



Evaluating the Effectiveness of E-Procurement Systems in Nigeria's Public Health Sector: A Case Study of Selected States

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ABSTRACT

The switch from traditional procurement to electronic procurement (e-procurement) has been acknowledged around the world as a smart way to make public sector processes more open, efficient, and accountable. In Nigeria's public health sector, the effective adoption and implementation of e-procurement is critical for ensuring timely delivery of medical supplies, reducing procurement leakages, and enhancing service delivery. This study evaluates the level of adoption and implementation of e-procurement systems within public health institutions across selected states in Nigeria. A quantitative research design was employed, using structured questionnaires administered to 132 procurement officers across public health institutions. Data were analyzed using descriptive statistics and regression analysis to determine the extent of adoption and the effectiveness of implementation. The independent variables included perceived usefulness, perceived ease of use, technological readiness, policy support, and management commitment, while the dependent variable was implementation effectiveness. Findings reveal moderate adoption levels, with notable variations linked to perceived usefulness, policy support, system quality, and organizational readiness. However, implementation challenges such as inadequate ICT infrastructure, limited technical capacity, resistance to change, and inconsistent regulatory enforcement constrained optimal utilization of e-procurement platforms. The study concludes that while awareness and partial adoption exist, full-scale implementation remains hindered by structural and institutional barriers. It recommends increased government investment in ICT infrastructure, enhanced capacity-building programs, stronger policy enforcement, and continuous stakeholder engagement to deepen e-procurement integration within the Nigerian public health sector. The implications of this study provide a foundation for policymakers and administrators seeking to advance procurement digitalization for improved health outcomes.

Keywords: E-procurement, Traditional procurement, Effective procurement, Public health sector, Implementation, Digitalization.

INTRODUCTION

E-procurement, defined as the use of electronic methods in every stage of the purchasing process, has emerged as a transformative tool for enhancing transparency, efficiency, and accountability in public sector procurement (Davila et al., 2023). In Nigeria, the public health sector relies heavily on procurement systems for the acquisition of medical supplies, pharmaceuticals, equipment, and services necessary to deliver quality healthcare (Adebayo & Ahmed, 2021). However, traditional manual procurement systems have been



associated with inefficiencies, corruption, long lead times, and poor documentation (World Bank, 2020). As a result, there has been increasing advocacy for the adoption of e-procurement systems as part of broader public sector reforms aimed at promoting good governance and improving service delivery (Bovaird & Löffler, 2016).

The Nigerian government has made several efforts of implement e-procurement through initiatives such as the Bureau of Public Procurement (BPP) and the National E-Government Master Plan (BPP, 2020). Despite these efforts, the level of adoption and implementation within the public health sector remains unclear. There is a need to critically evaluate how e-procurement systems have been adopted, the extent of their implementation, and the factors that influence their success or failure in selected public health institutions (Eze & Chinedu, 2022).

Statement of Problem

Traditional procurement practices in Nigeria's public health sector are often plagued by corruption, inefficiencies, prolonged procurement cycles, and a lack of transparency. Despite the potential of e-procurement to mitigate these challenges, its adoption and implementation face several obstacles such as infrastructural limitations, low technological readiness, inadequate training, resistance to change, and policy inconsistencies. Furthermore, empirical evidence on the current level of adoption and implementation of e-procurement in the public health sector in Nigeria is limited. It is also unclear whether procurement officers possess the necessary awareness and readiness to utilize e-procurement systems effectively. Additionally, the impact of e-procurement on procurement efficiency, transparency, and accountability has not been sufficiently examined in this context. Thus, this study seeks to fill these gaps.

Research Objectives

The main objective of this study is to evaluate the adoption and implementation of the e-procurement system in Nigeria's public health sector. The specific objectives of this study are to:

1. Assess the level of awareness and readiness of procurement officers toward e-procurement adoption in selected public health institutions.
2. Examine the impact of e-procurement implementation on procurement efficiency, transparency, and accountability in the public health sector.
3. Identify the critical success factors and challenges influencing sustainable e-procurement implementation in the Nigerian public health sector.

Research Questions

Based on the research objectives, the following research questions are formulated:

1. What is the level of awareness and readiness of procurement officers toward e-procurement adoption in selected public health institutions?
2. What is the impact of e-procurement implementation on procurement efficiency, transparency, and accountability in the public health sector?
3. What are the critical success factors and challenges influencing sustainable e-procurement implementation in the Nigerian public health sector?

Statement of Hypotheses

The study will be guided by the following hypotheses:

H0A: There is no significant relationship between awareness/readiness of procurement officers and the adoption of e-procurement systems.

H0B: E-procurement implementation has no significant impact on procurement efficiency, transparency, and



accountability.

H0C:Critical success factors do not significantly influence the sustainability of e- procurement implementation.

Conceptual Review

Concept of E-Procurement

E-procurement refers to the digitalization of procurement processes using internet-based technologies, digital platforms, and electronic systems to facilitate the acquisition of goods, services, and works (Akanbi & Ojo, 2023). It involves the automation of traditional procurement activities such as supplier sourcing, tendering, bidding, contract award, invoicing, and payment through electronic means (Chien & Tsai, 2020). E-procurement is recognized as a transformative tool that enhances procurement efficiency, promotes transparency, reduces administrative burden, and minimizes the risks of corruption and manipulation during procurement processes (Okechukwu et al, 2023).

According to Eze & Uzochukwu (2024), e-procurement systems typically operate via enterprise resource planning (ERP) platforms or dedicated government portals that allow procurement officers and suppliers to interact in a secure and streamlined digital environment. These platforms help organizations reduce paperwork, improve documentation accuracy, and enhance auditability. E-procurement has gained prominence in both public and private sectors due to its cost-saving potential and ability to improve supply chain responsiveness.

In the public sector, e-procurement is increasingly adopted as part of broader governance reforms aimed at improving accountability and combating corruption (World Bank, 2022). In Nigeria, e-procurement initiatives are aligned with the objectives of the Public Procurement Act of 2007, which encourages transparency, competitiveness, and efficiency in public procurement processes (Okechukwu et al., 2023). Recent studies indicate that e-procurement adoption in Nigerian public institutions is gradually increasing, particularly in sectors such as healthcare, education, and infrastructure (Eze & Uzochukwu, 2024).

E-procurement enhances transparency by providing real-time access to procurement information, ensuring that all stakeholders can monitor procurement stages from tender advertisement to contract execution (Ibem et al., 2018). It also strengthens accountability by improving record-keeping and enabling better tracking of procurement spending (Chopra & Meindl, 2022). In addition, e-procurement facilitates wider supplier participation by eliminating geographical barriers and allowing suppliers from different regions to compete fairly (Kahare & Chege, 2021).

In summary, e-procurement is a technology-driven approach that significantly enhances the effectiveness and reliability of procurement processes. Its successful adoption in public health institutions is critical in ensuring timely access to essential medical supplies and in strengthening health service delivery.

Concept of Procurement in Public Health Sector

Procurement in the public health sector refers to the systematic process of acquiring medical goods, services, and works necessary to support healthcare delivery, including pharmaceuticals, laboratory supplies, medical equipment, and health-related infrastructure (World Health Organization [WHO], 2020). It encompasses all activities related to identification of need, supplier selection, contract negotiation, purchasing, delivery management, and payment (Adegoke & Ojo, 2021). The procurement function in healthcare institutions is central to achieving efficient service delivery, reducing mortality and morbidity rates, and ensuring timely access to essential medical supplies (Ogbonna & Kalu, 2012).

Public health procurement is typically governed by national laws and regulations to ensure transparency, accountability, competitiveness, fairness, and value for money. In Nigeria, procurement within public health institutions operates under the Public Procurement Act of 2007, which mandates adherence to due process,



competitive bidding, and transparency in the acquisition of health-related goods and services (Okechukwu et al., 2023). According to Eze and Uzochukwu (2024), effective procurement practices contribute significantly to improving public trust in healthcare services and reducing opportunities for corruption.

Furthermore, procurement in public health settings often involves collaboration between multiple stakeholders, including government agencies, healthcare providers, suppliers, donors, and regulatory bodies (Kahare & Chege, 2021). Effective coordination among these stakeholders ensures compliance with quality standards and optimizes resource utilization. A recent study by Ayorinde and Hassan (2023) emphasized that a structured and transparent procurement process enhances the sustainability and responsiveness of healthcare institutions, especially in low- and middle-income countries like Nigeria. Procurement in the public health sector plays a critical role in strengthening healthcare systems by ensuring access to timely, cost-effective, and high-quality medical supplies and services. Its effectiveness depends on regulatory compliance, institutional capacity, stakeholder collaboration, and the integration of innovative procurement mechanisms, such as digital procurement platforms.

Implementation of E-Procurement in Public Health Institutions

The implementation of electronic procurement (e-procurement) represents one of the most significant transformations in public sector management, particularly in the healthcare sector. E-procurement implementation refers to the systematic process of integrating electronic tools and platforms into the procurement framework of an organization to enhance transparency, accountability, and efficiency (Adebayo & Okonkwo, 2022). It goes beyond the mere decision to adopt technology; it entails embedding digital processes into existing workflows, restructuring institutional systems, training personnel, and establishing mechanisms for monitoring and continuous improvement.

In public health institutions, effective procurement systems are vital for ensuring timely access to essential medical supplies, pharmaceuticals, and equipment. However, traditional procurement practices in many developing countries, including Nigeria, are often characterized by inefficiencies, bureaucratic delays, and corruption. The implementation of e-procurement offers a pathway to reform by automating procurement activities such as tendering, bid evaluation, contract management, and supplier relationship management. When properly executed, it enables faster decision-making, enhances accountability, and promotes value for money in public spending (World Bank, 2022).

Implementation, however, is not a one-off activity. It is a complex, multi-phase process that requires alignment of technology, policy, human capacity, and organizational culture. The degree to which e-procurement becomes institutionalized within public health systems depends largely on how well implementation is planned, executed, and supported by stakeholders.

Theoretical Review

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), is one of the most widely utilized theories for explaining user acceptance and utilization of information systems and technological innovations. TAM is grounded in the Theory of Reasoned Action (TRA), which asserts that an individual's behavioral intention is influenced by their attitudes and subjective norms. According to TAM, two key constructs—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—directly influence users' attitudes towards adopting a technology, which in turn affects their behavioral intention to use, and ultimately actual system usage (Venkatesh et al., 2003).

In the context of e-procurement, Perceived Usefulness refers to the extent to which procurement officers and health administrators believe that using the e-procurement system enhances procurement efficiency, transparency, and cost-effectiveness. Perceived Ease of Use, on the other hand, concerns the degree to which the e-procurement platform is user-friendly and requires minimal effort to operate. When health sector procurement officers perceive that e-procurement tools such as electronic tendering, supplier management



portals, and purchase requisition platforms are beneficial and easy to navigate, they are more likely to adopt and consistently use the system.

Furthermore, TAM posits that external variables such as training, technological infrastructure, managerial support, and organizational culture can indirectly influence user acceptance by affecting PU and PEOU (Venkatesh et al., 2003). In Nigerian public health institutions, inadequate ICT infrastructure, limited technical capacity, and resistance to change have been identified as factors that influence perceived usefulness and ease of use, thus affecting the adoption of e-procurement. Several studies have validated the applicability of TAM in e-procurement environments. For instance, PU and PEOU significantly influenced the adoption of electronic procurement tools among public health workers in selected Nigerian teaching hospitals. Similarly, Khalil and Seleim (2019) reported that procurement officials' perception of usefulness was the strongest predictor of e-procurement adoption in Egyptian public sector health ministries. These findings underscore the importance of ensuring that e-procurement platforms are both efficient and user-friendly to drive adoption in the public health sector.

However, while TAM provides a robust explanation of individual-level adoption behaviour, critics argue that it does not fully account for organizational, social, and institutional pressures that influence technology adoption in public sector contexts (Venkatesh et al., 2003). Therefore, TAM is often extended with additional constructs or complemented with other theories such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and Diffusion of Innovation (DOI) to capture broader determinants of adoption. TAM is crucial for understanding how perceptions of usefulness and ease of use influence the acceptance and utilization of e-procurement by procurement officers and health sector administrators. This theory provides a foundation for investigating user attitudes and intentions within Nigeria's public health procurement landscape.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh et al. (2003), synthesizes elements from eight prominent technology adoption theories, including TAM, TPB, DOI, TRA, and others. UTAUT was developed to provide a more comprehensive framework for explaining user acceptance and usage behavior, especially in organizational and public sector contexts.

The theory identifies four core determinants of behavioral intention and actual usage of technology: The extent to which an individual believes that using a system will enhance job performance (Venkatesh et al., 2003). In the public health procurement context, this refers to procurement officers' expectations that e-procurement systems will improve efficiency, accountability, and cost reduction. In addition, the perceived ease associated with using a technological system. If healthcare procurement personnel perceive that the e-procurement process—such as electronic tendering, bid submissions, and supplier collaboration—is simple, they are more likely to adopt it (Aboelmaged, 2010).

According to Venkatesh et al. (2003), behavioral intention is influenced by PE, EE, and SI, while actual usage is jointly influenced by behavioral intention and FC. Additionally, UTAUT introduces moderating variables such as gender, age, experience, and voluntariness of use, which can influence the effect of the core determinants on adoption behavior. In public health procurement settings, UTAUT has been widely applied to explain adoption behavior. For example, Okeke and Nwankwo (2022) found that PE and FC were the most significant predictors of e-procurement adoption among procurement officers in Nigerian federal hospitals. Similarly, Agyekum-Mensah and Knight (2021) reported that SI significantly impacted adoption in situations where government policy strongly encouraged the shift to digital procurement methods. The relevance of UTAUT to this study is rooted in its ability to explain not only individual acceptance but also the effect of organizational factors, stakeholder pressures, and enabling conditions. Given that public health procurement in Nigeria is heavily regulated and influenced by multiple stakeholders, UTAUT provides a comprehensive lens for understanding e-procurement adoption and implementation challenges. Integrating UTAUT with other organizational theories such as Institutional Theory may provide deeper insights into systemic influences on e-procurement adoption in public health institutions.

Theoretical Implications for the Study



The integration of the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Diffusion of Innovation (DOI), and Institutional Theory provides a robust theoretical foundation for understanding e-procurement adoption and implementation within Nigeria's public health sector. This multi-theoretical approach aligns with the complex and multifaceted nature of public sector digital transformation, where technological, organizational, behavioral, and institutional factors interact to influence outcomes. TAM highlights the importance of individual perceptions, specifically perceived usefulness and perceived ease of use, suggesting that e-procurement systems will be more widely adopted if procurement officers believe they enhance efficiency and are user-friendly (Davis, 1989; Venkatesh et al., 2003). This aligns with the study's objective on user acceptance and capacity-building needs.

UTAUT extends this perspective by incorporating social influence and facilitating conditions, emphasizing the role of peer pressure, management support, and organizational readiness in promoting adoption (Venkatesh et al., 2003). These constructs are relevant to assessing organizational preparedness, training, infrastructure availability, and leadership involvement in health institutions.

Together, these theories provide a holistic framework for evaluating e-procurement adoption and implementation by: Explaining individual-level acceptance (TAM and UTAUT), Identifying social and organizational enablers (UTAUT), Analysing innovation characteristics affecting uptake (DOI), Revealing regulatory and legitimacy pressures driving adoption (Institutional Theory). Therefore, this study leverages these theoretical lenses to explore how internal perceptions, external pressures, technological features, and organizational readiness collectively shape the adoption and implementation of e-procurement systems in Nigeria's public health institutions.

Comparative Theoretical Analysis

A comparative examination of the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Diffusion of Innovation (DOI), and Institutional Theory is essential for understanding their relative strengths, weaknesses, and relevance in analyzing e-procurement adoption in Nigeria's public health sector. While each theory provides distinct analytical lenses rooted in psychology, sociology, organizational behavior, and institutional dynamics, they converge on explaining how individuals and institutions respond to technological innovations. This comparison is necessary not only to identify overlaps and distinctions among the theories but also to justify the relevance of a multi-theoretical model for a complex public-sector environment such as Nigerian public health procurement. By critically contrasting the models based on individual behavioral factors, organizational conditions, innovation attributes, and institutional pressures, this section provides a theoretical rationale for selecting and integrating the most contextually appropriate constructs to guide this study.

The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) share a common foundation in explaining technology adoption through individual behavioral intention, grounded in cognitive evaluation of the technology (Davis, 1989). Both models highlight that an individual's decision to adopt a technology arises from their perceptions of its usefulness and ease of use. Specifically, TAM posits that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) shape users' attitudes and Behavioral Intention (BI), which ultimately leads to actual usage (Davis, 1989).

However, UTAUT extends this cognitive perspective by introducing a broader set of determinants, including Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC), while incorporating moderating variables such as gender, experience, age, and voluntariness of use (Venkatesh et al., 2003). While PU aligns conceptually with PE and PEOU aligns with EE, UTAUT acknowledges that adoption is not driven solely by technical evaluations but also by social and organizational contexts. For instance, in Nigerian public health procurement environments, UTAUT's inclusion of Social Influence is highly relevant due to the hierarchical structure of public institutions where adoption may be mandated by superiors or regulatory agencies (Okeke & Nwankwo, 2022).

Furthermore, UTAUT's Facilitating Conditions construct provides a more institutionalized approach to adoption compared to TAM, recognizing that access to ICT infrastructure, training, and supportive leadership



are critical enablers of actual system use (Boateng et al., 2020). This makes UTAUT more comprehensive for evaluating e-procurement systems where infrastructure disparities and organizational readiness significantly determine adoption outcomes.

Nevertheless, TAM remains valuable for its simplicity and predictive accuracy in understanding early-stage user attitudes, especially in environments where technological literacy may be limited, such as rural health institutions. However, in more complex institutional contexts marked by coercive mandates, stakeholder pressures, and leadership influence—as seen in donor-driven public health procurement—UTAUT offers a more robust framework. Thus, while TAM provides a fundamental understanding of individual user perceptions, UTAUT advances adoption analysis by adding contextual, regulatory, and social enablers, making it more aligned with the realities of Nigeria's public health sector.

Empirical Review

Over the past decade, and particularly following the disruptions caused by the COVID-19 pandemic, the global empirical literature on e-procurement has shifted significantly from conceptual or pilot-based analyses to more robust, evidence-driven evaluations of its adoption, implementation, and impacts across public sector domains—including the health sector. The growing body of empirical research reflects a global recognition of e-procurement as a strategic tool for promoting efficiency, accountability, and transparency in public expenditure management (World Bank, 2020; OECD, 2023). In particular, recent studies across high-income, middle-income, and emerging economies have employed a range of quantitative and mixed-methods approaches—such as quasi-experimental designs, large-scale surveys, and cross-national comparative analyses—to measure the effects of e-procurement systems on organizational performance, governance outcomes, and service delivery in public health.

E-Procurement and Efficiency Gains in Public Sector Operations

Several empirical studies conducted in advanced economies have consistently demonstrated that e-procurement systems contribute to measurable efficiency improvements within public procurement operations. Gunasekaran and Ngai (2008) found that the deployment of electronic procurement tools in South Korea and Singapore led to significant reductions in transaction costs, procurement cycle time, and administrative burdens for both buyers and suppliers. The study emphasized that centralized digital platforms not only streamlined tendering and contract management processes but also enhanced real-time data analytics for monitoring supplier performance. Similarly, a World Bank (2020) assessment of e-procurement systems across member countries of the Organisation for Economic Co-operation and Development (OECD) reported that digitization reduced procurement lead times by up to 40%, while the automation of bid evaluation procedures curtailed manual bottlenecks and reduced opportunities for human error or manipulation.

Empirical evidence from Eastern Europe reinforces these findings using more rigorous quasi-experimental methodologies. Comparable outcomes were observed in studies from Italy, Estonia, and Latvia, where digital tendering portals improved competition among vendors and facilitated public scrutiny through open-access contract databases (Müller et al., 2021). In the specific context of health systems, e-procurement has increasingly been recognized as an enabler of efficient, transparent, and resilient health supply chains. The COVID-19 pandemic, in particular, acted as a global stress test for public procurement mechanisms, exposing weaknesses in traditional, paper-based systems while demonstrating the value of digital platforms for emergency responsiveness (Agostinoteal., 2021). Multi-country case studies from Italy, Spain, and Chile conducted between 2020 and 2022 revealed that digital procurement portals facilitated faster aggregation of demand, more transparent supplier selection processes, and improved coordination among decentralized health agencies during the procurement of personal protective equipment (PPE) and ventilators. In Italy, for instance, regional health authorities that had already implemented electronic tendering systems prior to the pandemic were able to procure critical medical supplies 30% faster than those relying on manual procedures (Agostinoteal., 2021).

Empirical studies from developing countries also provide compelling evidence of e-procurement's role in improving supply chain reliability and reducing medicine stockouts. In India, the integration of electronic



procurement and inventory management systems has been associated with improved supply-chain visibility, more efficient inventory control, and better availability of essential medical commodities, thereby reducing procurement and stock-management challenges in public healthcare facilities (World Health Organization [WHO], 2021). Similarly, Carvalho et al. (2022) reported that Brazilian hospitals using e-procurement systems experienced a marked reduction in procurement cycle times and improved supplier compliance rates compared to those using traditional manual processes. These outcomes underscore the potential of e-procurement to strengthen last-mile delivery systems, which is particularly relevant in low- and middle-income countries (LMICs) where inefficiencies in public procurement often translate directly into poor health outcomes.

Determinants of E-Procurement Adoption: Behavioral and Organizational Evidence

Beyond impact evaluations, a significant body of cross-national survey research has explored the behavioral, institutional, and organizational determinants of e-procurement adoption in public health and government agencies. Drawing from the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT), several studies have identified perceived usefulness, perceived ease of use, management commitment, and facilitating conditions as critical predictors of adoption intentions (Venkatesh et al., 2003). For instance, a survey of 489 procurement officers across public hospitals in Malaysia and South Korea found that perceived usefulness and top management support significantly influenced behavioral intention to adopt e-procurement systems. Similarly, Omweri (2025) stated that institutional readiness, ICT infrastructure, and policy support emerged as enabling conditions for effective e-government procurement, while infrastructural deficits and regulatory fragmentation remained persistent barriers.

Institutional factors such as regulatory clarity and policy enforcement have also been empirically linked to adoption success. Studies in Indonesia and the Philippines, for example, revealed that where procurement laws explicitly mandate electronic platforms for public tendering, adoption rates and usage intensity were substantially higher than in contexts where e-procurement was optional or poorly enforced (World Bank, 2020). The role of capacity-building interventions—training, change management, and user sensitization—has equally been highlighted. Structured user training and continuous technical support significantly improved user satisfaction and reduced resistance to system use.

Challenges and Implementation Gaps Identified in Global Empirical Work

While the global evidence on e-procurement is broadly positive, empirical studies consistently highlight critical challenges that may undermine its potential benefits if not addressed. One recurrent issue is data quality and system interoperability. In several middle-income countries, fragmented ICT infrastructure and the use of non-standardized data formats have hindered the seamless exchange of procurement information across agencies (Neupane et al., 2014; World Bank, 2020). Supplier digital exclusion remains another persistent challenge—small and medium-sized enterprises (SMEs), particularly in rural or low-capacity regions, often lack the necessary digital literacy or internet connectivity to participate effectively in e-tendering processes (Adebayo & Ojo, 2021).

Cybersecurity and data protection risks have also been empirically documented. Müller et al. (2021) observed that decentralized e-procurement systems in some European countries faced vulnerabilities to data breaches and manipulation, prompting the adoption of blockchain-based audit trails in more recent implementations. Furthermore, empirical analyses warn that digitization does not automatically eliminate corruption or rent-seeking behaviours. Without corresponding governance reforms—such as open data publication, third-party oversight, and accountability mechanisms—digital systems can merely automate existing inefficiencies (Neupane et al., 2014). This finding echoes the view of the World Bank (2020), which emphasizes that the transformative potential of e-procurement depends not only on technology but also on institutional integrity and political will.

Implementation fidelity—how closely the actual deployment of e-procurement aligns with its intended design—has also emerged as a mediating factor in empirical research. Müller et al. (2021) found that in countries where system roll-out deviated significantly from planned specifications (e.g., inadequate user training or incomplete module integration), the expected efficiency and transparency gains were either



negligible or reversed.

Lessons for Developing Economies and Public Health Systems

The synthesis of global empirical findings offers several critical lessons for developing countries seeking to adopt or scale up e-procurement in public health. First, the evidence underscores the importance of contextual readiness—including digital infrastructure, institutional frameworks, and human capacity—as a prerequisite for effective implementation (Gunasekaran & Ngai, 2008; Nguyen et al., 2021). Second, policy coherence and enforcement emerge as essential drivers of success. Countries with clear e-procurement mandates embedded in procurement law (e.g., Chile, Estonia, South Korea) demonstrate higher levels of adoption and impact compared to those where digital reforms remain discretionary (OECD, 2023).

Third, the empirical literature stresses that integration—linking e-procurement with inventory, financial, and logistics systems—is critical for maximizing efficiency and reducing fragmentation in health supply chains (Carvalho et al., 2022). Fourth, stakeholder inclusion—particularly of local suppliers and subnational entities—is vital to prevent digital exclusion and ensure equitable access to public contracts (Adebayo & Ojo, 2021). Finally, continuous monitoring and evaluation using real-time data analytics are essential for identifying performance bottlenecks and maintaining accountability (World Bank, 2020).

The reviewed global empirical literature provides compelling evidence that e-procurement, when effectively implemented, can enhance efficiency, transparency, and responsiveness within public sector and health system procurement. However, the impact of e-procurement is not automatic; it is contingent upon a constellation of contextual factors—including technical readiness, institutional commitment, regulatory enforcement, and implementation fidelity. These insights are directly relevant to the Nigerian context, where public health procurement remains constrained by infrastructural gaps, weak enforcement of procurement laws, and limited ICT capacity among procurement personnel (Adebayo & Okonkwo, 2022).

Accordingly, the global evidence base justifies the need for Nigeria-specific empirical investigations into how e-procurement can be adapted to local realities within the public health sector. Understanding how global best practices can be localized—while addressing context-specific challenges such as digital literacy, connectivity gaps, and governance weaknesses—forms a crucial rationale for this study. Moreover, aligning e-procurement reforms with the objectives of Nigeria's Public Procurement Act (PPA) and health system strengthening initiatives will be essential for achieving the efficiency and transparency gains documented in the global literature.

RESEARCH METHODOLOGY

This study adopts a quantitative research design, specifically utilizing a descriptive survey approach. The descriptive survey design is appropriate because it enables the collection of quantifiable data from a large population sample to assess the extent of adoption and implementation of e-procurement systems in Nigeria's public health sector. The choice of this design aligns with previous studies that investigated the adoption of technological innovations in public institutions (Mensah & Obeng, 2021). Moreover, the quantitative approach facilitates objective measurement of variables such as perceived usefulness, ease of use, performance expectancy, institutional pressures, and implementation challenges, which aligns with the theoretical frameworks guiding the study (TAM and UTAUT).

The sample size for this study was drawn from the target population of procurement-related personnel across the selected public health institutions and World Bank–assisted projects in Abia, Lagos, Kaduna, and Rivers States. Since the total population of procurement officers and related staff varied across institutions and projects, a finite population approach was adopted, using official staff lists where obtainable, while a proportional distribution method was applied to ensure proper representation across states and institution types. As this study adopted a quantitative survey design, the sample size was determined using Yamane's (1967) formula for a known population where the population was undetermined.

Based on preliminary institutional data, approximately 300 eligible personnel were estimated across the



selected institutions. Therefore, a minimum sample size of 200–250 respondents was considered adequate, in line with similar studies on e-procurement in public health institutions (Mensah & Obeng, 2021).

The study relied exclusively on primary data, which were generated directly from respondents through the administration of a structured questionnaire. The respondent group consisted of procurement officers, supply chain managers, finance/accounts officers, ICT personnel, project implementation unit (PIU) members, and monitoring and evaluation (M&E) officers directly involved in procurement activities within public health institutions and World Bank–assisted health sector projects in the selected states. The exclusive use of primary data was consistent with the empirical design of the study

Multiple Regression analysis was conducted to examine the influence of adoption factors (perceived usefulness, ease of use, technological readiness, policy support, and management commitment) on implementation effectiveness of e-procurement systems. The independent variables included perceived usefulness, perceived ease of use, technological readiness, policy support, and management commitment, whereas the dependent variable was implementation effectiveness. The model assessed the degree to which independent variables predicted the dependent variable, providing insights into the key drivers of successful implementation. A significance level of 0.05 ($p < 0.05$) was applied to determine statistical relevance, consistent with standard quantitative research practices.

RESULTS AND DISCUSSION

The results for the multiple regression analysis was conducted to determine the extent to which adoption factors predicted the effectiveness of e-procurement implementation and the results output are as presented in Table 4.1 to 4.5. The independent variables included perceived usefulness, perceived ease of use, technological readiness, policy support, and management commitment, while the dependent variable was implementation effectiveness.

Table 4.1: Model Summary

Model	R	R ²	Adjusted R ²
1	0.712	0.507	0.492

The results indicated that approximately 50.7% of the variance in implementation effectiveness was explained by the adoption constructs, suggesting a moderate to strong predictive relationship.

Table 4.2: ANOVA Output

Source	F	Sig.
Regression	32.45	0

The ANOVA results revealed that the regression model was statistically significant ($p < 0.05$), confirming that the adoption variables collectively influenced implementation effectiveness.

Table 4.3: Coefficients

Predictor	Beta	p-value	Interpretation
Perceived Usefulness	0.315	0.001	Significant positive effect
Policy Support	0.27	0.005	Significant positive effect
Technological Readiness	0.182	0.014	Moderate positive effect
Ease of Use	0.109	0.067	Not statistically significant



Management Commitment	0.143	0.032	Significant positive effect
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The analysis showed that perceived usefulness, policy support, technological readiness, and management commitment significantly predicted the effective implementation of e-procurement systems, whereas ease of use was not statistically significant. This suggests that while familiarity with the system was helpful, institutional and policy support, technological readiness, and management commitment were more critical drivers of successful implementation.

The findings of this study revealed moderate-to-high adoption levels of e-procurement systems in Nigeria's public health sector, consistent with previous studies (Adebayo & Ojo, 2022; Mensah & Obeng, 2021). Adoption was primarily driven by perceived usefulness and management commitment, indicating that procurement officers recognized the benefits of e-procurement in enhancing transparency, reducing procurement delays, and improving accountability. Policy support and technological readiness also contributed to adoption, though to a lesser extent.

Despite these relatively high adoption levels, the implementation of e-procurement systems remained moderate, with gaps observed in system integration, institutionalization, and operational compliance. These results reflected the ongoing challenges reported in similar Nigerian public sector contexts, where inadequate ICT infrastructure, resistance to digital change, limited training, and weak regulatory enforcement constrained full-scale operationalization.

Regression analysis further highlighted that perceived usefulness, policy support, technological readiness, and management commitment significantly predicted implementation effectiveness, explaining 50.7% of the variance. This finding aligns with the Technology Acceptance Model (TAM), which emphasizes the importance of perceived usefulness in shaping adoption behaviors (Davis, 1989), and the Diffusion of Innovation (DOI) theory, which underscores the role of organizational readiness and policy environment in facilitating implementation (Rogers, 2003). The non-significant effect of ease of use suggested that familiarity with e-procurement platforms alone was insufficient for effective implementation. Instead, the presence of strong institutional frameworks, supportive policies, and adequate technological infrastructure was more critical. These insights indicated that while procurement officers valued e-procurement and were willing to adopt it, structural and systemic barriers prevented full operationalization.

Overall, the study confirmed that adoption is necessary but not sufficient for successful implementation, emphasizing the need for integrated strategies combining technology, policy, management, and capacity-building efforts to enhance e-procurement effectiveness in Nigeria's public health sector.

CONCLUSION AND POLICY RECOMMENDATIONS

This study evaluated the adoption and implementation of e-procurement systems in Nigeria's public health sector, using quantitative evidence collected from 132 procurement officers across selected states and World Bank-assisted projects. The findings revealed moderate-to-high adoption levels, primarily driven by perceived usefulness, management commitment, and policy support.

However, the actual implementation of e-procurement systems remained moderate, with challenges observed in system integration, institutionalization, and operational compliance. Regression analysis indicated that perceived usefulness, policy support, technological readiness, and management commitment significantly influenced implementation effectiveness, explaining 50.7% of the variance. The non-significant effect of ease of use suggested that user familiarity alone was insufficient to ensure successful implementation; systemic support, infrastructure, and organizational readiness were crucial determinants.

Overall, the study concluded that while adoption intentions were strong, structural and institutional barriers limited full operationalization. Successful implementation of e-procurement in Nigeria's public health sector required not only user acceptance but also supportive policies, robust ICT infrastructure, continuous capacity-building, and effective change management strategies.



Based on the findings, the study proposed the following recommendations:

1. Strengthen ICT Infrastructure: Governments and health institutions should invest in reliable digital infrastructure and ensure consistent internet connectivity to facilitate seamless e-procurement operations.
2. Enhance Policy Enforcement and Governance: Regulatory bodies, including the Bureau of Public Procurement (BPP), should enforce compliance with e-procurement guidelines and penalize continued reliance on manual processes without justification.
3. Institutionalize Continuous Capacity Building: Regular training programs should be conducted for procurement officers to enhance digital literacy and confidence in using e-procurement tools.
4. Promote Organizational Readiness and Change Management: Institutions should adopt structured change management strategies to reduce resistance to digital adoption and promote cultural shifts toward e-procurement.
5. Improve System Integration and Customization: E-procurement platforms should be integrated with existing health supply chain management systems to enhance interoperability, transparency, and traceability.

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