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Assessing the Level of Adoption of E-Procurement System in Selected Nigerian Federal MDAs and Analysing the Benefits and Barriers

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Abstract: The adoption of electronic procurement (e-procurement) systems has become increasingly important for improving transparency, efficiency, accountability, and compliance in public procurement. However, despite ongoing digital transformation initiatives in Nigeria, the level of e-procurement system adoption across Federal Government Ministries, Departments and Agencies (MDAs), as well as the benefits and barriers associated with the adoption, remains insufficiently established. This study assessed the level of e-procurement system adoption in selected Nigerian Federal MDAs and analysed the benefits and barriers influencing adoption. This study focused on the Federal Ministry of Works, Federal Ministry of Housing and Urban Development, Federal Ministry of Health and Social Welfare, and Federal Ministry of Education. A quantitative research approach was adopted, data were collected through a structured questionnaire administered to relevant personnel involved in procurement, information and communication technology, administration, and related functions within the selected Federal Ministries. A total of 264 valid questionnaires were returned and used for the analysis. Data were analysed using descriptive and inferential statistical techniques, including frequencies, percentages, means, standard deviations, Pearson correlation, and linear regression. This study was theoretically informed by the Technology-Organization-Environment (TOE) framework. The findings revealed that e-procurement adoption within the selected MDAs is currently low, with implementation still at initial stage. Although electronic tender advertisement and supplier registration have been widely adopted, critical procurement functions such as bidding (collection of tender documents, bid submission, bid evaluation) and contract management remain mostly paper based. This study identified benefits associated with e-procurement adoption, including improved transparency, accountability, greater procurement efficiency, improved record management, enhanced monitoring, and reduction in procurement-related delays. However, several barriers were identified, particularly inadequate ICT infrastructure, unreliable internet connectivity, insufficient funding, limited staff competence, resistance to organisational change, and information security concerns. Based on the findings, this study recommends sustained investment in ICT Infrastructure across Federal MDAs, establishment of dedicated e-procurement budget Lines, adoption of phased roll out of the system across MDAs and a PPP model for e-GP development, deployment and management to resolve funding and technical capacity problems. This study contributes to empirical evidence on e-procurement adoption within Nigerian Federal MDAs and provides a basis for improving the implementation and utilisation of digital public procurement systems in Nigeria.

Keywords: e-procurement, adoption, public procurement, Nigeria, Federal MDAs, ICT.

1. Introduction

Public procurement is a critical government function through which goods, works, and services are acquired to support governance and public service delivery. Its significance in Nigeria is reflected in the substantial share of government expenditure devoted to procurement. The 2025 Appropriation Act indicates that procurement of works, goods, and services accounts for approximately 41.99% of the Federal Government's ₦54.99 trillion budget. Consequently, efficient and transparent procurement is essential for achieving value for money, accountability, and national development objectives. Traditionally, procurement activities in Nigerian MDAs have relied heavily on manual and paper-based processes. These processes are often associated with excessive paperwork, lengthy approval procedures, poor record management, delays in contract awards, limited transparency, and opportunities for procurement irregularities. Such weaknesses can increase procurement costs and adversely affect the effectiveness of public service delivery[1][2].

E-procurement involves the use of digital platforms to automate and manage procurement activities, including requisitioning, sourcing, ordering, invoicing, and payment. The advancement of Information and Communication Technologies (ICTs) has provided opportunities to address these challenges through electronic procurement (e-procurement).

For the purpose of this study, e-procurement is defined as the use of ICT by procurement parties to conduct procurement activities with the aim of improving efficiency, transparency, accountability and achieve better value for money.

By replacing or reducing paper-based processes, e-procurement can streamline workflows, minimise human error, improve transparency and accountability, reduce operational costs, and strengthen procurement records and audit trails. In Nigeria, public procurement reforms were strengthened by the enactment of the Public Procurement Act (PPA) 2007 and establishment of the Bureau of Public Procurement (BPP), with emphasis on transparency, competitiveness, accountability, and value for money. Although digital governance initiatives have subsequently promoted electronic procurement, adoption across Federal MDAs remains uneven. Some institutions have introduced electronic components such as contractor registration, while others continue to depend substantially on manual procedures. Evidence indicates that ICT infrastructure, organisational readiness, staff competence, management support, and legal and regulatory conditions influence e-procurement adoption, while inadequate infrastructure, limited training, budgetary constraints, cybersecurity concerns, resistance to change, and weak institutional capacity remain important barriers[3][4].

The Federal Ministries of Works, Housing, Health, and Education are particularly important because of their extensive procurement responsibilities involving infrastructure, medical supplies, educational materials, and other public-sector services. Assessing e-procurement adoption within these ministries is therefore important for understanding the extent to which digital procurement is being utilised and the benefits and constraints associated with its implementation.

Despite existing studies on e-procurement in Nigeria, limited research has comprehensively assessed the level of adoption across key Federal MDAs while simultaneously examining the benefits realised and barriers affecting implementation. This study addresses this gap by assessing the level of e-procurement system adoption in selected Nigerian Federal Ministries and analysing the benefits and barriers associated with its implementation.

1.1 Statement of Problem

Public procurement remains one of the most vulnerable areas of public administration in Nigeria due to persistent challenges such as procurement delays, lack of transparency, contract inflation, weak accountability mechanisms, corruption, and

inefficient procurement processes. Reports from Organisation for Economic Co-operation and Development[5] shows that, many countries have achieved significant improvements in procurement performance through the adoption of e-procurement systems. E-procurement system facilitates real-time monitoring of procurement activities, improve record management, reduce human intervention in procurement processes, and support compliance with procurement regulations

Existing studies indicate that factors such as inadequate technological infrastructure, insufficient staff competence, limited organizational readiness, weak management support, financial constraints, poor internet connectivity, and resistance to change contribute to the slow adoption of e-procurement systems within public institutions in Nigeria[6]. Empirical evidence regarding the actual level of e-procurement adoption in major Nigerian Federal Ministries remains limited.

Most previous studies have focused on determinants of adoption, construction sector applications, or general public institutions without specifically examining the Federal Ministries of Works, Housing, Health, and Education. The absence of comprehensive empirical data on e-procurement adoption levels within these ministries creates a research gap that this study seeks to fill by assessing the level of e-procurement adoption in selected Federal MDAs, analysing the benefits of adoption and the barriers influencing its implementation. This will aid policy makers, the government and procurement stakeholders in designing effective policies, allocating resources, and implementing targeted interventions aimed at strengthening digital procurement transformation.

1.2 Objectives of the Study

This paper aimed to assess the level of adoption of e-procurement system in selected Nigerian Federal MDAs and analyse the benefits realized where it is adopted, and the barriers impeding full implementation.

The objectives of this study seek to:

- i. Identify the e-procurement system modules currently operational in the Federal Ministries of Works, Housing, Health, and Education to ascertain the level adoption.
- ii. Examine the benefits derived from the adoption of e-procurement systems in the selected MDAs.
- iii. Identify strategies for improving the implementation of e-procurement system within the selected MDAs.

1.3 Technology–Organization–Environment (TOE)

The Technology–Organization–Environment (TOE) framework was developed by Tornatzky and Fleischer[7] to explain organizational adoption of technological innovations.

The framework proposes that technology adoption is influenced by three major contexts: Technological context, Organizational context, Environmental context.

TECHNOLOGY ORGANIZATION ENVIRONMENT (TOE) FRAMEWORK

Adoption of e-Procurement system in Federal MDAs



Figure 1. TOE Framework

1.3.1 Technological Context

This dimension refers to the technologies available to an organization and their perceived characteristics. Factors such as compatibility, complexity, security, reliability, and relative advantage influence adoption decisions. In the context of e-procurement, technological readiness includes internet availability, software functionality, cybersecurity capabilities, and system integration capacity. Studies consistently identify inadequate ICT infrastructure as a major barrier to e-procurement adoption in developing countries.

1.3.2 Organizational Context

The organizational dimension includes internal characteristics such as organizational size, financial resources, leadership support, staff competence, organizational culture, and readiness for change. Research indicates that organizations possessing adequate technical expertise, sufficient budgets, and strong management commitment are more likely to successfully implement e-procurement systems.

1.3.3 Environmental Context

Environmental factors include government regulations, competitive pressures, supplier readiness, legal frameworks, and external stakeholder influence. In Nigeria, the Public Procurement Act[8] Bureau of Public Procurement guidelines, and federal digital transformation initiatives constitute important environmental influences affecting e-procurement adoption.

The TOE framework is particularly suitable for this study because it explains adoption decisions at the organizational level where e-procurement systems are implemented.

1.4 Level of Adoption of E-Procurement Systems in Nigerian Federal Government MDAs

1.4.1 E-Procurement System Modules

A comprehensive e-procurement platform typically includes several functional modules including;

E-Registration

This module facilitates contractors/suppliers registration, categorization through electronic platforms. It creates a digital database from which the government can source qualified vendors (contractors/suppliers).

E-Procurement Planning

This module is used for preparing procurement plans from MDA's budget. The procurement plan is made available to the general public where they can view or download the procurement plans document from different MDAs. It also creates a digital repository for past procurement plans.

E-Tendering

E-tendering allows procuring entities to advertise procurement opportunities online and receive bids from interested and qualified vendors electronically. Bidders can pay the required tender fees electronically, download tender documents, upload the required bidding documents through their dashboard and submit their financial bid documents. There are bid submission controls in place, to prevent bidders from submitting bids after the bid submission deadline.

E-Auctioning

Electronic auctions enable competitive and real-time bidding processes that promote transparency and value for money. It allows individuals, organisations and companies to buy used properties from disposing authorities (MDAs) through a more transparent process.

E-Evaluation/Award

This module automates the bid evaluation process and produce a detailed evaluation report to help evaluation committee and tender board committee in taking award decision. The system also sends award notice to successful bidder and debriefs the other bidders.

E-Contract Management

This module supports contract administration, performance monitoring, milestone tracking, and compliance management.

E-Invoicing and E-Payment

Electronic invoicing and payment modules facilitate automated financial transactions and reduce processing delays. It allows bidders to pay tender fees and other application fees online.

1.5 Capabilities of E-Procurement Systems

Modern e-procurement systems possess capabilities that extend beyond simple automation.

These capabilities include:

- i. Automated workflow management;
- ii. Real-time procurement monitoring;
- iii. Supplier performance tracking;
- iv. Digital document management;
- v. Electronic audit trails;
- vi. Data analytics and reporting;
- vii. Compliance monitoring;
- viii. Fraud detection mechanisms;
- ix. Integration with financial management systems; and
- x. Procurement performance measurement.

1.6 Benefits of e-procurement system adoption

Improved Transparency

Transparency remains one of the most widely reported benefits of e-procurement adoption. Electronic systems provide visibility into procurement activities by creating digital records accessible for monitoring and auditing purposes. According to Odulana and Oyewobi e-procurement reduces opportunities for procurement manipulation because procurement information becomes more accessible to oversight institutions and stakeholders.

Electronic tendering systems enable procurement notices, bid submissions, evaluation outcomes, and contract awards to be documented and tracked systematically. This enhances public confidence in procurement processes.

Enhanced Accountability

E-procurement systems create comprehensive audit trails that document procurement activities from initiation to contract completion.

Vaidya[9] argue that digital audit trails improve accountability because procurement decisions can be traced to specific individuals and approval stages. Consequently, officials become more accountable for procurement outcomes. The availability of transaction histories also facilitates investigations into procurement irregularities.

Cost Reduction

One of the primary motivations for adopting e-procurement systems is the potential for cost savings. Cost reductions arise from: Lower paper consumption, Reduced administrative expenses, Shorter procurement cycles, Reduced transaction costs, Improved supplier competition. Croom and Brandon-Jones[10] found that organizations implementing e-procurement frequently experience measurable reductions in procurement operating costs.

Improved Efficiency

E-procurement systems automate repetitive procurement tasks, thereby reducing delays associated with manual processing. Automation facilitates: faster approvals, real-time communication, rapid supplier engagement, automated reporting and efficient document management. These capabilities significantly improve procurement cycle times and operational efficiency.

Improved Data Management and Decision-Making

Modern procurement systems generate large volumes of procurement data that can support strategic decision-making. Procurement managers can use analytics capabilities to; monitor spending patterns, evaluate supplier performance, forecast procurement requirements, identify procurement risks and measure procurement performance. Consequently, decision-making becomes more evidence-based and strategic.

1.7 Barriers to the full adoption of e-procurement system

Despite the benefits in adoption of e-procurement system, there are some structural, technological, financial, and organizational barriers that hinder its successful implementation in Nigeria, such as:

1.7.1 Inadequate ICT infrastructure

Previous researchers such as Afolabi and Yamusa pointed out that unreliable broadband connectivity, erratic power supply, and outdated ICT tools make it difficult for public institutions to utilize e-procurement systems effectively. Ibem and Iheaka identified infrastructure deficiencies as major obstacles to successful implementation

Inadequate ICT infrastructure remains one of the most significant barriers affecting e-procurement adoption in Nigeria. Infrastructure challenges include: poor internet connectivity, unstable electricity supply, limited access to hardware and Inadequate data centers in Nigeria.

1.7.2 Resistance to organizational change

Employees often resist technological changes due to concerns about job security, increased accountability, and unfamiliarity with new systems. Musa found that organizational resistance significantly influences adoption outcomes within public institutions. Some procurement professionals are skeptical of embracing e-procurement because they are already familiar with the manual process and perceived job security risks.

According to Adjei-Bamfo this resistance is common across sub-Saharan Africa, where manual methods are often preferred for their simplicity.

Resistance can manifest through; delayed system usage, preference for manual procedures, low participation in training and circumvention of digital processes.

1.7.3 Financial Constraints

The setup of e-procurement system for an organisation requires a high initial cost, such as; software acquisition, maintenance, training and staff capacity building. According to Olatunji the costs associated with acquiring ICT infrastructure, developing platforms, and training personnel are often beyond the reach of many public institutions.

Budgetary constraints frequently delay implementation efforts within government institutions.

1.7.4 Cybersecurity and Data Privacy Concerns

Concerns regarding cyberattacks, unauthorized access, data breaches, and digital fraud continue to affect stakeholder confidence in electronic procurement systems. Organizations must therefore invest in robust cybersecurity measures to ensure system integrity and user trust.

2. Materials and Methods

2.1 Research Method

This study employed a quantitative research approach using a questionnaire survey to assess the level of e-procurement system adoption and examine the benefits and barriers associated with its adoption in selected Nigerian Federal Ministries. The quantitative approach was considered appropriate because this study sought to obtain measurable evidence from respondents and statistically examine the relationships between e-procurement adoption and selected technological, organisational, and environmental factors. Questionnaire-based quantitative methods have been widely applied in previous studies of e-procurement adoption in Nigeria and other contexts.

This study focused on four Nigerian Federal Ministries: the Federal Ministry of Works, the Federal Ministry of Housing and Urban Development, the Federal Ministry of Health and Social Welfare, and the Federal Ministry of Education. These Ministries were selected because of their substantial procurement responsibilities involving works, goods, services, infrastructure, medical supplies, educational materials, and other public-sector requirements. The target respondents comprised personnel within the selected Ministries who had knowledge of or involvement in procurement activities, ICT operations, administration, and related functions.

An extensive review of relevant literature was initially carried out for better understanding of e-procurement adoption, including its level of implementation, benefits, barriers, and factors influencing adoption. The literature review covered scholarly journal articles, books, conference publications, and relevant studies on electronic procurement and public-sector digital transformation. The development of the questionnaire was subsequently guided by the Technology-Organization-Environment (TOE) theoretical framework.

2.2 Data Collection

A structured questionnaire was developed and administered to respondents in the selected MDAs. The instrument consisted of sections covering respondents' demographic characteristics, the level of e-procurement adoption, perceived benefits of e-procurement, barriers to adoption, and factors influencing adoption. The adoption factors examined in this study were ICT infrastructure, staff competence, management support, organisational readiness, and the legal and regulatory framework. Responses to the substantive questionnaire items were measured using a Likert-type scale to enable respondents to indicate their level of agreement with the statements presented. The use of a standardised

scale provided uniformity in responses and facilitated quantitative comparison and statistical analysis.

The main survey produced 264 valid completed questionnaires, which constituted the dataset used for the empirical analysis. The collected data were coded and analysed using descriptive and inferential statistical techniques. Frequencies, percentages, means, and standard deviations were used to summarise respondents' demographic characteristics and assess the level of e-procurement adoption, perceived benefits, and barriers. Pearson correlation analysis was used to examine the direction and strength of relationships between the principal study variables.

The methodology is consistent with previous Nigerian e-procurement studies that have applied structured questionnaires and quantitative statistical techniques to examine adoption factors. For example, Ibem examined factors influencing e-procurement adoption using questionnaire-based quantitative analysis, while Musa investigated e-procurement adoption among Nigerian public-sector employees using a structured survey and statistical modelling. The present study extends this body of research by specifically examining adoption, benefits, and barriers across selected Nigerian Federal MDAs.

3. Results and Discussion

3.1 Method of Data Analysis

Data collected from the respondents were coded and analysed using the Statistical Package for the Social Sciences (SPSS). The analysis commenced with descriptive statistics, including frequency distributions, percentages, means and standard deviations, to summarise respondents' demographic characteristics and assess the level of e-procurement adoption, perceived benefits and barriers within the selected Federal MDAs. In line with the objectives of this study, inferential statistical techniques were also employed to examine the relationships between e-procurement adoption and the identified explanatory variables. Pearson Product-Moment Correlation was used to determine the direction and strength of relationships between the variables, while multiple linear regression was employed to determine the extent to which ICT infrastructure, staff competence, management support, organisational readiness, and the legal and regulatory framework influence e-procurement adoption.

3.2 Data Presentation, Analysis and Interpretation

A total of 264 valid questionnaires were obtained from respondents drawn from the Federal Ministry of Works, the Federal Ministry of Housing and Urban Development, the Federal Ministry of Health and Social Welfare, and the Federal Ministry of Education. The valid responses constituted the dataset used for the analysis.

3.3 Demographic Profile of Respondents

The respondents were drawn from the four Federal MDAs covered by this study. The distribution demonstrates that this study obtained responses from personnel with varying demographic and professional characteristics, thereby providing a broad basis for assessing perceptions of e-procurement adoption.

Most of the respondents were between the ages of 31 and 50 years with good educational qualifications, 43.2% have HND/BSc, 45.8% have MSc/MBA, 6.8% have PhD, and 4.2% have Professional certifications.

25.8% were from Ministry of Works, 17% from Ministry of Housing, 30.7% from Ministry of Health, and 26.5% from Ministry of Education. Majority of the respondents have good working experience; 35.25% have 11-15 years' work experience in procurement, 28.8% have 6-10 years' experience, 14.4% have 1-5 years work experience.

3.4 Level of E-Procurement System Adoption

This section presents the respondents' assessment of the extent to which electronic procurement practices have been adopted within the selected Federal Ministries. The analysis uses mean to take high-moderate-low decisions.

Table 1. Descriptive Analysis of E-Procurement System Adoption

Adoption Indicator	Mean	Decision
Electronic Tender Advertisement	4.12	High
Electronic Contractor/Supplier Registration	3.95	High
Electronic Bid Submission	1.20	Very Low
Electronic Evaluation Processes	1.14	Very Low
Electronic Contract Management	1.50	Low
Electronic Payment Processing	2.80	Moderate
Integration with Financial Management Systems	1.05	Very Low

Grand Mean = 2.25

Interpretation

The overall mean score of 2.25 indicates a low level of e-procurement adoption within the selected Federal Ministries. Although electronic tender advertisement and supplier registration have been widely adopted, critical procurement functions such as bidding (collection of tender documents, bid submission, bid evaluation) and contract management remain mostly paper based. This finding aligns with previous studies which reported partial rather than full adoption of e-procurement systems in Nigerian public institutions.

3.5 Perceived Benefits of E-Procurement Adoption

The second objective of this study examined the benefits associated with e-procurement adoption. Respondents were asked to assess the extent to which electronic procurement has improved procurement processes within their ministries.

Table 2. Descriptive Analysis of Benefits of E-Procurement Adoption

Benefit	Mean	Decision
Improved Transparency	4.50	Very High
Enhanced Accountability	4.41	High
Reduction in Procurement Delays	4.08	High
Improved Record Management	4.25	High
Improved Procurement Monitoring	4.39	High
Reduced Administrative Costs	3.91	High
Better Supplier Participation	4.06	High
Reduction of errors in financial bids	3.3	Moderate
Improvement of the entire tendering process	4.18	High
Process improvement in Automatic generation of necessary report	3.2	Moderate

Grand Mean = 4.03

Interpretation

Respondents strongly agreed that e-procurement systems generate significant benefits. Improved transparency emerged as the highest-rated benefit, followed by accountability and procurement monitoring. These findings support assertions by Vaidya and World Bank[11] that e-procurement enhances governance and procurement performance.

3.6 Barriers to E-Procurement Adoption

This study also examined the major barriers that constrain the adoption and effective utilisation of e-procurement systems within the selected Federal Ministries.

Table 3. Descriptive Analysis of Barriers to E-Procurement Adoption

Barrier	Mean	Decision
Inadequate ICT Infrastructure	4.61	Very High
Limited Funding	4.30	High
Staff ICT Skill Deficiencies	4.05	High
Resistance to Change	3.98	High
Poor Internet Connectivity	4.21	High
Cybersecurity Concerns	4.06	High
Weak Policy Enforcement	4.12	High
Insufficient e-Procurement training for contractors	3.90	High
Fear of transparency	3.97	High

Grand Mean = 4.13

Interpretation

The findings indicate that infrastructural and organizational barriers continue to hinder implementation efforts. ICT infrastructure emerged as the most significant barrier, followed by funding limitations and next was poor internet connectivity.

Table 4. Factors Influencing E-Procurement Adoption

Factors	Mean	Decision
ICT Infrastructure	4.48	High
Staff Competence	4.33	High
Management Support	4.21	High
Organizational Readiness	4.05	High
Legal Framework	3.98	High

Grand Mean = 4.21

Interpretation

The findings indicate that in e-procurement adoption, ICT infrastructure was identified as the strongest predictor of adoption, followed by staff competence and management support.

3.8 Discussion of Findings

The findings of this study demonstrate that e-procurement adoption within the selected Nigerian Federal MDAs is currently low but developing. Electronic processes such as supplier registration, procurement information dissemination, record management and monitoring appear more amenable to adoption, while more transaction-intensive activities such as electronic tender submission, evaluation, contract award, invoicing and payment may require stronger technological and institutional capacity. This supports the argument that e-procurement adoption is generally a gradual process rather than an immediate transition from fully manual to fully electronic procurement.

This study further indicates that e-procurement provides important organisational benefits, particularly improved transparency and accountability, faster processing of procurement activities, reduced paperwork, improved record management and better monitoring of procurement transactions. These benefits are consistent with previous studies which associate electronic procurement with improved operational efficiency, transparency and accountability in public-sector procurement[12]. The findings therefore

suggest that effective e-procurement can contribute not only to administrative efficiency but also to improved governance and auditability of public procurement.

However, several barriers continue to constrain wider adoption. Inadequate ICT infrastructure, limited funding and unreliable internet connectivity are particularly important challenges in the Nigerian public-sector environment. Other barriers include limited staff competence, inadequate training, resistance to organisational change, weak management support, difficulties integrating systems, cybersecurity and data-privacy concerns, and legal or regulatory uncertainties. These findings are consistent with previous Nigerian and international studies which identify infrastructure, human capacity, organisational resistance, financial constraints, security and regulatory issues as major challenges to public-sector e-procurement implementation[13][14][15]

The findings relating to the factors influencing adoption also support the relevance of the Technology–Organisation–Environment (TOE) framework. ICT infrastructure represents a critical technological condition for adoption, while staff competence, management support and organisational readiness reflect the organisational conditions necessary for successful implementation. The legal and regulatory environment represents an important external factor that can either facilitate or constrain adoption.

Overall, this study shows that the successful adoption of e-procurement in Nigerian Federal MDAs depends on more than the availability of an electronic platform. Sustainable adoption requires reliable ICT infrastructure, competent personnel, committed management, organisational preparedness, adequate funding and a supportive legal and regulatory environment. Consequently, strengthening these conditions should be prioritised if the Federal Government is to achieve wider, integrated and effective e-procurement adoption across its MDAs.

4. Conclusion

This study assessed the level of adoption of e-procurement system within selected Nigerian Federal MDAs, namely the Federal Ministry of Works, the Federal Ministry of Housing and Urban Development, the Federal Ministry of Health and Social Welfare, and the Federal Ministry of Education. This study further examined the benefits associated with e-procurement implementation, identified barriers affecting adoption, and investigated factors influencing successful deployment within these ministries. The findings indicate that e-procurement adoption within the selected ministries is currently low, because most MDAs are at the partial (initial) implementation stage, they have not yet reached full institutional maturity. Although electronic tender advertisement and supplier registration have been widely adopted, several critical procurement functions such as electronic bid submission, contract management, procurement analytics, supplier performance monitoring, and system integration remain mostly paper based and not digitized. This study established that e-procurement contributes significantly to transparency, accountability, efficiency, procurement monitoring, and record management. The creation of electronic audit trails has enhanced oversight capabilities and reduced opportunities for procurement irregularities. These findings support the objectives of Nigeria's public procurement reforms and align with global trends in digital government transformation. However, this study also revealed that significant challenges continue to constrain full implementation. Inadequate ICT infrastructure, insufficient funding, unreliable internet connectivity, limited technical competence, organizational resistance to change, cybersecurity concerns, and weak enforcement of procurement policies remain major obstacles to adoption. Furthermore, this study confirmed that technological readiness, organizational readiness, staff competence, management commitment, and regulatory support significantly influence adoption outcomes. The findings validate the Technology–Organization–Environment (TOE) Framework and demonstrate that successful e-procurement implementation requires coordinated attention to technological, organizational, environmental, and human factors. Overall, this

study concludes that while the selected Federal MDAs have made some progress in adopting e-procurement systems, sustained investment in digital infrastructure, capacity development, policy enforcement, and system integration is necessary to achieve full digital procurement transformation. For progressive and sustainable adoption of e-procurement across Nigerian Federal MDAs, this study recommends Strengthen ICT Infrastructure across Federal MDAs, adoption of a phased roll out of the system across MDAs, adoption of PPP model in e-procurement deployment and management to overcome initial funding and capacity building problem. The Federal Government should prioritize investment in robust ICT infrastructure to support e-procurement implementation. Ministries should be equipped with reliable servers, modern computer systems, secured mini-data centers, backup facilities, and high-speed internet connectivity. Improved infrastructure will enhance system reliability and reduce operational disruptions. Federal Ministries should create dedicated budget provisions for e-procurement implementation and maintenance. Funding should cover: Software acquisition and licensing. Infrastructure upgrades. Technical support services. Staff training. Cybersecurity measures. Sustainable funding is essential for long-term success. Start with Phase 1, which is the partial implementation of e-procurement system. This is the functional horizon. It is the initial stage where e-government procurement (e-GP) Framework is developed. Modules deployed at this phase include: E-Registration, E-Procurement Plan, E-Publishing, Proceed to Phase 2, Transition implementation of e-GP system. This is the transactional horizon, at this stage, core e-bidding is operational and the system is used for full transaction. Modules deployed at this phase include: E-Tendering (Bid collection, preparation & bid submission), Bid opening, E-Notification, Award, E-Auction, Proceed to Phase 3, full implementation of e-GP system. This is the integrated life cycle horizon, at this phase, End-to-end procurement life cycle done digitally. Minimized paper works, linked with external systems. Modules deployed at this phase include: E-Ordering, E-Contract Management, E-Payment, Business Intelligence, Predictive Analysis. Adopt a PPP model that allows private companies provide resources (financial and technical) for the development, deployment and management of the e-procurement across Federal MDAs. This will encourage faster adoption by reducing the amount of upfront investment required from the MDAs. The private investors can recoup their investment over a long period from transactional charges levied on contractors, suppliers, consultants. While this study has contributed significantly to understanding e-procurement adoption within selected Nigerian Federal MDAs, several areas require further investigation such as; Emerging technologies such as Artificial Intelligence (AI), Machine Learning, Blockchain, and Predictive Analytics are increasingly being integrated into procurement systems. Future studies should examine how these technologies can enhance procurement transparency, fraud detection, supplier evaluation, and contract management within Nigerian public institutions.

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