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Effect of tax innovation and capacity building on financial sustainability of the Nigeria Revenue Service

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Abstract

Purpose: The revenue authorities in both developed and developing nations, including Nigeria, continue to grapple with challenges such as widespread tax evasion, low voluntary compliance, and weak technological frameworks. These issues underscore the pressing need for integrated strategies that combine tax innovation with institutional capacity building to foster financial sustainability. This study investigated the effect of tax innovation and capacity building on the financial sustainability of the Nigeria Revenue Service (NRS).

Methodology: The study adopted a descriptive survey design and stratified sampling. The data were collected from a sample of 294 employees, drawn from a total population of 1,112 NRS staff across the six North Central states in Nigeria. The analysis employed Partial Least Squares Structural Equation Modeling (PLS-SEM).

Results and conclusion: Results showed that tax innovation has a strong and statistically significant positive effect on financial sustainability ($\beta = 0.525$, $p = 0.000$), while capacity building has an insignificant effect on financial sustainability ($\beta = 0.175$, $p = 0.140$). However, capacity building significantly moderated the relationship between tax innovation and financial sustainability ($\beta = 0.138$, $p = 0.048$). The study concluded that tax innovation substantially enhanced financial sustainability.

Implication of findings: Findings indicated that innovation in tax processes reduces inefficiencies, enhances compliance, and strengthens revenue collection, all of which contribute to a more financially sustainable tax system. However, suggesting that capacity-building efforts alone may not independently translate into sustainable financial outcomes within NRS, and both strategies should be integrated for optimal results.

Keywords: Capacity building; Financial sustainability; Tax innovation, Nigerian Revenue Service.

1. Introduction

Financial sustainability has become a central concern for nations across the globe, as governments grapple with mounting public expenditures, volatile global economic conditions, and increasing demands for service delivery (Achola et al., 2023; Shava, 2021). In advanced economies, financial sustainability is often supported by diversified revenue sources, strong institutional frameworks, and adaptive tax systems that leverage innovation and digitalization (Hole, 2025; Huayu, 2025). Countries like the United States, the United Kingdom, and Canada have invested heavily in modern tax technologies and human capital development to optimize revenue mobilization and reduce dependency on borrowing (Hamzah, 2025; Sakanga et al., 2020). These strategic efforts ensure the long-term stability of government finances and resilience in the face of economic shocks (Lubega, 2021; Musambaki, 2023).

In developing economies, particularly in Africa, achieving financial sustainability remains a significant challenge due to narrow tax bases, low compliance levels, high informality, and limited institutional capacity (Ebenezer et al., 2020). Many African countries, including Nigeria, continue to experience budgetary constraints, revenue leakages, and overreliance on volatile natural resource income (Shava, 2021; Abdullahi et al., 2025). Nigeria, Africa's largest economy, faces pressing concerns around revenue generation and fiscal sustainability, as the cost of governance and developmental needs increases, while non-oil revenues remain suboptimal (Purwanto, 2020). Despite ongoing tax reforms and policy shifts,

the country's financial sustainability is frequently undermined by systemic inefficiencies and the limited capacity of revenue authorities (Musambaki, 2023; Lubega, 2021).

To address these challenges, the focus is increasingly shifting toward tax innovation and capacity building as critical enablers of sustainable public finance (Huayu, 2025; Hole, 2025). Tax innovation, encompassing the use of digital platforms, data analytics, artificial intelligence, and automated tax systems, holds significant potential in expanding the tax net, improving transparency, and minimizing leakages (Manzhura, Pochenchuk, & Kraus, 2022; Xu et al., 2023). Equally important is capacity building in developing the skills, competencies, and institutional capabilities of tax officials to effectively manage complex tax environments, adapt to technological changes, and ensure policy compliance (Nkaye, 2024; Friday, Lawal, Ayodeji, & Sobowale, 2022; Sakanga et al., 2020).

In the Nigerian context, the Federal Inland Revenue Service (FIRS), which was renamed the Nigerian Revenue Service (NRS) in January 2026, plays a pivotal role in driving tax-based financial sustainability. The agency has embarked on several modernization initiatives, yet persistent issues such as inadequate staff training, poor infrastructure, and slow adoption of innovative tax technologies hinder optimal performance (Cheuk, 2021; Trihantoyo, 2024). Given these challenges, this study, therefore, seeks to examine the role of tax innovation and capacity building in enhancing the financial sustainability of Nigeria, using NRS as a focal point. The aim is to provide empirical evidence on how strategic reforms in these areas can strengthen Nigeria's revenue system and promote fiscal stability in the long term.

Despite various reform initiatives over the past two decades, the financial sustainability of Nigeria's revenue agencies remains fragile and uncertain (Achola et al., 2023; Ebenezer et al., 2020). Nigeria's tax-to-GDP ratio has persistently lagged behind the African average, indicating a limited capacity to mobilize domestic revenue effectively (Shava, 2021). Issues such as poor tax compliance, a large informal sector, outdated tax laws, low technological adoption, and limited diversification of revenue sources have collectively hindered the tax system's ability to support national development sustainably (Musambaki, 2023; Purwanto, 2020). While digital tax reforms have been introduced, their impact has been mixed due to inadequate integration, a lack of real-time data, and resistance to change within the tax administration ecosystem (Manzhura et al., 2022; Xu et al., 2023).

A critical challenge is the insufficient investment in institutional and human capacity building to support innovative tax systems (Nkaye, 2024; Sakanga et al., 2020). Many tax officials lack the technical expertise to effectively utilize modern tax technologies and data-driven tools for compliance monitoring, risk profiling, and revenue forecasting (Friday et al., 2022; Trihantoyo, 2024). Moreover, there is a disconnect between the pace of technological adoption and the readiness of the administrative infrastructure to support such transformations (Cheuk, 2021; Hole, 2025). Without sustained training, strategic leadership, and a culture of innovation, even the best-designed tax reforms may fail to deliver long-term financial sustainability (Hamzah, 2025; Huayu, 2025). Therefore, this study seeks to explore the pressing question of how tax innovation and capacity building can be strategically aligned to strengthen the operational performance and financial resilience of revenue agencies in Nigeria.

Despite numerous tax reforms and the introduction of digital platforms, Nigeria continues to experience challenges in achieving stable and predictable public revenues (Lubega, 2021; Shava, 2021). Limited institutional capacity and gaps in human capital development have often undermined the effectiveness of tax innovation initiatives (Nkaye, 2024; Ebenezer et al., 2020).

The main objective of this study is to examine the role of tax innovation and capacity building in enhancing financial sustainability in the Nigeria Revenue Service (NRS), Nigeria. The specific objectives are to assess the effect of tax innovation on the financial sustainability of the Nigeria Revenue Service (NRS); examine the impact of capacity building programs on the financial sustainability of the Nigeria Revenue Service (NRS); evaluate the moderating effect of capacity building on the relationship between tax innovation and the financial sustainability of the Nigeria Revenue Service (NRS).

2. Literature review

Tax innovation, capacity building, and financial sustainability

Tax innovation refers to the creative transformation of tax systems, policies, and technologies to make taxation more efficient, transparent, and growth-oriented (Huayu, 2025). Tax innovation is about reimaging how taxes are collected, managed, and used, especially in a digital-NRSt economy (Hole, 2025). According to Manzhura et al. (2022) and Tsindeliani et al. (2019), tax innovation is the introduction of digital systems and new approaches in tax administration, such as e-filing, automated tax collection, and data analytics (Manzhura, Pochenchuk, & Kraus, 2022; Tsindeliani, Kot, Vasilyeva, & Narinyan, 2019). The fundamental aspects of tax innovation encompass a range of modern tools and strategies designed to enhance the efficiency, transparency, and effectiveness of tax administration. The innovation includes digital platforms, smart tax policies, data-driven compliance, cross-border taxation, and simplified tax codes. The digital platforms, such as e-filing systems and online payment portals, streamline tax processes and improve accessibility for taxpayers (Okello et al., 2020; Lunina et al., 2020). Smart tax policies leverage technology and behavioral insights to design responsive, equitable, and growth-friendly tax systems (Xu et al., 2023; Brokelind & van Thiel, 2020). Data-driven compliance uses analytics and artificial intelligence to detect non-compliance, monitor taxpayer behavior, and enhance audit precision (Olorunfemi & Odewole, 2025). Cross-border taxation addresses challenges in taxing digital services and multinational corporations, ensuring fair revenue allocation in a globalized economy (Radulescu et al., 2025). Lastly, simplified tax codes reduce complexity, encourage voluntary compliance, and make it easier for both tax authorities and taxpayers to understand and fulfill their obligations (Al Karabsheh et al. 2021; Deyganto, 2022). Collectively, these innovations are essential for building a modern, resilient, and inclusive tax system (Tingbani et al., 2021).

Capacity building refers to the continuous process of developing and strengthening the skills, systems, competencies, and resources that organizations and individuals require to function effectively and sustainably (Nkaye, 2024). Within the framework of a tax revenue agency, such as the Nigeria Revenue Service (NRS) in Nigeria, capacity building encompasses the enhancement of institutional structures, technological infrastructure, and human capital necessary for the efficient execution of tax policies, improved taxpayer compliance, and increased revenue mobilization (Friday, Lawal, Ayodeji, & Sobowale, 2022). This process involves regular staff training, the integration of advanced information systems, the optimization of operational workflows, and the promotion of a culture of accountability, innovation, and performance (Cheuk, 2021). In light of increasing fiscal pressures and the demand for more transparent and technology-driven tax systems, effective capacity building is indispensable for fostering financial sustainability and driving digital transformation in tax administration (Ansong, Okumu, & Koomson, 2023). More specifically, it includes professional development initiatives, institutional reforms, and knowledge management strategies aimed at strengthening the financial management capabilities and long-term sustainability of revenue (Christina et al., 2022)

Financial sustainability refers to the ability of an organization, government, or institution to manage its financial resources efficiently to ensure long-term viability, meet ongoing obligations, and support future

development without over-reliance on unsustainable external funding sources (Achola et al., 2023; Lubega, 2021). It entails the capacity to generate stable and predictable revenues sufficient to cover operational costs, enable investment in growth opportunities, and withstand economic shocks (Musambaki, 2023; Ebenezer et al., 2020). In the public sector, financial sustainability is inherently tied to effective domestic resource mobilization, fiscal prudence, and transparent public financial management systems (Shava, 2021). For developing economies like Nigeria, financial sustainability is of particular importance due to heavy dependence on volatile oil revenues, mounting public debt, and rising demands for essential services such as infrastructure, healthcare, and education (Hamzah, 2025). Strengthening internal institutional capabilities, enhancing tax administration, and leveraging innovative financial and technological tools are essential strategies to boost domestic revenue, minimize fiscal imbalances, and safeguard long-term economic resilience (Purwanto, 2020; Oyewumi, 2025; Hamzah, 2025).

Theoretical framework

The theoretical foundation for assessing the effect of tax innovation on financial sustainability is rooted in Schumpeter's Theory of Innovation (Schumpeter, 1934), which posits that innovation is the driving force of economic development and institutional transformation. The theory assumes that introducing new methods, technologies, or systems into economic structures can significantly enhance productivity, efficiency, and value creation (Lubega, 2021; Musambaki, 2023). In the context of tax administration, this theory suggests that innovative tax practices such as digital filing systems, automated audit tools, and data-driven compliance can strengthen revenue generation and thus enhance financial sustainability (Acholanet et al., 2023). The assumption here is that a more innovative and technologically advanced tax system leads to increased efficiency, reduced leakages, and improved public revenue performance, aligning with the NRSt research objective.

For the second and third objectives, the Resource-Based Theory (RBT) by Barney (1991) provides a suitable lens. RBT assumes that an organization's internal resources, if valuable, rare, inimitable, and non-substitutable, can lead to sustained advantage. For the Nigeria Revenue Service (NRS), capacity building represents a strategic resource, encompassing human expertise, institutional capabilities, and technological competencies necessary for effective tax administration (Ebenezer, Musah, & Ahmed, 2020; Shava, 2021). This theory supports the view that capacity-building programs can directly impact financial sustainability by enhancing the effectiveness of tax officers and administrative processes (Hamzah, 2025). Moreover, the theory implies that capacity building can moderate the relationship between tax innovation and financial sustainability by ensuring that the workforce and systems are adequately prepared to implement and sustain innovative practices (Purwanto, 2020). The underlying assumption is that without the necessary capacity, tax innovations may not translate into improved outcomes, thereby reinforcing the third objective of the study.

Empirical review

Empirical evidence from various international studies underscores a growing consensus that tax innovation plays a significant role in promoting financial sustainability**,** as many studies have examined the tax innovation and financial sustainability in different ways and approaches across the world. In the context of Russia, Tsindeliani et al. (2019) investigated the transformation of the Russian tax system through digital innovation and administrative modernization. The study found that there have been the state's efforts to build a comprehensive tax information infrastructure, which is expected to improve tax compliance, reduce evasion, and ultimately strengthen the financial stability of the public sector. A parallel theme is observed in Manzhura et al. (2022)**,** who examined the Ukrainian tax system innovation

amid digital transformation and their impact on financial sustainability. Their study supported the idea that innovation in tax administration**,** including the use of digital platforms and tools, increases tax transparency, and contributes to both macroeconomic and fiscal stability.

Similarly, Bongomin et al. (2020) assessed how transaction tax exemptions can boost the use of digital financial services innovation in developing countries. Their findings indicated that tax reliefs on digital **innovations** like mobile money services significantly enhance financial inclusion**,** which is seen as a core driver of long-term financial sustainability, especially in the context of the Sustainable Development Goals (SDGs). From a sector-specific angle, Al Karabsheh et al. (2021) examined the impact of tax increases on the financial sustainability of Jordanian banks. The study found that excessive tax burdens can negatively affect profitability and financial endurance, indicating that a balanced tax policy is essential to sustain financial institutions**.**

Qi et al. (2020) focused on China's regional innovation system and provided empirical evidence that fiscal and tax incentives targeted at R\&D activities significantly enhance regional innovation capability. The study applied text-based analysis and Python tools for data analysis. The study found that tax policy tools such as R\&D tax credits have a strong incentivizing effect on local innovation ecosystems, contributing indirectly to long-term financial stability by fostering competitive, innovation-driven growth. Samoilikova et al. (2021) reinforce this view by exploring the causal relationship between innovation-focused tax incentives and macroeconomic stability. Their study found that tax incentives not only spur innovation activity but also enhance economic performance.

Xu et al. (2023) and Radulescu et al. (2025) further delved into the intersection between tax incentives and green innovation. Xu et al. provided empirical support that fiscal and tax incentives positively influence corporate innovation efficiency, especially when mediated through access to external financing. At the policy level, Brokelind and van Thiel (2020) advocated for sustainable tax policies that integrate innovation, revealed that well-designed tax systems can promote not only economic growth but also long-term financial sustainability. This aligns with the findings of Lunina et al. (2020), who emphasize that innovation-based tax reforms, including reducing the corporate income tax burden and introducing R&D incentives, are vital for creating fiscal space and enhancing resilience. Micro-level insights are provided by Deyganto (2022), who found that tax incentive practices were critical for the survival and sustainability of MSMEs in Ethiopia during the COVID-19 pandemic. This is consistent with Tingbani et al. (2021), whose study on OECD countries shows that environmental taxes and financial constraints significantly influence innovation in SMEs, with implications for their financial sustainability.

From an environmental perspective, Hakimova et al. (2021) compared eco-innovation with environmental taxation, concluding that while both tools contribute to fiscal revenue and innovation, eco-innovation strategies tend to be more effective for long-term budgetary health and environmental outcomes. This is echoed by Arthur et al. (2022), who found that eco-innovation mediates the effect of both tax and non-tax policies on the financing of a sustainable economy. The study argued that policy synergies between taxation and innovation create a reinforcing loop that enhances fiscal sustainability and environmental resilience. Further environmental connections are made by Ali et al. (2023) examined five green economies and demonstrate that environmental taxes and innovation policies are both necessary to achieve sustainability goals. Their study links innovation-friendly fiscal policy directly to lower carbon emissions and stronger environmental performance, reinforcing the role of taxation in sustainable development.

A broader perspective is provided by Kouam and Asongu (2022), who review literature on taxation and social innovation in developing countries. The study found that well-structured tax systems encourage inclusive and socially sustainable innovation, reinforcing the idea that tax innovation is a lever for achieving the Sustainable Development Goals (SDGs). Liu and Zhang (2023) investigated tax reduction policies and their effects on fiscal sustainability in China, finding that well-targeted reductions especially those aimed at stimulating innovation and investment can improve fiscal sustainability when balanced with measures to prevent revenue shortfalls or fiscal distortions. The role of tax incentives for MSMEs is critically examined by Prianto et al. (2024) showed that creative tax compliance, planning, and government-provided tax relief during and after the pandemic were essential in sustaining small businesses. Their findings suggest that flexible and innovation-friendly tax regimes can stabilize MSMEs during economic shocks, contributing to broader fiscal health.

The relationship between capacity building and financial sustainability has been examined and viewed by different researchers with diverse findings empirically. For instance, the study by Nkaye (2024) focused on non-governmental organizations (NGOs) in Bugiri District and provided compelling evidence on the crucial role of capacity building, particularly in financial planning, budgeting, and management training in enhancing the financial sustainability of NGOs. The study revealed that NGOs with structured training and institutional capacity development programs were better equipped to maintain financial viability over time. This aligns with the findings of Cheuk (2021) in the Malaysian charity sector, where financial management capacity, own income generation, and revenue diversification were empirically shown to significantly influence financial sustainability. Both studies reinforce the proposition that targeted capacity building, especially in financial competencies, is a strong predictor of organizational sustainability in non-profit contexts.

Further support for the capacity-sustainability nexus comes from Ansong, et al. (2023), who examined financial capability efforts across Africa. Their work highlighted that asset-building interventions, coupled with post-onboarding capacity building initiatives, helped strengthen the financial security of individuals and community-based organizations. Similarly, Trihantoyo (2024) found that school capacity development significantly mediates the relationship between financial management capabilities and school sustainability in Malaysia, suggesting that institutional learning and development not only influence immediate performance but also long-term sustainability outcomes. These studies emphasize that ongoing training, leadership development, and financial literacy are indispensable tools in achieving sustainable operations.

In fragile and developing economies, Friday and Lawal (2022) proposed a strategic model for institutional capacity building, especially in internal financial controls and compliance. Their model, developed through a contextual analysis of public and private sector experiences, demonstrates that robust financial governance systems fostered through strategic capacity building are foundational to achieving financial stability and sustainability. Similarly, in the Indonesian banking sector, Christina, et al. (2022) emphasized that talent management, training, and internal systems development are essential for the long-term sustainability of financial institutions, further cementing the consensus that capacity building plays a pivotal role across organizational types and national contexts.

Additionally, Musyoka (2023) in Kenya explored how financial accountability practices such as budgeting, monitoring, and control, when strengthened through capacity building contribute to the financial sustainability of microfinance institutions. These findings are echoed by Achola, et al. (2023), who argued that financial sustainability is positively influenced by capacity-driven initiatives,

particularly those that encourage prudent resource utilization and strategic financial planning. Both studies point to the mediating role of organizational capacity in the relationship between financial controls and sustainable outcomes.

Finally, the work of Babajide et al. (2020) added a gender and entrepreneurship lens by showing that capacity building, when integrated into programs targeting women entrepreneurs in sub-Saharan Africa, had a meaningful impact on their financial inclusion, access to funding, and ultimately, their financial sustainability. For instance, Lubega (2021) assessed the relationship between capacity building and financial sustainability of a microfinance institution in Uganda and revealed that institutions with stronger internal controls and trained personnel are more likely to remain financially sustainable. These findings emphasize that building managerial and technical competence is foundational not only to improving fiscal health but also to fostering resilient systems that adapt to external shocks.

Musambaki (2023) examined the components of internal capacity building as mediators in achieving sustainability in Kenya. This perspective supports Ebenezer, et al. (2020) who linked financial sustainability directly to financial capacity, showing that inadequate internal financial skills, tools, and processes severely compromise long-term viability. These studies collectively reinforce that strengthening financial systems and managerial competencies through structured capacity building can mitigate the adverse effects of inconsistent external funding.

In a broader development context, Shava (2021) used resource dependency theory to analyze NGOs in rural Zimbabwe and found that overreliance on donor funding, coupled with limited internal capabilities, led to financial instability. This is in line with Sakanga et al. (2020), who demonstrated how building financial management capacity within local health initiatives in Zambia enhanced community ownership and long-term financial viability of development interventions. Both studies show that equipping organizations with financial autonomy through internal learning and operational empowerment is essential for their sustainability.

From a sector-specific perspective, Bohorquez et al. (2023) presented a five-step framework to improve the financial sustainability of marine protected areas (MPAs). One of the core steps emphasized capacity building among managers and stakeholders to enhance funding strategies and accountability. Complementing this, Sherraden and Ansong (2016) argued that transitioning from financial literacy to financial capability is key to long-term financial stability. They emphasized the importance of financial education, behavioral change, and institutional support, all foundational components of effective capacity building. These works shift the focus from organizational development alone to individual and systemic capacity building as essential pillars for enduring financial s

Additional insights are provided by Hamzah (2025) who explored internal capabilities as drivers of SME financial sustainability, using a Resource-Based View (RBV) framework. The study showed that in environments with scarce financial resources, the presence of organizational learning, employee competencies, and strategic alignment, all elements of capacity building are key enablers of sustainability. This aligns with Purwanto (2020), whose research on CSR in SMEs revealed that financial capacity development, paired with organizational learning, significantly improved social and financial performance. These studies demonstrate the cross-sectoral relevance of capacity building, especially in environments constrained by external financing.

Research gaps

This study aims to examine the impact of tax innovation and capacity building on the financial sustainability of the Nigeria Revenue Service (NRS) in Nigeria, including the moderating effect of capacity building. However, the empirical review predominantly draws from international contexts, such as the digital tax system transformations in Russia (Tsindeliani et al., 2019) and Ukraine (Manzhura et al., 2022), or the impact of tax increases on Jordanian banks (Al Karabsheh et al., 2021). While these studies, along with others on green innovation (Xu et al., 2023; Radulescu et al., 2025) and SME resilience (Deyganto, 2022; Prianto et al., 2024), highlight the role of tax innovation and incentives in financial sustainability, there is a limited specific empirical evidence or detailed discussion directly related to Nigeria's unique tax landscape and the NRS. This creates a significant contextual gap, as the generalizability of findings from diverse economies to the Nigerian context remains largely unexplored.

Furthermore, while the document extensively covers tax innovation and capacity building in relation to financial sustainability, drawing on works of Nkaye (2024) and Cheuk (2021) on capacity building in NGOs, and Ansong, Okumu, and Koomson (2023) on financial capability efforts, there is an absence of explicit empirical evidence or in-depth analysis regarding the moderating effect of capacity building on the relationship between tax innovation and financial sustainability. Musyoka (2023) and Achola, Ombok, and Kiganda (2023) discussed the positive influence of capacity-driven initiatives on financial sustainability, but they did not specifically address its moderating role in the context of tax innovation. This leaves a critical gap in understanding how enhanced capacity building specifically influences the effectiveness of tax innovation initiatives in achieving financial sustainability within the Nigerian context, thereby limiting the practical implications for policy and implementation.

Guided by the empirical review, the following hypotheses were formulated in null form.

H1: Tax innovation has no significant effect on the financial sustainability of the Nigeria Revenue Service (NRS).

H2: Capacity building has no significant effect on the financial sustainability of the Nigeria Revenue Service (NRS).

H3: Capacity building has no significant moderating role on the relationship between tax innovation and the financial sustainability of the Nigeria Revenue Service (NRS).

3. Methodology

The study adopted a survey research design, utilizing structured questionnaires to collect primary data from selected staff of the Nigeria Revenue Service (NRS) across Nigeria. A stratified sampling technique was employed to ensure equal representation, with a target population of 1,112 respondents. Based on Taro Yamane's formula, a sample size of 294 was determined. For data analysis, the study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS4 software. The measurement model was assessed using the PLS-SEM algorithm to confirm construct reliability and validate the factor structure, while the structural model assessment was conducted to test the hypothesized relationships and the moderating effects among the constructs. Figure 1: Calculation of sample size, $n= N/1+N(e)^2 = 1112/(1+(1112 \times 0.0025) = n \approx 294.44$

To ensure diverse and relevant insights, the study targeted nine categories of staff from strategic departments within the NRS, including: Tax Operations, Assessment Officers, ICT and Digital Innovation Staff, Human Resources and Training Officers, Strategy, Policy and Research Personnel, Finance, and Revenue Reporting Officers. These categories were deliberately selected based on their

direct roles in tax innovation, training, policy development, digital systems, and financial performance monitoring: key areas related to the study's objectives. Respondents were drawn from the NRS head office in Abuja and other top revenue-generating states, ensuring national coverage and operational relevance. Only officials with a minimum of ten years' experience in tax administration practices, policy, or IT systems were included, as they possess the depth of knowledge needed to accurately evaluate the impact of innovation and capacity building on financial sustainability. All questionnaire items were rated on a 5-point Likert scale to quantify perceptions and facilitate robust statistical analysis.

For effective and representative data collection, this study centered its strategic focus on the NRS offices in Abuja and Lagos State, where a significantly higher number of staff are deployed compared to other states in Nigeria. These two locations serve as central operational hubs for the Nigeria Revenue Service: Abuja houses the national headquarters where major role in policy formulation, strategic planning, and overall tax governance, while Lagos, as Nigeria's commercial capital, contributes the largest share to national tax revenue and operates high-volume tax administration activities. Due to their larger staff strength, concentration of specialized departments, and higher levels of tax innovation and digitalization, staff in these offices are better positioned to provide informed insights on the role of tax innovation and capacity building in enhancing financial sustainability. Including respondents from these locations ensures the study captures a more accurate picture of NRS's operations and reform outcomes at both policy and execution levels.

Table 1: Population and sample size distribution by location

Location	Estimated Staff Population	Percentage of Total (%)	Sample Size Allocation
NRS HQ FCT Abuja	512	46.0%	135
NRS Benue State Office	100	9.0%	26
NRS Kogi State Office	95	8.5%	25
NRS Kwara State Office	92	8.3%	24
NRS Nasarawa State Office	90	8.1%	24
NRS Niger State Office	112	10.1%	30
NRS Plateau State Office	111	10.0%	30
Total	**1,112**	**100%**	**294**

Source: Author's Compilation from Survey Questionnaire (2025).

The population and sample size distribution presented in the Table reflect a strategic allocation of respondents based on the staff strength of NRS offices across Nigeria. Out of the total staff population of 1,112, the Abuja headquarters (HQ) accounts for the highest proportion, with 512 staff members (46.0%), and accordingly, the largest sample size of 135 respondents was allocated to this location. This is justified by Abuja's role as the national administrative and policy center of NRS, where major operational, strategic, and decision-making functions are concentrated, hosting core departments relevant to tax innovation and capacity building. The remaining respondents were proportionately distributed among state offices within the North Central zone to ensure regional representation. Specifically, the NRS office in Benue State, with 100 staff (9.0%), was allocated 26 respondents, while Kogi State, with 95 staff (8.5%), received 25 respondents. Similarly, the office in Kwara State with 92 staff (8.3%) was assigned 24 respondents, and Nasarawa State with 90 staff (8.1%) also received 24 respondents. 30 respectively the offices in Niger State and Plateau State, with staff populations of 112 (10.1%) and 111 (10.0%)

respectively, were allocated 30 respondents each. This proportional sampling approach ensures that each office is represented according to its staff capacity, thereby improving the representativeness, reliability, and analytical validity of the study while adequately capturing institutional perspectives across the North Central operational structure of the NRS.

4. Results and discussion

The results are presented in a table and graphical format using a measurement and structural model.

Measurement model assessment

Measurement Model using Quality. The measurement model was assessed using established PLS-SEM Algorithm quality criteria, including construct reliability, validity, and discriminant validity via cross-loadings. Collinearity diagnostics were also evaluated, with results presented in Tables 1 and 2.

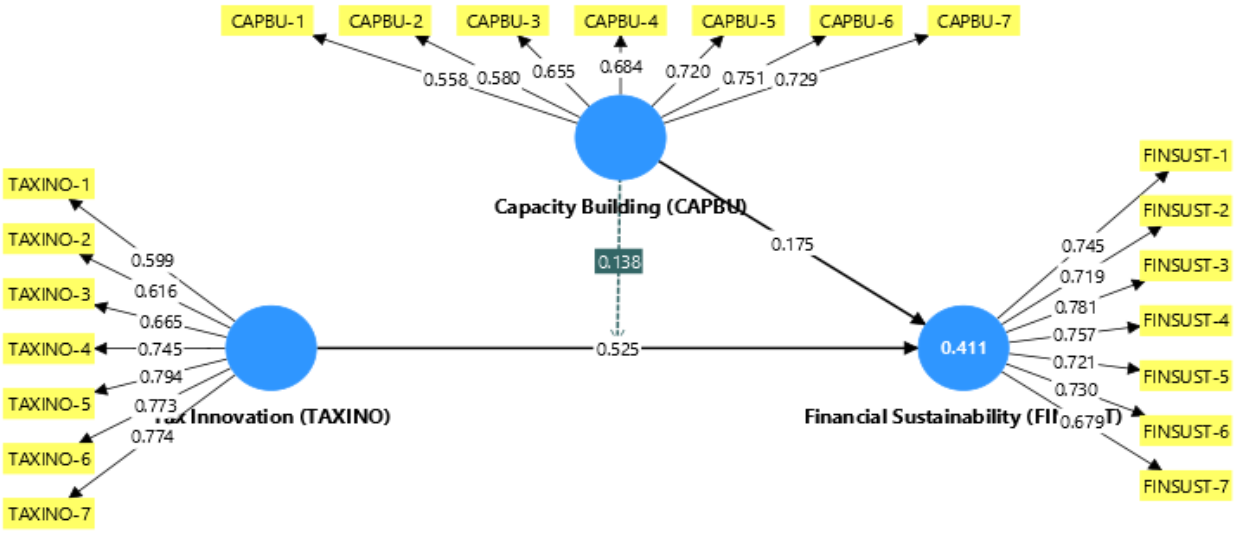
Table 2: Construct reliability and validity

Constructs	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Tax Innovation (TAXINO)	0.838	0.848	0.878	0.509
Capacity Building (CAPBU)	0.801	0.848	0.851	0.501
Financial Sustainability (FINSUST)	0.857	0.863	0.891	0.538

Source: Author's Computation (2025).

Table 2 presents the construct reliability and validity results for the three key constructs: Tax Innovation, Capacity Building, and Financial Sustainability. The Cronbach's alpha values for all constructs range from 0.801 to 0.857, exceeding the acceptable threshold of 0.70, which indicates strong internal consistency. Similarly, both the rho_A and composite reliability (rho_C) values fall within the range of 0.848 to 0.891, confirming the reliability and internal coherence of the measurement model. The Average Variance Extracted (AVE) values are also satisfactory, with all constructs exceeding the minimum benchmark of 0.50, demonstrating adequate convergent validity, as each construct explains more than half of the variance in its indicators. These findings collectively validate the robustness and reliability of the measurement constructs, as further illustrated in the graphical representation of the measurement model derived through the PLS-Algorithm.

Figure 2: Graphical Representation of Measurement Model via Basic PLS-Algorithm



Source: SmartPLS4 output.

Table 3: Discriminant validity and collinearity

Indicators	Items	Cross Loadings	VIF
TAXINO-1	Use of digital platforms for e-filing systems for tax returns and tax remittances	0.599	1.311
TAXINO-2	Use of data analytics to detect tax evasion and fraud.	0.616	1.320
TAXINO-3	Automation of tax audit and compliance processes.	0.665	1.407
TAXINO-4	Use of artificial intelligence in tax collection and Introduction of mobile tax payment options.	0.745	1.676
TAXINO-5	Simplified tax codes and implementation of real-time tax monitoring tools.	0.794	1.844
TAXINO-6	Digital communication channels for taxpayer engagement.	0.773	1.415
TAXINO-7	Innovation in tax administration and system policy design to improve compliance.	0.774	1.709
CAPBU-1	Frequency of professional training for tax officers and tax consultants/agents.	0.558	1.989
CAPBU-2	Access to modern IT tools for tax administration.	0.580	1.664
CAPBU-3	Adequacy of staffing and resource allocation, and Availability of continuous learning programs.	0.655	2.072
CAPBU-4	Competency development in tax law and compliance.	0.684	1.981
CAPBU-5	Supportive leadership and strategic direction, through efficiency in skills, systems, competencies, and resources.	0.720	1.777
CAPBU-6	Collaboration with external training institutions.	0.751	1.748
CAPBU-7	Internal knowledge-sharing and mentorship programs.	0.729	1.686
FINSUST-1	Stability of internally generated revenue over time.	0.745	1.406

FINSUST-2	Ability of the revenue agency to meet operational costs without external support.	0.719	1.727
FINSUST-3	Reduction in budget deficits from improved revenue.	0.781	1.886
FINSUST-4	Efficiency in tax collection relative to cost.	0.757	1.837
FINSUST-5	Reduction in tax arrears and leakages.	0.721	2.196
FINSUST-6	Increase in voluntary tax compliance credentials.	0.730	2.016
FINSUST-7	Improved forecast accuracy for revenue planning.	0.679	2.735

Source: Author's Computation (2025).

Table 3 presents the discriminant validity and collinearity statistics for the measurement model, based on the PLS-Algorithm output. The cross-loadings indicate that all items load adequately on their respective constructs, such as Tax Innovation, Capacity Building, and Financial Sustainability, with values ranging from 0.558 to 0.794, demonstrating acceptable construct validity, which fall within the thresholds of the value above 0.5 (good) and 0.7 (excellent). Notably, items such as TAXINO-5 (0.794), CAPBU-6 (0.751), and FINSUST-3 (0.781) show strong individual item reliability. The variance inflation factor (VIF) values, which range from 1.311 to 2.735, are well below the common threshold of 5, suggesting no multicollinearity issues among the indicators. These results are supported by the graphical representation of the measurement model assessed through the PLS-SEM Algorithm, which visually confirms the appropriate factor loadings and construct associations, thereby validating the measurement model's reliability and discriminant validity.

Figure 3: Graphical representation of structural equation model

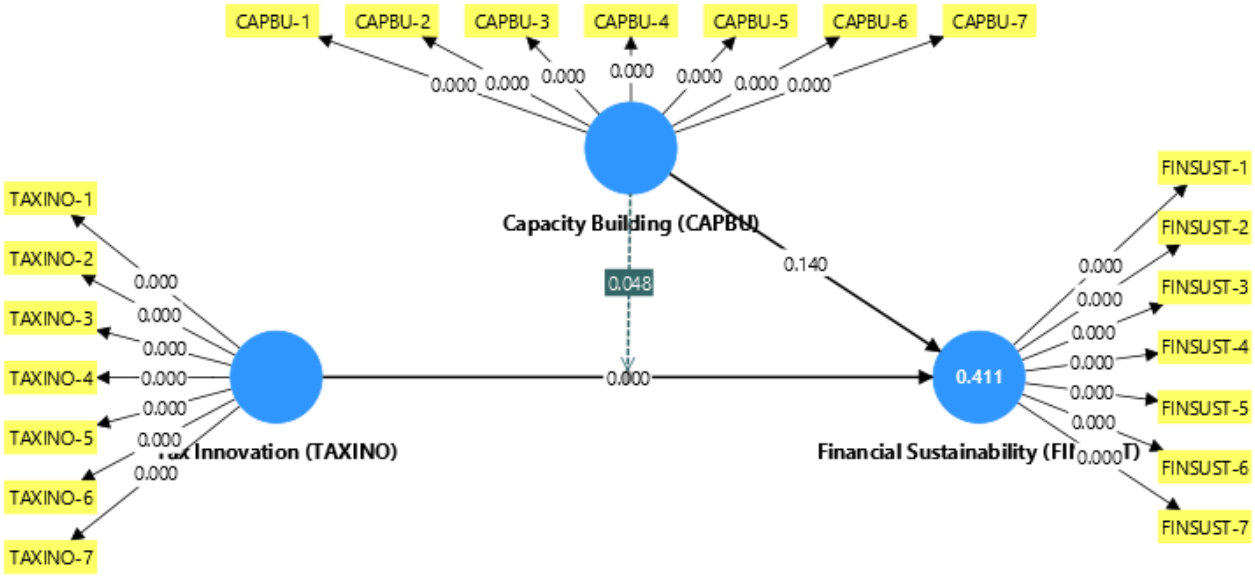


Figure 2: Graphical Representation of Measurement Model via Basic PLS-Algorithm

Structural model for testing hypotheses

The structural model was evaluated through bootstrapping of 5000 resamples to test the study's hypotheses using path coefficient analysis. Table 4 presents the results, including original sample estimates, standard deviations, t-statistics, and p-values.

Table 5: Path coefficient

Constructs	Original Sample (O)	Sample mean (M)	Std.dev	T statistics	P values
TAXINO -> FINSUST	0.525	0.522	0.105	5.004	0.000
CAPBU -> FINSUST	0.175	0.203	0.119	1.478	0.140
CAPBU x TAXINO -> FINSUST	0.138	0.118	0.070	1.975	0.048

Source: Author's Computation (2025).

The results from Table 5 show that Tax Innovation (TAXINO) has a strong and statistically significant positive effect on Financial Sustainability (FINSUST) of the revenue agency, with a path coefficient of 0.525 ($p = 0.000$, $t = 5.004$). This result implies that tax innovation has a strong and statistically significant positive effect on the financial sustainability of the Nigeria Revenue Service (NRS). In practical terms, this means that as NRS continues to adopt and implement digital platforms, real-time monitoring systems, data analytics, and other technological innovations, its ability to generate stable and sufficient revenue over time improves. It highlights that innovation in tax processes reduces inefficiencies, enhances compliance, and strengthens revenue collection, all of which contributes to a more financially sustainable tax system. This finding is consistent with prior studies such as Tsindeliani et al. (2019) and Manzhura et al. (2022**)**, who found that digital innovation and the modernization of tax systems in Russia and Ukraine, respectively, enhanced tax compliance and improved financial stability. The significant relationship also aligns with Schumpeter's Innovation Theory (1934**)**, which posits that innovation through the introduction of new tools, processes, or methods can transform institutional performance and economic structures. Similarly, Qi et al. (2020) and Samoilikova et al. (2021) demonstrated how tax incentives and innovation-friendly policies contribute to macroeconomic and fiscal stability, reinforcing the idea that technological advancement in tax administration can directly enhance long-term financial sustainability.

On the other hand, the relationship between Capacity Building (CAPBU) and Financial Sustainability (FINSUST) ($\beta = 0.175$, $p = 0.140$) was not statistically significant, suggesting that capacity-building efforts alone may not independently translate into sustainable financial outcomes within NRS. This result indicates that capacity building has a positive but statistically non-significant effect on financial sustainability. Although capacity-building efforts, such as staff training, leadership development, and systems improvement, may intuitively seem beneficial, this finding suggests they may not directly translate into better financial outcomes unless properly aligned with operational performance metrics or integrated with other strategic initiatives. For NRS, this means that capacity building in isolation may not yield measurable improvements in revenue sustainability. It raises the need for a more targeted and performance-driven approach to capacity development, ensuring that it directly supports core revenue functions. This contrasts with findings from Nkaye (2024) and Cheuk (2021), who emphasized that structured capacity development programs in NGOs and charities significantly enhanced financial sustainability. However, this apparent contradiction can be interpreted through the lens of the Resource-Based Theory (Barney, 1991), which highlights that organizational resources such as skilled personnel and internal systems must not only exist but must also be valuable, rare, and well-deployed to produce a sustainable advantage. It is possible that within NRS, capacity-building efforts may still be in developmental stages, inadequately aligned with strategic financial objectives, or not fully integrated with operational processes, thereby limiting their immediate impact on financial sustainability.

Interestingly, the interaction term between Capacity Building (CAPBU) and Tax Innovation (TAXINO) shows a positive and statistically significant moderating effect on Financial Sustainability (FINSUST) ($\beta = 0.138$, $p = 0.048$). This finding reveals that while capacity building may not exert a direct influence on sustainability, it plays a crucial enabling role when coupled with innovation. This interaction result is statistically significant and shows that capacity building positively moderates the relationship between tax innovation and financial sustainability. In essence, while capacity building alone may not significantly influence financial sustainability, it enhances the effectiveness of tax innovation efforts when both are implemented together. This implies that the success of digital and technological innovation in tax administration is heavily dependent on the organization's human and institutional capacity to adopt, manage, and sustain these innovations.

For NRS, this calls for a strategic integration of innovation initiatives with staff training, infrastructure investment, and system strengthening to fully realize the benefits of innovation for long-term financial health. This supports studies like Bongomin et al. (2020) and Brokelind & van Thiel (2020), which emphasized the synergetic effect of innovation and institutional preparedness in achieving fiscal resilience. Furthermore, the result aligns with Resource-Based Theory, which suggests that when complementary resources such as technology and human capital are strategically combined, they enhance organizational performance. In this case, tax innovation alone is effective, but its full impact on financial sustainability is realized only when the organization's capacity is sufficiently developed to support, manage, and sustain such innovations. Thus, this interaction reinforces the strategic importance of integrating innovation initiatives with strong institutional and human capacity frameworks to achieve enduring financial sustainability within Nigeria's revenue administration.

5. Conclusion

Based on the findings, the study concludes that tax innovation significantly enhances the financial sustainability of the Nigeria Revenue Service (NRS), affirming that modernized, technology-driven tax systems are instrumental in achieving stable and efficient revenue generation. Although capacity building alone did not show a statistically significant direct effect on financial sustainability, its interaction with tax innovation was found to be significant, suggesting that capacity building serves a critical supporting role in maximizing the benefits of innovation. These results highlight that while technological innovation is essential, it must be complemented by strong institutional and human capacity to fully deliver sustainable financial outcomes for revenue agencies like NRS. Based on the conclusion, the following recommendations were made.

i. The NRS and policymakers should prioritize sustained investment in digital transformation and innovation across tax operations. This includes expanding the use of artificial intelligence, real-time data analytics, mobile tax payment systems, and automated audit tools. By reinforcing the digital infrastructure and enhancing the innovation ecosystem within tax administration, NRS can reduce leakages, improve compliance, and secure a more stable revenue base necessary for long-term financial sustainability.

ii. Given the supportive but non-significant direct impact of capacity building, it is crucial to align training and development programs with innovation goals. Capacity building should not only focus on general administrative skills but also equip staff with digital competencies, change management techniques, and data literacy that are directly relevant to operating and sustaining technology-driven systems. Structured mentorship, professional certification, and cross-functional training will further enhance the internal capabilities of the agency to manage innovation effectively.

iii. NRS should adopt a strategic integration framework, where capacity building and innovation are planned, executed, and monitored as interdependent pillars of financial reform. The agency should institutionalize performance metrics that measure the combined impact of both innovation and capacity-building initiatives on revenue performance. This calls for continuous assessment, stakeholder engagement, and adaptive leadership to ensure that both technological and human resource capacities are developed in tandem to support Nigeria's broader fiscal sustainability objectives.

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