

Evaluating the Effectiveness of E-Procurement Systems in Enhancing Supply Chain Efficiency in Kogi State, Nigeria

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Abstract

Despite the growing recognition of the transformative benefits of electronic procurement (e-procurement) systems, their adoption and effective implementation in developing countries, particularly Nigeria, has been considerably slow and uneven. Hence, the effectiveness of E-Procurement systems in enhancing supply chain efficiency in Kogi State, Nigeria, was investigated in this study. The study participant were workers in Kogi State ministries, departments, and agencies (MDAs) and questionnaires through electronic platforms/online survey platforms was used to gather data from the respondents, after which the data were analysed using Statistical Package for Social Sciences (SPSS) software v23. Results from the findings showed that majority of the respondents are procurement officers (81.8%), with 4-6 years working experience (63.6%). Also, 54.5% majority of the respondents stated that the e-procurement system has reduced procurement led time to a moderate extent, whereas more than half of the respondents (54.5%) stated that the e-procurement system has reduced procurement costs to a moderate extent. More also, 63.6 % majority of the respondents stated that e-procurement system significantly enhanced transparency and accountability in their organizations to a large extent. The major challenges usually encountered when implementing e-procurement systems in Kogi State MDAs were found to be lack of proper infrastructure (26.1%) and poor staff training and support (26.1%). Hence, it was recommended that there should be proper strengthening of digital infrastructure, adequate capacity building and training, change in management strategies, and stakeholders' engagement among Kogi state MDAs, which will improve E-Procurement systems and supply chain efficiency.

Keywords: E-Procurement, Procurement, Kogi State, Ministries, Departments, and Agencies (MDAs), Supply chain.

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1.0 INTRODUCTION

Electronic procurement (e-procurement) systems refer to the use of digital technologies, particularly internet-based platforms, to support the entire procurement cycle from requisitioning, tendering, ordering, contract management, to payment and supplier evaluation (Chan and Owusu, 2022; Emenogu, 2025). Unlike traditional procurement that is often paper-based, time-consuming, and prone to inefficiencies, e-procurement introduces automation, transparency, and cost-effectiveness into supply chain processes (Amakye, 2023; Ahmed *et al.*, 2026). Globally, e-procurement has emerged as a cornerstone of modern supply chain management, reshaping how governments and organisations acquire goods and services. The World Bank underscores that e-procurement is no longer a

luxury but a necessity in ensuring accountability, minimising corruption, and driving efficiency in public spending, particularly in economies seeking to optimise scarce resources (Maiyaki and Abimbola, 2025).

Globally, the adoption of e-procurement systems has been transformative. More than 80% of large organisations worldwide have integrated e-procurement solutions into their supply chain frameworks (Khouya, 2025), leading to reductions in transaction costs by up to 15 per cent and procurement cycle times by nearly 30%. In Europe, the European Commission's directives on public procurement have mandated the use of e-procurement across member states to ensure transparency and open competition. Similarly, in Asia, countries such as South Korea and Singapore have

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emerged as pioneers in deploying e-procurement platforms that integrate artificial intelligence and data analytics to predict demand, streamline vendor management, and monitor compliance (Kim *et al.*, 2023; Ayobami *et al.*, 2024; Kim and Shin, 2024). These examples illustrate that e-procurement has become an indispensable tool in promoting good governance and enhancing operational efficiency across diverse economies.

The pace of e-procurement adoption in Africa has been mixed in the sense that while several countries are still grappling with infrastructural challenges, there has been notable progress in East and Southern Africa. For example, Kenya's Integrated Financial Management Information System (IFMIS) has digitised procurement processes, improved supplier access and reducing procurement fraud (Kipngeno, 2024; Mutangili, 2025a). Another case of success in Africa is the case of Rwanda where the adoption of e-procurement has also recorded success in implementing its Umucyo e-procurement platform, which has improved transparency in government tenders and fostered citizen trust in public institutions (Isimbi Uwadede, 2016; Chidama and Ononiwu, 2023; Kubwimana and Nimpano, 2025). Nonetheless, many African countries, including Nigeria, face hurdles some of which according to Okeke and Nnaemeka-Okeke (2021) are tied to limited ICT infrastructure, resistance to change among procurement officers, and inadequate policy frameworks to drive e-procurement adoption.

For Nigeria in particular, the procurement landscape has undergone gradual reforms over the last two decades, especially following the enactment of the Public Procurement Act of 2007, which established the Bureau of Public Procurement (BPP). This Act was designed to institutionalise transparency, accountability, and competition in government procurement processes. However, despite these reforms, Onwujekwe *et al.*, (2022) observed that public procurement in Nigeria has often been criticised for inefficiency, corruption, and bureaucratic bottlenecks. Recognising these weaknesses, the Federal Government introduced e-procurement initiatives under the Government Integrated Financial Management Information System (GIFMIS) to automate processes and reduce leakages.

However, the journey towards full-scale adoption has been uneven across states and ministries, departments, and agencies (MDAs). Recent studies reveal that while some federal MDAs in Abuja have gradually adopted e-procurement systems, states in the north-central geopolitical zone, including Kogi state, are still in the early stages of integration (Adeiza and Abdulazeez, 2025; Yakubu, 2025). The challenges confronting these states are often tied to weak ICT infrastructure, limited technical capacity among staff, and budgetary constraints that hinder full digital transformation. Nonetheless, with increasing

government interest in curbing corruption and improving efficiency in public service delivery, e-procurement adoption is gaining momentum.

Kogi State, like many subnational entities in Nigeria, relies heavily on procurement processes to deliver essential services ranging from infrastructure to health, education, and agriculture. Yet, inefficiencies in supply chain operations within the state MDAs have often led to project delays, inflated costs, and public mistrust (Husain, 2024; Esan *et al.*, 2025; Ogwueleka, 2025). The adoption of e-procurement is seen as a strategic response to these challenges. According to the Kogi State Budget Office (2022), nearly 60% of the state's recurrent and capital expenditures are tied to procurement-related activities, making efficiency in this area critical for overall governance and fiscal sustainability (Kogi-State-Budget-Office, 2022). However, preliminary evidence suggests that while e-procurement initiatives have been piloted in some MDAs, their effectiveness in achieving desired supply chain outcomes remains underexplored, to the best of the authors knowledge.

From a practical standpoint, the success of e-procurement in Kogi State depends on its ability to enhance transparency, shorten procurement cycles, and create a more competitive environment for suppliers. Recent reports indicate that manual procurement processes in Kogi State MDAs often extend beyond stipulated timelines, leading to inefficiencies that affect project delivery (Yakubu, 2025). Moreover, supply chain inefficiency has been linked to cost overruns and abandoned projects (Panova and Hilletoft, 2018; Luo *et al.*, 2020; Asiedu and Ameyaw, 2021; Álvarez-Pozo *et al.*, 2024), undermining citizens' confidence in government service delivery. A digital shift towards e-procurement thus holds the promise of addressing these longstanding weaknesses by fostering openness, improving data management, and aligning procurement with global best practices. Against this background, this study seeks to assess the effectiveness of e-procurement systems in enhancing supply chain efficiency within Kogi State MDAs. However, the study focused on Kogi State MDAs that have implemented e-procurement systems, it also evaluates the impact of e-procurement systems on supply chain efficiency in these organizations, with a focus on procurement lead time, procurement costs, and transparency and accountability in procurement processes, as well as the associated challenges.

2.0 RESEARCH METHODOLOGY

2.1 Research Design

This study employs a survey research design to collect data from Kogi State MDAs. The survey design is suitable for this study because it allows for the collection of data from a large number of respondents and provides insights into the impact of e-procurement

systems on supply chain efficiency (Creswell and Creswell, 2017).

2.2 Study Population

The study population included workers in Kogi State ministries, departments, and agencies (MDAs) that have implemented e-procurement systems.

2.3 Sample Size

The Cochran formula was used for the sample size determination as given in Equation 1.

$$n = \frac{Z^2 * p * (1-p)}{e^2} \quad (1)$$

Where n is the sample size

Z is the desired confidence level (e.g., 1.96 for 95%)

p is the estimated proportion of the population with the attribute of interest, and

e is the margin of error.

In the context of this study, assuming a 95% confidence level, a margin of error of 5%, and an estimated proportion of 0.5 (which maximizes the sample size), the sample size would be:

$$n = \frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2} \approx 384$$

However, given the finite population of MDAs in Kogi State, a finite population correction (FPC) factor can be applied to adjust the sample size as shown in Equation 2:

$$n_{adj} = \frac{n}{(1 + \frac{n-1}{N})} \quad (2)$$

Where N is the total number of MDAs in Kogi State (N = 11);

$$\text{Therefore; } n_{adj} = \frac{384}{(1 + \frac{384-1}{11})} \approx 11$$

Hence, the sample size for this study is 11.

2.4 Methods of Data Collection

Data was collected using a questionnaire survey instrument. The questionnaire was designed to capture data on the impact of e-procurement systems on supply

chain efficiency, including procurement lead time, procurement costs, and transparency and accountability in procurement processes. The questionnaires were administered to respondents through electronic platforms/online survey platforms.

2.5 Methods of Data Presentation

After obtaining the data from the respondents, the data's were cleaned manually and coded into the software (IBM SPSS software program v23). The data collected was presented using both tabular and graphical techniques in order to ensure clarity, ease of interpretation, and effective communication of findings. Frequency distribution tables were employed to summarise respondents' socio-demographic characteristics, enabling a concise overview of the sample population. Graphical illustrations such as bar charts and pie charts were further be utilised to depict the responses to research questions, thereby making patterns and variations in the data more visible and accessible. Percentages were used consistently in both tables and figures to highlight the relative weight of each response, facilitating straightforward comparisons and interpretation.

2.6 Validity and Reliability

The validity and reliability of the questionnaire was ensured through a pilot study. The pilot study was conducted with a small group of respondents to test the clarity and relevance of the questionnaire items. The feedback from the pilot study was used to revise and improve the questionnaire.

3.0 RESULTS AND DISCUSSION

The results were presented in tables and charts for easy reading and interpretation. Following the data presentation is the discussion of findings.

3.1 Results

Table 1: Socio-Demographic Characteristics of Respondents

Variables	Options	Frequency	Percentage
Age	26-35yrs	1	9
	36-45yrs	7	64
	46-55yrs	3	27
Gender	Male	11	100
	Female	0	0
Educational level	Primary level	0	0
	Secondary level	0	0
	Tertiary level	8	73.7
	Post graduate level	3	27.3
Department	Procurement Department	9	81.8
	MIS	1	9.1
	Health Planning, Research and Statistics	1	9.1
Respondent role in the organization	Procurement officer	9	81.8
	Health Planning Officer	1	9.1
	ICT personnel	1	9.1

Variables	Options	Frequency	Percentage
Duration of work experience	Less than 1 year	0	0
	1-3 years	3	27.3
	4-6 years	7	63.6
	More than 6 years	1	9.1
Implementation of e-procurement	Yes	8	72.7
	No	3	27.3
Duration of using e-procurement systems	Less than 1 year	1	12.5
	1-3 years	6	75
	4-6 years	1	12.5
	More than 6 years	0	0

Source: Researcher’s Fieldwork, 2025.

The socio-demographic profile of respondents as shown in Table 1 indicates that the study sample was predominantly male (100 %), highly educated, and largely drawn from the Procurement Department. Most respondents (63.6 %) had 4-6 years of work experience

and worked as procurement officers. The results also show that most organisations have already introduced e-procurement systems (72.7 %) but usage has been quite new with most of them stating they have implemented it in the past three years.

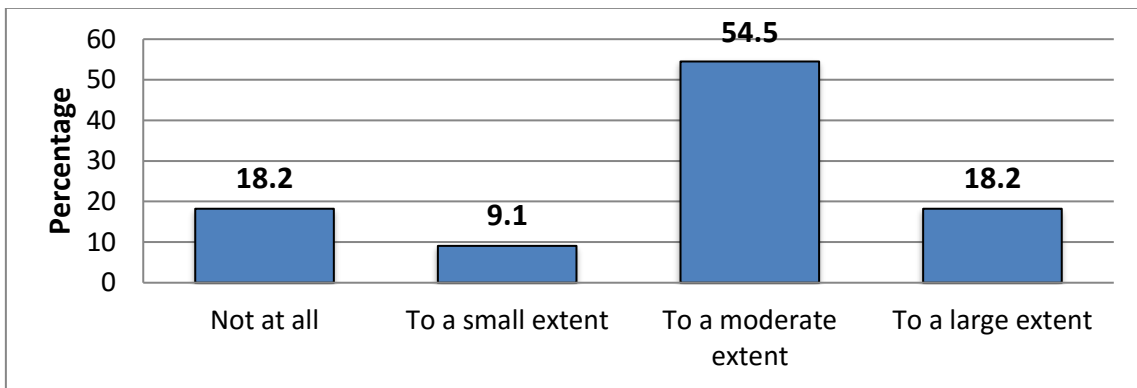


Figure 1: Extent to which e-procurement has reduced procurement lead time

The result presented in Figure 1 indicates that the majority of respondents (54.5%) reported that the e-procurement system has reduced procurement lead time to a moderate extent. A smaller proportion (18.2%) believed it has reduced lead time to a large extent, while 9.1% indicated it has done so to a small extent. Interestingly, 18.2% of respondents stated that the e-procurement system has not reduced procurement lead

time at all. These results show that despite the positive impact that the system has had, it has not produced an effect of a significant extent. The relatively large percentage of the respondents who said that there was no improvement highlights the existence of inefficiencies or problems with the implementation of the system, thus limiting its ability to significantly shorten procurement timelines.

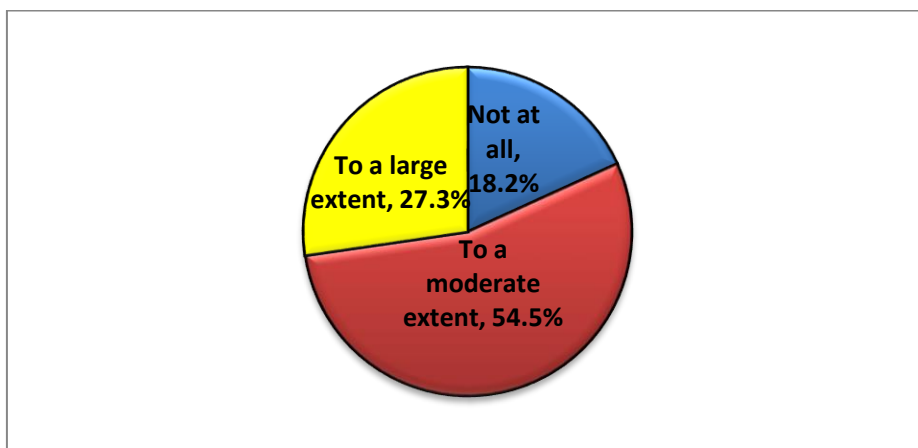


Figure 2: Extent to which e-procurement has reduced procurement costs

The study further examined the perceived effect of the e-procurement system on procurement costs within Kogi State MDAs. The responses in Figure 2 reveal that more than half of the respondents (54.5%) indicated that the e-procurement system has reduced procurement costs to a moderate extent. In addition, 27.3% reported that the system has largely reduced costs, suggesting a substantial level of efficiency gains in some organizations. However, 18.2% of respondents indicated

that the system actually has not reduced procurement costs at all, thereby showing that cost reduction benefits are not experienced equally across all MDAs. The results imply that the e-procurement system has had a moderately positive effect on the reduction of costs, and a large share of organisations report high positive impacts. However, the presence of respondents who did not report cost savings indicates the possibility of the implementation or use of the systems in various MDAs.

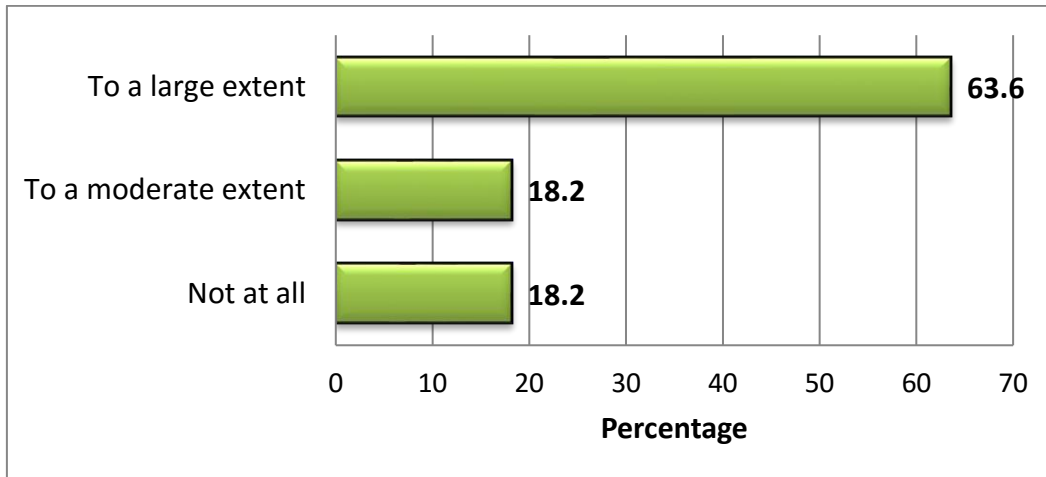


Figure 3: Extent to which e-procurement has enhanced transparency and accountability in procurement processes

The findings from Figure 3 reveal that most of the respondents (63.6%) agreed that e-procurement system has significantly enhanced transparency and accountability. Less number (18.2%) claimed that there was a moderate improvement, and another 18.2% has not noticed improved in transparency and accountability. This result suggests that the e-procurement system has

been efficient in promoting transparency and accountability in the procurement activities of the Kogi State MDAs. However, the fact that a few respondents have not recorded an improvement indicates that there are variations in the system implementation, compliance, or even utilization between different agencies.

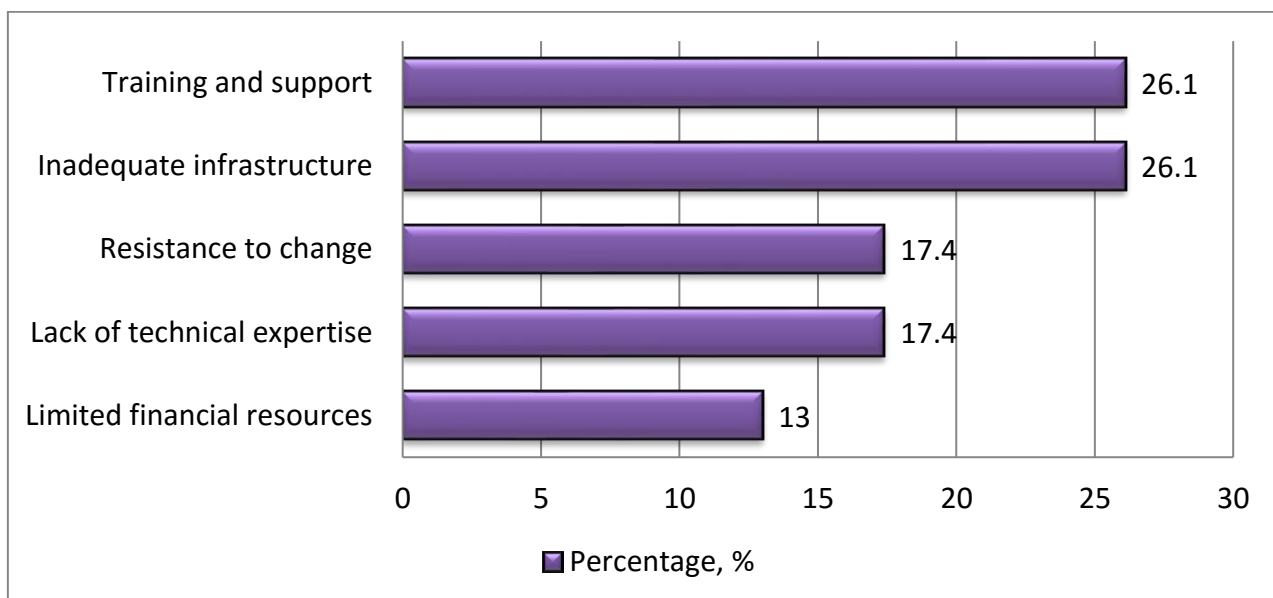


Figure 4: Challenges in implementing e-procurement systems in Kogi State MDAs

The study also established the key problems that affected effective deployment of e-procurement systems in Kogi State Ministries, Departments, and Agencies

(MDAs). The result in Figure 4 shows that the biggest obstacles to the uptake of e-procurement are lack of proper infrastructure (26.1%) and poor training and

support (26.1%). These limitations highlight systemic failures both in material resources, including ICT infrastructure, access to the internet and electricity, and in human capacity building, which are all critical to an effective implementation of e-procurement. Furthermore, the lack of technical expertise (17.4 %) and change resistance (17.4 %) can be viewed as key obstacles, which signifies organisational and cultural obstacles that might hinder the transition between the manual and digital procurement operations. Besides, low financial resources (13.0 %) were identified as a limitation, which means that the lack of money can limit investment in the infrastructure, training, and further system improvement.

The results suggest that despite the potential of e-procurement to foster efficiencies in the supply chain, such effective realisation in the Kogi State MDAs is hampered by a combination of technical, infrastructural, financial and organisational barriers.

3.2 DISCUSSION OF FINDINGS

The analysis of data from the fieldwork provides critical insights into the effectiveness of e-procurement systems in enhancing supply chain efficiency across Ministries, Departments, and Agencies (MDAs) in Kogi State. The findings are discussed in relation to the objectives of the study, while also engaging with relevant empirical evidence to situate them within broader academic and policy conversations.

3.2.1 E-procurement and Procurement Lead Time Reduction in Kogi State MDAs

The findings of this study reveal that the introduction of e-procurement has had a substantial impact on reducing procurement lead time across MDAs in Kogi State. A significant majority of respondents affirmed that the system curtailed the long bureaucratic procedures that previously characterised procurement processes. By automating requisitioning, approval, and bidding, e-procurement reduced delays caused by manual paperwork, face-to-face approvals, and physical tendering. This indicates that procurement officers can now finalise processes in shorter timeframes, thereby enabling MDAs to meet urgent operational needs more promptly.

This outcome resonates with the findings of Tyopev and Kpelai (2025), who emphasised that digitisation of procurement workflows in Nigerian public institutions significantly shortened the cycle time from requisition to delivery. Their study argued that faster procurement not only improved efficiency but also boosted service delivery in public offices. Similarly, in a comparative study across selected African countries, asserted that e-procurement enables real-time communication between suppliers and government agencies, reducing delays associated with document handling and physical submissions (Amakye, 2023; Emenogu, 2025; Kimambo, 2025).

However, it is worth acknowledging that while most respondents in Kogi State noted improvements, a small proportion indicated that technical glitches, network failures, and poor ICT infrastructure sometimes reintroduce delays into the process. This aligns with Amakye (2023), who found that while Ghana's e-procurement system reduced cycle times, technical downtimes often undermined the gains. In this respect, the findings from Kogi State affirm the argument that technology itself does not automatically guarantee efficiency unless supported by robust infrastructure. Thus, the reduction in lead time is both real and significant, yet contingent upon continuous investment in technological support systems.

3.2.2 E-procurement and Reduction of Procurement Costs in Kogi State MDAs

The second objective of this study examined whether the adoption of e-procurement has contributed to reducing procurement costs. The findings demonstrate that e-procurement has indeed lowered costs associated with printing, advertising, physical meetings, and repetitive paperwork. Respondents explained that the automation of procurement eliminated hidden expenditures that were previously normalised under manual processes. Furthermore, competitive electronic bidding has increased supplier participation, which in turn fosters price competition, driving down procurement expenses for MDAs.

These findings are consistent with Egwim *et al.*, (2024); Emenogu (2025), who showed that the implementation of e-procurement in Nigerian public institutions resulted in notable cost savings, particularly through reductions in administrative and overhead expenses. They argued that cost reduction was a direct consequence of increased transparency and competition. In a related vein, Kumar and Ganguly (2020) and Addo (2019) asserted that cost efficiency is one of the strongest value propositions of e-procurement in public finance management, noting that electronic platforms discourage inflated quotations and promote standardised pricing.

Nevertheless, the study also observed that cost reductions were not always uniform across all MDAs in Kogi State. In some cases, respondents claimed that costs were merely shifted from traditional printing and logistics to system maintenance, ICT infrastructure, and staff training. This perspective implies that while e-procurement may reduce traditional costs, the initial and ongoing expenses of digital platforms must be carefully weighed to ensure sustainable savings. In this respect, the Kogi State experience suggests that while e-procurement does reduce procurement costs overall, policymakers must manage the hidden costs of system implementation to ensure lasting efficiency gains (Mahdillou and Akbary, 2014; Kumar and Ganguly, 2020).

3.2.3 E-procurement and Transparency/Accountability in Kogi State MDAs

One of the strongest outcomes of this study lies in the evidence that e-procurement has enhanced transparency and accountability within procurement processes in Kogi State MDAs. Respondents widely affirmed that the automation of processes minimises human interference, thereby reducing opportunities for manipulation, favouritism, and corruption. The system's audit trail features make it possible to track transactions from initiation to completion, providing a verifiable record of procurement decisions. This has enhanced the confidence of both internal stakeholders and external suppliers in the fairness of procurement exercises.

This finding corresponds with the assertions of Ojih *et al.*, (2025) and Ajibola *et al.*, (2025), who argued that e-procurement significantly enhances transparency in Nigerian public procurement by providing digital records that can be independently verified. Similarly, Mutangili (2025b) in his study of Kenyan public procurement, affirmed that digital platforms curb discretion and provide stronger accountability frameworks by compelling officials to operate within the visibility of an electronic system.

At the same time, the findings highlight that transparency and accountability gains in Kogi State are sometimes challenged by limited ICT literacy among procurement officers and contractors. Where staff are inadequately trained, some steps are bypassed or wrongly executed, creating loopholes that diminish transparency. This observation supports the caution raised by Oyenmwun and Patrick (2025), who noted that inadequate training often weakens the capacity of e-procurement systems to guarantee transparency. Nonetheless, the evidence from this study affirms that e-procurement is a powerful tool for reinforcing accountability and integrity in public procurement, though it requires continuous capacity-building to sustain its impact.

3.2.4 Challenges in the Implementation of E-procurement in Kogi State MDAs

The final objective of this study was to identify the key challenges affecting the implementation of e-procurement systems in Kogi State MDAs. The findings reveal a number of recurring obstacles. First, weak ICT infrastructure, particularly inconsistent internet connectivity and power supply, was frequently cited as a hindrance to seamless operation of the e-procurement platform. Second, resistance to change among some procurement officers and suppliers has slowed adoption, as certain stakeholders still prefer traditional manual processes. Third, limited training opportunities have left some staff ill-equipped to navigate the complexities of the system.

These challenges are consistent with broader literature on e-procurement in developing contexts. For example, Elenwo and Wike (2025) and Nkole (2025)

found that Nigerian public institutions face persistent infrastructural and human capacity barriers that undermine digital procurement. Similarly, Maiyaki and Abimbola (2025) argued that while e-procurement reduces inefficiencies, its success is often compromised by infrastructural fragility and cultural resistance to change. In contrast, Egwim *et al.*, (2024) highlighted that proactive government policies and consistent training can mitigate these challenges, suggesting that the obstacles are not insurmountable but require deliberate commitment from policymakers.

In the case of Kogi State, the persistence of infrastructural challenges indicates that without sustained investment, the gains of e-procurement could be eroded. The findings further underscore the importance of addressing human attitudes towards technological adoption, as resistance among procurement officers reflects both a cultural and generational divide. These issues collectively affirm the argument by Marchisotti *et al.*, (2025) that technology adoption in procurement is as much a social process as it is a technical one, requiring deliberate change management strategies to ensure full buy-in from stakeholders.

4.0 CONCLUSION

Based on the outcome of findings, it was concluded that the adoption of e-procurement in Kogi State MDAs has had a largely positive impact on supply chain efficiency. Specifically, it has shortened procurement lead times, reduced costs, and enhanced transparency and accountability in procurement processes. These achievements underscore the potential of e-procurement as a reform tool capable of promoting good governance and efficient service delivery. Nevertheless, the presence of implementation challenges such as infrastructural gaps, inadequate training, and low adaptability highlights the need for sustained interventions to consolidate the gains of the system. Thus, the findings affirm that while e-procurement is not a panacea, it represents a significant step towards curbing inefficiency and corruption in public procurement processes. With improved institutional support, adequate training, and better infrastructure, the system can deliver even greater benefits to governance and public administration in Kogi State and beyond.

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