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Digital Public Financial Management Systems and Fiscal Transparency in an Emerging Economy: Role of Stakeholder Engagement

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Abstract: *The study investigated the moderating effects of stakeholder engagement on the relationship between digital public financial management systems and fiscal transparency in the public sector of Bayelsa State. The study grounded on technology acceptance theory and quantitative research design was adopted with a population of 820 individuals with knowledge in digital public sector financial management systems and a sample size of 385 was determined using Cochran formula. Data was collected through structured questionnaires after conducting validity and reliability tests to ensure the quality and consistency of the research instrument. The data was analysed using univariate, bivariate and multivariate analytical techniques. The findings revealed a positive and statistically significant relationship between digital infrastructure readiness, information system adoption, digital transparency and accountability, digital governance and financial analytics, human capacity and digital competence and budget transparency. Furthermore, stakeholder engagement was found to have a positive and significant moderating effect on the relationship between digital financial management systems and fiscal transparency. The study concludes that strengthening digital capabilities, promoting stakeholder participation, and enhancing institutional digital competence are critical for improving fiscal openness and budget transparency in the public sector.*

Keyword: digital infrastructure readiness, budget transparency, digital financial management systems, fiscal transparency, stakeholder engagement, digital governance and analytics

INTRODUCTION

In recent decades, governments across the world have increasingly adopted digital financial management systems to improve public financial management (PFM), enhance fiscal

transparency, and strengthen accountability in the management of public resources. Fiscal transparency refers to the openness, clarity, and accessibility of government fiscal policies, financial activities, and budgetary information to the public and other stakeholders. It is widely recognized as a critical component of good governance because it enables citizens, oversight institutions, and development partners to monitor how public funds are collected, allocated, and utilised (Adamu et al, 2024). In developing economies such as Nigeria, improving fiscal transparency has become a key priority due to persistent challenges such as corruption, weak institutional capacity, and limited public trust in government financial processes. The emergence of digital financial management systems has provided governments with new tools to address these challenges. These systems integrate information and communication technologies into public finance processes, enabling governments to automate financial transactions, monitor budgets in real time, and maintain accurate financial records. In Nigeria, several digital reforms have been introduced to strengthen financial management, including the Government Integrated Financial Management Information System (GIFMIS), the Treasury Single Account (TSA), and the Integrated Personnel and Payroll Information System (IPPIS). These platforms are designed to improve transparency, reduce leakages in public finance, and enhance accountability in government institutions (Bamallum & Moses, 2025). For instance, the implementation of GIFMIS enables real-time tracking of government revenues and expenditures, thereby facilitating efficient budget monitoring and reporting across ministries, departments, and agencies.

Public financial management (PFM) is a critical determinant of governance quality, accountability, and economic development. Governments worldwide are increasingly adopting digital financial management systems (DFMS) to modernize budgeting, accounting, payroll, and reporting processes, thereby enhancing fiscal transparency, efficiency, and accountability (Habimana & Gashema, 2025). Digital financial management systems also contribute to fiscal transparency by strengthening internal controls and reducing opportunities for financial mismanagement. Studies indicate that systems such as GIFMIS help improve government budget planning, execution, and reporting while providing reliable audit trails that support fraud prevention and financial accountability (Ajao, Aremu, & Ufuoma, 2022). Similarly, IPPIS was introduced to address the issue of "ghost workers" and payroll fraud in the Nigerian public service by creating a centralized payroll database for federal government employees. The system has significantly enhanced transparency in payroll administration and improved financial discipline within government institutions (Alalade et al., 2025). Digital financial systems such as the Integrated Financial Management Information System (IFMIS), Government Integrated Financial Management Information System (GIFMIS), and Integrated Personnel and Payroll Information System (IPPIS) represent a paradigm shift in the management of public funds, aiming to reduce human errors, minimize corruption, and improve real-time reporting (Harelimana, 2017; Udoh & Tijani, 2024).

In Nigeria, despite significant investment in DFMS, public sector organizations continue to face challenges related to financial mismanagement, delayed reporting, and inadequate fiscal accountability (Nwachukwu, Ogbada, & Okafor, 2023). Scholars argue that the effectiveness of DFMS depends not only on technological infrastructure but also on human and organizational factors, including leadership commitment and stakeholder engagement (Habimana & Gashema, 2025; Onowu & Oludi, 2024). Despite the potential benefits of digital financial management

systems, their effectiveness largely depends on the level of stakeholder engagement in the implementation process. Stakeholders in public financial management include government officials, public sector employees, civil society organizations, development partners, and citizens who have an interest in the management of public resources. Effective stakeholder engagement ensures that these groups participate in policy formulation, system design, implementation, and oversight, thereby enhancing the legitimacy and effectiveness of financial management reforms. Research suggests that stakeholder participation contributes to improved transparency, accountability, and inclusiveness in public sector financial management systems (Nweze et al, 2025).

Empirical studies highlight that countries across Africa have adopted DFMS with varying degrees of success. For instance, Rwanda's IFMIS implementation improved financial reporting, budgeting efficiency, and audit compliance, but its effectiveness was contingent on leadership support and staff capacity building (Harelimana, 2017; Habimana & Gashema, 2025). In Kenya and South Africa, research indicates that stakeholder participation and executive oversight significantly enhance system adoption, transparency, and fiscal accountability (Uwingeneye & Akims, 2024; Kadir et al, 2024). These findings suggest that technological interventions alone cannot achieve optimal fiscal transparency; human and organizational factors are equally crucial. In the Nigerian context, particularly in Bayelsa State, public sector institutions have made efforts to digitize financial management processes. Yet, empirical evidence on the impact of stakeholder engagement on DFMS effectiveness remains limited. Most studies focus on system functionality, adoption rates, or technical performance, without adequately exploring how organizational dynamics and stakeholder participation influence transparency outcomes (Eme et al, 2020; Olaoye & Adekoya, 2021; Ajao et al, 2022; Nwachukwu et al, 2023; Udoh & Tijani, 2024). This gap presents an opportunity to investigate how DFMS, when supported by committed leadership and engaged stakeholders, can enhance fiscal transparency, accountability, and governance in the state public sector. Moreover, integrating theoretical frameworks such as the Technology Acceptance Model (TAM) and Contingency Theory provides a robust lens for examining these dynamics. TAM explains how perceived usefulness and perceived ease of use influence system adoption (Davis, 1989), while Contingency Theory emphasizes that organizational effectiveness is contingent on the alignment between leadership, stakeholders, technology, and the external environment (Donaldson, 2001; Fiedler, 1964). Together, these theories offer a comprehensive understanding of how DFMS can achieve intended fiscal transparency outcomes within complex public sector environments. Therefore, this study seeks to explore the role of stakeholder engagement in strengthening digital financial management systems and improving fiscal transparency in Nigeria.

Objective of the Study

The main objective of this study is to investigate the moderating effects of stakeholder engagement on the relationship between digital public financial management systems and fiscal transparency in an emerging economy.

The following specific objectives were analysed in this study:

1. To investigate the effect of the digital infrastructure readiness (DIR) on budget transparency in Bayelsa State, Nigeria.
2. To assess the effect of the integrated financial management information system adoption (IFA) on budget transparency in Bayelsa State, Nigeria.
3. To evaluate the effect of the digital transparency and accountability (DTA) on budget transparency in Bayelsa State, Nigeria.
4. To determine whether data governance and financial analytics (DGF) on budget transparency in Bayelsa State, Nigeria.
5. To investigate the effect of human capacity and digital competence (HUC) on budget transparency in Bayelsa State, Nigeria.
6. To evaluate whether stakeholder engagement moderates the relationship between digital public financial management systems and fiscal transparency in Bayelsa State, Nigeria.

Research Questions

The following research questions were analysed in this study:

1. What is the relationship between the digital infrastructure readiness (DIR) and budget transparency in Bayelsa State, Nigeria?
2. How does the integrated financial management information system adoption (IFA) affect budget transparency in Bayelsa State, Nigeria?
3. Does the digital transparency and accountability (DTA) affect revenue transparency in Bayelsa State, Nigeria?
4. What is the relationship between the data governance and financial analytics (DGF) on budget transparency in Bayelsa State, Nigeria?
5. How does human capacity and digital competence (HUC) affect budget transparency in Bayelsa State, Nigeria?
6. Does stakeholder engagement moderate the relationship between digital public financial management systems and fiscal transparency in Bayelsa State, Nigeria?

Research Hypotheses

The study tested the following research hypotheses:

Ho_1: Digital infrastructure readiness (DIR) has no significant effect on budget transparency in Bayelsa State, Nigeria.

Ho_2: Integrated financial management information system adoption (IFA) has no significant effect on budget transparency in Bayelsa State, Nigeria.

Ho_3: Digital transparency and accountability (DTA) have no significant effect on the budget transparency in Bayelsa State, Nigeria.

Ho_4: There is no significant relationship between data governance and financial analytics (DGF) and budget transparency in Bayelsa State, Nigeria.

Ho_5: There is no significant relationship between human capacity and digital competence (HUC) and budget transparency in Bayelsa State, Nigeria.

Ho_6: Stakeholder engagement does not significantly moderate the relationship between digital public financial management systems and fiscal transparency in Bayelsa State, Nigeria.

LITERATURE REVIEW

Conceptual Framework

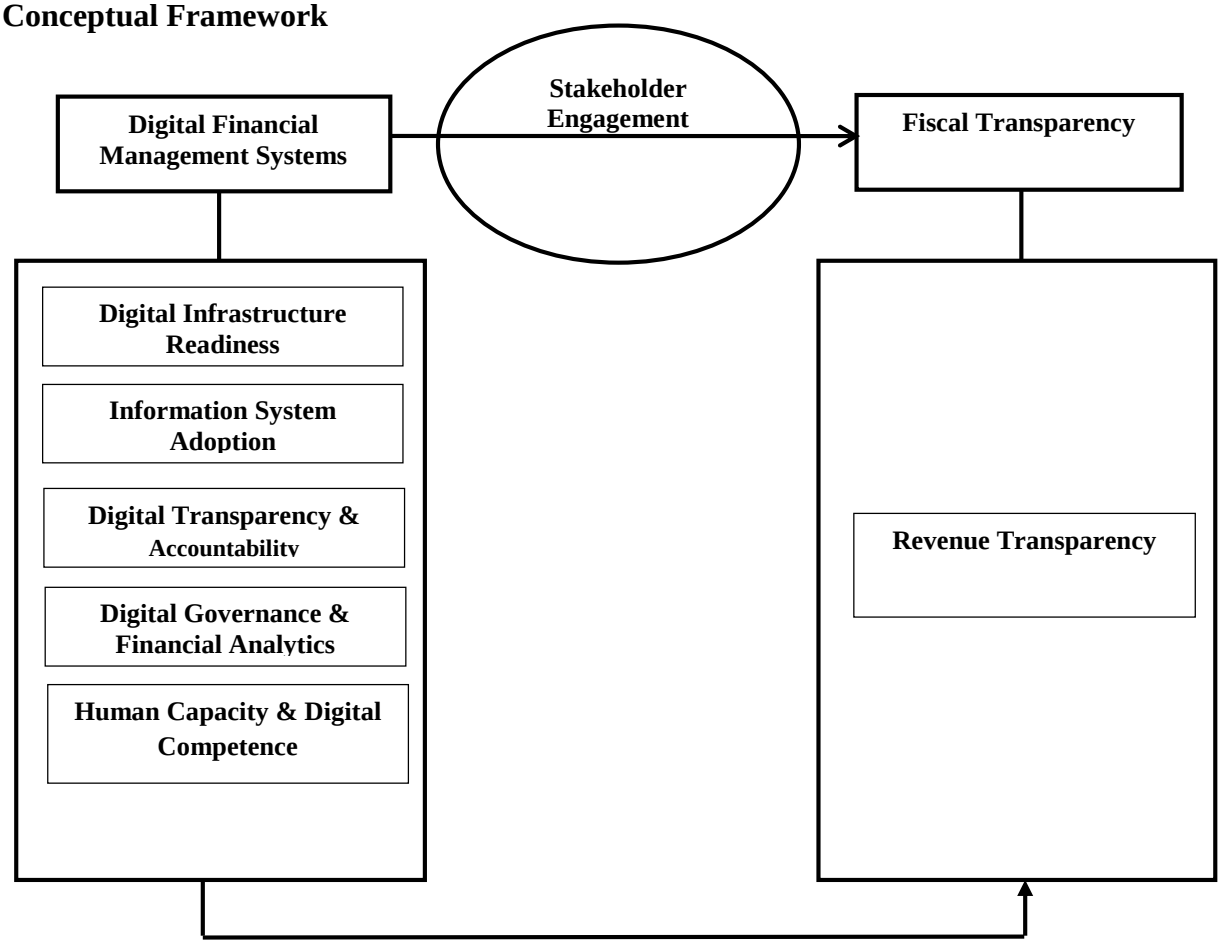

Figure 1: Conceptual Framework Authors Creation

Concept of Digital Financial Management Systems (DFMS): Digital Financial Management Systems (DFMS) are technology-driven platforms and software solutions that governments use to manage financial operations such as budgeting, accounting, payroll, procurement, and reporting (Diamond & Khemani, 2016). DFMS aims to increase efficiency, reduce leakages in public funds, and enhance transparency in financial transactions. Common examples in the Nigerian context include the Government Integrated Financial Management Information System (GIFMIS), the

Treasury Single Account (TSA), and the Integrated Personnel and Payroll Information System (IPPIS) (Ajao et al, 2022). These systems facilitate real-time monitoring of revenue and expenditure, ensure proper documentation of transactions, and support the automation of financial reporting processes, which can improve compliance and reduce opportunities for fraud (Bamallum & Moses, 2025). Digital Financial Management Systems (DFMS) are technology-driven platforms and software solutions used by governments to plan, manage, and monitor public financial resources (Appah & Ayabina, 2025b). These systems integrate various aspects of public financial management, including budgeting, accounting, revenue collection, expenditure control, procurement, payroll management, and financial reporting, into a unified digital platform (Diamond & Khemani, 2016; Ajao et al, 2022). By automating and standardizing financial processes, DFMS aim to enhance efficiency, reduce errors, improve data accuracy, and strengthen transparency and accountability in government operations (Appah & Ayabina, 2025a). At its core, DFMS is designed to transform traditional, manual financial management practices into a technology-enabled system that allows for real-time monitoring and reporting of financial activities (Bamallum & Moses, 2025). This transformation addresses common challenges in public financial management, such as delayed reporting, misappropriation of funds, lack of data integration, and inefficiencies in budget execution. For example, systems like the Government Integrated Financial Management Information System (GIFMIS), the Treasury Single Account (TSA), and the Integrated Personnel and Payroll Information System (IPPIS) in Nigeria are examples of DFMS implemented to centralize financial data, prevent duplicate payments, monitor expenditures, and promote fiscal discipline (Olaoye & Adekoya, 2021). Scholars emphasize that DFMS is not merely a technological solution but also a governance tool. Its effectiveness in enhancing public financial management depends on institutional readiness, stakeholder engagement, and leadership commitment. For instance, Diamond and Khemani (2016) note that the implementation of DFMS requires adequate training, policy support, and alignment with institutional processes to achieve its intended outcomes. Similarly, Bamallum and Moses (2025) argue that while technology provides the platform for transparency and accountability, human factors such as administrative capacity, leadership oversight, and stakeholder participation significantly influence the performance and impact of these systems.

Concept of Fiscal Transparency: Fiscal transparency is the openness, clarity, and accessibility of government fiscal information to stakeholders. It is a key indicator of good governance and effective public financial management (Heald & Hodges, 2018). Transparency ensures that government revenue, expenditure, borrowing, and debt management are reported accurately and made available for public scrutiny. In practice, fiscal transparency is measured by the availability of budget information, reliability of financial reports, and adherence to regulatory frameworks for public financial disclosure (International Monetary Fund [IMF], 2019). Fiscal transparency is a cornerstone of good governance because it allows for public oversight, accountability, and informed decision-making. Transparent fiscal systems reduce opportunities for corruption, mismanagement, and leakages in public resources while fostering public trust in government institutions (Adamu, Abubakar, & Abdulkarim, 2024). In developing countries like Nigeria, the adoption of fiscal transparency measures has become central to efforts aimed at improving public financial management, increasing efficiency, and promoting socio-economic development. According to the IMF (2019), fiscal transparency involves three key dimensions: Clarity of roles

and responsibilities – clear definitions of the functions of various public financial management institutions. Open budget processes – ensuring budget formulation, approval, and execution processes are accessible and understandable to the public. Availability and reliability of fiscal information – providing timely, accurate, and comprehensive reports on revenues, expenditures, debts, and contingent liabilities. The conceptual link between DFMS and fiscal transparency is grounded in the idea that technology enables better record-keeping, real-time monitoring, and accurate reporting of financial data. Studies in the Nigerian context have shown that the adoption of systems like GIFMIS and IPPIS has improved financial reporting and reduced leakages, although challenges such as weak leadership commitment and limited stakeholder engagement sometimes hinder the full realization of transparency benefits (Paul & Malachy, 2025; Olaoye & Adekoya, 2021). In the context of the Bayelsa State public sector, fiscal transparency can be conceptualized to the extent to which state ministries, departments, and agencies provide accurate, timely, and accessible information on financial transactions, budget implementation, and expenditure monitoring. It involves both the technical use of digital systems to track and report financial data and the governance practices that ensure accountability and oversight.

Concept of Stakeholder Engagement: Stakeholder engagement refers to the involvement of individuals and groups with a vested interest in public financial management, including government officials, civil society organizations, auditors, and citizens (Fung, 2015). Engaging stakeholders in the design, implementation, and monitoring of digital financial management systems can increase the legitimacy, acceptance, and effectiveness of these systems. The literature suggests that participatory approaches to financial governance improve transparency and accountability by creating a shared sense of ownership and responsibility among stakeholders (Nweze, Okolie, & Jesuwunmi, 2025). Stakeholder engagement is essential for promoting transparency, accountability, and inclusiveness in governance. By involving stakeholders in financial management processes, governments can ensure that public funds are utilized efficiently, policies reflect citizen priorities, and oversight mechanisms are strengthened (Fung, 2015). Effective engagement provides a platform for dialogue, feedback, and participatory monitoring, which in turn reduces the risk of mismanagement, corruption, and resource misallocation. In the context of digital financial management systems (DFMS), stakeholder engagement plays a critical role in enhancing system adoption, effectiveness, and sustainability. Studies indicate that when stakeholders are consulted during system design, implementation, and monitoring, they are more likely to adopt the system and actively use it for oversight, thereby improving fiscal transparency. Conversely, limited stakeholder participation often leads to resistance, poor utilization, and reduced effectiveness of DFMS, undermining the intended benefits of digital financial reforms (Nweze, et al, 2025). Furthermore, stakeholder engagement is closely tied to leadership commitment. Leaders who actively promote participation, provide resources for training, and institutionalize feedback mechanisms help ensure that stakeholders are meaningfully involved in financial management processes (Adamu, Abubakar, & Abdulkarim, 2024). In the Nigerian public sector, evidence suggests that ministries and agencies that effectively engage stakeholders in financial reforms achieve higher levels of accountability and transparency, especially in systems like GIFMIS, TSA, and IPPIS. In practice, stakeholder engagement in DFMS may involve consultations, feedback mechanisms, training programs, and the inclusion of civil society oversight in budgetary processes. Studies indicate that low levels of stakeholder engagement are a

common barrier to achieving fiscal transparency in developing countries, as reforms may be poorly understood, resisted, or underutilized by intended users (Fung, 2015).

Theoretical Review

Technology Acceptance Theory: This study anchored on the technology acceptance theory advanced by Davis (1989). The theory refers to a body of theoretical models developed to explain how and why individuals or organizations adopt and use new technologies (Nnaji et al., 2023; Ramadhani et al., 2025). The theory focuses on the psychological, social, and contextual factors that influence users' attitudes, intentions, and actual usage behaviour toward technological systems (Musa et al, 2024). Technology acceptance research has become a central theme in information systems, management, education, and digital innovation studies because understanding adoption behaviour helps predict technology success or failure in organizations and society (Yakubu et al, 2025). TAM proposes that two key cognitive beliefs determine users' attitudes toward technology: perceived usefulness and perceived ease of use (Bazine, 2025). According to Duan (2026), perceived usefulness refers to the extent to which an individual believes that using a particular technology will enhance job performance or productivity, while perceived ease of use refers to the degree to which a user believes that interacting with the system will require minimal effort. These beliefs influence the user's attitude toward technology, which subsequently shapes behavioural intention and actual system use. Technology acceptance theory provides a conceptual framework for explaining how users come to accept and use new technologies (Bazine, 2025). Within information systems research, the theory focuses on the cognitive, social, and contextual factors that influence individuals' willingness to adopt technological innovations and integrate them into their activities (Yacob et al., 2025). Technology acceptance research has evolved over the past three decades, drawing from interdisciplinary fields such as psychology, sociology, and information systems. Scholars have developed various models to explain the factors that influence technology adoption, including the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and related frameworks. These models emphasize the role of user perceptions, attitudes, and social influences in shaping behavioral intentions toward technology use (Ramadhani et al., 2025). Understanding technology acceptance is particularly important in the context of rapid digital transformation, where organizations invest heavily in technological infrastructure but often face challenges in ensuring effective user adoption. Research suggests that technological innovations frequently fail not because of technical limitations but due to resistance from users who perceive them as difficult to use or lacking practical benefits (Nnaji et al., 2023). Consequently, technology acceptance theory provides valuable insights into the psychological and behavioral processes underlying technology adoption. Despite its popularity, TAM has undergone several modifications to enhance its explanatory power. For instance, TAM2 incorporated social influence processes and cognitive instrumental processes to explain technology adoption in organizational settings, while TAM3 integrated factors such as computer self-efficacy, computer anxiety, and perceptions of external control. These extensions sought to address criticisms that the original TAM oversimplified technology adoption by focusing primarily on individual perceptions while neglecting social and organizational influences (Nnaji et al., 2023; Ramadhani et al., 2025). Xue et al (2024) argue that despite their widespread application, technology acceptance models have faced several criticisms. One major limitation is the tendency

to focus primarily on cognitive perceptions while neglecting emotional and contextual factors that may influence technology adoption. For example, users' trust in technology, perceived risk, and emotional responses to technological change can significantly affect adoption decisions but are not fully captured in the original TAM framework (Qi et al, 2025). Another criticism concerns the proliferation of model extensions, which has resulted in many modified TAM frameworks with varying constructs and theoretical assumptions (Nnaji et al., 2023; Ramadhani et al., 2025). While these extensions aim to improve explanatory power, they sometimes create theoretical fragmentation and reduce the comparability of research findings across studies.

Bamallum and Moses (2025) analysed the effect of computer-centric systems on financial transparency within the Federal Ministry of Finance in Nigeria. The study was conducted against the backdrop of increasing demand for accountability, efficiency, and integrity in public financial governance, where digital systems such as the Integrated Personnel and Payroll Information System (IPPIS), the Treasury Single Account (TSA), the Government Integrated Financial Management Information System (GIFMIS), and Remita (an electronic payment platform) have been deployed to improve transparency in government financial operations. The authors adopted a quantitative survey research design, which is well-suited for assessing relationships between technological systems and outcome variables like transparency. Data was collected through a structured questionnaire administered to 98 staff members from the ICT and accounting departments of the Federal Ministry of Finance. The study adopted a purposive sampling targeted at personnel directly involved with these digital systems, ensuring relevant insights on system performance. The collected data were analyzed using multiple regression techniques via SPSS, and the results indicated that all four computer-centric systems—IPPIS, TSA, GIFMIS, and Remita—had significant positive effects on financial transparency within the ministry. Among these systems, IPPIS and GIFMIS showed the strongest influence, particularly in enhancing payroll integrity, providing real-time budget monitoring, and improving audit trail accuracy. While TSA and Remita also contributed to transparency, their effects were somewhat more moderate, largely due to challenges such as delays in fund disbursement and issues with full integration across systems. The regression model explained 61% of the variation in financial transparency ($R^2 = 0.610$), indicating a robust predictive relationship between the use of computer-centric systems and transparency outcomes. The study concluded that digital financial systems are critical tools for strengthening fiscal transparency, reducing opportunities for fraud, and improving overall fiscal discipline within public sector financial management. The authors recommended enhanced user training, infrastructure upgrades, and full integration of systems to maximize transparency benefits. Importantly, the study contributes empirical evidence supporting the argument that digital financial systems improve transparency in public financial management, especially when combined with supportive governance and capacity-building measures.

Obarisiagbon and Eke (2025) examined the impact of modern financial management practices on fraud mitigation in the Nigerian public sector, with specific focus on major digital financial reforms such as the Treasury Single Account (TSA), Integrated Personnel and Payroll Information System (IPPIS), and the Government Integrated Financial Management Information System (GIFMIS). These digital systems are widely implemented to enhance financial control, reduce leakages, and strengthen transparency in government financial processes. The study adopted a

descriptive survey research design, which is suitable for assessing relationships between variables and for capturing respondents' perceptions on the effectiveness of financial management reforms in reducing fraud. A structured questionnaire was administered to employees in the accounting, audit, and budget departments of selected federal ministries, departments, and agencies (MDAs) operating in Edo State, Nigeria. The sample targeted staff directly involved in financial operations, ensuring that respondents had relevant practical experience with the digital financial systems under investigation. Data collected were analyzed using descriptive statistics (means and percentages) to summarize responses and multiple regression analysis to examine how well TSA, IPPIS, and GIFMIS collectively and individually predict the level of fraud mitigation in the public sector. The results showed that all three financial management systems had significant positive effects on fraud mitigation, with IPPIS exhibiting the strongest influence on reducing fraudulent activities. The regression model demonstrated a strong level of explanation, with an R value of 0.899 and an R^2 of 0.808, indicating that 80.8% of the variance in fraud mitigation was accounted for by the combined influence of the digital systems studied. These findings suggest that modern financial management practices, especially centralized payroll and integrated financial systems, played a key role in enhancing accountability and reducing opportunities for financial irregularities within public sector finances. The study concludes that the implementation of digital financial management reforms is crucial for strengthening financial integrity and transparency in Nigeria's public sector.

Olaoye and Oluyori (2025) conducted a study to empirically examine the relationship between stakeholder engagement practices and the levels of transparency and accountability in budgeting processes within Nigeria's public sector. The study recognized gaps in participatory governance and fiscal opacity, particularly in how budgeting decisions are made and communicated in federal ministries. The authors adopted a mixed-method research approach incorporating both quantitative and qualitative elements to explore the effect of stakeholder engagement on transparency and accountability. The population consisted of all federal ministries in Nigeria, and purposive sampling combined with simple random sampling was used to select five ministries actively involved in budget processes. Data were collected using a cross-sectional survey design, which is useful for capturing perceptions and current practices at a specific point in time. Questionnaires were distributed to selected stakeholders associated with each ministry, including financial officers, budget analysts, and oversight personnel. The study applied Pearson correlation analysis to determine the strength and direction of relationships among variables and regression analysis to assess the predictive influence of stakeholder engagement constructs on transparency and accountability outcomes. The study revealed strong positive correlations between stakeholder engagement strategies and both transparency and accountability in public sector budgeting. Specifically, regression results showed that stakeholder engagement variables—such as stakeholder participation in budget planning, communication channels, and feedback mechanisms—were positively and statistically significant predictors of transparent budgeting processes. This implies that as engagement activities increased, so did the levels of fiscal transparency and accountability in federal ministries. The authors concluded that meaningful involvement of stakeholders—beyond mere token participation—enhances openness in budget processes, supports shared understanding of fiscal priorities, and strengthens accountability mechanisms. They recommended institutionalising stakeholder consultation forums, expanding

access to budget information, and enhancing conflict-of-interest management frameworks to sustain transparency outcomes.

Nwachukwu et al (2023) investigated the effectiveness of government budgeting and accounting systems—specifically the Government Integrated Financial Management Information System (GIFMIS) and the Integrated Personnel and Payroll Information System (IPPIS)—on public sector performance and accountability in Nigeria. The study aimed to empirically compare how these digital systems influence the performance of public sector ministries, departments, and agencies (MDAs), particularly in terms of promoting transparency, efficiency, and reducing financial irregularities in government. The study adopted a descriptive survey research design, appropriate for evaluating the perceptions and experiences of public sector officers regarding budgeting and accounting systems. Primary data were collected using a structured questionnaire administered to public sector staff who were knowledgeable about financial management processes in their organisations. The population consisted of officers across selected federal MDAs in Nigeria who use GIFMIS and IPPIS. To analyze the data, the study applied the Chi-square (χ^2) statistical test to determine the strength and significance of the relationship between the adoption of each digital system and public sector performance, used here as a proxy measure for accountability and transparency in financial management. The Chi-square test allowed the authors to compare the observed responses to expected outcomes under the assumption of no effect, thus assessing whether GIFMIS and IPPIS had statistically significant impacts. The empirical results showed that GIFMIS had a strong and statistically significant positive effect on public sector performance, indicating that its adoption contributed meaningfully to improved budgeting accuracy, expenditure monitoring, and accountability. In contrast, IPPIS exhibited a positive but comparatively weaker significant effect on performance. This suggests that while both systems contribute to enhanced financial processes, GIFMIS had a more pronounced impact on accountability and transparency outcomes in MDAs than IPPIS. The study concluded that digital budgeting and accounting systems are vital tools for improving public financial management in Nigeria.

Ezenwaka et al (2022) investigated the effect of accounting software on transparency in the Nigerian public sector. The study was motivated by widespread concerns that manual financial processes in Nigerian public institutions contributed to opacity, fraud, and poor accountability, prompting the introduction of digital accounting applications such as the Integrated Personnel Payroll Information System (IPPIS) and the Government Integrated Financial Management Information System (GIFMIS). The study employed a survey research design, which is appropriate for assessing perceptions and relationships among variables in a real-world setting. A structured questionnaire was administered to 250 staff members of the Federal Pay Office, Nigeria, and 202 were duly completed responses were returned and used for analysis. The researchers utilized descriptive statistics to summarize respondent characteristics and key variable measures. To test the hypothesized relationships between the use of accounting software and transparency outcomes, the study applied Ordinary Least Squares (OLS) regression analysis, which allowed for estimating the effect of IPPIS and GIFMIS on organizational transparency. The results revealed positive and statistically significant relationships between the adoption of IPPIS and GIFMIS and fiscal transparency in the Nigerian public sector. The regression results demonstrated that both systems significantly enhance transparency in financial reporting, budget tracking, and expenditure control.

Accordingly, the authors concluded that the implementation of IPPIS and GIFMIS has significantly improved transparency in public sector organizations by providing more accurate, timely, and accessible financial information than traditional manual systems. The study suggests that continued investment in digital financial management platforms like IPPIS and GIFMIS can strengthen fiscal transparency, improve stakeholder confidence, and reduce opportunities for financial irregularities within government institutions.

Onowu and Oludi (2024) examined the impact of computerized accounting systems (GIFMIS, TSA, and IPPIS) on fraud prevention and financial accountability in federal public sector organizations in Rivers State, Nigeria. The study sought to determine whether the implementation of these digital systems enhances transparency, reduces misappropriation of funds, and improves overall public sector performance. The study adopted a descriptive survey design, suitable for capturing the perceptions of staff directly involved in financial operations. A structured questionnaire was administered to 120 respondents, including accountants, auditors, and ICT officers from federal MDAs in Rivers State that actively use GIFMIS, TSA, and IPPIS. Data analysis employed multiple regression techniques, which enabled the authors to assess the extent to which each computerised accounting system predicts reductions in fraud and improvements in accountability. Descriptive statistics were also used to summarise demographic data and system usage patterns. The study found that all three digital financial systems had significant positive effects on fraud prevention and financial accountability. GIFMIS showed the strongest impact, particularly in tracking expenditures and generating timely audit reports. TSA also contributed substantially by centralising government funds, while IPPIS improved payroll accuracy and reduced ghost worker-related fraud. The regression results indicated that computerised systems collectively explained 65% of the variation in fraud prevention outcomes ($R^2 = 0.65$), highlighting their effectiveness in promoting transparency and accountability.

Agbo and Nicholas (2024) explored the role of the Government Integrated Financial Management Information System (GIFMIS) in the management of public debt in Nigeria, focusing on how GIFMIS adoption influences debt sustainability and fiscal control as part of broader public financial reforms. The study employed an ex post-facto research design, which is appropriate for assessing the impact of an intervention (in this case, the implementation of GIFMIS) over time by comparing data from periods before and after its adoption. Secondary time-series data covering eighteen fiscal years (2003–2021) were used, with nine years before GIFMIS implementation (2003–2011) and nine years after (2013–2021). GIFMIS adoption was modelled as a dummy variable (0 for pre-GIFMIS years and 1 for post-GIFMIS years). Public debt management was represented by debt service expenditure over the same period. To analyze the data, the researchers used the Auto-Regressive Distributed Lag (ARDL) model estimated via Ordinary Least Squares (OLS) and implemented using E-Views statistical software. This approach allowed them to investigate both short-run and long-run relationships between GIFMIS implementation and debt management outcomes, controlling for underlying fiscal trends. The findings suggested that the adoption of GIFMIS had a positive but statistically insignificant effect on public debt management in Nigeria during the study period. The results indicate that GIFMIS had a beneficial impact on public debt management by improving monitoring and controlling debt obligations, which are key aspects of fiscal transparency and accountability. The study concluded that digital financial

systems like GIFMIS are important for strengthening public financial governance, particularly in areas requiring accurate tracking of fiscal commitments such as debt service.

Udoh and Tijjani (2024) investigated the impact of e-governance initiatives—including GIFMIS (Government Integrated Financial Management Information System), IPPIS (Integrated Personnel and Payroll Information System), and other government digital platforms—on organizational performance and service delivery within selected federal public sector entities in the Federal Capital Territory. The study adopted a qualitative research design, drawing on secondary data sources rather than primary surveys or interviews. This approach involved extensive review and analysis of existing reports, policy documents, academic literature, and administrative records relating to e-governance implementation in Nigeria's public sector. The Unified Theory of Acceptance and Use of Technology (UTAUT) served as the theoretical framework, which helped interpret how users adopt and interact with digital systems and how these interactions influence organizational performance. The qualitative approach allowed the authors to capture nuanced perspectives on operational impacts, contextual challenges, and institutional variations in how e-governance systems are used across public agencies. The findings indicated that e-governance initiatives have produced observable improvements in public sector performance, including automation of processes, faster transaction processing, improved budgeting practices, and reduced incidences of "phantom workers." Respondents and secondary evidence showed that systems like IPPIS and GIFMIS contributed to greater efficiency in payroll administration, transparency in financial flows, and enhanced audit trails. These improvements were perceived as meeting stakeholder expectations for more transparent and effective public services.

Court and Iwedi (2024) examined the impact of public sector financial reforms on government expenditure and fiscal accountability in Nigeria. The study focused on how recent financial management reforms—including digital platforms and accounting practices—affect the management and reporting of government expenditures, which is an important aspect of fiscal transparency and public financial governance. The authors adopted a survey research design, which is commonly used in public sector empirical studies to collect perceptions and data from practitioners directly involved in financial management activities. The study population consisted of accounting and finance personnel within selected public sector ministries and agencies in Nigeria. Using a structured questionnaire, data were gathered on respondents' perceptions of how public sector financial reforms influence expenditure planning, control, reporting, and accountability. For data analysis, the study applied descriptive statistics to summarize demographic and system-use information, and inferential statistical techniques (such as correlation and multiple regression analysis) to examine the relationships between financial management reforms and expenditure control. The use of regression analysis allowed the authors to estimate how much variation in government expenditure transparency and efficiency could be explained by the adoption of digital and institutional reforms in financial management practices. The empirical results showed that public sector financial management reforms, particularly those involving digital accounting and reporting platforms, significantly influence the effectiveness of expenditure control and reporting in Nigerian government entities. Generally, the findings suggested that effective adoption of financial management reforms correlates with improved transparency in government expenditure reporting, reduced opportunities for financial mismanagement, and

stronger accountability frameworks within public institutions. These outcomes align with broader objectives of fiscal transparency and governance reform in the Nigerian public sector.

Kadir, Sanni, and Adekunle (2024) investigated the effect of digitalized financial management practices on the accountability of Ministries, Departments, and Agencies (MDAs) in Nigeria. The study was motivated by persistent concerns over public financial mismanagement and the need to assess whether adopting technology-driven financial practices improves accountability and transparency in Nigerian public institutions. The researchers employed a quantitative survey research design, which is suitable for examining relationships between organizational practices and accountability outcomes. Primary data were collected via structured questionnaires administered to auditors working within the Office of the Auditor-General for the Federation (AoGF), a population considered highly knowledgeable about financial practices and accountability issues in MDAs. Using Krejcie and Morgan's (1970) sampling table, the authors selected a sample of 233 respondents from a total population of 588 eligible auditors. Data analysis involved descriptive statistics to summarize respondent characteristics and inferential statistics (like regression analysis) to test the effects of digitalized financial practices on accountability outcomes. The independent variables included digitalized inventory management, digitalized asset management, and digitalized budgetary practices, while the dependent variable was financial accountability in MDAs. The findings suggest that digitalized inventory management had a negative and statistically significant effect on accountability, suggesting that inventory systems in their current form may not yet support accountability improvements in MDAs. The study concluded that continued expansion and refinement of digital financial management practices, especially those linked to budgeting and asset management, can strengthen financial accountability. It is recommended that the Ministry of Finance, Budget and National Planning and related agencies invest more comprehensively in digital systems such as GIFMIS and related platforms to enhance procurement, asset control, and financial reporting.

Attiogbe et al (2025) evaluated the impact of the Ghana Integrated Financial Management Information System (GIFMIS) on accountability in public sector entities in Ghana. The researchers collected survey data from 316 public sector employees across 17 Metropolitan, Municipal, and District Assemblies (MMDAs) in Ghana's Volta Region. Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS to test relationships among variables, including GIFMIS implementation, organizational structures, and accountability outcomes. Organizational structures showed a significant positive effect on accountability. The direct relationship between GIFMIS implementation and accountability was not statistically significant, indicating that simply installing GIFMIS is not enough — governance and institutional contexts matter. Influencing factors had a significant positive relationship with GIFMIS implementation but did not directly affect accountability outcomes.

Botchwey (2025) conducted an empirical study examining the role of digitalization in strengthening payroll discipline and fiscal accountability in Ghana's e-government reforms between 2010 and 2025. The study employed a mixed descriptive – analytical research designs. The methodological approach relied primarily on secondary data analysis combined with policy and institutional analysis. The study drew on multiple data sets and documentary sources such as Ghana national budget statements (2019 – 2025), government digitalization progress, IMF

programme reviews and fiscal monitoring reports, world bank public financial management assessments, and government payroll and financial management records. The investigation applied descriptive statistical analysis and trend evaluation to assess changes in payroll expenditure, transaction volumes, and institutional adoption of digital platforms. The study found that Ghana has significantly expanded digital financial platforms over the past decade as part of its e-government strategy. Another notable finding of the study was the dramatic increase in digital transactions processed through government platforms. The study found that digitalization improved the transparency and traceability of government financial transactions. Hence, the integration of digital financial systems created electronic audit trials and enhanced the ability of government agencies to monitor revenue collection and public expenditures.

Gebreyesus (2020) conducted a mixed-methods survey among 93 staff at the Ethiopian Ministry of Finance (76 valid responses) to examine factors affecting government expenditure budget management. Using Pearson correlation and multiple linear regression, the study found that IFMIS utilization was positively and significantly associated with budget execution effectiveness, demonstrating the system's potential to improve transparency. However, gaps in staff digital skills and knowledge moderated these effects, highlighting the critical role of organisational capacity. Seifu (2024) extended this investigation by examining IFMIS implementation in the Ministries of Agriculture and Finance. Using a quantitative descriptive design with questionnaires from 156 staff, the study employed multiple linear regression to assess the influence of top management support, ICT infrastructure, technical skills, and staff resistance on IFMIS adoption. Findings indicated that leadership commitment and technical capacity were positive predictors of successful adoption, whereas resistance undermined system effectiveness. This underscores that digital systems alone do not guarantee fiscal transparency; institutional support and user competence are essential mediators. Belay (2025) employed an exploratory qualitative case study of Ethiopia's Ministry of Finance and Economic Development, using semi-structured interviews and document analysis. The study revealed that leadership commitment, governance structures, and process integration were crucial for effective digital financial transformation. Challenges such as bureaucratic rigidity and partial system integration limited transparency gains, highlighting the institutional constraints that affect DFMS outcomes.

Onyango and Mwangi (2022) examined the effect of IFMIS adoption on financial accountability in 15 county governments. Using a descriptive cross-sectional survey of 180 respondents, data was analyzed through regression analysis. Findings indicated a positive and significant effect of IFMIS adoption on fiscal transparency and accountability ($\beta > 0.60$, $p < 0.01$). Counties with higher IFMIS adoption demonstrated timely reporting, reduced budget variances, and improved audit compliance. The study also noted that training gaps and lack of user confidence moderate system effectiveness. Chepkonga and Njoroge (2023) investigated e-procurement adoption across 12 counties, using a quantitative correlational design with 156 procurement officers. Analysis via Partial Least Squares Structural Equation Modeling (PLS-SEM) showed that e-procurement adoption significantly improved transparency (path coefficient = 0.58, $p < 0.01$), particularly by reducing procurement irregularities and enhancing audit trails. User capacity and system integration were significant moderators of transparency outcomes. Wanjohi (2021) employed a mixed-methods approach to examine ICT integration in Kenyan public financial management.

Data from 120 finance officers and 24 key informants were analyzed using regression and thematic analysis. Results demonstrated that ICT integration enhanced accessibility of budget information and transparency, with leadership buy-in and inter-agency coordination identified as critical success factors. Kiragu and Ouma (2024) explored institutional determinants of digital PFMIS adoption and fiscal transparency across 25 government ministries and county departments. Using structural equation modeling (SEM) on survey data from 210 respondents, the study found that leadership commitment, stakeholder engagement, and organisational culture significantly influenced DFMS adoption, which in turn positively affected fiscal transparency. The study confirmed that institutional factors indirectly enhance transparency through system adoption as a mediator.

METHODOLOGY

The study adopts a positive research philosophy, which is consistent with the quantitative measurement of relationships between observable variables. Positivism underscores objectivity, hypothesis testing, and generalizability, which supports the study's aim to examine causal relationships (Appah, 2020). The research employed a deductive approach, drawing on established theories including: A quantitative research strategy permits hypothesis testing, statistical validation, and generalization of findings to the population of financial stakeholders in Bayelsa State (Ezie & Ezie, 2025a). A cross-sectional survey design was employed, which is appropriate for investigating relationships between variables at a single point in time. Cross-sectional survey was used because it allows for efficient data collection from large populations (Ezie & Ezie, 2025b). Additionally, the study employed moderated regression analysis and structural equation modeling (SEM) to test the moderating effects of stakeholder engagement and leadership commitment. The study population comprises employees and stakeholders involved in financial management, budgeting, and audit in Bayelsa State, including Officials in Ministries, Departments, and Agencies (MDAs), Internal auditors and finance officers, IT staff responsible for DFMS implementation. The total population is 820 individuals across relevant MDAs. A multi-stage sampling strategy was employed: Purposive Sampling was used to Identify MDAs that have adopted DFMS. Stratified Random Sampling was adopted to ensure proportional representation of staff categories (finance, audit, and IT) while simple Random Sampling was employed to select individual participants within each stratum to reduce selection bias. This strategy ensures representativeness, diversity, and fairness, critical for stakeholder-based studies. The study adopted Cochran's formula for large populations at 95% confidence and 5% margin of error Where (95% confidence), (maximum variability) and (margin of error). The calculated minimum sample size is approximately 385 respondents. The study used a structured questionnaire divided into demographics characteristics, DFMS adoption and use, Stakeholder engagement practices, Leadership commitment behaviors and perceptions of fiscal transparency. The questionnaire contains closed – ended questions measured on a five-point Likert scale, ranging from strongly Disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). A pilot test with 30 respondents from similar MDAs outside Bayelsa State was conducted to assess clarity and appropriateness of items, refine language and scale, evaluate internal consistency and reliability and the pilot results guided the final instrument. The questionnaire adopts content and face validity. Experts in accounting, management, and research methodology reviewed the instrument to ensure

that the questions adequately measure the constructs of the study. The reliability of the instrument was tested using Cronbach's Alpha value of 0.70 or above, which was considered acceptable, indicating that the instrument is reliable. Data obtained from the questionnaire administered were analysed using statistical software and descriptive statistics, correlation analysis, and multiple regression was applied to test the overall research model. The multiple regression was guided by a linear model below:

$$BUT = \beta_0 + \beta_1 DIR + \beta_2 IFA + \beta_3 DTA + \beta_4 DGF + \beta_5 HUC + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$BUT = \beta_0 + \beta_1 DIR + \beta_2 IFA + \beta_3 DTA + \beta_4 DGF + \beta_5 HUC + \beta_6 SHE + \beta_7 (SHE * DIR) + \beta_8 (SHE * IFA) + \beta_9 (SHE * DTA) + \beta_{10} (SHE * DGT) + \beta_{11} (SHE * HUC) + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where:

BUT = Budget Transparency, DIR = Digital Infrastructure Readiness, IFA = Integrated Financial Management System Adoption, DTA = Digital Transparency and Accountability, DGF = Data Governance and Financial Analytics, HUC = Human Capacity and Digital Competence, and SHE = Stakeholder Engagement. $\beta_0 - \beta_5$ represent the regression coefficient; $\beta_6 - \beta_{11}$ represent the moderating effects coefficients, while $\mathfrak{e}$ represents the error term. According to Appah (2020), the interpretation of correlation (r) parameters is 0.8 – 1.0 = very strong relationship, 0.6 – 0.79 = strong relationship, 0.4 – 0.59 = moderate relationship, 0.2 – 0.39 = weak relationship; and 0.0 – 0.19 = very weak or no relationship. The study utilised a 5% level of significance; hence we conclude that the coefficient is significantly different from zero at the 5% level if the p-values is less than or equal to 0.05. If it is greater than 0.05 then we cannot reject the null hypothesis that the coefficient is zero at our 5% significance level.

RESULTS AND DISCUSSIONS

Data Presentation

The primary data was collected from respondents using the questionnaire. The questionnaire was distributed and later retrieved by the respondents. The primary data collected was then subjected to analysis. In testing the hypotheses of the study, the Ordinary Least Square (OLS) multiple regression was used. From the sample 385 copies of the questionnaire were distributed.

Table 1: Internal Consistency Reliability

Construct	Number of Items	Cronbach's Alpha (α)	Interpretation
Budget Transparency (BUT)	5	0.74	Good reliability
Digital Infrastructure Readiness (DIR)	5	0.78	Acceptable reliability
Integrated Financial Management System (IFA)	5	0.72	Acceptable reliability
Digital Transparency and Accountability (DTA)	5	0.76	Acceptable reliability
Data Governance and Financial Analytics (DGF)	5	0.82	Good reliability
Human Capacity and Digital Competence (HUC)	5	0.75	Acceptable reliability
Stakeholder Engagements (SHE)	5	0.78	Acceptable reliability

Source: Authors' Calculation (2026)

Table 1 shows the internal consistency reliability using Cronbach's Alpha model. The analysis of the constructs used in the questionnaire design shows that all items had a score of above 0.70 showing that the instrument suggested both good and acceptable reliability for the purpose of primary data collection for this study.

Table 2 Questionnaire Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Number Retrieved	302	78.4	78.4	78.4
	Number not retrieved	55	14.3	14.3	14.3
	Number not properly filed	28	7.3	7.3	100.0
	Total	385	100.0	100.0	

Table 2 shows the distribution and collection of questionnaires sent to the respondents. It was shown that 385 questionnaires were distributed to the respondents, representing 100%. 302 questionnaires representing 78.4% were correctly filled and successfully retrieved from the respondents; however, 55 questionnaires representing 14.3% were not retrieved, and 28 questionnaires representing 7.3% were not properly filed.

Table 3: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	205	67.9	67.9	67.9
	Female	97	32.1	32.1	100.0
	Total	302	100.0	100.0	

Table 3 shows the gender of respondents in the sample of the study. 67.9% which translates to two hundred and five (205) respondents, are male, while 32.1%, which translates to ninety-seven (97) respondents, are female.

Table 4: Age Range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 – 25 years	24	7.9	7.9	7.9
	26 – 35 years	34	11.3	11.3	19.2
	36 – 45 years	80	26.5	26.5	45.7
	46 – 55 years	106	35.1	35.1	80.8
	56 and above years	58	19.2	19.2	100.0
	Total	302	100.0	100.0	

Table 4 shows the age range of respondents. It was shown that 24 respondents representing 7.9% are between the age brackets of 18 – 25 years, 34 respondents representing 11.3% are between the age bracket of 26 – 35 years, 80 respondents representing 26.5% are between the age bracket of 36 – 45 years, 106 respondents representing 35.1% are between the age bracket of 46 – 55 years, 58 respondents representing 19.2% are between the age bracket of 56 and above years.

Table 5 Educational Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	OND/HND	22	7.3	26.3	26.3
	Bachelor's Degree	90	29.8	28.8	55.1
	Masters Degree	87	28.8	19.6	74.7
	Doctorate Degree	18	6.0	17.3	92.0
	Professional Certification	85	28.1	28.1	100.0
	Total	302	100.0	100.0	

Table 5 presents the educational qualifications of respondents. The 22 respondents (7.3%) hold a OND/HND degree, while 90(29.8%) hold a bachelor's degree. 87(28.8%), hold a master's degree. Those with a PhD or other professional qualifications were 18(6.0%), and finally, 85(28.1%) hold a Professional Certification. The cumulative percentage indicates the progressive accumulation of respondents across different educational levels, reaching 100% for all categories combined. This distribution offers insights into the educational backgrounds of the study sample.

Table 6: Job Title/Role

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Accountant	105	34.8	34.8	34.8
	Budgeting Officer	48	15.9	15.9	50.9
	Internal Auditors	52	17.2	17.2	67.9
	Revenue Officer	47	15.6	15.6	83.5
	ICT Specialist	50	16.5	16.5	100.0
	Total	302	100.0	100.0	

Table 6 shows the Job Title/Role of respondents. It was shown that 105 respondents representing 34.8% are Accountants, 48 respondents representing 15.9% are Budget Officers, 52 respondents representing 17.2% are Internal Auditors, 47 respondents representing 15.6% are Revenue Officer and 50 respondents representing 16.5% are ICT Specialist.

Table 7: Years of Professional Service

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 years	12	4.0	19.2	19.2
	1 – 5 years	42	13.9	50.0	69.2
	6 – 10 years	83	27.5	12.5	81.7
	11 – 15 years	95	31.5	8.7	90.4
	over 15 years	70	23.2	9.6	100.0
	Total	302	100.0	100.0	

Table 7 shows the Years of Professional Service of respondents. It was shown that 12 respondents representing 4.0% have worked for less than 1 years, 42 respondents representing 13.9% have worked for 1 – 5 years, 83 respondents representing 27.5% have worked for 6 – 10 years, 95 respondents representing 31.5% have worked for 11 – 15 years and finally, 70 respondents representing 23.2% have worked for over 15 years.

Table 8: Descriptive Statistics of Digital Infrastructure Readiness

S/N	Items	N	Min	Max	Mean	Std. D
1	The accounting unit has reliable internet and network connectivity to support public financial management operations	302	1.00	5.00	3.421	1.327
2	Employees have access to adequate digital devices and ICT infrastructure needed for their work	302	1.00	5.00	3.372	1.421
3	The public sector uses effective digital financial management systems for budgeting, accounting, and reporting	302	1.00	5.00	3.183	1.252
4	Accounting officers possesses the necessary digital skills to effectively use public financial management technologies	302	1.00	5.00	3.474	1.264
5	Management provides adequate support and funding for digital infrastructure development and maintenance	302	1.00	5.00	3.581	1.215
Valid N (listwise)		**302**			**3.406**	**1.496**

Source: Field Survey (2026)

The results in table 8 depicted the descriptive statistics of the mean and standard deviation responses on digital infrastructure readiness variable using five questionnaire items that were designed on a five-point Likert scale. Thus, the questionnaire items labelled above, and the mean and standard deviation of the five items were calculated to determine the overall mean and standard deviation responses on digital infrastructure readiness. Notwithstanding, all the items mean are above the cut-off point of 2.5. However, the grand mean and standard deviation responses on the questionnaire items disclosed (**Mean =3.406; Std. D =1.469**) respectively.

Table 9: Descriptive Statistics of Integrated Financial Management System

S/N	Items	N	Min	Max	Mean	Std. D
1	The Integrated Financial Management Information Systems improves the accuracy of financial reporting in the organization	302	1.00	5.00	3.256	1.523
2	The Integrated Financial Management Information Systems enables timely processing of financial transactions and budget information	302	1.00	5.00	3.274	1.485
3	Different departments within the organization can effectively share financial data through IFMIS	302	1.00	5.00	3.172	1.372
4	Employees have adequate skills and training to use the IFMIS effectively	302	1.00	5.00	3.438	1.318
5	The IFMIS enhances transparency and accountability in public financial management processes	302	1.00	5.00	3.185	1.317
Valid N (listwise)		**302**			**3.265**	**1.403**

Source: Field Survey (2026)

The results in table 9 depicted the descriptive statistics of the mean and standard deviation responses on integrated financial management systems variable using five questionnaire items that were designed on a five-point Likert scale. Thus, the questionnaire items labelled above, and the

mean and standard deviation of the five items were calculated to determine the overall mean and standard deviation responses on integrated financial management systems. Notwithstanding, all the items mean are above the cut-off point of 2.5. However, the grand mean and standard deviation responses on the questionnaire items disclosed (**Mean =3.265; Std. D =1.403**) respectively.

Table 10: Descriptive Statistics of Digital Transparency and Accountability

S/N	Items	N	Min	Max	Mean	Std. D
1	Digital financial systems improve public access to government financial information	302	1.00	5.00	3.215	1.321
2	The use of digital platforms enhances accountability in financial management processes	302	1.00	5.00	3.523	1.252
3	Financial transactions and budget activities can be easily tracked through digital systems	302	1.00	5.00	3.142	1.251
4	Digital technologies reduce opportunities for fraud and financial mismanagement	302	1.00	5.00	3.284	1.246
5	Public sector organisations use digital tools to promote transparency in budgeting, expenditure, and reporting activities	302	1.00	5.00	2.813	1.316
Valid N (listwise)		**302**			**3.194**	**1.277**

Source: Field Survey (2026)

The results in table 9 depicted the descriptive statistics of the mean and standard deviation responses on digital transparency and accountability variable using five questionnaire items that were designed on a five-point Likert scale. Thus, the questionnaire items labelled above, and the mean and standard deviation of the five items were calculated to determine the overall mean and standard deviation responses on digital transparency and accountability. Notwithstanding, all the items mean are above the cut-off point of 2.5. However, the grand mean and standard deviation responses on the questionnaire items disclosed (**Mean =3.194; Std. D =1.277**) respectively.

Table 11: Descriptive Statistics of Data Governance and Analytics

S/N	Items	N	Min	Max	Mean	Std. D
1	The public sector has clear policies and procedures for managing financial data.	302	1.00	5.00	3.216	1.285
2	Financial data within the organization is accurate, secure, and consistently maintained	302	1.00	5.00	2.953	1.274
3	Data analytic tools are used to support financial planning and decision making	302	1.00	5.00	2.952	1.285
4	Employees can easily access relevant financial data for operational and reporting purposes	302	1.00	5.00	3.156	1.382
5	The use of data analytics improves transparency and accountability in financial management process.	302	1.00	5.00	3.423	1.319
Valid N (listwise)		**302**			**3.140**	**1.309**

Source: Field Survey (2026)

The results in table 11 depicted the descriptive statistics of the mean and standard deviation responses on digital governance and analytics variable using five questionnaire items that were designed on a five-point Likert scale. Thus, the questionnaire labelled above, and the mean and standard deviation of the five items were calculated to determine the overall mean and standard deviation responses on digital governance and analytics. Notwithstanding, all the items mean are above the cut-off point of 2.5. However, the grand mean and standard deviation responses on the questionnaire items disclosed (**Mean =3,140; Std. D =1.309**) respectively.

Table 12: Descriptive Statistics of Human Capacity and Digital Competence

S/N	Items	N	Min	Max	Mean	Std. D
1	Employees possess adequate digital skills to effectively perform their job responsibilities	302	1.00	5.00	3.242	1.242
2	Public sector entities provide regular training on digital financial management systems and technologies	302	1.00	5.00	3.423	1.325
3	Staff can effectively use digital tools for financial reporting and decision making	302	1.00	5.00	3.256	1.286
4	Employees adapt easily to new digital technologies introduced in the organization.	302	1.00	5.00	3.464	1.326
5	The level of digital competence among staff enhances efficiency and accountability in financial management processes.	302	1.00	5.00	3.284	1.232
Valid N (listwise)		**302**			**3.334**	**1.282**

Source: Field Survey (2026)

The results in Table 12 depicted the descriptive statistics of the mean and standard deviation responses on human capacity and digital competence variable using five questionnaire items that were designed on fixed-point Likert scale. Thus, the questionnaire items labelled above, and the mean and standard deviation of the five items were calculated to determine the overall mean and standard deviation responses on human capacity and digital competence. Notwithstanding, all the items mean are above the cut-off point of 2.5. However, the grand mean and standard deviation responses on the questionnaire items disclosed (**Mean =3.334; Std. D =1.282**) respectively.

Table 13: Descriptive Statistics of Stakeholder Engagement

S/N	Items	N	Min	Max	Mean	Std. D
1	Stakeholders are actively involved in the implementation of digital financial management systems	302	1.00	5.00	3.156	1.228
2	Public sector entities regularly communicate digital financial management updates to relevant stakeholders	302	1.00	5.00	3.213	1.245
3	Feedback from stakeholders is considered when improving digital financial management systems	302	1.00	5.00	2.946	1.227
4	Digital platforms enhance collaboration between the organization and external stakeholders	302	1.00	5.00	2.786	1.342
5	Stakeholder participation in digital financial management systems promotes transparency and accountability.	302	1.00	5.00	2.968	1.318

Valid N (listwise)	**302**			**3.014**	**1.272**

Source: Field Survey (2026)

The results in table 13 present the descriptive statistics of the mean and standard deviation responses on stakeholder engagement variable using five questionnaire items that were designed on fixed-point Likert scale. Thus, the questionnaire items labelled above, and the mean and standard deviation of the five items were calculated to determine the overall mean and standard deviation responses on stakeholder engagement. Notwithstanding, all the items mean are above the cut-off point of 2.5. However, the grand mean and standard deviation responses on the questionnaire items disclosed (**Mean =3.014; Std. D =1.272**) respectively.

Table 14: Descriptive Statistics of Budget Transparency

S/N	Items	N	Min	Max	Mean	Std. D
1	Budget information is easily accessible to relevant stakeholders and the public	302	1.00	5.00	3.215	1.364
2	Public sector entities provide timely disclosures of budget allocations and expenditures	302	1.00	5.00	3.346	1.254
3	Digital financial systems improve transparency in budget preparation and implementation	302	1.00	5.00	3.423	1.284
4	Citizens and stakeholders can effectively monitor government budget activities through available information	302	1.00	5.00	3.254	1.315
5	Budget reporting practices in the organization promotes accountability and public trust.	302	1.00	5.00	3.524	1.325
Valid N (listwise)		**302**			**3.352**	**1.308**

Source: Field Survey (2026)

The results in table 14 show the descriptive statistics of the mean and standard deviation responses on budget transparency variable using five questionnaire items that were designed on a five-point Likert scale. Thus, the questionnaire items labelled above, and the mean and standard deviation of the five items were calculated to determine the overall mean and standard deviation responses on budget transparency. Notwithstanding, all the items mean are above the cut-off point of 2.5. However, the grand mean and standard deviation responses on the questionnaire items disclosed (**Mean =3.352; Std. D =1.308**) respectively.

Table 15: Results of Correlation Matrix

	BUT	DIR	IFA	DTA	DGF	HUC	SHE
BUT Pearson Correlation	1						
Significant (2 tailed)	.000						
N	302						
DIR Pearson Correlation	.654**	1					
Significant (2 tailed)	.000	.000					
N	302	302					
IFA Pearson Correlation	.682**	.684**	1				
Significant (2 tailed)	.000	.000	.000				
N	302	302	302				
DTA Pearson Correlation	.724**	.654**	.612**	1			
Significant (2 tailed)	.000	. .000	.000	.000			
N	302	302	302	302			
DGF Pearson Correlation	.628**	.642**	.724**	.684**	1		
Significant (2 tailed)	.000	.000	.000	.000	.000		
N	302	302	302	302	302		
HUC Pearson Correlation	.742**	.762**	.642**	.648**	.686**	1	
Significant (2 tailed)	.000	.000	.000	.000	.000	.000	
N	302	302	302	302	302	302	
SHE Pearson Correlation	.684**	.658**	.682**	.626**	.682**	.646**	1
Significant (2 tailed)	.000	.000	.000	.000	.000	.000	.000
N	302	302	302	302	302	302	302

Source: Authors' Computation Via SPSS (2026)

The Pearson Product Moment Correlation Coefficient (PPMC) analysis shows the moderating role of fiscal engagement on the relationship between digital financial management systems and budget transparency in Nigeria. Table 15 shows a strong and positive relationship (r = 0.654, P = 0.00) between digital infrastructure readiness (DIR) and budget transparency (BUT) in Nigeria, a strong and positive relationship (r = 0.682, P = 0.000) between integrated financial management system (IFS) and budget transparency (BUT) in Nigeria, a strong and positive relationship (r = 0.724. P = 0.000) between digital transparency and accountability (DTA) and budget transparency (BUT) in Nigeria, a strong and positive relationship (r = 0.628, P = 0.000) between data governance and financial analytics (DGF) and budget transparency (BUT) in Nigeria, a strong and positive relationship (r = 0.742, P = 0.000) between human capacity and digital competence (HUC) and budget transparency (BUT) in Nigeria, and a strong and positive (r = 0.684, p = 0.000) relationship between stakeholder engagement and budget transparency (BUT) in Nigeria. The findings therefore suggested a strong and positive relationship between digital public financial management system and fiscal transparency in Nigeria.

Table 16: Multiple Regression Analysis Model One
Dependent Variable: BUT
Method: Least Squares
Date: 05/16/26 Time: 15:20
Sample(adjusted): 1 302

Included observations: 302 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.275444	2.256856	1.451330	0.1488
DIR	0.285935	0.095662	2.989017	0.0033
IFA	0.249495	0.106627	2.339885	0.0206
DTA	0.216547	0.102573	2.111150	0.0363
DGF	0.273341	0.123184	2.218965	0.0400
HUC	0.234756	0.112637	2.126453	0.0374

R-squared	0.548726	Mean dependent var	12.99346
Adjusted R-squared	0.462352	S.D. dependent var	3.098167
S.E. of regression	2.888766	Akaike info criterion	4.997962
Sum squared resid	1226.711	Schwarz criterion	5.116803
Log likelihood	-376.3441	F-statistic	5.567008
Durbin-Watson stat	2.16401	Prob(F-statistic)	0.000100

Source: e-view output

As shown in Table 16, digital infrastructure readiness (DIR) with ($\beta = 0.285935$; $p < 0.05$) have positive and significant impact on budget transparency (BUT). This means that for every 1-unit increase in DIR, the level of BUT increases by 0.285935 units, assuming all other factors are held constant. Integrated financial management system (IFA) with ($\beta = 0.249495$; $p < 0.05$) have positive and significant impact on budget transparency (BUT). This means that for every 1-unit increase in IFA, the level of BUT increases by 0.249495 units, assuming all other factors are held constant. Digital transparency and accountability (DTA) with ($\beta = 0.216547$; $p < 0.05$) have positive and significant impact on budget transparency (BUT). This means that for every 1-unit increase in DTA, the level of BUT increases by 0.285935 units, assuming all other factors are held constant. Data governance and financial analytics (DGF) with ($\beta = 0.273341$; $p < 0.05$) have positive and significant impact on budget transparency (BUT). This means that for every 1-unit increase in DGF, the level of BUT increases by 0.285935 units, assuming all other factors are held constant. Human capacity and digital competence (HUC) with ($\beta = 0.234756$; $p < 0.05$) have positive and significant impact on budget transparency (BUT). This means that for every 1-unit increase in HUC, the level of BUT increases by 0.285935 units, assuming all other factors are held constant. Hence, that there is a positive and significant relationship between digital public financial management systems and fiscal transparency in Nigeria. The R^2 (coefficient of determination) of 0.548726 and adjusted R^2 of 0.462352 shows that the variables combined determines about 55% and 46% of digital public financial management systems and fiscal transparency in Nigeria. The F-statistics and its probability shows that the regression equation is well formulated explaining that the relationship between the variables combined affects fiscal transparency in Nigeria are statistically significant (F-stat = 5.567008; F-pro. = 0.000100).

Table 17: Multiple Regression Analysis Model Two
Dependent Variable: BUT
Method: Least Squares
Date: 05/16/26 Time: 15:32
Sample(adjusted): 1 302
Included observations: 302 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.275444	2.256856	1.451330	0.1488
DIR	0.285935	0.095662	2.989017	0.0327
IFA	0.249495	0.106627	2.339885	0.0254
DTA	0.216547	0.102573	2.111150	0.0347
DGF	0.275632	0.123481	2.384517	0.0352
HUC	0.273341	0.123184	2.218965	0.0373
SHE	0.284753	0.148523	2.847532	0.0345
DIR*SHE	0.287452	0.134273	2.182735	0.0253
IFA*SHE	0.382834	0.182347	2.394851	0.0226
DTA*SHE	0.238474	0.283415	2.398345	0.0254
DGF*SHE	0.374625	0.273547	2.362535	0.0253
HUC*SHE	0.234756	0.112637	2.126453	0.0264

R-squared	0.742385	Mean dependent var	12.99346
Adjusted R-squared	0.687462	S.D. dependent var	3.098167
S.E. of regression	2.718266	Akaike info criterion	4.997962
Sum squared resid	1234.711	Schwarz criterion	5.116803
Log likelihood	-3126.3441	F-statistic	5.837465
Durbin-Watson stat	2.364372	Prob(F-statistic)	0.000100

Source: e-view output

Table 17 presents the multiple regression analysis for the effects of stakeholder's engagement on the relationship between digital public financial management systems and fiscal transparency in Nigeria. The findings indicated a significantly positive (0.0327 < 0.05) relationship between digital infrastructure readiness (DIR) and budget transparency (BUT) in Nigeria. A significantly positive (0.0254 < 0.05) relationship between integrated financial management system (IFA) and budget transparency (BUT) in Nigeria. A significantly positive (0.0347 < 0.05) relationship between digital transparency and accountability (DTA) and budget transparency (BUT) in Nigeria. A significantly positive (0.0352 < 0.05) relationship between data governance and financial analytics (DGF) and budget transparency (BUT) in Nigeria. A significantly positive (0.0373 < 0.05) relationship between human capacity and digital competence (HUC) and budget transparency (BUT) in Nigeria. A significantly positive (0.0345 < 0.05) relationship between stakeholder engagement and budget transparency (BUT) in Nigeria. Therefore, there is a significantly positive relationship between digital public financial management systems and fiscal transparency in Nigeria. The R^2 (coefficient of determination) of 0.742385 and adjusted R^2 of 0.687462 show that the variables combined determines about 74% and 69% of fiscal transparency in the Nigerian public sector. The multiple regression analysis also suggested that the moderator variable of stakeholder's engagement (SHE) positively and significantly moderates the relationship between digital public financial management systems with p-values of (0.0253, 0.0226, 0.0254, 0.0253 and 0.0264 < 0.05). Hence, stakeholder's engagement (SHE) positively and significantly moderates

the association between digital public financial management systems and fiscal transparency in Nigeria. The F-statistics and its probability show that the regression equation is well formulated, explaining that the relationship between the independent variables combined affects budget transparency in Nigeria is statistically significant (F-stat = 5.837465; F-prob. = 0.000100).

DISCUSSION OF FINDINGS

Digital Infrastructure Readiness (DIR) and Budget Transparency (BUT): The study revealed a positive and statistically significant association between digital infrastructure readiness and budget transparency in the public sector of Nigeria. The positive connection indicates that countries with strong digital capabilities are more likely to achieve higher levels of fiscal openness and accountability. This finding suggests that digital infrastructure functions as an enabling institutional framework that facilitates the disclosure, accessibility, and monitoring of public financial information. This study aligns with the study investigated by Taiwo (2024) that provided that digital infrastructure such as broadband connectivity, interoperable databases, e-government systems, and online budget portals enhances citizens' ability to access, scrutinize, and evaluate government expenditure, thereby strengthening accountability mechanisms. The result also supports institutional and e-governance literature which posits that technologically advanced nations possess greater administrative capacity to implement fiscal systems. According to Olarewaju (2026), governments with higher digital readiness can adopt Integrated Financial Management Information Systems (IFMIS), open-data platforms, and digital procurement systems that improve the timeliness, accuracy, and accessibility of budget information. Empirical evidence similarly confirms that digital governance significantly improves fiscal transparency and reduces opportunities for corruption by increasing public oversight and reducing bureaucratic secrecy (Jin & Wang, 2025).

Integrated financial management system (IFS) and Budget Transparency (BUT): The hypothesis tested showed a positive and statistically significant relationship between integrated financial management system and budget transparency in the public sector of Nigeria. The finding suggests that digitally integrated public financial systems substantially improve fiscal openness, accountability, and public oversight of government finances. IFMIS enhances transparency by automating budgeting, expenditure tracking, procurement, thereby reducing information asymmetry and discretionary manipulation in public finance management. The finding supports contemporary e-governance and public financial management literature, which argues that digital financial systems improve timeliness, accuracy, and accessibility of budget information. Through centralized databases and real-time reporting mechanisms, IFMIS strengthens audit trails, internal controls, and expenditure monitoring, making government financial activities more transparent and traceable (Osei-Dwomoh & Forkuo, 2025; Olatinsu & Eke, 2025). The study conducted by Olarewaju (2026) revealed that integrated digital budget systems promote citizen participation and reduce corruption by enabling public access to monitorable fiscal information. The finding implies that governments with effective IFMIS implementation possess stronger institutional capacity for transparent fiscal governance.

Digital Transparency and Accountability (DTA) and Budget Transparency (BUT): The hypothesis tested showed a positive and statistically significant relationship between digital transparency and accountability and budget transparency in the public sector of Nigeria. The result suggests that the adoption of digital governance mechanisms substantially enhances fiscal openness, public oversight, and accountability in budgetary processes. This finding provides that digital transparency tools such as e-budgeting systems, open data portals, online expenditure tracking platforms, and real time financial disclosure systems reduce information asymmetry between governments and citizens, thereby strengthening public scrutiny of government finances. This finding aligns with the e-governance framework, which argues that transparency improves when digital systems lower monitoring costs and increase the traceability of public financial decisions. According to Olarewaju (2026), digital accountability mechanisms enable continuous auditability of budget execution, making government spending more visible and verifiable to oversight institutions and the public. Empirical evidence further suggests that digital supervision systems significantly enhance fiscal transparency by improving institutional monitoring and reducing bureaucratic discretion (Jin & Wang, 2025).

Data Governance and Financial Analytics (DGF) and Budget Transparency (BUT): The hypothesis tested showed a positive and statistically significant relationship between data governance and financial analytics and budget transparency in the public sector of Nigeria. The result suggests that stronger data management frameworks and advanced analytical capabilities substantially enhance the openness, reliability, and accountability of public financial systems. This relationship indicates that when governments instutionalise structured data governance and deploy financial analytic tools, they improve the quality, timeliness, and accessibility of budget information, thereby strengthening transparency outcomes. Empirical evidence supports this linkage. Naguib et al (2024) demonstrates that integrated data governance and analytics enhances financial performance and decision quality through improved data quality management and institutional accountability. Kusumba (2024) reported that the integration of analytics and governance systems has been shown to significantly strengthen real-time financial monitoring, auditability, and performance accountability, thereby improving transparency in budget reporting. Augustine et al (2025) suggests that digital data governance mechanisms are increasingly recognized as critical enablers of transparency because they facilitate structured data flows, interoperationability between systems, and consistent financial reporting standards.

Human Capacity and Digital Competence (HUC) and Budget Transparency (BUT): The finding revealed a positive and statistically significant relationship between human capacity and digital competence and budget transparency in the public sector of Nigeria. Human capacity and digital competence are increasingly recognized as major determinants of budget transparency and accountability in public financial management. Recent evidence suggests that digital transparency reforms are effective only when supported by sufficient institutional skills, citizen digital literacy, and organizational readiness. While digital technologies such as e-budgeting systems, IFMIS, and open budget portals improve access to fiscal information, their effectiveness depends largely on the capacity of both public officials and citizens to interpret and utilize budget data effectively (Bisogno et al, 2022). Bisogno et al (2022) study found that e-government initiatives and e-participation significantly improve budget transparency where digital competence and

participatory governance structures are strong. Adewumi and Abasilim (2024) evidence on Nigeria's public sector also revealed that limited digital competence among civil servants constrains digital transformation and weakens transparency reforms. Alfakoro et al (2026) provide that continuing education and institutional training are fundamental to bridge digital skill gaps and strengthen public sector accountability mechanisms.

Stakeholder's Engagement (SHE) and Budget Transparency (BUT): The finding revealed a positive and statistically significant relationship between stakeholder commitment and budget transparency in the public sector of Nigeria. The finding suggests that increased participation by members of the society and other stakeholders enhances openness, accountability, and accessibility in public budgeting processes. Empirical evidence reveals that participatory budgeting mechanisms and stakeholder consultations reduce information asymmetry and enhance fiscal accountability (Olaoye & Oluyori, 2025). The study conducted by Olaoye and Oluyori (2025) provides that stakeholder dialogue, communication channels, and stakeholder inclusion significantly predict transparency outcomes in public sector budgeting. The statistical analysis showed that governments with better stakeholder engagement frameworks are more likely to disclose comprehensive and understandable budget information. Jung (2022) maintains that digital stakeholder engagement platforms have been found to improve budget transparency by enabling real-time citizens monitoring and participation in fiscal governance.

Conclusion, Policy Implications, Limitations and Future Research

Conclusively, the empirical evidence demonstrates that digital infrastructure readiness, integrated financial management systems, digital transparency and accountability data governance and financial analytics, human capacity and digital competence, and stakeholder engagement each exert a positive and statistically significant influence on budget transparency within the public sector. Also, the finding revealed that stakeholder engagement positively and significantly moderates the connection between digital public sector financial management system and fiscal transparency in the public sector. Collectively, these dimensions constitute an interdependent governance ecosystem in which technological capability, institutional coordination, analytical intelligence, and participatory governance reinforce one another to enhance fiscal openness, accountability and public trust. The results indicate that robust digital infrastructure and integrated financial systems improve the efficiency, accuracy, and traceability of public financial data, thereby reducing information asymmetry. Digital transparency mechanisms improve accountability by expanding access to budget information, while strong data governance and analytics improve decision making, monitoring, and control of public resources. In addition, human capacity and digital competence are critical enablers of effective system use, and stakeholder engagement further reinforces transparency through external oversight and participatory accountability. Consequently, budget transparency in the public sector is best achieved through a holistic approach that integrates technological systems, data governance, skilled individuals, and inclusive governance mechanisms.

This finding carries several important policy implications for public sector reform. First, it underscores that digital transformation in public financial management should not be treated as a purely technocratic reform. Investments in infrastructure, systems integration, and analytics will

yield suboptimal transparency outcomes. Therefore, policy makers should embed participatory mechanisms such as open budget portals, citizens feedback platforms, participatory budget frameworks, and civil society oversight channels directly into digital public financial management ecosystems. Second, the moderating effect suggests that stakeholder engagement enhances the utility and legitimacy of digital infrastructure and integrated financial management systems by improving data validation, increasing usage intensity, and improving accountability loop. Accordingly, government should prioritize co-creation approaches in system design and implementation, ensuring that end-users, and civil society actors are involved from the architecture stage to evaluation. Third, in relation to digital transparency and accountability, stakeholder engagement functions as a critical enforcement. Policy frameworks should move beyond passive disclosure toward active transparency regimes that support civic data literacy, open data accessibility and structured public deliberation on budget information. Fourth, the moderating role of stakeholder engagement on data governance and financial analytics highlights the relevance of participatory data ecosystems. Data governance policies should incorporate transparency standards, citizens-accessible metadata, and mechanisms for external auditability. Fifth, regarding human capacity and digital intelligence, stakeholder engagement amplifies the effectiveness of training and skills development initiatives by creating external accountability pressures and reinforcing continuous learning. Public sector capacity building policies should therefore integrate collaborative training models involving civil society, professional bodies and academia to ensure that digital competences align with public expectations of transparency.

Despite the robust empirical evidence demonstrating the positive and Significant effects of digital infrastructure readiness, integrated financial management systems, digital transparency and accountability, data governance and financial analytics, human capacity and digital competence and stakeholder engagement on budget transparency, several limitations warrant consideration. The study is limited by its cross-sectional design, which restricts causal interpretation of the connection among variables. The reliance on self-reported data may also introduce response bias and may not fully reflect actual public sector transparency practices. In addition, contextual differences across public institutions may affect the generalizability of the findings. The study further excludes other potential determinants such as political stability, regulatory quality, and anti-corruption frameworks that may influence budget transparency. Future research should extend this study in several important directions to deepen theoretical and empirical understanding of digital public financial governance. Future studies should employ longitudinal and comparative research designs to better investigate causal links and contextual variations across regions and countries. Researchers are also encouraged to integrate objective financial and administrative data alongside perceptual measures to improve validity. Further investigation into the distinct dimensions of stakeholder engagement and the potential mediating or nonlinear effects of digital governance variables would provide deeper theoretical and practical insights into public sector budget transparency.

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