

THE IMPACT OF ARTIFICIAL INTELLIGENCE (AI) AND TAX REVENUE COMPLIANCE IN NIGERIA REVENUE SERVICE

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Abstract

This study examined the impact of artificial intelligence on tax revenue compliance in the Nigeria Revenue Service, with particular emphasis on machine learning as the dimension of artificial intelligence and Companies Income Tax (CIT) and Value Added Tax (VAT) as measures of tax revenue compliance. The study adopted a qualitative research approach based on a narrative literature review. The reviewed literature was analysed thematically to establish how machine learning can support tax administration and improve compliance with CIT and VAT obligations. The review indicates that machine learning can assist tax authorities in analysing large volumes of taxpayer data, identifying unusual transaction patterns, assessing taxpayer risk, detecting possible cases of non-compliance, and supporting targeted tax audits. The study further found that the application of machine learning has the potential to improve Companies Income Tax compliance by helping to identify inconsistencies in corporate tax declarations and improve VAT compliance through better monitoring of taxable transactions and returns. However, the effectiveness of machine learning depends on reliable data, adequate technological infrastructure, skilled personnel, data security, and appropriate human oversight. The study concludes that the effective

adoption of machine learning can strengthen tax administration and contribute to improved tax revenue compliance in Nigeria. It recommends that the Nigeria Revenue Service should strengthen the use of machine learning in CIT and VAT monitoring, improve taxpayer data integration, and provide continuous training for tax officials to ensure effective use of AI-based tax administration systems.

Keywords: Artificial Intelligence (AI), Machine Learning, Tax Revenue Compliance, Companies Income Tax (CIT), and Value Added Tax (VAT)

Introduction

Tax revenue compliance refers to the extent to which taxpayers fulfil their obligations under tax laws. It involves registering with the tax authority, providing correct information, filing tax returns, declaring taxable income, and paying the required taxes within the stipulated period. In Nigeria, companies and other taxable businesses are required to comply with different tax obligations, including Companies Income Tax (CIT) and Value Added Tax (VAT). Companies Income Tax is imposed on the profits of companies, while Value Added Tax is charged on taxable goods and services. Compliance with these taxes is important because failure to properly declare and pay them can lead to revenue losses for the government. The problem of tax compliance is particularly important in Nigeria because a large amount of government revenue can be lost when taxpayers do not properly declare their taxable activities. Evidence from the World Bank (2022) shows that non-compliance affects major taxes in Nigeria. The report estimated that fewer than 6% of taxpayers registered for Companies Income Tax were actively filing tax returns, while VAT payment compliance was estimated at between 15% and 40%. The report further noted that Nigeria's VAT and CIT collection efficiency was affected by exemptions, weak administration, and low compliance. These conditions show the need for better methods of identifying taxpayers, monitoring transactions, detecting under-reporting, and improving compliance.

Artificial intelligence (AI) is a further development in the use of technology. Bankole et al., (2025) refers AI to computer systems that are capable of performing tasks that normally require human intelligence, including learning from data, identifying patterns, making predictions, and supporting decision-making. In tax administration, AI can be used to analyse large amounts of taxpayer information, identify unusual transactions, assess compliance risks, detect possible tax evasion, and support tax audits. It can also help tax authorities provide faster and more personalised services to taxpayers. One important dimension of artificial intelligence is machine learning. Machine learning allows computer systems to learn from existing data and improve their ability to make predictions or identify patterns without being explicitly programmed for every individual situation. In tax administration, machine learning can be used to examine previous tax records and transaction information to identify patterns associated with non-compliance. It can also help tax authorities predict taxpayers who may be at high risk of under-reporting income, failing to file returns, or avoiding tax payments. This makes machine learning particularly relevant to tax revenue compliance because tax authorities deal with large volumes of information that may be difficult to examine manually.

The relevance of artificial intelligence to Nigerian tax administration is also supported by recent empirical studies. Aina (2024) examined the perceptions of Nigerian tax officers, taxpayers, and tax consultants regarding the adoption of AI in tax risk management. The study found that tax officers generally viewed AI-driven tax risk management tools

positively, particularly because they could improve audit accuracy and efficiency. The study also identified AI as a possible means of improving tax compliance and revenue collection, although issues relating to training, resources, privacy, and trust were identified as challenges. Similarly, Bankole et al. (2025) examined the effects of artificial intelligence on tax administration in Lagos State. Their study included machine learning among the AI technologies examined. The researchers found that AI technologies improved the efficiency of tax administration and contributed to improvements in the speed and accuracy of tax assessment and taxpayer compliance. Although the study considered several AI technologies, its findings provide useful evidence that machine learning can form part of a technology-based approach to improving tax administration in Nigeria.

Despite the possible benefits of AI and machine learning, their use in tax administration is not without challenges. Poor-quality taxpayer information, inadequate digital infrastructure, limited technical skills, cybersecurity risks, data privacy concerns, and the cost of implementing advanced technology may affect their effectiveness. Aina (2024) identified the need for adequate resources and training as important considerations in adopting AI for tax risk management in Nigeria. There is also a need to ensure that decisions supported by AI are transparent and can be reviewed where necessary. This is important because taxpayers may lose confidence in the tax system if they believe that automated decisions are inaccurate or unfair. The OECD (2025) also cautioned that although AI provides opportunities for improving tax compliance and preventing tax fraud, it creates risks relating to the processing of sensitive taxpayer information. Tax administrations therefore need appropriate safeguards to ensure that AI systems are secure, reliable, transparent, and accountable. Thus, the effectiveness of machine learning in improving tax compliance may depend not only on the availability of the technology but also on the quality of data, technical capacity, taxpayer trust, and proper governance.

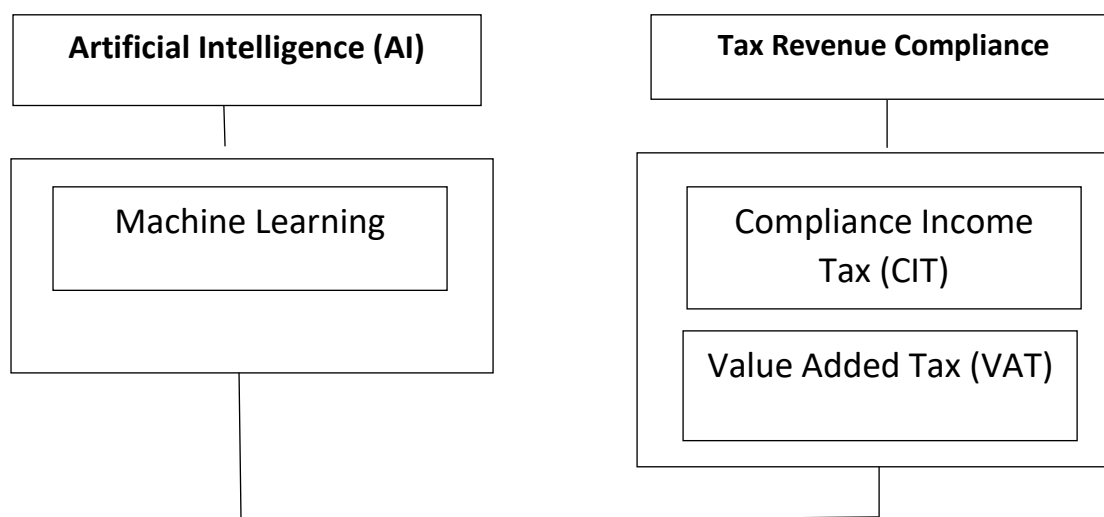
Although existing studies have examined digitalisation, artificial intelligence, and tax administration in Nigeria, there is still a need for more focused research on the effect of machine learning as a dimension of artificial intelligence on specific measures of tax revenue compliance. Existing Nigerian studies such as Aina (2024) and Bankole et al. (2025) provide useful evidence on AI and tax administration, but there is limited empirical attention to how machine learning relates specifically to Companies Income Tax and Value Added Tax compliance within the Nigeria Revenue Service.

Statement of the Problem

Despite the importance of taxation, Nigeria continues to face problems of low tax revenue collection and tax non-compliance. Some companies and businesses fail to register for tax, understate their income, submit inaccurate tax returns, or delay and avoid the payment of taxes. These practices can reduce government revenue and limit the funds available for economic and social development. The problem is more serious because the Nigeria Revenue Service has to monitor a large number of companies and business transactions. Traditional methods of tax monitoring and auditing may not be sufficient to examine the large volume of information generated by taxpayers. Manual processes can be time-consuming and may make it difficult for tax officials to quickly identify companies that under-report income, fail to file returns, or do not properly account for VAT. As a result, some cases of tax non-compliance may remain undetected, leading to possible revenue losses for the government.

The introduction of artificial intelligence provides a possible solution to some of these challenges. In particular, machine learning, as a dimension of artificial intelligence, can analyse large amounts of taxpayer information and identify patterns that may indicate tax non-compliance. It can assist tax authorities in identifying high-risk taxpayers, detecting unusual transactions, supporting tax audits, and predicting possible cases of tax evasion. However, despite these potential benefits, there is still uncertainty about the extent to which artificial intelligence, particularly machine learning, can actually improve tax revenue compliance in Nigeria. The use of AI may be affected by poor-quality taxpayer data, inadequate digital infrastructure, shortage of skilled personnel, cybersecurity concerns, privacy issues, and the cost of implementing advanced technological systems. These challenges may limit the ability of the Nigeria Revenue Service to use machine learning effectively for tax monitoring and compliance management. Although these studies provide useful evidence, limited attention has been given to machine learning as a specific dimension of artificial intelligence and its relationship with Companies Income Tax and Value Added Tax compliance within the Nigeria Revenue Service. Consequently, there is need to determine the impact of artificial intelligence on tax revenue compliance in the Nigeria Revenue Service

Conceptual Framework



Source: Researcher's Conceptualization 2026

Objectives of the Study

1. Examine the impact of machine learning on Companies Income Tax (CIT) compliance in the Nigeria Revenue Service.
2. Determine the impact of machine learning on Value Added Tax (VAT) compliance in the Nigeria Revenue Service.

Literature Review

Artificial Intelligence

Artificial Intelligence (AI) is one of the most important technological innovations of the twenty-first century. It refers to the ability of computer systems and machines to perform tasks that normally require human intelligence, such as learning, reasoning, problem-solving,

decision-making, language understanding, and pattern recognition. AI enables machines to analyse information, learn from experience, and make decisions with little or no direct human intervention. As technology continues to advance, AI has become increasingly important in various sectors, including healthcare, education, finance, manufacturing, transportation, security, and public administration. There is no single universally accepted definition of artificial intelligence. However, many scholars and institutions have provided definitions that explain its meaning and scope. Russell and Norvig (2021) defined AI as the study and design of intelligent agents that can perceive their environment and take actions that maximize the achievement of specified goals. Similarly, Kaplan and Haenlein (2019) described AI as a system's ability to correctly interpret external data, learn from such data, and use those learnings to achieve specific objectives through flexible adaptation. These definitions emphasize the ability of AI systems to learn, reason, and make decisions based on available information.

The growing adoption of artificial intelligence has created significant opportunities for organizations and governments. AI can improve efficiency, accuracy, productivity, and decision-making by processing large volumes of information more quickly than humans. In public administration, AI can support policy implementation, service delivery, fraud detection, compliance monitoring, and resource management. The OECD notes that AI has the potential to improve productivity, enhance public services, and help solve complex social and economic challenges. In the area of taxation, artificial intelligence is increasingly being used to strengthen tax administration and improve compliance. Tax authorities can use AI to analyse taxpayer information, identify compliance risks, detect tax fraud, monitor financial transactions, and support audit activities. AI systems can process large amounts of taxpayer data more efficiently than traditional manual methods, thereby helping tax authorities identify irregularities and potential cases of tax evasion. This capability is particularly important in developing countries where tax authorities often face challenges related to limited resources and large taxpayer populations. Despite its numerous benefits, the adoption of artificial intelligence also presents several challenges. These include concerns about data privacy, cybersecurity, transparency, accountability, bias in decision-making, and the ethical use of technology. AI systems depend heavily on the quality of the data used to train them, and inaccurate or incomplete data may produce unreliable results. Furthermore, excessive reliance on automated systems may raise concerns regarding fairness and the protection of individual rights. Consequently, organizations and governments are increasingly focusing on the development of responsible and trustworthy AI systems that operate within appropriate legal and ethical frameworks.

Machine Learning

Machine learning (ML) is an important branch of artificial intelligence that enables computer systems to learn from data and improve their performance without being directly programmed to perform every task. Instead of relying only on fixed instructions, machine learning systems identify patterns in existing data and use those patterns to make predictions, classifications, or decisions when new data are presented. Mitchell (1997) explained machine learning as the study of computer algorithms that improve automatically through experience. This means that a machine learning system can become more effective as it receives and processes more relevant data. Machine learning has become increasingly important because of the large amount of data generated by individuals, businesses, and government institutions. Traditional methods of analysing large datasets can be slow and may require significant human effort. Machine learning provides a way of processing large volumes of information

and identifying relationships or patterns that may not be easily detected through manual analysis. Jordan and Mitchell (2015) described machine learning as a rapidly developing field that combines ideas from computer science and statistics to create systems capable of learning from data. The authors noted that machine learning has become an important tool for solving problems involving prediction and decision-making.

Machine learning is closely related to artificial intelligence, but the two concepts are not exactly the same. Artificial intelligence is the broader concept concerned with creating systems that can perform tasks associated with human intelligence, while machine learning is one of the major approaches used to achieve this goal. In other words, machine learning can be viewed as a dimension or component of artificial intelligence. Machine learning can generally be divided into three major types: supervised learning, unsupervised learning, and reinforcement learning. Machine learning is increasingly being applied in financial services, banking, healthcare, marketing, security, and public administration. Its ability to process large amounts of data makes it particularly useful in situations where organisations need to identify patterns and make predictions. Jordan and Mitchell (2015) noted that machine learning has applications across a wide range of fields because of its ability to support prediction and decision-making. This growing application has also increased interest in using machine learning within tax administration.

In tax administration, machine learning can assist tax authorities in analysing taxpayer information and identifying possible cases of non-compliance. Tax authorities receive large amounts of information from tax returns, payments, business registrations, financial transactions, and other sources. Examining all of this information manually can be difficult and time-consuming. Machine learning can help analyse these records and identify unusual patterns that may suggest under-reporting, tax evasion, fraudulent claims, or other compliance risks. The Organisation for Economic Co-operation and Development (OECD, 2025) reported that tax administrations are increasingly using machine learning and other forms of artificial intelligence to improve compliance management. Machine learning models can be used to assess taxpayer risk, identify potential tax fraud, select cases for audit, and support other compliance activities. This can allow tax authorities to direct their limited resources towards taxpayers and transactions that present higher levels of risk. Such an approach may improve the efficiency of tax audits and increase the likelihood of detecting non-compliance.

Machine learning can also be useful for improving Companies Income Tax (CIT) compliance. Companies generate financial information that can be compared with their tax declarations and other available records. A machine learning system can examine historical information and identify patterns associated with under-reporting of taxable income or failure to file tax returns. Tax officials can then investigate companies identified as having unusual or high-risk patterns. This may encourage companies to provide more accurate information and comply with their tax obligations. Similarly, to Aina (2024) machine learning can support Value Added Tax (VAT) compliance. VAT administration requires tax authorities to monitor businesses that collect and remit VAT. Some businesses may fail to register for VAT, understate their sales, submit inaccurate VAT returns, or fail to remit the correct amount collected. Machine learning can help identify unusual differences between sales information, VAT declarations, and other available data. This can assist tax authorities in identifying businesses that may require further examination. Machine learning also has limitations, the accuracy of a machine learning model depends heavily on the quality and completeness of the data used to train it. Where taxpayer records are incomplete, outdated, or

inaccurate, the results produced by the system may also be unreliable. There are also concerns about data privacy, cybersecurity, algorithmic bias, transparency, and the need for skilled personnel to develop and monitor machine learning systems. The OECD (2025) emphasised that tax administrations using AI need appropriate governance, security, transparency, and safeguards to protect taxpayer information.

Tax Revenue Compliance

Tax revenue compliance refers to the extent to which individuals, companies, and other taxpayers fulfil their responsibilities under tax laws. It involves registering with the relevant tax authority, providing correct information about taxable activities, filing tax returns when required, and paying the appropriate amount of tax within the prescribed period. In simple terms, a taxpayer is considered compliant when the taxpayer follows the rules of the tax system and pays the required taxes correctly and on time. Tax compliance is important because the effectiveness of a tax system depends not only on the tax laws that are in place but also on the willingness and ability of taxpayers to follow those laws. (Kirchler et al, 2008). Tax revenue compliance is important to government because taxes provide funds for public expenditure. When taxpayers comply with tax laws, government is more likely to receive the revenue needed to provide public services and finance development. However, when taxpayers evade or avoid taxes, government revenue may fall below its expected level. The Organisation for Economic Co-operation and Development (OECD, 2024) noted that effective compliance management is an important part of tax administration because it helps tax authorities identify and address risks that may reduce revenue collection. Therefore, improving tax compliance is an important part of strengthening domestic revenue mobilisation.

In Nigeria, tax revenue compliance involves different categories of taxes administered by federal, state, and local tax authorities. At the federal level, important taxes include Companies Income Tax (CIT) and Value Added Tax (VAT). Companies Income Tax is imposed on the taxable profits of companies, while Value Added Tax is imposed on the supply of taxable goods and services. Compliance with these taxes requires companies and businesses to properly register, maintain appropriate records, submit accurate tax returns, and pay the required tax within the period provided by law. Improving tax revenue compliance is particularly important because the government needs stronger domestic revenue sources to finance development. The Nigeria Revenue Service (Establishment) Act, 2025 provides a modern framework for the administration and collection of federal revenue and supports the use of technology in tax administration. The effective use of technology, including artificial intelligence and machine learning, can therefore support the Service in identifying taxpayers, monitoring transactions, managing compliance risks, and improving revenue collection.

Companies Income Tax

Companies Income Tax (CIT) is a tax imposed on the income or profits earned by companies operating in Nigeria. It is an important part of the Nigerian tax system and provides revenue to the government for financing public services and development activities. In simple terms, CIT requires companies that earn taxable profits to contribute part of those profits to the government in accordance with the relevant tax laws. The administration of Companies Income Tax is therefore an important part of the country's revenue system. The legal foundation for Companies Income Tax in Nigeria is mainly provided by the Companies Income Tax Act (CITA). The Act provides the rules for assessing companies to tax,

determining taxable profits, filing tax returns, and paying the appropriate tax. The Federal Inland Revenue Service (FIRS), now operating as the Nigeria Revenue Service (NRS) under the Nigeria Revenue Service (Establishment) Act, 2025, is responsible for administering federal taxes, including Companies Income Tax. The Nigeria Revenue Service (2025) provides the current legal framework for the administration and collection of federal tax revenue in Nigeria.

In Nigeria, the importance of Companies Income Tax is connected to the size and activities of the corporate sector. Companies operating in sectors such as manufacturing, banking, telecommunications, oil and gas, insurance, trade, and other services contribute to government revenue through corporate taxation. As the Nigerian economy becomes more diverse and businesses expand their activities, effective administration of CIT becomes increasingly important for domestic revenue mobilisation. CIT non-compliance can occur in different forms. Some companies may fail to register with the tax authority, while others may fail to file their tax returns. Other forms of non-compliance include under-reporting income, overstating allowable expenses, making inappropriate deductions, delaying tax payments, or deliberately providing incorrect information to reduce their tax liability. These practices can reduce government revenue and create an unfair situation where compliant companies bear a greater proportion of the tax burden. The problem of CIT compliance is particularly important in Nigeria because weaknesses in corporate tax administration can result in significant revenue losses. The World Bank (2022) reported that Nigeria has substantial tax compliance gaps and noted weaknesses in the filing and payment of corporate taxes. The report showed that the number of companies registered for Companies Income Tax was significantly higher than the number actively filing returns. This suggests that taxpayer registration alone does not necessarily result in actual compliance.

The administration of Companies Income Tax has also become more dependent on technology. Tax authorities increasingly use electronic registration, digital filing, electronic payment, taxpayer identification systems, and data analysis to improve corporate tax administration. Bird and Zolt (2008) observed that information technology can strengthen tax administration by improving the ability of tax authorities to collect, process, and use information about taxpayers. Digital systems can therefore make it easier for tax authorities to monitor companies and identify possible compliance problems. The introduction of artificial intelligence provides further opportunities for improving CIT administration and compliance. Artificial intelligence can analyse large volumes of corporate and financial information and identify patterns that may indicate possible tax risks. For example, AI can assist tax authorities in comparing information reported by companies with information obtained from other sources. It can also help identify companies whose reported income, expenses, or transactions appear unusual when compared with historical records or similar businesses. Companies Income Tax is a major component of Nigeria's tax system and represents an important source of government revenue. CIT requires companies to pay tax on their taxable profits and comply with various reporting and payment obligations. However, problems such as under-reporting, failure to file returns, inaccurate declarations, and delayed payments can reduce the amount of revenue collected. The use of artificial intelligence, particularly machine learning, provides an opportunity to improve CIT compliance by helping the Nigeria Revenue Service analyse taxpayer information, identify compliance risks, support tax audits, and detect possible tax evasion. Therefore, effective use of technology, together with appropriate legal, human, and institutional capacity, may contribute to improved Companies Income Tax compliance in Nigeria.

Value Added Tax

Value Added Tax (VAT) is a consumption tax imposed on the supply of goods and services. It is an important source of government revenue in Nigeria and is collected at different stages of the supply chain. Unlike income tax, which is generally imposed on income or profits, VAT is connected to the consumption of taxable goods and services. The final burden of VAT is normally borne by the consumer, while registered businesses collect the tax and remit it to the relevant tax authority. VAT was introduced in Nigeria in 1993 through the Value Added Tax Decree No. 102 of 1993, replacing the former sales tax system. Since its introduction, VAT has become an important component of Nigeria's domestic revenue system. The legal framework governing VAT has undergone changes over time, particularly through the Finance Acts and other tax reforms. The Nigeria Revenue Service (NRS), under the Nigeria Revenue Service (Establishment) Act, 2025, is responsible for administering federal taxes and collecting revenue accruing to the Federal Government.

To Bankole, (2025) the basic idea behind VAT is that tax is imposed on the value added to goods and services at different stages of production and distribution. A business generally charges VAT on taxable supplies made to customers and may be able to deduct eligible VAT paid on its business inputs. The difference between the VAT collected on taxable supplies and the allowable input VAT is generally the amount payable to the tax authority. This system allows VAT to be collected throughout the supply chain while placing the final economic burden on consumption. According to the OECD (2024), VAT is a broad-based consumption tax that is designed to be collected on the value added at each stage of the production and distribution process. VAT systems are widely used around the world because they can generate significant government revenue while spreading the tax collection process across different stages of economic activity. The OECD also noted that the effectiveness of VAT depends greatly on the ability of tax administrations to ensure that businesses correctly report transactions and remit the tax collected.

In Nigeria, VAT is imposed on taxable goods and services in accordance with the relevant tax laws. Businesses that fall within the scope of the VAT system are required to register where applicable, charge VAT on taxable supplies, issue appropriate invoices, keep relevant records, file VAT returns, and remit the appropriate amount of VAT to the tax authority. Compliance with these requirements is important because the government depends on VAT as one of its sources of domestic revenue. One of the major challenges of VAT administration is the large volume of transactions that occur every day. Businesses engage in thousands or millions of transactions involving different customers, suppliers, goods, and services. Monitoring all these transactions manually can be difficult for tax authorities. Technology has therefore become increasingly important in VAT administration. Digital registration, electronic filing, electronic payment, digital invoicing, and data matching can help tax authorities obtain more accurate information about taxable transactions. (Aina, 2024).

Bird and Zolt (2008) explained that information technology can improve tax administration by strengthening the ability of tax authorities to collect and process taxpayer information. Digital systems can reduce the time required to process tax returns and payments and can also make it easier to identify differences between information reported by taxpayers and information obtained from other sources. This can contribute to better compliance monitoring. The OECD (2025) noted that tax administrations are increasingly using artificial intelligence and machine learning for compliance risk management, fraud detection, and taxpayer services. However, it also stressed the importance of data security, privacy,

transparency, and human oversight. These issues are important for Nigeria because VAT administration involves large amounts of financial and business information. The effective use of AI therefore requires reliable databases, trained personnel, appropriate infrastructure, and strong safeguards for taxpayer information.

Theoretical Review

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Davis (1989) to explain why individuals accept or reject new information technologies. The theory is based on the idea that a person's decision to use a technology is mainly influenced by two factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which a person believes that using a particular technology will improve his or her performance, while perceived ease of use refers to the extent to which the person believes that using the technology will require little effort (Davis, 1989). According to the Technology Acceptance Model, when people believe that a technology is useful and easy to use, they are more likely to develop a positive attitude towards it and eventually use it. Davis (1989) argued that perceived usefulness and perceived ease of use are important determinants of users' acceptance of information technology. The model has been widely applied in different areas, including banking, healthcare, education, electronic commerce, and government digital services. The TAM was later extended by Venkatesh and Davis (2000), who developed the Technology Acceptance Model 2 (TAM2). The extended model incorporated additional factors that may influence perceived usefulness and technology acceptance. Venkatesh et al. (2003) further developed the Unified Theory of Acceptance and Use of Technology (UTAUT), which incorporated several factors associated with technology adoption. However, the original TAM remains widely used because of its simplicity and ability to explain people's acceptance of new technologies.

The Technology Acceptance Model provides a useful theoretical foundation for this study because artificial intelligence represents a technology that is increasingly being introduced into tax administration. In this study, artificial intelligence is the independent variable, while machine learning is its dimension. Machine learning involves the use of computer systems that learn from data and identify patterns that can be used to support predictions and decisions. For machine learning to contribute effectively to tax administration, tax officials and taxpayers must be willing to accept and use technology-based tax systems. The perceived usefulness of machine learning is particularly relevant to the Nigeria Revenue Service. If tax officials believe that machine learning can help them analyse large amounts of taxpayer information, identify tax risks, detect possible tax evasion, improve tax audits, and make better compliance decisions, they are more likely to accept and use the technology. Similarly, if taxpayers believe that technology makes tax registration, filing, payment, and communication with the tax authority easier, they may be more willing to use digital tax services.

The second major element of TAM, perceived ease of use, is also important. Machine learning and other AI-supported tax systems need to be easy for tax officials and taxpayers to understand and operate. Complicated systems may discourage users and reduce their effectiveness. Where taxpayers find electronic tax platforms difficult to use, they may continue to depend on traditional methods or fail to complete their tax obligations on time. Therefore, the ease with which technology can be used may influence its contribution to tax

administration. The connection between TAM and this study can also be explained through the measures of tax revenue compliance. The study measures tax revenue compliance using Companies Income Tax (CIT) and Value Added Tax (VAT). If machine learning is perceived as useful and easy to use by the Nigeria Revenue Service, it can support better monitoring of companies and businesses. For CIT, machine learning can assist in identifying companies whose reported income, expenses, or transactions may require further examination. For VAT, it can help identify unusual sales patterns, differences in reported transactions, or businesses that may have a higher risk of VAT non-compliance.

The application of TAM to this study therefore suggests that the successful use of machine learning in tax administration can improve the ability of the Nigeria Revenue Service to monitor taxpayers and identify compliance risks. Better monitoring may increase the likelihood that companies and businesses comply with their CIT and VAT obligations. In this sense, the acceptance and effective use of AI-supported systems can indirectly contribute to improved tax revenue compliance

Empirical Review

Bankole et al. (2025) examined the effect of artificial intelligence on tax administration in Lagos State, Nigeria. The study focused on the use of artificial intelligence technologies, including natural language processing, blockchain technology, predictive analytics, and machine learning, and their effects on the efficiency of tax administration. A quantitative research design was adopted, and primary data were collected through a structured questionnaire administered to 152 participants comprising personnel connected with the Lagos State Internal Revenue Service, tax consultants, and taxpayers. Regression analysis was used to examine the relationship between the AI technologies and tax administration efficiency. The findings showed that artificial intelligence technologies significantly improved tax administration. In particular, machine learning was found to contribute positively to tax administration, while the technologies also improved processing speed, accuracy of tax assessments, taxpayer compliance, and reduced administrative costs. The study recommended increased investment in AI infrastructure and training of tax officials. The study is closely related to the present research because both examine artificial intelligence and taxation in Nigeria, with machine learning forming part of the AI variables. However, the present study differs by focusing specifically on machine learning as the dimension of artificial intelligence and Companies Income Tax and Value Added Tax as measures of tax revenue compliance.

Aina (2024) examined the perceptions of Nigerian tax officers and stakeholders regarding the adoption of artificial intelligence in tax risk management. The study was motivated by the problems of tax evasion, tax avoidance, and non-compliance in Nigeria and considered the potential role of AI in improving tax compliance, reducing tax risks, and increasing revenue collection. A quantitative survey approach was used, involving tax officers, taxpayers, and tax consultants. The findings indicated that tax officers generally had positive perceptions of AI-driven tax risk management tools and believed that such technologies could improve audit accuracy and audit efficiency. The study also identified issues such as training, resources, privacy, and trust as factors that could affect the successful adoption of AI in tax administration. The study recommended greater investment in AI capabilities and appropriate capacity building for tax officials. The study is relevant to the present research because both investigate artificial intelligence within the Nigerian tax environment and consider its potential contribution to tax compliance. However, while Aina focused mainly on

stakeholders' perceptions and tax risk management, the present study goes further by examining the impact of machine learning on specific tax compliance measures, namely Companies Income Tax and Value Added Tax.

Olorunfemi and Odewole (2025) examined the relationship between artificial intelligence and Petroleum Profit Tax administration in Nigeria. The study considered the extent of AI adoption, the types of AI technologies being used, their perceived effectiveness and ease of use, and their influence on tax compliance and revenue collection. Data were collected from 98 respondents comprising tax agency officers, compliance officers, and AI professionals. Descriptive statistics and multiple regression analysis were employed to examine the relationship between AI adoption and petroleum profit tax administration. The findings showed that although the overall level of AI adoption was still limited, technologies such as machine learning, predictive analytics, and robotic process automation were becoming increasingly relevant to tax administration. The study further found that AI-supported data analytics and reporting systems had a statistically significant effect on tax compliance and petroleum profit tax revenue generation. The researchers identified inadequate technical skills, resistance to change, and high implementation costs as major challenges to AI adoption. The study recommended capacity building, improved infrastructure, better data governance, and regulatory reforms. The study is closely related to the present research because both examine AI, machine learning, tax compliance, and revenue generation in Nigeria. However, the present study differs by focusing on Companies Income Tax and Value Added Tax rather than Petroleum Profit Tax.

Methodology

The study adopted a qualitative research approach based on a narrative literature review. The study relied exclusively on secondary sources of data, including peer-reviewed journal articles, textbooks, empirical studies, reports of tax authorities, publications of relevant professional and international organisations, conference papers, and other credible scholarly materials. These sources were carefully reviewed and interpreted to examine the relationship between artificial intelligence and tax revenue compliance in the Nigeria Revenue Service, with particular attention to machine learning as the dimension of artificial intelligence and Companies Income Tax (CIT) and Value Added Tax (VAT) as measures of tax revenue compliance.

Conclusion

This study examined the impact of artificial intelligence on tax revenue compliance in the Nigeria Revenue Service, with particular attention to machine learning as the dimension of artificial intelligence and Companies Income Tax (CIT) and Value Added Tax (VAT) as measures of tax revenue compliance. Based on the literature and empirical studies reviewed, the study concludes that artificial intelligence has the potential to improve the effectiveness of tax administration and strengthen taxpayer compliance in Nigeria. The ability of AI systems to process large volumes of information, identify unusual patterns, assess taxpayer risks, and support decision-making can help the Nigeria Revenue Service improve the monitoring of taxpayers and reduce tax revenue leakages. Machine learning can contribute to improved Companies Income Tax compliance. Machine learning systems can analyse historical taxpayer information and identify companies whose reported income, expenses, transactions, or tax returns show unusual patterns. This can assist tax officials in identifying high-risk companies for further investigation and audit. By improving the ability of the tax authority to detect possible under-reporting and other forms of non-compliance, machine

learning can support better CIT administration and potentially increase the amount of revenue collected from companies. Similarly, Machine learning can support Value Added Tax compliance. The large volume of VAT transactions makes manual monitoring difficult, particularly where businesses operate across different locations and sectors. Machine learning can assist the Nigeria Revenue Service in analysing transaction data, identifying unusual sales patterns, detecting inconsistencies in VAT returns, and identifying businesses that may be at higher risk of VAT non-compliance. Therefore, the appropriate use of machine learning can strengthen VAT monitoring and contribute to improved revenue collection. Effective adoption of artificial intelligence, particularly machine learning, provides an important opportunity for the Nigeria Revenue Service to improve tax revenue compliance. However, the success of AI-based tax administration will depend on the availability of reliable taxpayer data, adequate technological infrastructure, skilled personnel, data protection, and appropriate human oversight. Artificial intelligence should therefore be regarded as a tool that supports tax officials rather than completely replacing human judgement.

Recommendations

The Service should develop and adopt machine learning systems capable of analysing corporate tax returns, financial information, payment records, and other relevant taxpayer data to identify companies that may present a high risk of non-compliance. Such systems can help the Service identify possible under-reporting of income, unusual deductions, and inconsistencies in tax declarations. The use of machine learning should also be supported with regular training of tax officials so that they can properly interpret the results produced by the technology and use them to support targeted tax audits. This will help improve CIT monitoring, reduce tax leakages, and encourage companies to comply with their tax obligations.

The Nigeria Revenue Service should apply machine learning to strengthen Value Added Tax compliance. The Service should improve the integration and analysis of VAT registration, sales, filing, payment, and transaction data to enable machine learning systems to identify unusual patterns and possible cases of VAT non-compliance. Businesses with significant differences between their reported transactions and VAT returns can be flagged for further review, while businesses that consistently demonstrate compliant behaviour can be subjected to less intensive monitoring. The Service should also improve digital VAT systems and provide adequate taxpayer education to make electronic VAT registration, filing, and payment easier. This combination of machine learning, effective monitoring, and taxpayer support can improve VAT compliance and increase the amount of VAT revenue collected by government.

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