.84
Group 1 mean	4.15
Group 2 mean	3.82
Group 3 mean	3.75
Group 4 mean	3.79
Group 5 mean	3.65
Mean Differences:	
Group 1 → 2.00	0.31(0.00)
Group 1 → 3.00	0.40(0.00)
Group 1 → 4.00	0.36(0.00)
Group 1 → 5.00	0.50(0.00)
Group 2 → 5.00	0.19(0.03)

Source: Research Output 2025

(Note that probability values are in brackets)

The conclusion by Falana et al. (2024) aligns with the position of this study because tax platform digitization was found to enhance compliance in the informal sector. Similarly, Ozue (2022) found that AI-enhanced audits strengthen the threat of enforcement, motivating higher corporate tax compliance. ITAS has been found to positively influence compliance with tax (Ologun & Oloruntoba, 2023; Mohammed et al., 2023)

Analyzing the challenges to implementation of AI-powered tax monitoring system in Nigeria

Five questions were utilized in the questionnaire to gather the opinions of respondents on possible difficulties that portend to slow down the success of implementing the AI-powered tax monitoring system; the analyses of the responses obtained are shown in Table 5.

Table 5: Challenges of implementing AI-powered tax monitoring system in Nigeria

Criteria	**Results**
F-ratio	2.66(0.04)
Overall mean	3.46
Group 1 mean	3.58
Group 2 mean	3.18
Group 3 mean	3.60
Group 4 mean	3.51
Group 5 mean	3.46
Mean Differences:	
Group 1 → 2.00	0.40(0.01)
Group 2 → 3.00	-0.42(0.01)
Group 2 → 4.00	-0.33(0.03)

Source: Research Output 2025

(Note that probability values are in brackets)

The respondents on the challenges of implementing AI-powered tax monitoring indicate a lower level of agreement on the issues outlined in the questionnaire. On the one hand, this outcome can imply that some do not strongly regard issues ranging from cost, technical expertise, technological acceptance, policy constraints, and poor infrastructure as problematic enough to prevent implementing an AI-powered tax monitoring system. However, the general mean level of 3.46 still suggests that the issues can hinder the effective implementation of AI-powered tax monitoring systems if they are not tackled decisively before application. The success of any technological application to social systems depends on how other supportive frameworks are strengthened to support the system. So, the mean responses on challenges of implementing an AI-powered tax monitoring strategy suggest that cost of implementation, technical expertise, policy constraints, inadequate infrastructural facilities, and acceptance are some of the difficulties of using AI in the Nigerian tax system.

It is evident from the respondents' group analyses that group 3 (tax consultants) has the lowest level of agreement, judging from the mean group score of 3.18. This outcome was found to be significantly different from the mean values of group 1 (tax officials), group 3 (registered taxpayers), and group 4 (ICT/data expert in public finance). So, the study concludes that there are challenges to implementing an AI-powered tax monitoring system. However, there is a significant difference in respondents' opinions on the subject matter. The challenges of implementing an AI-powered tax monitoring system can be compared to the difficulties encountered in installing digitized tax platforms. However, studies by Adeagbo et al. (2025), Dibie and Dibie (2020), and Falana et al. (2023) emphasized user training and lack of awareness as major impediments. Concerning AI adoption, the findings here align with the position of Olaniyi et al. (2023) regarding poor infrastructure as a massive challenge to implementation.

CONCLUSION AND RECOMMENDATION

Based on the results obtained from analyses in this study, it was concluded that tax evasion is one of the pressing issues in the Nigerian tax system, and the study respondents generally viewed AI-powered tax monitoring strategies as effective in combating tax evasion and eliciting adequate compliance from taxpayers in both formal and informal sectors of the economy. The study also concluded that some challenges to effective implementation, such as the cost of this AI strategy, should be critically analyzed and handled to ensure that the fiscal objective of the nation is attained. Therefore, it was recommended that the Nigerian government seriously consider the implementation of AI in its tax system alongside many other countries like Austria, Poland, and Singapore, which have successfully applied artificial intelligence to improve their fiscal system. The study also recommended that policy somersaults be avoided by carefully articulating how to overcome some of the observed challenges of AI-powered tax monitoring strategies before installation.

The study provides insights that will be impact on existing literature on strategies to improve Nigeria's fiscal strategy by implementing AI-powered tax monitoring tools. By providing empirical evidence on the level of tax evasion prevalent in the Nigerian system and highlighting the possible solution through AI. This will guide policymaker in designing and implementing policy that address tax evasion and strategies to improve tax compliance and monitoring.

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