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Role of digital tax platforms adoption in enhancing revenue generation and capital projects funding in emerging markets

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Abstract

Tax revenue plays a significant role in funding government activities, especially in emerging economies where public investment is essential for infrastructure development and economic progress. This paper assessed the effectiveness of digital tax platforms, specifically electronic tax filing, automated tax payment systems, and blockchain-based tax solutions on revenue generation and capital projects funding in Nigeria. This study employed survey research design using primary data collected via structured questionnaires. The sample included 4,352 individuals comprising tax officials from FIRS, federal government officials in finance and infrastructure, and IT experts involved in digital tax platforms. A multistage sampling method, combining purposive and random techniques, was used to arrive at 384 respondents as sample size. Data analysis involved descriptive statistics and multivariable regression. This found that digital tax platforms which comprised of electronic tax filing, automated tax payment systems, and blockchain-based tax solutions had a positive and significant effects on revenue generation and capital projects funding in Nigeria. This study concluded that digital tax platforms significantly improve both revenue generation and capital project funding in Nigeria. It was therefore recommended that the government should expand and modernize its digital tax infrastructure nationwide to ensure broader adoption among taxpayers and administrators.

Keywords: Automated tax payment systems, Blockchain-based tax solutions, Capital projects funding, Digital tax platforms, Electronic tax filing, Revenue generation.

Contents

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Contribution of this paper to the literature
This study provides empirical evidence on the efficacy of digital tax platforms in enhancing government revenue and public investment in a developing country like Nigeria. It bridges the gap between technological innovation and public finance performance, contributing to both academic and practical understanding of digital transformation in tax administration.

1. Introduction

Tax revenue is a critical source of government financing, particularly in emerging markets where infrastructural development and economic growth heavily depend on public investment (Awotomilusi, Oso, Oluwagbade, & Dagunduro, 2023; Dagunduro, Abbood, Dakhil, & Falana, 2025). However, traditional tax collection methods in many developing economies, including Nigeria, are often characterized by inefficiencies such as tax evasion, corruption, inadequate record-keeping, and weak enforcement mechanisms (Okoye & Akenabor, 2023). In response to these challenges, governments worldwide are increasingly leveraging digital tax platforms to enhance revenue generation, improve tax compliance, and streamline the allocation of funds for capital projects (Dakhil, Dagunduro, Abbood, & Falana, 2025; Falana, Dakhil, Abbood, & Dagunduro, 2024; World Bank, 2023). The adoption of digital tax platforms, including electronic tax filing (e-filing), automated tax payment systems, and blockchain-based tax solutions, has shown significant promise in reducing revenue leakages and increasing government tax revenues in various economies (Akinadewo, Kayode, Dagunduro, & Akinadewo, 2023; Aluko, Igbekoyi, Dagunduro, Falana, & Oke, 2022; Organisation for Economic Co-operation and Development (OECD), 2023).

In recent years, Nigeria has made considerable efforts to digitize its tax system, particularly through the introduction of the TaxPro-Max platform by the Federal Inland Revenue Service (FIRS) and various state-level e-tax initiatives (Federal Inland Revenue Service (FIRS), 2023). These digital innovations aim to simplify tax compliance, expand the tax base, and increase voluntary tax payments. Empirical evidence suggests that digital tax systems improve revenue mobilization by reducing bureaucratic bottlenecks and encouraging tax compliance among individuals and businesses (Adebayo & Yusuf, 2024; Lawal, Igbekoyi, & Dagunduro, 2024). However, despite these advancements, Nigeria still faces challenges such as digital illiteracy, inadequate technological infrastructure, and taxpayer resistance to digital tax reforms (Eze & Nwankwo, 2024; Ige, Igbekoyi, & Dagunduro, 2023). This study seeks to investigate the extent to which digital tax platforms have contributed to revenue generation and the financing of capital projects in Nigeria.

While existing studies have examined the general relationship between taxation and economic development, limited research has focused on the specific impact of digital tax platforms on revenue mobilization and capital project funding in emerging markets (Agwu, Olanrewaju, & Okonkwo, 2024). Moreover, studies in developed economies have highlighted the efficiency of digital tax systems in improving revenue collection, but their applicability to developing economies with weaker technological infrastructure remains underexplored (International Monetary Fund (IMF), 2023). This study, therefore, aims to bridge this gap by providing empirical evidence on how digital tax platforms influence government revenue generation and capital expenditure in Nigeria.

This paper contributes to the existing literature by assessing the effectiveness of digital tax platforms in enhancing tax compliance, increasing tax revenue, and improving capital project funding in Nigeria. By examining the challenges and opportunities associated with digital tax adoption, this study offers valuable insights for policymakers, tax administrators, and stakeholders in emerging markets. The findings are expected to inform strategies for optimizing digital tax infrastructure and leveraging technology for sustainable fiscal development.

2. Literature Review and Hypothesis Development

This section serves as a critical foundation for the research by summarizing and analyzing existing studies related to the research topic. This section identifies key theories, concepts, and empirical findings from prior research, thereby contextualising the study within the broader academic discourse. These hypotheses guide the research methodology and help in investigating the relationship between the variables under study. The section provides a clear rationale for the study's objectives and how it contributes to advancing knowledge in the field.

2.1. Theoretical Framework

This study was rooted in the technology acceptance model (TAM) and public finance theory. The Technology Acceptance Model (TAM) is a framework used to assess how customers' attitudes influence the adoption of new technology. Developed by Davis (1989) at the University of Michigan's Graduate School of Business Administration, the model suggests that the likelihood of adopting technology is determined by two key factors: perceived ease of use and perceived usefulness (Davis, 1989). Recent studies have applied the technology acceptance model to examine the impact of digital tax platforms on revenue generation and capital expenditure. Wulandari and Dasman (2023) investigated the correlation between digital taxation systems, TAM, and taxpayer compliance,

with internet understanding as a mediating variable. The research found that the tax digitization system positively influences internet understanding, and the technology acceptance model significantly affects taxpayer compliance. However, the direct effect of the tax digitization system on taxpayer compliance was positive but not significant. Umar, Bappi, and James (2023) examined the effect of information and communication technology (ICT) on revenue generation in the Gombe State Internal Revenue Service. The study adopted a technology acceptance model as its theoretical framework. Through survey research and analysis using SPSS, the findings revealed that ICT infrastructure availability significantly enhances revenue collection efficiency. Abdulkadir, Bello, and Yusuf (2024) examined the impact of the unified theory of acceptance and use of technology (UTAUT) on tax professionals' responses to digitalization and automation in tax administration processes in Sub-Saharan Africa. The study found that automating tax administration processes positively affects revenue optimization.

The technology acceptance model has proven to be highly relevant and applicable in understanding the adoption of digital tax platforms, particularly in the context of revenue generation and capital expenditures in emerging economies. In emerging markets, where digital infrastructure may still be developing, TAM provides valuable insights into how taxpayers and government agencies perceive the utility of digital tax systems. For instance, Wulandari and Dasman (2023) demonstrated that digital tax systems, when perceived as useful and easy to use, positively influence taxpayer compliance, which directly impacts revenue generation. Moreover, Umar et al. (2023) highlighted that the adoption of ICT and digital tax platforms by revenue services in Gombe State, Nigeria, significantly improved the efficiency of revenue collection. This efficiency is critical for capital expenditure funding, as increased tax revenue can be allocated to essential infrastructure and development projects. Despite its applicability, TAM has been critiqued for a few limitations. First, it largely focuses on individual perceptions and may overlook organizational and contextual factors, which can be critical in governmental and institutional settings (Venkatesh, Morris, Davis, & Davis, 2003). For example, in the case of capital expenditure, the decision to invest in digital tax systems may also depend on the political climate, regulatory frameworks, and government capacity, factors that TAM does not directly address (Venkatesh et al., 2003). Second, TAM assumes that user behavior is rational and uniform, which may not always be the case, especially in the context of emerging economies where there may be resistance to technological change or lack of awareness (Gefen & Straub, 2000). Finally, while TAM effectively captures the initial acceptance of technology, it often fails to account for the long-term engagement and evolving user satisfaction with the technology (Venkatesh & Bala, 2008). These critiques suggest that while TAM provides valuable insights into technology adoption, it should be used in conjunction with other frameworks to capture the broader socio-economic and political dynamics that influence digital tax systems' impact on revenue generation and capital expenditures.

Figure 1 illustrates the process by which individuals adopt and use new technology. It begins with external variables that influence two key perceptions: perceived usefulness (the belief that technology will improve performance) and perceived ease of use (the belief that using the technology will require minimal effort). These perceptions shape the user's attitude toward using the technology, which in turn affects their behavioral intention to use it. Ultimately, this intention leads to the actual use of the system. TAM is widely used to understand and predict user behavior toward technology adoption.

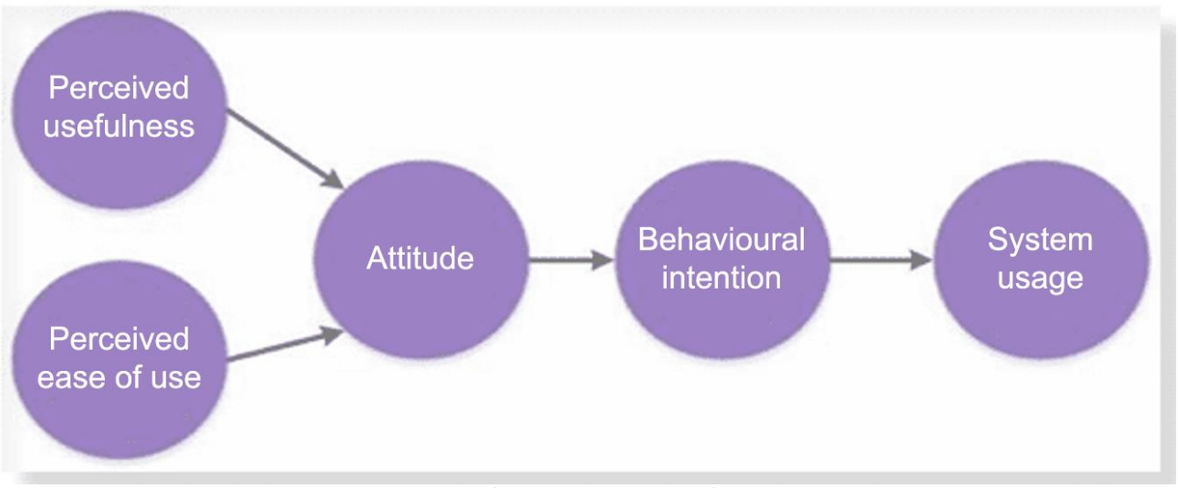

Figure 1. Technology Acceptance model (TAM).

Public finance theory has evolved through the contributions of numerous economists and does not have a single specific founder. Early contributions to the field can be traced to Smith (1776) who in *The Wealth of Nations* laid the foundation for the theory of taxation and government expenditures, emphasizing the importance of equitable and efficient taxation in fostering national prosperity. Smith's ideas on taxation and government spending were pivotal in shaping the understanding of public finance. Later, Musgrave (1959) further developed the field by analyzing the role of government in resource allocation, stabilization, and redistribution of wealth, which is often considered the modern foundation of public finance theory. Musgrave's work helped establish a more comprehensive understanding of the government's role in managing the economy and distributing resources for societal welfare. Public finance theory focuses on how governments raise and allocate funds to meet the needs of the public, including revenue generation through taxes, expenditure management, and debt administration. This field addresses crucial issues such as the effectiveness of taxation policies, government budgetary allocations, and the efficiency of government spending to ensure societal well-being (Musgrave, 1959). The insights from both Smith and Musgrave continue to shape modern public finance practices, including the design and implementation of fiscal policies aimed at achieving economic stability and social equity. These contributions remain essential in understanding the role of government in financing public goods and services.

Several recent studies have applied public finance theory to examine the impact of digital technologies on revenue generation and capital expenditure. Okiakpe, Empere, and Etale (2024) investigated how public sector capital expenditure influences tax revenue generation, specifically petroleum profit tax (PPT), in Nigeria. Guided by public finance and Keynesian theories, the study utilized a quasi-experimental design and analyzed secondary data from the National Bureau of Statistics and the Central Bank of Nigeria. The findings revealed significant positive relationships between capital expenditures on road construction, power, and security with PPT, underscoring the role of public investment in enhancing tax revenues. Iorlaha (2024) conducted a conceptual and theoretical review of Nigeria's tax reforms and their impact on revenue generation. The study examined reforms such as the 2012 and 2017 National Tax Measures and the 2017 Voluntary Asset and Income Declaration Scheme (VAIDS), analyzing them through the lenses of the Laffer Curve Theory and Behavioral Economics Theory. The review found that while tax reforms positively influenced revenue generation, challenges like infrastructure deficits and digital literacy gaps persisted, suggesting the need for a comprehensive approach integrating policy, technology, and behavioral insights. Nwolu, Akani, and Ironkwe (2024) examined the impact of digital technologies on tax revenue in Nigeria. Employing a mixed-method research design, the study focused on the management staff of the Federal Inland Revenue Service in Abuja. The analysis indicated that digital technologies significantly influenced companies' income tax and capital gains tax revenues.

Public finance theory is highly relevant in understanding the effect of digital tax platforms on revenue generation and capital expenditures in emerging economies. This theory emphasizes the role of government policies, taxation, and public expenditure in economic stability and development (Musgrave & Musgrave, 2022). Digital tax platforms, as an extension of modern public finance mechanisms, streamline tax collection, reduce leakages, and improve compliance, leading to increased government revenue (Tanzi, 2023). In emerging economies, where informal economic activities and tax evasion are prevalent, the adoption of digital tax platforms enhances transparency and minimizes revenue losses (Bird & Zolt, 2023). Moreover, increased tax revenue from digital platforms enables governments to fund critical capital expenditures, such as infrastructure, education, and healthcare, which are essential for economic growth and social welfare (Fjeldstad & Moore, 2023). Thus, public finance theory provides a strong foundation for evaluating how digitalization in tax administration supports sustainable revenue generation and efficient public spending in developing nations.

Despite its relevance, public finance theory faces several critiques when applied to digital tax platforms in emerging economies. First, the theory assumes that increased tax revenue automatically translates into improved public services, but in many developing countries, corruption and inefficient governance hinder the effective allocation of resources (Gupta & Tareq, 2023). Second, while digital tax platforms enhance compliance, they may disproportionately burden small businesses and informal sector operators who lack the digital literacy or resources to comply, potentially leading to reduced economic participation (Moore, Prichard, & Fjeldstad, 2023). Third, public finance theory often overlooks the socio-political dynamics influencing tax policies, such as resistance from powerful interest groups that benefit from tax loopholes (Besley & Persson, 2023). These limitations suggest that while public finance theory provides valuable insights into the benefits of digital tax platforms, it must be supplemented with governance and institutional frameworks to ensure equitable and effective revenue utilization.

2.2. Role of Digital Tax Platforms in Enhancing Revenue Generation and Capital Projects Funding

The empirical studies collectively explore the relationship between tax revenue and government expenditure, particularly capital expenditure, across different national contexts. While they vary in scope and methodology, common patterns and divergences emerge regarding how tax income affects public investment and economic growth. Craig, Adetola, and Maminu (2020) investigated tax revenues and capital expenditures in the Nigerian economy, analyzing the effect of oil and non-oil tax revenues on capital expenditure using secondary data and linear regression. The study found that non-oil revenue had a significant positive impact on capital expenditure, suggesting the growing importance of diversifying revenue sources. In contrast, oil tax revenues and total tax revenues did not show a statistically significant relationship with capital expenditure, pointing to volatility and overdependence on oil-based revenues in Nigeria. Maharani, Romli, and Meiriasari (2021) studied the South Sumatra provincial government in Indonesia using multiple linear regression to examine the impact of local taxes, general allocation funds, and special allocation funds on capital expenditure. The findings showed that only general allocation funds positively influenced capital expenditure, while local taxes and special allocation funds did not. This suggests that intergovernmental fiscal transfers played a more critical role in driving public investment than local tax revenues in that region. Gurdal, Aydin, and Inal (2021) examined the broader fiscal dynamics in G7 countries using panel causality tests. The study discovered a unidirectional causality from tax revenue to government expenditure and a bidirectional causality between economic growth and government expenditure. However, tax revenue did not cause economic growth in the time domain. In the frequency domain, a bidirectional causality was observed between tax revenue and economic growth, especially in the long run. This implies that tax policy is effective when aligned with broader macroeconomic goals, though its short-term effects can be limited.

Alim, Setiyantono, and Zakiah (2021) focused on Indonesia over a 20-year period, applying the VAR model and Granger causality test to determine the relationship between tax income and government spending. The findings revealed a short-term relationship between the two variables but no long-term equilibrium. Moreover, government expenditure showed instability over time, and no strong causal link was found. This suggests potential inefficiencies in fiscal policy implementation and instability in revenue allocation patterns. Craig et al. (2020) and Maharani et al. (2021) both identified that certain revenue types (non-oil in Nigeria, general allocation funds in Indonesia) are more effective in financing capital expenditure, while other sources (oil revenues, special funds, and local taxes) show limited impact. Gurdal et al. (2021) and Alim et al. (2021) extended the discussion to include economic growth and broader expenditure patterns, revealing that the strength and direction of the relationship between tax revenue and spending vary significantly by region and economic stability. While Craig et al. (2020) and Maharani et al. (2021) showed positive but selective effects on capital expenditure, Alim et al. (2021) findings indicated instability and weak long-term alignment, and Gurdal et al. (2021) analysis suggested that fiscal relationships are sensitive to time horizons and economic maturity.

Malhotra, Mishra, and Vyas (2022) examined the Tax Increment Financing (TIF) model in Indian cities, especially within the Smart Cities Mission. The study emphasized how TIF could empower Urban Local Bodies (ULBs) to leverage future tax revenues and urban land value appreciation to finance infrastructure sustainably. The TIF model was presented as both theoretically and practically viable, particularly in contexts where current tax revenues are insufficient. Case studies from other countries supported the feasibility of adopting this innovative financing strategy in India. Akinola and Akinrinola (2023) analyzed the effects of tax revenue and infrastructure investment (using Gross Capital Formation) on economic growth in Nigeria. Using the ARDL model, they found a significant long-run relationship, especially highlighting the positive role of the Petroleum Profit Tax (PPT). However, Gross Capital Formation (GCF) and Company Income Tax (CIT) had no significant impact, suggesting inefficiencies in how these components contribute to growth. VAT was only marginally significant. Aisien, Otusanya, and Ala-Peters (2024) explored the relationship between tax revenue mobilization and infrastructural development in Nigeria using OLS regression. The study found that CIT, VAT, and Capital Gains Tax significantly contributed to infrastructure development, while PPT did not. This contrasts with Akinola and Akinrinola (2023) where PPT was a key growth driver. The findings underscore differences in tax effectiveness depending on whether the goal is GDP growth or physical infrastructure development. Aworetan, Alade, and Agbaje (2024) assessed the Granger causality between tax revenue, foreign aid, and capital expenditures in southwestern Nigerian states. The results showed that tax revenue had a significant causal relationship with capital expenditure, while foreign aid did not, suggesting that internally generated revenue, rather than external aid, drives sustained capital investment at the subnational level.

Ajagun, Kehinde, and Jinadu (2025) evaluated the impact of oil and non-oil tax revenues on capital expenditure in Nigeria. Both revenue types were found to positively affect capital expenditure, supporting the idea that a diversified revenue base contributes to development financing. The study complements the findings of Aworetan et al. (2024) by reinforcing the link between tax revenues and capital spending. Aisien et al. (2024); Aworetan et al. (2024) and Aisien et al. (2024) confirm the significant effect of tax revenue on capital/infrastructure spending, reinforcing a pattern of reliance on internal revenue generation. Akinola and Akinrinola (2023) distinguish between infrastructure as a growth driver and tax revenue as a standalone growth input. Interestingly, while PPT was significant for economic growth, it was not significant for infrastructure in Aisien et al. (2024) highlighting a mismatch in fiscal transmission mechanisms. Malhotra et al. (2022) introduce a futuristic dimension to the conversation through the TIF model, offering an alternative to traditional tax-based funding. This study bridges the gap between theory and practice by integrating land value capture and municipal bonds, suggesting that innovative tools are essential when conventional tax systems fail to deliver sufficient surplus. While studies like Akinola and Akinrinola (2023) and Ajagun et al. (2025) focused on national-level analysis, Aworetan et al. (2024) and Malhotra et al. (2022) draw attention to state and municipal challenges. These studies emphasize that subnational governments often struggle with inadequate fiscal autonomy and highlight the potential of localized solutions like TIF or improving internal revenue mobilization.

Amaglobeli, Crispolti, and Klemm (2023) investigated the effect of digital tax reporting on revenue mobilization in developing countries, employing a survey research design and analyzing the data using linear regression. The findings revealed a positive relationship between digital tax reporting and revenue mobilization, indicating that enhanced tax administration capabilities are facilitated by advanced reporting systems. Similarly, Mbise and Baseka (2022) investigated how digital tax reporting influences tax compliance, focusing on SMEs. Using a survey research design and regression analysis, the study found a significant positive effect of digital tax reporting on tax compliance, emphasizing improvements in efficiency and accuracy due to digital platforms. Edori (2023) focused on the ease of tax compliance with electronic tax services, such as e-registration, e-tax payment, and e-filing. Using data from 106 participants analyzed through Pearson Product-Moment Correlation, the study demonstrated that these e-tax services significantly improved the ease of tax compliance. Strong correlations were observed between e-registration, e-filing, and ease of compliance, indicating that these services have made it easier for taxpayers to manage their tax obligations. However, Abdulkadir and Alabede (2022) offered a nuanced perspective, revealing that although digital tax awareness and perceived ease of use positively affected compliance attitudes, poor service quality hindered overall compliance. This suggests that while digital tools can improve tax processes, the effectiveness of these tools is contingent upon their quality and user experience, particularly in informal sectors where digital literacy remains a barrier. Building on the theme of technological advancement, Manani and Mose (2024) emphasized the role of blockchain-related features, such as data immutability and information transparency, in strengthening revenue administration in Nairobi City County. The findings echoed the importance of secure and transparent data management in improving public efficiency. Similarly, Sutarman, Juliastuti, Yati, and Pasha (2025) focused specifically on blockchain's application in tax administration, finding that it enhanced transparency, reduced data manipulation, and supported accurate tax reporting and smart contract-enabled automation.

Studies conducted by Craig et al. (2020) and Akinola and Akinrinola (2023) emphasized the growing importance of non-oil revenues for capital expenditure in Nigeria, yet the role of digital tax platforms in optimizing revenue generation remains underexplored. While these studies show a significant impact of non-oil taxes on capital spending, the potential for digital tax platforms to enhance the efficiency and transparency of tax collection processes, particularly in increasing non-oil tax contributions, is largely missing from the discussion. This research gap highlights the need to explore how digital platforms can transform tax administration to generate more stable and predictable revenue streams for capital projects. Furthermore, studies such as those by Aworetan et al. (2024) and Aisien et al. (2024) point to the significant role of internal revenue in funding infrastructure projects, yet they do not consider how digital tax platforms can enhance this process. Although these studies acknowledge the importance of tax revenues in capital expenditure, they do not delve into the specific mechanisms through which digital tax systems might improve revenue mobilization, particularly in a developing country context like Nigeria. This study intends to fill this gap by investigating how digital tax platforms can streamline tax reporting, improve tax compliance, and ultimately lead to more effective funding for capital projects. Finally, while studies by Amaglobeli et al. (2023) and Mbise and Baseka (2022) explore the broader impact of digital tax reporting on tax

mobilization and compliance, their focus is often on the national level or smaller enterprises like SMEs. However, little attention has been paid to the effect of digital platforms on the broader fiscal health of governments, particularly in funding capital projects through efficient revenue generation. This study seeks to bridge this gap by analyzing how digital tax platforms can be leveraged not only for improved tax compliance but also for financing critical public sector investments and capital projects, thus providing a comprehensive framework for using digital solutions in enhancing government revenue and infrastructure funding. Based on the above facts, it was therefore hypothesized that:

H_0: Digital tax platforms adoption has no significant effect on revenue generation and capital projects funding in Nigeria.

2.3. Conceptual Framework

Figure 2 illustrates the relationship between digital tax platforms (independent variable) and revenue generation and capital projects funding (dependent variable) while grounding the study in the technology acceptance model (TAM) and public finance theory as theoretical foundations. The independent variable, digital tax platforms, is measured through three key components: electronic tax filing, automated tax payment systems, and blockchain-based tax solutions. These elements represent advancements in tax administration aimed at improving efficiency, compliance, and transparency. The arrows indicate the influence of these digital tax solutions on revenue generation and capital project funding. The dependent variable, revenue generation and capital projects funding, reflects the outcomes of implementing digital tax systems, emphasizing increased tax revenue, better financial management, and improved public infrastructure funding. The Technology Acceptance Model (TAM) explains the adoption of digital tax systems by taxpayers and institutions. At the same time, public finance theory provides an economic perspective on how tax policies and digitalisation contribute to government revenue and expenditure efficiency.

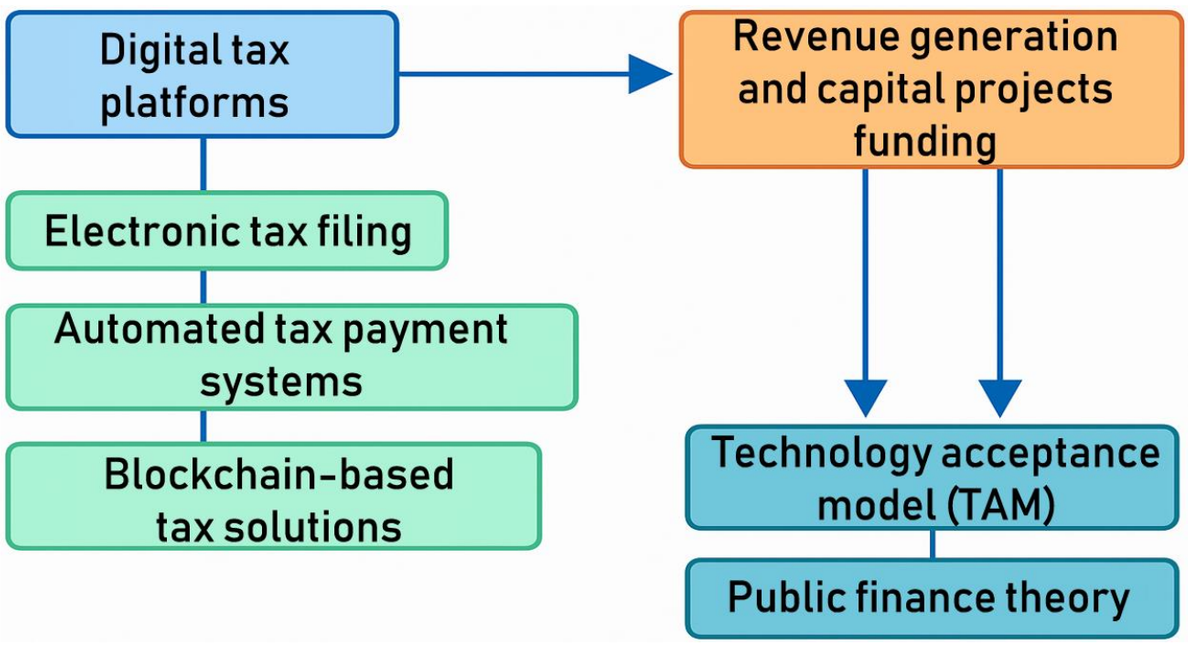

Figure 2. Conceptual framework.

3. Data and Methods

This study adopted a survey research design, utilizing primary data collected through the distribution of a structured questionnaire, which was developed in line with the study's objectives. The survey research design was chosen for its effectiveness in collecting data from a large and diverse population, ensuring a broad representation of key stakeholders involved in the digital tax platform ecosystem. The target population consisted of 4,352 individuals, including 3,145 tax officials from the Federal Inland Revenue Service (FIRS), as of December 31, 2023, based on FIRS data. Additionally, 638 federal government officials responsible for budgeting, financial planning, and infrastructure development, as well as 569 technology and IT experts involved in the development, implementation, and maintenance of digital tax platforms, were included. The technical expertise of these IT professionals is crucial for understanding the infrastructure, capabilities, and limitations of existing tax technologies and for identifying opportunities to enhance tax collection and revenue generation through technological innovations. By focusing on tax officials, government policymakers, and technology experts, the study aims to gather comprehensive insights from different perspectives, allowing for a well-rounded analysis of how digital tax platforms impact revenue generation and capital project funding. The inclusion of IT professionals is particularly significant as their expertise is vital for assessing the technological aspects of tax systems and identifying potential areas for improvement and innovation. The study used a multistage sampling approach that combined purposive and simple random sampling techniques. Purposive sampling was employed to target individuals or units directly or indirectly involved in digital platforms and tax revenue administration. Following this, simple random sampling was applied to assign a cluster sample. This approach helped reduce bias and enhanced the generalizability of the findings. To determine the appropriate sample size for the population, with a 95% confidence level and a margin of error of 0.05, the researcher applied the Fisher, Laing, and Stoeckel (1983) formula. The formula used is.

$n = \lceil Z^2 * p\,(1\text{-}p) / E^2 \rceil$.

$n = \lceil 1.96^2.\ 0.5(1\text{-}0.5)/0.05^2 \rceil$.

$n = 384.16$.

Where: n = The required sample size, Z = The Z-score corresponding to the desired confidence level (For a 95% confidence level, Z ≈ 1.96), p = The estimated proportion of the population (0.5, chosen for maximum sample size) E = The margin of error.

Table 1 presents the population of the study along with the sample proportion drawn from it. It outlines the total number of individuals or entities considered in the research and specifies how the sample was distributed or selected across different groups or categories, ensuring representativeness and reliability in the findings.

Table 1. Population and sample proportion.

Strata	Targeted population	Sample proportion
Tax officials	3,145	277
Federal government officials	638	56
Technology and IT experts	569	51
Total	4,352	384

The study employed both descriptive and inferential analysis techniques for data evaluation. Descriptive statistics, including measures of central tendency (mean) and dispersion (standard deviation), were used to summarize the data. Additionally, ordinary least square (OLS) regression analysis was performed to assess the statistical significance of the relationships between the independent variables and the dependent variables.

3.1. Reliability and Validity of Research Instrument

In Table 2, reliability was assessed using Cronbach's Alpha. Revenue, capital, e-filling, autopayment and blockchain were shown by the Cronbach's Alpha test scores of 0.7986, 0.8008, 0.7893, 0.7922, and 0.7971, suggesting that the survey is suitable for high-stakes evaluations. Overall, the test's dependability was 83%. This indicates good internal consistency among the items.

Table 2. Cronbach's alpha.

Item	Alpha
Revenue generation	0.7986
Capital projects funding	0.8008
Electronic tax filing	0.7893
Automated tax payment systems	0.7922
Blockchain-based tax solutions	0.7971
Overall test	0.8295

3.2. Model Specification

To create an econometric model where the independent variable is Digital Tax Platforms (which includes electronic tax filing, automated tax payment systems, and blockchain-based tax solutions), and the dependent variables are Revenue Generation and Capital Projects Funding. This study developed two separate models to reflect relationships.

3.2.1. Econometric Model for Revenue Generation

Revenue Generation (RG) is influenced by the adoption of Digital Tax Platforms (DTP), which include.

Electronic Tax Filing (ETF).

Automated Tax Payment Systems (ATPS).

Blockchain-based Tax Solutions (BTS).

The relationship was represented as:

$$RG = \beta_0 + \beta_1 ETF + \beta_2 ATPS + \beta_3 BTS + \epsilon$$

Where:

RG = Revenue Generation (Measured by the total revenue generated from taxes).

ETF = Electronic Tax Filing (A measure of adoption or frequency of usage of e-filing).

ATPS = Automated Tax Payment Systems (A measure of usage or adoption level of automated systems).

BTS = Blockchain-based Tax Solutions (A measure of blockchain adoption in tax collection).

β_0 = Intercept (Constant term).

β_1, β_2, β_3 = Coefficients for each independent variable (Measures of impact of each digital platform on revenue generation).

ϵ\epsilon = Error term (Captures unobserved factors affecting revenue generation).

3.2.2. Econometric Model for Capital Projects Funding

The model for Capital Projects Funding (CPF) was defined as a function for the adoption of Digital Tax Platforms (DTP).

$$CPF = \alpha_0 + \alpha_1 ETF + \alpha_2 ATPS + \alpha_3 BTS + \nu$$

Where:

CPF = Capital Projects Funding (Measured by the availability of funds for capital projects).

ETF = Electronic Tax Filing.

ATPS = Automated Tax Payment Systems.

BTS = Blockchain-based Tax Solutions.

α_0 = Intercept (Constant term).

α_1, α_2, α_3 = Coefficients for each independent variable (Measures of the impact of each platform on capital projects funding).

ν = Error term (Captures unobserved factors affecting capital projects funding).

3.3. Data Analysis Techniques

This study employed both descriptive statistics (mean, median, variance, standard deviation, skewness, and kurtosis) and inferential statistics (regression, correlational analysis, and others) to analyse the data.

4. Data Analysis and Discussion of Findings

This section presents the analysis's findings, as well as their implications.

4.1. Demographic Information

Table 3 displays demographic statistics in percentages and frequencies according to the respondents' backgrounds. There were 384 responses. 25.52% of respondents were government officials, while 24.22% of the sample were tax officials. Technology/IT Experts are the smallest group at 22.40%. 27.86% of respondents did not specify their roles. On the other hand, the highest number of respondents (29.69%) work at the Federal Inland Revenue Service (FIRS), while 27.60% of participants are from agencies or organisations not explicitly listed. The Ministry of Finance accounts for 23.18%, and the Ministry of Budget and National Planning accounts for 19.53% of respondents. Similarly, 24.48% of the respondents had under 5 years of experience. While 19.53% had between 6 to 10 years of experience. A good spread exists across the mid-experience ranges (11–20 years), with each range contributing around 20% of the sample. About 35.42% of respondents have over 20 years of experience, indicating a mature and experienced sample. Conversely, 26.04% of the samples were not too familiar with tax digitalization. While 25.78% of the samples were somewhat familiar with digital tax platforms, 23.96% were familiar with tax digitalization. 24.22% of respondents were experienced in using digital tax platforms.

In the same vein, 50. 52% of the sample participated in the development, implementation, or maintenance of a digital tax platform, while 49.48% did not participate in the development of digital tax platforms. Also, 23.96% of the firms sampled fully implemented digital tax platforms. While 25% of firms sampled partially implemented tax platforms, 25.26% were in the process of implementation. However, 25.78% did not implement digital platforms yet. In terms of objectives, 17.97% of the sampled respondents stated that improving tax collection efficiency was the main goal of setting up digital tax platforms in their firms. While 16.41% of respondents asserted that enhancing revenue generation informed digitalization of tax in their firms. 15.63% of the respondents opined that to facilitate easier tax filing for taxpayers, informed digitalization tax platforms in their organisations. 15.89% of respondents indicated that improving transparency in tax processes formed the basis of tax platforms' digitalization. 20.57% of the sampled respondents stated that reducing corruption and fraud was the main objective of using digital tax platforms in their organisations. 13.54% of the respondents did not specify.

Furthermore, 30.21% of the respondents emphasised that digital tax platforms did not contribute to the funding of capital projects. While 22.92% and 23.7% stated that digital tax platforms contributed to the funding of capital projects to a small and moderate extent. 23.18% of the sample stated that digital tax platforms contributed to the funding of capital projects to a great extent. In terms of challenges encountered during the use of the digital tax platform, 16.67% of the sampled respondents stated that they encountered a lack of technical infrastructure during digital tax platform adoption. 14.84% stated that poor internet connectivity contributed to the challenges of the digital tax platform. While 16.41% opined that limited training and capacity building was the bane of digital tax, 18.75% of the respondents suggested that resistance to change from employees or taxpayers accounted for these challenges**.** Again, 14.58% of the respondents stated there was limited awareness among taxpayers, while 18.75% did not specify. However, 28.13% of the respondents believed the adoption of digital tax platforms would enhance the sustainability of funding for capital projects. While 31.77% of the respondents did not believe the adoption of digital tax platforms would enhance the sustainability of funding for capital projects, 40.10% of the respondents were indifferent.

Table 3. Frequency distributions.

Role	Frequency	Percent	Cumulative percent
1	93	24.22%	24.22%
2	98	25.52%	49.74%
3	86	22.40%	72.14%
4	107	27.86%	100.00%
Total	384	100.00%	
Organisation			
1	114	29.69%	29.69%
2	89	23.18%	52.86%
3	75	19.53%	72.40%
4	106	27.60%	100.00%
Total	384	100.00%	
Experience			
1	94	24.48%	24.48%
3	75	19.53%	44.01%
4	79	20.57%	64.58%
5	136	35.42%	100.00%
Total	384	100.00%	
Familiarity level			
1	100	26.04%	26.04%
2	99	25.78%	51.82%
3	92	23.96%	75.78%
4	93	24.22%	100.00%
Total	384	100.00%	
Participation			
1	194	50.52%	50.52%

2	190	49.48%	100.00%
Total	384	100.00%	
Adoption status			
1	92	23.96%	23.96%
2	96	25.00%	48.96%
3	97	25.26%	74.22%
4	99	25.78%	100.00%
Total	384	100.00%	
Objective			
1	69	17.97%	17.97%
2	63	16.41%	34.38%
3	60	15.63%	50.00%
4	61	15.89%	65.89%
5	79	20.57%	86.46%
6	52	13.54%	100.00%
Total	384	100.00%	
Contribution level			
1	116	30.21%	30.21%
2	88	22.92%	53.13%
3	91	23.70%	76.82%
4	89	23.18%	100.00%
Total	384	100.00%	
Challenge			
1	64	16.67%	16.67%
2	57	14.84%	31.51%
3	63	16.41%	47.92%
4	72	18.75%	66.67%
5	56	14.58%	81.25%
6	72	18.75%	100.00%
Total	384	100.00%	
Belief level			
1	108	28.13%	28.13%
2	122	31.77%	59.90%
3	154	40.10%	100.00%
Total	384	100.00%	

4.2. Descriptive Statistics

In Table 4, the means range from 2.87 to 2.94, indicating that respondents generally provided moderate to slightly above-average ratings for the items under study. This indicates neutral to slightly positive perceptions of the listed digital tax platform features. In terms of dispersion, the standard deviations range from 0.70 to 0.77, showing moderate variability in responses. There is no extreme spread, which supports the reliability indicated by your Cronbach's alpha. However, the minimum is 0, and maximums are all slightly below or equal to 5, which suggests respondents used scale-like measurement.

Table 4. Descriptive statistics.

Variable	Obs.	Mean	Std. dev.	Min.	Max.
Revenue generation	384	2.930	0.747	0	4.571
Capital projects funding	384	2.924	0.769	0	5.000
Electronic tax filing	384	2.879	0.704	0	4.285
Automated tax payment systems	384	2.874	0.723	0	4.571
Blockchain-based tax solutions	384	2.941	0.756	0	4.429

4.3. Test of Variable

The outcomes of both pre- and post-estimation tests to guarantee the reliability and validity of the study's findings for models 1 and 2, respectively.

4.3.1. Model 1's Correlation Analysis

Table 5 shows the results of a pairwise correlation coefficient test performed on independent variables. The test results indicated a significant positive association between revenue generation and electronic tax filing, automated tax payment systems and blockchain-based tax solutions, respectively. While the coefficient values range from 0.4523 to 0.5449 and a p-value of 0.0000, these findings suggest that as one part of digital tax infrastructure improves, others tend to follow suit. The moderate and significant correlations indicate that the variables are connected but not collinear, making them appropriate for further multivariate analysis.

Table 5. Model 1's correlation analysis.

Variable	Revenue generation	Electronic tax filing	Automated tax payment systems	Blockchain-based tax solutions
Revenue generation	1.0000			
Electronic tax filing	0.4523*	1.0000		
Automated tax payment systems	0.5449*	0.5064*	1.0000	
Blockchain-based tax solutions	0.4882*	0.5343*	0.4846*	1.0000

4.3.2. Model 1's Post-Estimation Test

Also, based on the results of the previous correlation investigation, the degree of multicollinearity in the data distribution was estimated using the variance inflation factor (VIF) analysis. In this regard, there is no multicollinearity since the mean VIFs of these variables are 1.53. Likewise, the constant variance of residuals with fitted values was evaluated using the Breusch-Pagan/Cook-Weisberg test. With a chi-square of 2.95 and a p-value of 0.0860, the results demonstrated significant evidence of homoscedasticity. To ascertain whether the variables have a normal distribution, the Skewness/Kurtosis tests for Normality test were employed. Since the p-value of 0.3058 was more than the 0.05 significant level, the null hypothesis of normalcy was accepted. Similarly, the Durbin-Watson test, which has values between 0 and 4, finds autocorrelation in data distributions. A score of 2.0617 implies marginally positive autocorrelation in residuals, whereas a value of 2 indicates no autocorrelation. According to the study's findings, autocorrelation does not exist.

Table 6. Estimation test results.

Test	F-statistics	P-value
Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity	2.95	0.0860
Skewness/Kurtosis tests for normality	2.37	0.3058
Durbin-Watson D-statistic	2.0617	-
VIF	1.53	-

4.3.3. Model 2's Correlation Analysis

The findings of a pairwise correlation coefficient test on independent variables are displayed in Table 7. The test results showed that capital project funding was significantly positively correlated with automated tax payment systems, blockchain-based tax solutions, and electronic tax filing, respectively. These results imply that when one aspect of the digital tax infrastructure gets better, others tend to follow suit, even though the coefficient values range from 0.4523 to 0.5434 and the p-value is 0.0000. The variables are suitable for additional multivariate analysis since the moderate and significant correlations show that they are related but not collinear. Autocorrelation in data distributions is also detected by the Durbin-Watson test, which has values ranging from 0 to 4. While a score of 2 denotes no autocorrelation, a score of 2.0617 suggests slightly positive autocorrelation in the residuals. The results of the investigation show that there is no autocorrelation.

Table 7. Model 2's correlation analysis.

Variable	Capital project funding	Electronic tax filing	Automated tax payment systems	Blockchain-based tax solutions
Capital project funding	1.0000			
Electronic tax filing	0.5434*	1.0000		
Automated tax payment systems	0.4715*	0.5064*	1.0000	
Blockchain-based tax solutions	0.4566*	0.5343*	0.4846*	1.0000

4.3.4. Model 2's Post-Estimation Test

In Table 8, the variance inflation factor (VIF) analysis was used to quantify the degree of multicollinearity in the data distribution based on the findings of the prior correlation inquiry. Given that these variables mean VIFs are 1.53, multicollinearity is not present in this context. Similarly, the Breusch-Pagan/Cook-Weisberg test was used to assess the constant variance of residuals with fitted values. With a p-value of 0.6914 and a chi-square of 0.16, the results showed strong evidence of homoscedasticity. The Skewness/Kurtosis tests for normality were used to determine whether the variables had a normal distribution. The null hypothesis of normalcy was accepted because the p-value of 0.6886 was greater than the 0.05 significant level. The Durbin-Watson test, which has values between 0 and 4, can also identify autocorrelation in data distributions. A score of 1.9685 indicates somewhat positive autocorrelation in the residuals, whereas a score of 2 indicates no autocorrelation. The investigation's findings indicate that autocorrelation does not exist.

Table 8. Estimation test results.

Test	F-statistics	P-value
Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity	0.16	0.6914
Skewness/Kurtosis tests for normality	0.75	0.6886
Durbin-Watson D-statistic	1.9685	-
VIF	1.53	-

4.4. Digital Tax Platforms Adoption and Revenue Generation

As shown in Table 9, the linear regression model, with revenue generation as the dependent variable (Y) and digital tax platform adoption as the independent variable (X), has an F-statistic of 76.26 and a p-value of 0.0000. The F-statistics are significant ($p < 0.05$), indicating that the model explains a significant portion of the variation in revenue generation. The R-squared of 0.376 (37.6%) indicates that 37.6% of the variance in revenue generation is explained by the model. Similarly, the coefficient of electronic tax filing is 0.153 ($p = 0.005$). This indicates that a one-unit increase in electronic filing relates to a 0.153-unit increase in income, assuming all other variables remain constant. The Automated Tax Payment Systems coefficient is 0.368 with a p-value of 0.000. This implies that A one-unit increase in automated tax payment results in a 0.368 rise in revenue. The Blockchain's coefficient is 0.236 with a p-value of 0.000. This suggests that a unit increase in blockchain use corresponds to a 0.236 increase in revenue creation. While automated tax payment systems had the strongest effect on revenue, electronic filing, automated payment, and blockchain solutions are significant contributors to revenue generation.

4.5. Digital Tax Platforms Adoption and Capital Projects Funding

In Table 9, the F-statistics for the linear regression model with capital project funding as the dependent variable (Y) and digital tax platform adoption as the independent variable (X) is 72.99, with a p-value of 0.0000. The F-statistics are substantial ($p < 0.05$), suggesting that the model explains a large percentage of the volatility in income creation. The model explains 36.6% of the variance in revenue generation (R-squared = 0.366). Similarly, the coefficient for electronic tax filing is 0.376 (p=0.000). This means that a one-unit increase in electronic filing corresponds to a 0.376-unit gain in capital project funding, providing all other factors are unchanged. The Automated Tax Payment Systems coefficient is 0.229 and has a p-value of 0.000. This means that a one-unit increase in automated tax payment results in a 0.229 rise in capital project funding. The Blockchain's coefficient is 0.171 with a p-value of 0.000. This shows that a unit increase in blockchain adoption equates to a 0.171 rise in capital project funding. While electronic tax filing had the strongest effect on capital projects, all predictors are significant contributors to capital project funding.

Table 9. Multivariable regression analysis.

Variable	Coef.	Std. err.	t	P>t	[95% Conf	Interval]
Revenue generation						
Electronic tax filing	0.153	0.054	2.840	0.005	0.047	0.259
Automated tax payment systems	0.368	0.051	7.240	0.000	0.268	0.468
Blockchain-based tax solutions	0.236	0.045	4.750	0.000	0.138	0.333
_cons	0.739	0.150	4.920	0.000	0.444	1.035
Capital project funding						
Electronic tax filing	0.376	0.056	6.710	0.000	0.266	0.486
Automated tax payment systems	0.229	0.053	4.350	0.000	0.126	0.333
Blockchain-based tax solutions	0.171	0.051	3.320	0.001	0.070	0.272
_cons	0.679	0.156	4.350	0.000	0.372	0.985
Equation	Obs.	Parms	RMSE	R-sq	F	P-value
Revenue	384	4	0.592	0.376	76.260	0.000
Capital	384	4	0.615	0.366	72.990	0.000

4.6. Discussion of Findings

This multivariable regression analysis conducted found that digital tax platforms which comprised of electronic tax filing, automated tax payment systems, and blockchain-based tax solutions had a positive and significant effects on revenue generation and capital projects funding in Nigeria. The study found strong evidence that when Nigeria uses digital tax technologies like online filing, automated payments, and blockchain, it sees improvements in collecting more taxes (revenue generation) and is better able to fund public infrastructure or development projects (capital projects funding). This suggests that embracing digital tax innovations can enhance the financial performance and public service delivery of the government. The findings align with Tivde (2024) who reported that electronic taxation platforms significantly boosted total tax revenue, particularly in Company Income Tax (CIT), Value Added Tax (VAT), and Capital Gains Tax (CGT). Similarly, Etale, Bingilar, and Ifurueze (2021) found that e-tax clearance certificates, electronic filing, and e-tax identification improved corporate income tax revenue, supporting the idea that digital tax systems enhance revenue collection. Uguagu, Ayodele, and Ajayi (2023) showed that electronic tax systems reduced tax evasion and increased revenue. Mas'ud, Mohammed, and Gimba (2023) emphasized that the strategic use of e-tax data by State Internal Revenue Services improved states' per capita internally generated revenue. Falana et al. (2024) found that digital payment platforms and technical expertise significantly improved tax compliance in the Southwest informal sector. Dakhil et al. (2025) concluded that both voluntary tax compliance and enforcement strategies enhanced tax revenue generation. Dagunduro et al. (2025) revealed that electronic systems such as e-filing, billing, and payments had a positive effect on informal sector tax compliance in Nigeria. However, contrasting evidence from Akinadewo et al. (2023) indicated that while qualified personnel and tax law enforcement improved revenue generation, ICT had an inverse and insignificant impact on revenue in Kano and Ekiti States. Similarly, Ashafoke and Obaretin (2023) found that although there was a positive relationship between tax e-commerce and revenue generation, it was statistically insignificant. Only digital advertising among various digital tax channels showed a significant positive effect, suggesting that not all digital tax innovations equally enhance revenue.

The positive and significant impact of digital tax platforms such as electronic tax filing, automated payment systems, and blockchain solutions on revenue generation and capital project funding aligns with the technology acceptance model (TAM). This model posits that perceived usefulness and ease of use are critical factors influencing the adoption of new technologies. In the Nigerian context, the adoption of e-taxation systems has been associated with increased efficiency in tax collection and public financial management. For instance, Tivde (2024) found that the introduction of electronic taxation platforms led to a statistically significant increase in total tax revenue collection in Nigeria, highlighting the perceived usefulness of these technologies among tax officials and stakeholders. Furthermore, the ease of use associated with these digital platforms has facilitated their adoption. Ezeala, Opara, and Omaliko (2024) reported that electronic tax systems significantly improved revenue generation concerning personal and company income taxes in Anambra State, Nigeria. This improvement suggests that users find these systems user-friendly, which is consistent with the TAM's emphasis on ease of use as a determinant of technology adoption.

From the perspective of public finance theory, which emphasizes efficient revenue generation and allocation for public goods and services, the findings showed the fiscal benefits of digital tax platforms. The integration of digital technologies into tax administration has enhanced transparency and accountability, key principles in public finance. According to Akinyosoye, Adesoga, Olubisi, and Nwankwere (2024) tax digitalization dimensions had a positive and significant effect on revenue generation, with online payment systems being the most effective predictor. This enhancement in revenue collection capacity enables better funding for capital projects and public services, aligning with the theory's focus on optimal resource allocation. Moreover, the adoption of blockchain-based tax solutions

contributes to reducing tax evasion and fraud, further strengthening the integrity of the tax system. The increased revenue from these digital platforms allows for more effective allocation of public resources towards infrastructure development, promoting economic growth and social welfare central goals of public finance theory. The successful implementation of digital tax technologies in Nigeria is both behaviorally justified, as per the TAM, and fiscally sound, in line with public finance theory. The adoption of these platforms reflects user acceptance driven by perceived benefits and leads to improved financial outcomes, supporting efficient governance and public service delivery.

5. Conclusion and Recommendations

This study employed multivariable regression analysis to examine the impact of digital tax platforms comprising electronic tax filing, automated tax payment systems, and blockchain-based tax solutions on revenue generation and capital project funding in Nigeria. The results revealed a positive and statistically significant relationship between the adoption of these digital tax innovations and improved government revenue as well as the capacity to finance infrastructure and development projects. The study underscores the transformative potential of digital technologies in strengthening public financial management and enhancing service delivery. The study concluded that digital tax platforms significantly improve both revenue generation and capital project funding in Nigeria. Technologies such as e-filing, automated payment systems, and blockchain increase tax collection efficiency, reduce leakages, and promote accountability in public finance. These innovations enable the government to mobilize more domestic resources and allocate them more effectively towards development goals. It was therefore recommended that the government should expand and modernize its digital tax infrastructure nationwide to ensure broader adoption among taxpayers and administrators. Secondly, continuous training and capacity development programs for tax officials and IT staff should be institutionalized to optimize the use of digital platforms. Furthermore, clear guidelines on the implementation and oversight of digital tax platforms, especially blockchain systems, should be enacted to boost trust and compliance. Lastly, efforts should be intensified to sensitize the public to the benefits and use of digital tax systems to foster voluntary compliance.

This study provides empirical evidence on the efficacy of digital tax platforms in enhancing government revenue and public investment in a developing country context. It bridges the gap between technological innovation and public finance performance, contributing to both academic and practical understanding of digital transformation in tax administration. The integration of blockchain technology into the tax ecosystem is highlighted as a key innovation that strengthens transparency and accountability. The findings reinforce the technology acceptance model (TAM) by showing that perceived usefulness and ease of use drive the adoption of digital tax platforms. It supports the public finance theory, demonstrating how improved revenue mechanisms enable efficient public spending and infrastructure development. For practitioners, the study advocates for an increased role of digital accounting tools and automation in public sector financial management, ensuring accuracy, real-time reporting, and enhanced audit trails. Policy makers are encouraged to prioritize digital transformation policies in tax administration, recognizing its role in improving fiscal sustainability and development financing. There is a need for collaborative policy formulation involving tax authorities, IT experts, and financial planners to create an ecosystem that supports innovation and compliance. Policies should also promote inter-agency data integration and interoperability to ensure seamless information flow and improved service delivery.

Future research could investigate the sector-specific impacts of digital tax platforms on different industries (e.g., manufacturing, agriculture, digital economy). Cross-country comparisons in sub-Saharan Africa can offer deeper insights into the regional effectiveness of digital tax technologies. Tracking changes over time would help in understanding the long-term effects of digital tax implementation on fiscal performance and economic development. Further studies could explore how digital platforms influence taxpayer attitudes, trust, and compliance behavior.

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