International Journal of Economics, Business and Management Research

Vol. 9, No.05; 2025

ISSN: 2456-7760

Data Analytics and Efficiency of Companies Income Tax Revenue Generation in Nigeria

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doi.org/10.51505/IJEBMR.2025.9534 URL: https://doi.org/10.51505/IJEBMR.2025.9534

Received: May 02, 2025 Accepted: May 09, 2025 Online Published: May 31, 2025

Abstract

Globally, tax revenue plays a crucial role in government revenue generation. In Nigeria, the efficiency of company income tax has been hampered by various inefficiencies and inaccurate data analysis. Evidence suggests that data analytics has the potential to enhance the efficiency of company income tax revenue collection; however, the extent of its effectiveness remains unclear. This study, therefore, examined the impact of data analytics on the efficiency of company income tax revenue generation in Nigeria. A survey research design was adopted, utilizing a structured questionnaire for data collection. The population comprised approximately 2,000,000 individuals, including employees of the Federal Inland Revenue Service (FIRS), professional accountants, tax consultants, and other experts with knowledge of data analytics and tax-related matters in Nigeria. The Taro Yamane formula was used to determine a sample size of 400, selected using a purposive sampling technique. The validity and reliability of the research instrument were confirmed through the Kaiser-Meyer-Olkin (KMO) and Bartlett's tests, with Cronbach's alpha values ranging between 0.798 and 0.880. The study achieved a 96% response rate. Both descriptive and inferential statistical methods were used to analyze the data. Findings revealed that a significant proportion of respondents agreed that data analytics enhances the efficiency of company income tax revenue generation. Furthermore, regression analysis showed that data analytics had a joint significant effect on the efficiency of tax revenue generation from companies in Nigeria. The study recommends that policymakers and tax administrators leverage data analytics to improve tax revenue generation in the country.

Keywords: Company income tax, Data analytics, Digital data processing and reporting, Efficiency in tax revenue generation, and Taxpayers database and segmentation

Tax revenue generation is crucial for Nigeria's economic development, as it serves as a primary source of government funding for infrastructure, public services, and social welfare programs. Given the country's reliance on oil revenue, diversifying income sources through effective tax collection enhances fiscal sustainability and reduces vulnerability to global oil price fluctuations. Studies have shown that tax revenue generation plays a pivotal role to stabilize the source of income for the government in a sustainable manner (Adesanya et al., 2024; Ogunode & Akintoye, 2023). Efficient tax administration promotes economic stability, encourages investment, and fosters business growth by creating a predictable financial environment.

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Additionally, increased tax revenue enables the government to address pressing issues such as poverty alleviation, education, healthcare, and security, ultimately driving national development and improving citizens' quality of life.

Tax evasion and avoidance are pervasive in developing economies, where tax administration systems often lack the resources and regulatory strength to counteract such practices effectively (Appiah et al., 2021). Companies tend to evade taxes by underreporting incomes or entirely avoiding registration, which limits the overall tax revenue collected. Further, limited information exchange frameworks and weak institutional structures exacerbate tax avoidance and enable multinational corporations to shift profits out of developing countries, reducing taxable income bases and resulting in considerable revenue losses (Prichard, 2019). Administrative challenges also hinder effective tax revenue generation in African economies. Limited staffing, inadequate training, and a lack of technological tools often prevent tax authorities from efficiently processing tax returns, verifying compliance, or performing audits. This administrative deficit reduces enforcement capacity, enabling widespread tax evasion and non-compliance, especially among high-net-worth individuals and corporations who can exploit legal loopholes. Due to difficulties in enforcing direct taxes, many African nations rely heavily on indirect taxes, such as value-added tax (VAT) and customs duties. Although VAT is easier to collect, it often disproportionately impacts low-income households, potentially worsening income inequality (Ezenagu, 2021).

Technological barriers further complicate tax revenue generation. Many African tax administrations lack modern digital systems for tax filing, record-keeping, and compliance monitoring. This technological gap restricts authorities' ability to improve taxpayer registration, track incomes, and detect irregularities. Research on Rwanda's tax system highlights how limited access to technology among taxpayers and tax officials alike affects compliance and revenue performance (Mukama et al., 2019). Comparing Nigeria's GDP to tax revenue with that of selected developed economies highlights the disparity in tax revenue efficiency and the role of taxation in economic management in Nigeria. The low tax-to-GDP ratio reflects systemic inefficiencies, and a narrow tax base compared to developed economies like the United States, United Kingdom, Germany and France. For instance, World Bank (2022) documented that while the Nigeria GDP in 2022 was approximately $477 billion (World Bank, 2022), and tax revenue in the same year was around $38 billion with a tax-to-GDP ratio of 7.9%, United States (US) GDP in 2022 stood at approximately $25.5 trillion, and tax revenue approximately $4.9 trillion (federal, state, and local taxes combined) and the tax to GDP ratio as 19.3%.

In United Kingdom's GDP $3.7 trillion, tax revenue $1.1 trillion and tax to GDP 30%. Germany's GDP was approximately $4.2 trillion, tax revenue $1.5 trillion and tax to GDP around 36% whereas France's GDP $2.8 trillion, tax revenue approximately $1.4 trillion and tax to GDP about 50%. The disparity between Nigerian tax efficiency and these advanced economies' is the comprehensive well-structured tax laws, broad tax base, efficient enforcement and collection, strong compliance mechanism, higher revenue efficiency through advanced tax, economic diversification and technological integration. Okafor and Egiyi (2021) posited that one

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of the main barriers to making an economy more competitive is tax avoidance. It has a direct and detrimental impact on the business environment in the market for companies that lawfully declare and pay taxes. This raises their production costs, which in turn drives up the cost of their goods and services when compared to rivals who do not make these tax payments. Additionally, tax evasion reduces the amount of money available to improve the standard and caliber of public goods and services as well as the happiness of individuals because it results in comparatively low budget revenues. It creates an environment of uncertainty and denial of basic human rights, or the characteristics of a contemporary society - health, retirement, disability insurance (Olugbohungbe & Awodele, 2021; Sadiq & Akintoye, 2023).

The objective of the study primarily focuses on the relevance of data analytics in enhancing the efficiency of tax revenue generation in Nigeria a subject that cannot be overemphasized, given the pivotal role tax revenue plays in funding government budgets (Appah & Duoduo, 2023; Odukwu et al., 2023). Ogunmakin and Owoniya (2022) observed that the growing importance of tax revenue is immeasurable, and any effort aimed at improving its efficiency is both necessary and justified. Tax revenue remains a vital source of income for governments, particularly in developing countries like Nigeria. With the increasing demand for public services and infrastructure, there is a greater need to improve tax collection efficiency to ensure sustainable revenue generation (Aregbesola et al., 2020; Aremu & Siyanbola, 2021).

Despite extensive research on tax revenue generation, the implications and challenges of applying data analytics to the efficiency of company income tax in Nigeria have received limited attention and remain under-researched. This is particularly concerning in light of persistent issues such as growing tax non-compliance, inefficiencies in tax administration, and inadequate revenue generation. These issues highlight significant gaps in the literature. The challenge of achieving efficiency in tax revenue generation is a global concern, and numerous studies have explored solutions to the complexities of tax avoidance, evasion, and inefficiency—issues that are particularly pronounced in Nigeria.

Consequently, in an effort to contribute to the body of knowledge, this study examined the effect of data analytics on the efficiency of company income tax revenue generation in Nigeria. In response to the identified gaps and the need to extend the frontiers of existing literature, this study proposes the following hypothesis:

Hypothesis: Data analytics does not significantly affect the efficiency of company income tax revenue generation in Nigeria.

2.0 Literature Review and Theoretical Review

2.1 Conceptual Review

2.1.1 Efficiency in Companies Income Tax Revenue Generation

Efficiency of tax revenue generation is defined as how effective and competence the Nigerian government and the government authorized tax agent collect taxes from taxpayers in a timely

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and efficient manner (Khalifaturofi'ah, 2021). According to Monica et al. (2017), efficient tax revenue generation is also the ability to maximize tax revenue collection in an efficient manner, minimizing tax administration and ensure tax compliance, compliance cost efficient, ensuring fairness and improved tax compliance rate. Maisiba and Atambo (2016) noted that tax efficiency requires widening tax net, ensure higher tax managerial competence, tax authorities enforcing tax laws, encourage tax compliance among taxpayers (private and corporate taxpayers.

The efficiency of Companies Income Tax (CIT) revenue generation reflects the government's ability to maximize CIT revenue relative to resources expended, considering timeliness, cost-effectiveness, and accuracy in tax collection (Agbeyegbe et al., 2006). CIT efficiency is essential for economic stability and supports government spending on infrastructure, social programs, and other development initiatives (Saez & Zucman, 2019). Efficient CIT revenue generation implies optimal tax administration and reduced tax leakages, thereby improving compliance rates among companies and enhancing revenue for the government (Tanzi & Zee, 2001).

Efficiency of company income tax is defined as the extent the government and the tax authorities saddled with the responsibility in tax revenue collection are maximizing every opportunity available to them to increase tax revenue from companies in Nigeria (Alade, 2018). Efficiency of company income tax revenue generation entails the effective and timely assessment of corporate taxpayers, accurate computation and remittances using the best practices at a cost-effective manner (Ajuonu, 2022). According to Ajala and Adegbie (2020), while efficiency of company income tax revenue generation entails maximization tax revenue as well as minimizing cost implications in tax collection and in this respect, efficiency in company income tax revenue requires managerial competence from tax administrators as well as tax collectors, considering the tax revenue yield, administrative costs implications, extent of tax compliance and motivations of the corporate taxpayers, ability to discover and fill existing tax gaps and making all tax reforms aimed at simplifying tax laws, accountability and transparency on the part of the government and the tax authority (Ajape et al., 2017). The volume of tax avoidance, tax evasion and tax revenue leakages largely depend on the efficiency being displayed by the tax authority and by extension the amount of tax revenue accruable to the government (Khadijat & Taophic, 2018; John & Dickson, 2020).

2.1.2 Data Analytics

Amzuica et al. (2022) described data analytics as data analysis procedures, data interpretation techniques, methods for organizing data collection to facilitate, improve, or increase the accuracy of data analysis, and all the tools and output of (mathematical) statistics that are applicable to data analysis. Anisimova (2021) observed that while business intelligence encompasses data analysis that primarily focuses on business information and extensively depends on aggregation, data mining is a specific data analytics technique that focuses on statistical modelling and knowledge discovery for predictive rather than just descriptive reasons. Data analytics provides the resources firms need to be successful, whether a leader trying to improve the tax operations of a company, or an individual contributor hoping to increase accuracy and efficiency and

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change the way companies handle tax data analytics by beginning firm's journey with data analytics tools right now (Falana et al., 2023; Feng, 2021).

Adeusi et al. (2020) opined that whereas one tax that is gathered from businesses is the corporate income tax rate, the extent tax collector's express transparency is significant in enhancing tax revenue generation and its amount of tax revenue is determined by the net income that businesses make when conducting business, usually over the course of a calendar year. The highest rate of corporate income is the benchmark that we employ. The Nigerian government receives a significant portion of its funding from the corporate tax rate. In Nigeria, the corporate tax rate is thirty percent. From 2006 to 2024, Nigeria's corporate tax rate was 30.00 percent on average; it peaked in 2007 at 30.00 percent and fell to a record low of 30.00 percent in that same year (Adefulu et al., 2024). The National Bureau of Statistics reported that the total tax revenue generated from company income tax in the year 2024 stood at N984.64 billion, and this represented a growth rate of 12.87 percent on the first quarter basis from N1.13 trillion in 4th quarter 2023 (Ajuonu & Anizoba, 2024).

According to Akinadewo (2021), the local payments received were a total of N386.49 billion, while tax revenue generated from the foreign company income tax (CIT) contributed a total of N598.13 trillion. Meanwhile, Appa and Duoduo (2023) noted that among the activities that reported the highest growth rate on a quarter-on-quarter basis were those of households as employers, undifferentiated goals and services producing activities for own use, and administrative and support services activities at 33.18 percent and -70.24 percent respectively. Through the Federal Inland Revenue Service (FIRS), the Federal Government oversees the regulatory framework for Companies' Income Tax (CIT) in Nigeria. Based on the audited financial records of the previous year, CIT is imposed on the profits of Nigerian businesses, both resident and non-resident, from sources both inside and outside of Nigeria. Within six months of the end of their accounting year, companies are required to file tax returns and pay CIT. Interest and penalties are incurred for noncompliance (Appah & Duoduo, 2023).

2.1.3 Data Integration Capability Analytics

While taxation is not a novel problem, data is rapidly become one of the primary facilitators for state tax departments the future and with the VAT' and other tax categories' entrance into the area, tax authorities throughout the world are getting closer to e-auditing and real-time data extraction, as well as new legal framework embracing data integration capability analytics (Gupta et al., 2022; Haleen et al., 2020). Data is quickly becoming one of the key facilitators for future state tax departments, even though taxes are not a new problem. Hamadneh et al. (2021) posited that there has seldom been more importance for tax departments to be data literate to meet the challenges ahead, especially with the implementation of tax revenue generation into the region, tax authorities around the world getting closer to real-time data extraction and e-auditing, and fresh legislative demands coming thick and fast. Technology relies heavily on data, and regrettably, poor data quality frequently causes delays in tax technology solutions. The top priority for tax technology project enhancements was tax data sensitization. Artificial intelligence (AI), data, and analytics are driving a significant transformation that is changing how businesses

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make decisions that include a lot of human interaction (Hanrahan, 2021). Global budget deficits are making new revenue streams necessary, and governments are turning to corporations to help close the gap.

2.1.4 Taxpayers Behavior Prediction Analytics

Cappa (2022) argued that tax administrations can enhance satisfaction initiatives and provide more robust and efficient compliance risk remedies with a better grasp of taxpayer behavior and attitudes toward taxes. Although there are many elements that affect behavior, this study focuses on those that the tax agency can evaluate and apply in a real-world situation. Even when aimed at particular tax risks, traditional tax administration methods (such as audits) are a costly means to try to enhance compliance. Changing taxpayers' behavior is significant in the extent of their tax compliance and this could be a less costly but equally effective solution when properly understood and managed. Behavior is influenced by whether or not an outcome is thought to be fair. According to experiments, people would rather not receive any reward than obtain one that feels unfair to them; in other words, they are turning down a situation that would improve their lot in life (Ajah et al., 2024). Fairness is frequently associated with legitimacy and trust since these factors will determine how fair an outcome is viewed. Three forms of fairness in taxation are discussed in Budak and Yilmaz (2022) that a distributive fairness (the understanding and belief that the government spends tax money wisely); procedural fairness (the belief that the tax administration follows fair procedures when interacting with taxpayers); and retributive fairness, (there is the belief that the tax administration is fair in imposing penalties when the rules are fair and simplified for easy understanding).

2.1.5 Taxpayers Database and Segmentation Analytics

In addition, a quickly expanding taxpayers' database may become too much to handle without the right management frameworks and a rapid data expansion necessitating an effective database are impacted by growing efforts to include all taxpayers in the tax system (Ionescu, 2019; Aguguom et al., 2023). Good taxpayer databases are therefore very important for planning growth and development. However, it goes beyond the statistics alone. It also serves as the foundation for designing fiscal and tax policies that are appropriately targeted. Effective taxpayer database mining consistently yields significant insights required for improved compliance issue management and government policy creation that aligns with the actual income prospects of subnational governments. As a result, finding trends in tax compliance at the individual, corporate, and industry levels is made simpler for tax administrations and policymakers (Jiapang et al., 2019; Janvrin & Weidenmier, 2017). The effective formulation and execution of fiscal policies are supported by such pattern discovery. Once more, taxpayers' perception is shifting more and more toward that of consumers. This worldwide change in taxpayer perception suggests that tax officers will be motivated to provide significant customer pleasure in addition to collecting the proper taxes (Khalifaturofi'ah, 2021; Martinez et al., 2023).

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2.1.6 Accuracy of Tax Revenue Projections

Consistent with the foregoing, Najib and Badamasi (2021) stressed that if there is a chance for increased revenue, computer technology and political resolve to enforce tax collection must be united. Technology alone won't increase revenue unless it is accompanied by enforcement measures. A master file system can be developed with the aid of computer technology. Every taxpayer is given a unique number by the system. The assessment and collection of direct taxes, including property taxes, corporate income taxes, and personal income taxes, are directly aided by this special number (Uhuaba & Aguguom, 2019). The master file may thus develop into a crucial auditing tool. The taxpayer identification number may be a potentially effective tool for tax enforcement if it is linked to other forms of identification, such as passports or driver's licenses. The location and, in reality, the availability of data will determine the best revenue projection approach. It is evident that the most widely used forecasting method, which uses an aggregate tax buoyancy, is now likely to produce skewed findings. This bias frequently, but not always, results in an inaccurate estimation of revenue.

2.1.7 Digital Data Processing and Reporting.

Digital data processing and reporting using data analytics, artificial intelligence and cloud accounting as well as machine learning are new disruptive technologies that are useful and significant in enhancing data processes quality, accuracy and timely reporting decision-making purposes (Ajape et al., 2017; Alm, 2021; Cui, 2019). The advent of digitized tax system has brought with it timely tax computations, filing, tax returns and remittances using online platforms as taxpayers may have to transfer their digital data from their systems to the tax administration's systems, which could result in further obligations if the current tax administration process is not altered (Chen et al., 2016; Di Gioacchino & Fichera, 2020). This increases the likelihood of mistakes and may make it more challenging for tax authorities to collect the appropriate amount of taxes. Over time, this would result in more expenses, decreased production, and possibly more chances for the dishonest few to avoid paying taxes. On the other hand, tax administration is expected to result in greatly less burdens and help guarantee that the correct amount of tax is paid if it is safely incorporated into the instruments and procedures of the digitalizing economy, even across borders (Ezekiel, 2018; Felix & Cyrus, 2020).

2.2 Theoretical Framework

2.2.1 Benefit received Theory

The benefit-received theory, proposed by Hoffman in 1961, is predicated on the idea that there ought to be a positive exchange relationship between the government's provision of services and the benefits that taxpayers can derive (Olschewski et al., 2018). According to Owens and Hodzic (2022) and Peng (2015), the State is a supplier of certain products and services to the general public, however its share of the cost of these supplies may not always match the benefits to the public. Framing tax efficiency through the lens of benefits received provide a pathway for improving taxpayer relations and engagement. The benefit received theory was considered the underpinning theory for tax revenue generation in this study because understanding that tax

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payments are directly linked to the benefits received may encourage greater compliance among taxpayers. When data analytics reveal the positive impact of tax revenue on public goods and services, it can motivate taxpayers to comply with tax obligations, thus enhancing overall tax efficiency. In this regard, tax revenue generation is obedience to civil duties and for the benefit of the taxpayers, and the entire stakeholders who will be directly or indirectly affected by the extent of tax revenue generation and the economic fortunes or misfortunes of the taxpayers. Also, by demonstrating how tax revenues are utilized for public benefit, authorities can create a more conducive environment for voluntary compliance. Finally, understanding that tax payments are directly linked to the benefits received may encourage greater compliance among taxpayers. When data analytics reveal the positive impact of tax revenue on public goods and services, it can motivate taxpayers to comply with tax obligations, thus enhancing overall tax efficiency.

2.2.2 Theory of Disruptive Innovation

The Theory of Disruptive Innovation is founded on the principle that technological advancements can reshape markets by creating new consumer demand while challenging established incumbents. According to Christensen (1997), disruptive innovations are generally lower-cost and simpler solutions that initially serve niche markets or underserved consumers. Over time, they improve and often displace established competitors. Supporters have credited the distinctiveness of innovation as natural and expected since there is no stagnation real line and man are insatiably seeking new way of doing things (Yokoyama, 2023; Abugu, 2015). In contrast, the applicability of disruptive innovation has been questioned in highly regulated sectors, where the barriers to entry are substantial, such as in public taxation systems (Ansari, Garud, & Kumaraswamy, 2016). The Theory of Disruptive Innovation is relevant in highlighting how data-driven technologies can challenge traditional revenue collection methods. Taxation authorities historically rely on outdated, less integrated systems, which can hinder efficiency. The introduction of Data Analytics tools like Taxpayers Behavior Prediction Analytics and Digital Data Processing could disrupt conventional systems by enhancing accuracy, streamlining processes, and potentially reaching underserved or non-compliant taxpayer segments. This alignment with disruptive innovation theory suggests a potential paradigm shift in revenue generation efficiency within Nigeria, a shift critical for modernizing tax systems in a digital age

2.3 Empirical Review

Empirical studies demonstrate that data analytics significantly improves tax revenue efficiency by enhancing predictive analytics and accuracy in revenue forecasting (OECD, 2015). For instance, countries that employ data analytics in tax administration benefit from reduced audit costs and improved revenue through better identification of non-compliant taxpayers (Keen & Slemrod, 2017). Data integration capabilities, such as centralizing taxpayer information, allow tax authorities to quickly detect discrepancies and accurately project revenue, reducing collection costs and increasing CIT efficiency (McKinley et al., 2016). Nigeria's CIT efficiency is impeded by a lack of adequate technological infrastructure and skilled personnel, as well as policy inconsistencies (Fagbemi et al., 2010). These inefficiencies result in low revenue generation, with potential revenue losses due to tax evasion and avoidance by companies (Asada, 2005). Enhancing Nigeria’s data analytics capability could streamline tax administration processes,

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allowing for better segmentation and understanding of taxpayer behavior, leading to more efficient CIT revenue generation.

Xinwu et al. (2024) researched the utilization of big data technology to worldwide tax administration is becoming increasingly common. China has been employing big data systems and progressively sophisticated technologies for tax governance in recent years. The study investigated the association between big data tax administration and business bank credit in developing economies by gathering data via secondary data and web scraping on the initial deployment times of big data tax administration in different provinces of China. Regression analysis and the findings indicated that tax administration using big data had a significant effect and improved a company's capacity to get bank loans. Mechanism testing show that the administration of big data taxes enhances the standard of company information transparency, making bank credit loans more accessible. The study discovered that the company finance climate was improved by big data tax administration, increasing resource efficiency.

Gomba et al. (2024) investigated how digital technologies affect Nigeria's tax collection. The research design strategy of mixed methods was employed. With a sample size of 20, the study's population consisted of the management personnel of Federal Inland Revenue Services, Abuja. Primary and secondary data from the Federal Inland Revenue Service were used in the investigation. Descriptive statistics, such as frequencies, percentages, means, standard deviations, and minimum and maximum values, were used to analyze the data. The ideas presented were subjected to statistical testing using the Pearson Product Moment Correlation Coefficient and multiple linear regression techniques were applied for analysis. The study demonstrated a strong correlation between digital technology and businesses' capital gains and income taxes. According to the study's findings, digital technologies significantly affect Nigeria's ability to generate money. Using data gathered from tax professionals in Lagos State, Nigeria, via a Google form, Ashafoke and Obaretin (2023) explored the impact of implementing a digital tax on digital channels on revenue production in Nigeria. Utilizing an exploratory study methodology, data is statistically evaluated using the Structural Equation Model (SEM) via the STATA program. 200 respondents at FIRS and a subset of BIG4 auditing firms in Nigeria were given questionnaires as part of the research. The study's conclusions demonstrate a weak but positive and significant correlation between content providers and revenue generation, as well as between revenue generation and tax ecommerce. However, there is a strong and positive correlation between revenue production and digital advertisers. Using an exploratory research approach and certain World Bank statistics,

Ogunode and Akintoye (2023) investigated financial technologies and financial inclusion in emerging economies: insights from Nigeria. According to the study, while the use of financial technologies has aided efforts to increase financial inclusion in Nigeria, issues with system interoperability, gender sensitivities resulting from sociocultural variables, concerns about data privacy violations, and the over-servicing of urban areas by financial technology firms at the expense of rural areas still exist. The report suggested that regulatory bodies provide explicit policy guidelines that address issues of gender sensitivity, data breaches, and expanding fintech

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services to rural areas toto have a greater impact on the push for financial inclusion. In light of the review. Umar et al. (2023) looked at the impact of information and communication technology (ICT) on revenue generation in the Gombe State Internal Revenue Service. In order to determine if the use of ICT improved the effectiveness of revenue collection, The Technology Acceptance Model (TAM) was the theory used for this investigation. Survey research was the method employed, and data was collected from a sample of respondents. The 98 Gombe State Internal Revenue Service employees that made up the study's sample size were the study's total population. To conduct the questionnaire, a basic random sampling method was used. Using the Statistical Package for Social Sciences (SPSS), the average mean score was used to analyze the data, and the Analysis of Variance (ANOVA) method was used to evaluate the hypotheses. The study's conclusions showed a a significant difference in mean between an increase in revenue collection and the availability of ICT infrastructure.

Similarly, Haleen et al. (2020) studied the application of big data in the efficiency of tax management during the Covid-19 pandemic. The study was conducted using online survey research as primary data were collected through questionnaires administered through an online survey where respondents responded to the question in relation to the relevance of big data in the efficiency of tax revenue generation and tax administration. The regression of the responses from the respondents showed that big data applications had a significant effect on the efficiency of tax revenue and tax administration.

Ajala and Adegbie (2020) looked into how information technology affected Nigeria's ability to assess taxes effectively. The research design used in the study was a survey. There were 2,857 managerial and administrative employees from six particular international corporations working in Lagos State, in addition to the Lagos State Internal Revenue Service and the Federal Inland Revenue Services' headquarters. Using the stratified sampling technique, the sample size of 641 was calculated using Krejcie and Morgan's formula. The reliability coefficients for Cronbach's alpha varied from 0.88 to 0.96. Information technology had a statistically significant positive impact on efficient tax assessment, according to data analysis using descriptive and inferential statistics. Adeyemo (2020) looked into how digital companies affected Nigeria's tax revenue as well as the challenges tax officials had in locating and bringing these companies under the tax code. The research methodology of survey was used. Ordinary least squares were used to examine the data. The study found that online businesses in Nigeria had little to insignificant effect on the generation of tax income. This hasn't had much of an effect on tax evasion and government income loss in a digital economy. According to the report, Nigeria should keep collaborating with international authorities, especially the OECD and the UN, on BEPS regulations and new legislation pertaining to taxes on the digital economy.

Methodology

The study adopted survey research design. The population consisted of 11,181 Federal Inland Revenue Service (FIRS) employees as at October 2024. Sample size of 424 was determined using Taro Yamane’s formular. Purposive sampling technique was used to select the respondents with experience in data analytics. Data were collected using structured and validated

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questionnaire. Cronbach's alpha reliability coefficient for the constructs ranged from 0.80 to 0.88. Response rate of 94.34% was achieved. Data were analyzed using descriptive and inferential (multiple regression) statistics at 5% level of significance.

Dependent variable was efficiency of company income tax revenue generation, while the independent variable of the study was data analytics surrogated with data integration capability analytics (DICA), taxpayers' behavior prediction analytics (TBPA), taxpayers database and segmentation analytics (TDSA), accuracy of tax revenue projections (ATRP), and digital data processing and reporting (DDPR).

Sample size determination was conducted using: Taro Yamane's (1967) formula which was adopted to arrive at the sample size that has been proposed for this study.

n=N/(1+n〖(α)〗^2)

Where:
n = sample size
N = Population size
α = level of significance

n=2,000,000/(1+2,000,000〖(0.05)〗^2)

n=2,000,000/(1+5,000)

n=399.92 ≃400 Respondents.

Model Specification

Functional Relationship

ECIT = *f* (DICA, TBPA, TDSA, ATRP, DDPR) ---------- (1)

Model

$ECIT_i = \alpha_0 + \beta_1 DICA_i + \beta_2 TBPA_i + \beta_3 TDSA_i + \beta_4 ATRP_i + \beta_5 DDPR_i + \mu_i$..... (2)

Where: ECIT = Efficiency of company income tax revenue generation, DICA = Data Integration Capability Analytics, TBPA = Taxpayers Behaviour Prediction Analytics, TDSA = Taxpayers Database and Segmentation Analytics, ATRP = Accuracy of Tax Revenue Projections, and DDPR = Digital Data Processing and Reporting.

4. Data Analysis, Results and Discussions

4.1 Descriptive Statistics

Respondent responses to Questions on Efficiency of Company Income Tax

Table 4.1 presents respondents' perceptions on the role of data integration, predictive analytics, and digital processes in enhancing the efficiency of Company Income Tax (CIT) revenue generation in Nigeria. The table highlights the level of agreement on key technological advancements, such as digital data processing, data analytics tools, taxpayers' behaviour

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prediction, and database documentation, in driving tax efficiency. The structured questionnaire used was designed in terms of Six Likert-scale where 5 = (Strongly Agree), 4 = (Agree), 3 = (Undecided), 2 = (Disagree) and 1 = (Strongly Disagree).

Table 4.1: Respondents' responses to Questions on Efficiency of Company Income Tax

	SD		D		U		A		SA		Mean/SD	
	C	%	C	%	C	%	C	%	C	%	Mean	SD
Data integration capability analytics can enhance efficiency of company income tax revenue generation in Nigeria	0	0%	0	0%	9	2%	162	41%	229	57%	4.55	0.54
Adequate taxpayers behaviour prediction has the ability to improve the efficiency of company income tax generation in Nigeria	0	0%	0	0%	9	2%	132	33%	259	65%	4.62	0.53
Sufficient documented taxpayers database and segregation can greatly affect the efficiency of company income tax generation in Nigeria	0	0%	0	0%	11	3%	132	33%	257	64%	4.62	0.54
Accuracy of tax revenue projection help improve the efficiency of company income tax revenue generation in Nigeria.	0	0%	0	0%	11	3%	134	34%	255	64%	4.61	0.54
Digital data process and reporting improve the efficiency of company income revenue generation in	0	0%	0	0%	11	3%	128	32%	261	65%	4.63	0.54
Data analytical tools in place could affect efficiency of company income tax revenue generation	0	0%	0	0%	8	2%	133	33%	259	65%	4.63	0.52

Source: Researcher's survey, 2025

The responses from Table 4.1 indicate strong agreement among respondents regarding the role of data integration, predictive analytics, and digital processes in enhancing the efficiency of company income tax (CIT) revenue generation in Nigeria. The highest level of agreement was observed for the statements on digital data processing (Mean = 4.63, SD = 0.54) and the effect of data analytical tools (Mean = 4.63, SD = 0.52), where 65% of respondents strongly agreed, and

33% agreed. Similarly, the importance of taxpayers' behaviour prediction (Mean = 4.62, SD = 0.53) and database documentation (Mean = 4.62, SD = 0.54) also received overwhelming support, with 65% and 64% of respondents strongly agreeing, respectively. The lowest agreement was recorded for data integration capability (Mean = 4.55, SD = 0.54), though still reflecting a strong consensus.

From a statistical standpoint, the mean values, which range between 4.55 and 4.63, indicate a highly positive perception across all factors, with minimal deviation as reflected in the low standard deviations (ranging from 0.52 to 0.54). These results suggest consistency in respondents' views, reinforcing the argument that technological advancements and data analytics significantly impact CIT efficiency.

4.2 Regression Analysis

Table 4.2: Summary of Multiple Regression between Data Analytics and Efficiency of Company Income Tax Revenue Generation

	Model 1	**B**	**SE**	**t-stat**	**Sig.**	**ANOVA (Sig.)**	**R**	**Adjusted R^2**	**F (5,355)**
400	(Constant)	-.131	.125	-1.051	.294	0.000	.562[a]	.307	36.334
	DICA	.180	.072	2.491	.013				
	TBPA	.245	.071	3.439	.001				
	TDSA	.236	.058	4.044	.000				
	ATRP	.298	.074	4.026	.000				
	DDPR	.033	.071	.469	.639				
		Predictors: (Constant), DICA, TBPA, TDSA, ATRP, DDPR							
		Dependent Variable: ECIT							

Source: *Author's computation, 2025 underlying data from Field Survey.* ***Note:*** *ECIT = Efficiency of company income tax revenue generation, DICA = Data Integration Capability Analytics, TBPA = Taxpayers Behaviour Prediction Analytics, TDSA = Taxpayers Database and Segmentation Analytics, ATRP = Accuracy of Tax Revenue Projections and DDPR = Digital Data Processing and Reporting. A significance threshold of 5% has been chosen.*

From the results in Table 4.2, the coefficient for Data Integration Capability Analytics (DICA) ($\beta = 0.180$, $p = 0.013$) is positive and statistically significant, indicating that enhanced data integration improves company income tax revenue efficiency. This suggests that effective data integration enables better monitoring of corporate tax compliance, minimizes revenue leakages,

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and enhances the accuracy of tax reporting. The significance of this factor highlights the importance of a well-integrated tax database in improving revenue generation.

Taxpayers Behaviour Prediction Analytics (TBPA) (β = 0.245, p = 0.001) has a strong positive and statistically significant effect on company income tax revenue efficiency. This suggests that predictive analytics enhances the ability of tax authorities to forecast corporate tax compliance, identify potential revenue risks, and address tax evasion proactively. By leveraging predictive insights, tax agencies can implement strategic interventions to improve corporate tax collection.

Taxpayers Database and Segmentation Analytics (TDSA) (β = 0.236, p = 0.000) is positive and statistically significant, suggesting that efficient segmentation of corporate taxpayers improves revenue generation. This implies that categorizing businesses based on industry, size, or compliance history enables tax authorities to apply targeted enforcement strategies, optimize audit processes, and enhance tax collection efficiency.

Accuracy of Tax Revenue Projections (ATRP) (β = 0.298, p = 0.000) has the highest positive and statistically significant effect on company income tax revenue efficiency. This finding suggests that accurate tax revenue projections play a crucial role in revenue optimization by allowing policymakers to set realistic revenue targets, allocate resources effectively, and minimize revenue shortfalls. Reliable projections also enhance strategic planning and tax administration efficiency.

Digital Data Processing and Reporting (DDPR) (β = 0.033, p = 0.639) is not statistically significant, suggesting that digital data processing alone does not have a significant impact on company income tax revenue efficiency. This implies that while digital tax administration systems may improve record-keeping, their effectiveness in revenue generation depends on complementary enforcement mechanisms and compliance strategies.

The predictive multiple regression models can be expressed as follows:

ECIT = -0.131 + 0.180DICA + 0.245TBPA + 0.236TDSA + 0.298ATRP + 0.033DDPR … (Equation 1 – Predictive Model)

Since only **DDPR** was insignificant, the prescriptive model can be expressed as:

ECIT = -0.131 + 0.180DICA + 0.245TBPA + 0.236TDSA + 0.298ATRP … (Equation 2 – Prescriptive Model)

This model suggests that when holding all variables constant, the baseline level of tax revenue efficiency is -0.131. The results indicate that accuracy of tax revenue projections and taxpayer behaviour prediction, Taxpayers Database and Segmentation Analytics, Taxpayers Behaviour Prediction Analytics, Data Integration Capability Analytics are the most critical components in improving tax revenue efficiency.

The model demonstrates a moderately strong relationship between data analytics and CIT revenue efficiency, with an R value of 0.562. The adjusted R^2 value of 0.307 indicates that

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30.7% of the variation in company income tax revenue efficiency is explained by data analytics components included in the model, while the remaining 69.3% were other factors explaining changes in the efficiency of capital income tax revenue generation in Nigeria but were not capture in the model. The model is statistically significant (F = 36.334, p = 0.000), suggesting that data analytics plays a crucial role in optimizing company income tax revenue. At 5% level of significance, the F-statistic 36.334 with degree of freedom of 5, 355 and probability of F-Statistics of 0.000 which is lower than the 0.05 level of significance, this indicated that the overall model is significant, meaning the predictors collectively influence tax revenue efficiency. This result implies that the deployment of data analytics tools particularly taxpayer segmentation, predictive analytics, and revenue forecasting can significantly enhance company income tax revenue generation in Nigeria. Consequently, the null hypothesis stating that data analytics does not significantly affect tax revenue efficiency will not be accepted, rather the alternative accepted and we conclude that data analytics does significantly affect tax revenue efficiency. Hence, research question is answered and objective one achieved.

Discussion of Findings

The findings indicate that data analytics contributes significantly to company income tax revenue efficiency, with certain components having a stronger impact than others. The significant positive effects of ATRP, TBPA, TDSA, and DICA highlight the role of revenue forecasting, predictive analytics, and taxpayer segmentation in optimizing tax collection. These results suggest that integrating data-driven decision-making into tax administration can help tax authorities improve revenue mobilization, detect tax evasion, and enhance compliance among corporate taxpayers. However, the insignificance of DDPR suggests that digital data processing alone is insufficient in enhancing revenue generation, emphasizing the need for complementary compliance enforcement measures. Overall, the study reinforces the critical role of advanced data analytics in modern tax administration. The result is in tandem with some other past empirical studies that have found similar and documented significant effects like the study by Xinwu et al. (2024) who researched the utilization of big data technology to worldwide tax administration is becoming increasingly common. China has been employing big data systems and progressively sophisticated technologies for tax governance in recent years.

Regression analysis and the findings indicated that tax administration using big data had a significant effect and improved a company's capacity to get bank loans. Mechanism testing show that the administration of big data taxes enhances the standard of company information transparency, making bank credit loans more accessible. Also, similar results include (Ashafoke & Obaretin, 2023; Hamisu & Akintoye, 2023; Ogunnode & Akintoye, 2023; Oladele et al., 2022; Pohan et al., 2022; Karuru, 2022; Uyar et al., 2021; Okeke, 2018; Adeyemo, 2020). Also, Gomba et al. (2024) investigated how digital technologies affect Nigeria's tax collection and the finding of the study demonstrated a strong correlation between digital technology and businesses' capital gains and income taxes. According to the study's findings, digital technologies significantly affect Nigeria's ability to generate money

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On the contrary, some other prior studies did not find similar results, rather have documented inverse results of insignificant effects (Ogiden, 2021; Audu & Ishola, 2021; Oreku, 2021; Adeusi et al., 2020; Suna et al., 2019). For example, Udofot and Etim (2020) examined the impact of the economy's digitalization on Nigeria's revenue tax compliance. An *ex-post facto* research design was adopted, using data from the Central Bank of Nigeria and published Tax authorities for the period. The results indicated insignificant effect, suggesting that the lack of contemporary technology to prevent tax evasion and the absence of a legislative framework to stop non-compliance, particularly about NRCs, had a detrimental impact on revenue tax compliance in Nigeria as a result of the digitalization of the economy.

5. Conclusion and Recommendations

The study examined the effect of data analytics on efficiency in company income tax revenue generation in Nigeria. The descriptive statistics showed that the majority of respondents in strongly agreed and indicated strong agreement among respondents regarding the role of data integration, predictive analytics, and digital processes in enhancing the efficiency of company income tax (CIT) revenue generation in Nigeria. The highest level of agreement was observed for the statements on digital data processing (Mean = 4.63, SD = 0.54) and the effect of data analytical tools (Mean = 4.63, SD = 0.52), where 65% of respondents strongly agreed, and 33% agreed. In addition, the regression analysis found that. The regression revealed that all the variable of Data Integration Capability Analytics (DICA), Taxpayers Behaviour Prediction Analytics (TBPA), Taxpayers Database and Segmentation Analytics (TDSA), Accuracy of Tax Revenue Projections exhibited positive and significant effects, but DDPR exerted positive but insignificant effect. However, the joint statistics using the entire explanatory variables revealed significant effect, hence the study resolved that data analytics had a significant effect on efficiency in company income tax revenue generation in Nigeria.

Recommendations

At the tax administration level, the implications extent to enhanced capacity and deepening efficiency in tax computations and ability of the tax administration competence enhanced in better administration that yields desired results. The significance of taxpayer behaviour prediction analytics as found in the study has huge implications. It suggests that the understanding and predictive ability of taxpayers' antics and behavioural patter is likely to assist the tax administrators the model and how to deal with it. The predictive analytical tool gives the tax administrator edge and increase the tax administrator readiness to deal with issues and handle the attitude and behaviour of the taxpayers aimed at increasing tax revenue and payment from the taxpayers on the long run. Furthermore, the study reported that digital data processing and reporting exerted an insignificant effect on efficiency in company income tax revenue generation, a suggesting of wrong computation and false tax data that had impacted on the extent of tax revenue from company income tax revenue generation in Nigeria. The recommends that the government and its tax agencies should compile detailed database of all registered companies in Nigeria, besides accurate tax computation of tax liability should handle by an unbiased and competent personnel of government tax agencies. Also, the study recommends that policymakers should rejig the existing system to tax reforms to meet with realities specifically in computation

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and remittance of petroleum profit-tax in Nigeria. The current on-shore and downstream activities tax rates and computation appear obsolete and do not meet current international best practices in petroleum profit tax revenue generation and worrisome as Nigeria rely on consultants and middle-men as tax agents in this regards have the implication of possible of tax leakages and partial remittances.

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