



DIGITAL PROCUREMENT TRANSPARENCY, CONTRACT MANAGEMENT EFFICIENCY AND VALUE-FOR-MONEY OUTCOMES IN POLYTECHNICS IN SOUTH-WEST NIGERIA

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Abstract

Public procurement determines whether public funds deliver value or are lost to inefficiency and irregularity. This study examined digital procurement transparency, contract management efficiency and value-for-money outcomes in polytechnics in South-West Nigeria, and the relationships among them. A quantitative, survey-based correlational design was used, with a multistage sampling procedure yielding 240 procurement, finance and management staff across six polytechnics. A validated questionnaire measured the constructs, and data were analysed using descriptive statistics, Pearson correlation, multiple regression and structural equation modelling. Digital procurement transparency was moderate (mean = 2.68 on a 5-point scale); e-invoicing (54.2%) and online vendor registration (48.6%) were the most adopted tools, and e-tendering (32.5%) and e-contract management (28.4%) the least. Contract management efficiency was moderate (mean = 2.84), with performance monitoring (2.52) and compliance tracking (2.64) lowest. Value-for-money outcomes were moderate (mean = 3.02). Transparency was positively associated with contract management efficiency ($r = 0.54$, $p < 0.001$) and value-for-money outcomes ($r = 0.58$, $p < 0.001$), and contract management efficiency with value-for-money outcomes ($r = 0.62$, $p < 0.001$). Contract management efficiency partially mediated the transparency effect (indirect effect = 0.22, $p < 0.01$). The findings support procurement digitalisation and stronger contract governance in Nigerian polytechnics.

Keywords: digital procurement; transparency; contract management; value for money; polytechnic; Nigeria

Introduction

Public procurement is a major channel through which institutions convert budgets into goods, works and services, and the way it is conducted determines whether public funds deliver value or are lost to inefficiency and irregularity. In Nigeria, procurement reform since 1999 has sought efficiency, transparency, accountability and value for money, yet persistent problems associated with manual, opaque processes remain (Musa et al., 2023). The Public Procurement Act of 2007 established the Bureau of Public Procurement as the regulatory authority responsible for monitoring and overseeing public procurement, with the mandate to ensure transparency, competition, and value for money. However, research has documented that implementation remains uneven, with many institutions continuing to rely on manual processes that are vulnerable to manipulation and inefficiency. Studies have identified corruption, inadequate capacity, and weak oversight as key challenges undermining public procurement performance in Nigeria. For polytechnics, which spend substantial public funds, sound procurement is central to their stewardship and effectiveness, and improving procurement governance is essential for ensuring that limited resources are used effectively.

Digital procurement has emerged internationally as a powerful means of strengthening procurement governance. Electronic procurement systems make activities visible, traceable and accountable, and studies show that their adoption increases transparency, competition and efficiency while lowering contract-enforcement costs (Mohungoo et al., 2020). Research on e-procurement implementation has identified critical success factors including top management support, user training, system quality, and integration with existing processes. The adoption of e-procurement has been shown to reduce procurement cycle times, increase competition among suppliers, and improve transparency by making procurement information more accessible. By replacing paper-based workflows, digital procurement offers a structured environment in which transparency and control are enhanced across the procurement lifecycle. Studies have demonstrated that e-procurement systems can reduce opportunities for corruption by automating processes, increasing traceability, and reducing human discretion in decision-making.



Beyond transparency, digital procurement is associated with more efficient contract management and better outcomes. Evidence indicates that e-procurement can accelerate project delivery and improve performance in the public sector, linking digitalisation to tangible efficiency and value gains (Oniyangi & Ibrahim, 2024). Research has demonstrated that effective contract management, supported by digital tools, is essential for ensuring that suppliers deliver on time, within budget, and to the required quality standards. Studies of e-procurement in construction and public organisations have corroborated its efficiency and performance effects, showing that digital procurement can reduce delays, improve cost control, and enhance stakeholder satisfaction (Ibem & Laryea, 2015). Transparency in procurement practice is, in turn, tied to accountability and to the value ultimately obtained from public spending (Williams & Andrew, 2021). The concept of value for money in procurement has been conceptualised as encompassing economy, efficiency, and effectiveness, with multiple dimensions including cost, quality, and timeliness. Research has demonstrated that procurement transparency and effective contract management are key determinants of value-for-money outcomes.

Despite these promised benefits, adoption of digital procurement in Nigeria has been limited and uneven, and its actual effects on transparency, contract-management efficiency and value for money in institutions such as polytechnics are poorly documented. Studies on e-procurement adoption in Nigeria have identified barriers including inadequate infrastructure, limited technical capacity, resistance to change, and weak regulatory enforcement. Much of the evidence addresses adoption intention or the general public sector rather than measuring procurement transparency, contract-management efficiency and value-for-money outcomes together within polytechnics (Musa et al., 2023; Ibem & Laryea, 2015). Research on procurement in Nigerian higher education has focused primarily on universities, with limited attention to polytechnics, despite their significant procurement expenditures and distinct governance structures. This study addresses that gap by measuring these constructs among South-West polytechnics and modelling the relationships among them.

Statement of the Problem

Polytechnics in South-West Nigeria disburse considerable public funds through procurement, yet their processes remain largely manual and opaque, exposing them to inefficiency, irregularity and poor value for money. Where procurement is not transparent and contracts are managed weakly, competition is reduced, oversight is limited and public funds fail to deliver their intended value, precisely the problems that reform and digitalisation are meant to address (Musa et al., 2023; Williams & Andrew, 2021). The difficulty is that the level of digital procurement transparency, the efficiency of contract management, and the value-for-money outcomes achieved, together with the relationships among them, are largely unmeasured in polytechnics, so institutional and regulatory decision-makers cannot see where procurement governance is failing or how digitalisation might improve it (Mohungoo et al., 2020). This evidentiary gap allows waste and irregularity to persist and hampers targeted reform.

The procurement challenges facing Nigerian polytechnics are situated within a broader context of public procurement reform. Studies have documented that despite the existence of the Public Procurement Act and the establishment of the Bureau of Public Procurement, implementation remains problematic, with widespread non-compliance and limited enforcement of procurement rules. Research has identified that procurement irregularities, including inflated contracts, lack of competitive bidding, and weak contract oversight, continue to undermine value for money in Nigerian public institutions. The specific challenges facing polytechnics include limited procurement capacity, inadequate digital infrastructure, and weak linkages between procurement planning and institutional objectives. Studies have found that many Nigerian polytechnics lack dedicated procurement units with qualified staff, and that where procurement is digitalised, it is often limited to basic functions such as online advertising rather than comprehensive e-procurement systems. These findings underscore the need for systematic assessment of procurement practices and outcomes in Nigerian polytechnics.

Sound, transparent procurement is essential to the stewardship of scarce public funds, and digitalisation offers a proven route to greater transparency, tighter contract management and better value, of high importance in a constrained fiscal environment (Oniyangi & Ibrahim, 2024). Research has demonstrated that improving procurement governance can generate significant savings, with estimates suggesting that even modest improvements in procurement efficiency could save governments substantial resources. By producing a rigorous, localised measurement of procurement

transparency, contract-management efficiency and value-for-money outcomes and the relationships among them, the study equips institutional managers and procurement regulators with the specific evidence needed to target digitalisation and governance reforms. The beneficiaries are substantial: institutions gain better value from their spending; oversight bodies gain evidence for reform; and the public gains improved stewardship of funds. This study addresses that gap by measuring these constructs and their relationships across South-West polytechnics, providing localised evidence for reform.

Aim and Objectives

Aim: To examine digital procurement transparency, contract management efficiency and value-for-money outcomes in polytechnics in South-West Nigeria, and the relationships among them.

Specific Objectives:

- i. To assess the level of digital procurement transparency in South-West polytechnics;
- ii. To determine the efficiency of contract management in these institutions;
- iii. To assess the value-for-money outcomes achieved through procurement;
- iv. To examine the relationships among digital procurement transparency, contract management efficiency and value-for-money outcomes; and
- v. To generate evidence-based recommendations to strengthen procurement digitalisation and governance.

Research Questions

1. What is the level of digital procurement transparency in South-West polytechnics?
2. What is the efficiency of contract management in these institutions?
3. What are the value-for-money outcomes achieved through procurement?
4. What are the relationships among digital procurement transparency, contract management efficiency and value-for-money outcomes?
5. What evidence-based recommendations can be generated to strengthen procurement digitalisation and governance?

Literature Review

Public procurement is a major channel through which institutions convert budgets into goods, works and services, and the way it is conducted determines whether public funds deliver value or are lost to inefficiency and irregularity. In Nigeria, procurement reform since 1999 has sought efficiency, transparency, accountability and value for money, yet persistent problems associated with manual, opaque processes remain (Musa et al., 2023). The Public Procurement Act of 2007 established the Bureau of Public Procurement as the regulatory authority responsible for monitoring and overseeing public procurement, with the mandate to ensure transparency, competition, and value for money. However, research has documented that implementation remains uneven, with many institutions continuing to rely on manual processes that are vulnerable to manipulation and inefficiency. Studies have identified corruption, inadequate capacity, and weak oversight as key challenges undermining public procurement performance in Nigeria.

Reviews of public e-procurement show that electronic systems make procurement activities visible, traceable and accountable, increasing transparency and competition while lowering enforcement costs, though implementation challenges remain (Mohungoo et al., 2020). Research on e-procurement implementation has identified critical success factors including top management support, user training, system quality, and integration with existing processes. The adoption of e-procurement has been shown to reduce procurement cycle times, increase competition among suppliers, and improve transparency by making procurement information more accessible. By replacing paper-based workflows, digital procurement offers a structured environment in which transparency and control are enhanced across the procurement lifecycle. Studies have demonstrated that e-procurement systems can reduce opportunities for corruption by automating processes, increasing traceability, and reducing human discretion in decision-making. This positions digital transparency as a measurable and consequential dimension of procurement governance.

A third strand links digital procurement to efficiency and value outcomes. Evidence indicates that e-procurement can accelerate public-sector project delivery and improve performance, connecting digitalisation to contract-management efficiency and tangible value gains (Oniyangi & Ibrahim, 2024). Research has demonstrated that effective contract management, supported by digital tools, is essential for ensuring that suppliers deliver on time, within budget, and to the required quality

standards. Studies of e-procurement in construction and public organisations have corroborated its efficiency and performance effects, showing that digital procurement can reduce delays, improve cost control, and enhance stakeholder satisfaction (Ibem & Laryea, 2015). This grounds the study's attention to contract-management efficiency. The concept of value for money in procurement has been conceptualised as encompassing economy, efficiency, and effectiveness, with multiple dimensions including cost, quality, and timeliness. Research has demonstrated that procurement transparency and effective contract management are key determinants of value-for-money outcomes.

A fourth strand concerns transparency, accountability and value for money as intertwined outcomes. Research on transparency in Nigerian public procurement practice ties disclosure and openness to accountability and to the value ultimately obtained from public spending, clarifying the mechanism by which transparency contributes to value for money (Williams & Andrew, 2021). Studies have found that procurement transparency is positively associated with value for money, with accountability mechanisms acting as a mediator in this relationship. The literature has identified multiple dimensions of procurement transparency, including the availability of procurement information, openness of bid processes, and transparency in contract award and implementation. This underpins the hypothesised relationships among the study's constructs.

Across these strands a consistent gap emerges. Much of the evidence addresses adoption intention or the general public sector, with limited localised study measuring digital procurement transparency, contract-management efficiency and value-for-money outcomes together within Nigerian polytechnics (Musa et al., 2023). Research on procurement in Nigerian higher education has focused primarily on universities, with limited attention to polytechnics, despite their significant procurement expenditures and distinct governance structures. Moreover, few studies have examined the mediating role of contract management efficiency in the relationship between digital procurement transparency and value-for-money outcomes. This study addresses that gap by measuring these constructs and their relationships across South-West polytechnics, providing localised evidence for reform.

Methods

The study adopted a quantitative, survey-based correlational design. The target population comprised procurement, finance and management staff in polytechnics across the six South-West states, sampled through a multistage procedure that treated institutions as clusters, selected units across procurement, finance and management functions, and proportionately sampled employees to yield a target of 240 respondents. The sample size was determined to provide adequate statistical power for the planned analyses, consistent with recommendations for structural equation modelling given the number of constructs and indicators involved. The multistage sampling procedure ensured representation across the six states, with one polytechnic selected from each state, and within each institution, respondents selected from procurement units, finance departments, and management positions. The sample was stratified by staff category to ensure adequate representation.

The principal instrument was a structured, validated questionnaire drawing on established scales, measuring digital procurement transparency, contract management efficiency, value-for-money outcomes, and relevant background variables. The digital procurement transparency scale was adapted from established instruments measuring e-procurement adoption and transparency, including items on the availability of online procurement information, transparency of bid processes, openness of contract award, and accessibility of procurement records. The contract management efficiency scale was developed based on the literature on contract management, with items measuring contract planning, performance monitoring, compliance tracking, and dispute resolution. The value-for-money outcomes scale was adapted from established instruments measuring procurement performance, with items assessing cost savings, quality of goods and services, timeliness of delivery, and overall satisfaction with procurement outcomes. The instrument was reviewed by five experts in procurement, public administration, and management for face and content validity, and their suggestions were incorporated into the final version.

The instrument underwent a pilot pre-test with 30 respondents from a polytechnic not included in the main sample, with reliability estimated using Cronbach's alpha. The reliability coefficients were: digital procurement transparency scale ($\alpha = 0.86$), contract management efficiency scale ($\alpha = 0.88$), and value-for-money outcomes scale ($\alpha = 0.85$), indicating acceptable to high internal consistency. For reflective constructs, composite reliability was also computed, with values

exceeding 0.80 for all constructs. Data were collected through self-administered questionnaires, with research assistants available to clarify any questions. Strict anonymity and confidentiality were maintained, given the sensitivity of the procurement data, with respondents assured that their responses would not be identifiable and would not affect their employment. Data were analysed in SPSS and a structural-equation-modelling package (SmartPLS) using descriptive statistics, correlation, multiple regression and structural equation modelling to test the hypothesised relationships and possible mediation, for example of contract management efficiency between transparency and value for money, with attention to differences across staff categories. The analysis strategy followed established procedures for mediation analysis, using the bootstrapping method with 5,000 resamples to estimate indirect effects. Ethical clearance was obtained from the institutional research ethics committee, informed consent secured from all respondents, participation kept voluntary and anonymous, and confidentiality carefully protected given the sensitivity of the procurement data. This study addressed the gap by measuring these constructs and their relationships across South-West polytechnics.

Results

The study successfully surveyed 240 procurement, finance and management staff across six polytechnics in South-West Nigeria. The findings are organised below according to the five research questions.

Research Question 1: What is the level of digital procurement transparency in South-West polytechnics?

Table 1

Digital Procurement Transparency and Adoption of Digital Tools (N = 240)

Digital Procurement Component	Frequency	Percentage
Adoption of Digital Tools		
Online vendor registration	116	48.6
E-invoicing	130	54.2
Electronic bid submission	86	35.8
E-tendering	78	32.5
E-contract management	68	28.4
Online payment systems	104	43.3
Transparency Indicators (Mean, SD)		
Availability of online procurement information	2.84 (0.82)	
Transparency of bid processes	2.68 (0.86)	
Openness of contract award	2.52 (0.88)	
Accessibility of procurement records	2.74 (0.84)	
Overall digital procurement transparency	2.68 (0.80)	

Note. Scale: 1 = Very low, 5 = Very high.

Table 1 presents the level of digital procurement transparency and adoption of digital tools. The results show moderate adoption of digital procurement tools, with e-invoicing being the most adopted (54.2%), followed by online vendor registration (48.6%) and online payment systems (43.3%). The least adopted tools were e-contract management (28.4%) and e-tendering (32.5%), indicating that digitalisation is more advanced in transactional functions than in strategic procurement processes. The overall digital procurement transparency score was 2.68 (SD = 0.80) on a 5-point scale, indicating moderate transparency. The highest-scoring transparency indicator was availability of online procurement information (2.84), while openness of contract award scored lowest (2.52). These findings are consistent with the literature on e-procurement adoption in Nigeria, which has documented moderate and uneven adoption, with transactional functions being more readily

digitalised than strategic functions. The finding that e-tendering and e-contract management are the least adopted tools is significant, as these are the functions most directly linked to transparency and competition in procurement. Research has identified inadequate infrastructure, limited technical capacity, resistance to change, and weak regulatory enforcement as key barriers to e-procurement adoption in Nigeria. The low score for openness of contract award (2.52) suggests that contract award decisions remain opaque, which is a significant concern for procurement governance.

Research Question 2: What is the efficiency of contract management in these institutions?

Table 2

Contract Management Efficiency (N = 240)

Contract Management Dimension	Mean (SD)*	Interpretation
Contract planning	3.12 (0.78)	Moderate
Performance monitoring	2.52 (0.86)	Low-Moderate
Compliance tracking	2.64 (0.84)	Low-Moderate
Dispute resolution	2.86 (0.80)	Moderate
Contract closure and evaluation	2.74 (0.82)	Moderate
Overall contract management efficiency	2.84 (0.76)	Moderate

Note. Scale: 1 = Very low, 5 = Very high.

Table 3

Contract Management Efficiency by Procurement Value

Contract Value	n	Mean Contract Management Efficiency (SD)
Low value (< ₦5 million)	86	2.68 (0.74)
Medium value (₦5–20 million)	92	2.86 (0.76)
High value (> ₦20 million)	62	3.02 (0.78)
Total	240	2.84 (0.76)

Table 2 presents the contract management efficiency of respondents. The overall contract management efficiency score was 2.84 (SD = 0.76) on a 5-point scale, indicating moderate efficiency. The highest-scoring dimension was contract planning (3.12), followed by dispute resolution (2.86) and contract closure and evaluation (2.74). The lowest-scoring dimensions were performance monitoring (2.52) and compliance tracking (2.64), indicating significant gaps in these critical areas. These findings are consistent with the literature on contract management in Nigerian public institutions, which has documented weaknesses in performance monitoring and compliance tracking. The low scores for performance monitoring (2.52) and compliance tracking (2.64) are particularly concerning, as these functions are essential for ensuring that suppliers deliver on time, within budget, and to the required quality standards. Research has identified that effective contract management, supported by digital tools, is essential for ensuring that suppliers deliver on time, within budget, and to the required quality standards. Table 3 presents contract management efficiency by procurement value. Higher-value contracts had higher contract management efficiency scores (3.02 for contracts over ₦20 million) compared to lower-value contracts (2.68 for contracts under ₦5 million), suggesting that higher-value contracts receive more attention and oversight. This finding is consistent with the literature on procurement, which has documented that higher-value contracts attract more management attention and resources.

Research Question 3: What are the value-for-money outcomes achieved through procurement?

Table 4

Value-for-Money Outcomes (N = 240)

Value-for-Money Dimension	Mean (SD)*	Interpretation
Cost savings	3.24 (0.76)	Moderate-High
Quality of goods and services	2.96 (0.82)	Moderate
Timeliness of delivery	2.86 (0.84)	Moderate
Overall satisfaction with procurement outcomes	3.02 (0.80)	Moderate
Overall value-for-money outcomes	3.02 (0.78)	Moderate

Note. Scale: 1 = Very low, 5 = Very high.

Table 5

Value-for-Money Outcomes by Staff Category

Staff Category	n	Cost Savings Mean (SD)	Quality Mean (SD)	Timeliness Mean (SD)
Procurement staff	92	3.32 (0.72)	3.04 (0.80)	2.94 (0.82)
Finance staff	78	3.18 (0.78)	2.92 (0.84)	2.82 (0.86)
Management staff	70	3.20 (0.78)	2.90 (0.82)	2.80 (0.84)
Total	240	3.24 (0.76)	2.96 (0.82)	2.86 (0.84)

Table 4 presents the value-for-money outcomes. The overall value-for-money score was 3.02 (SD = 0.78) on a 5-point scale, indicating moderate value for money. The highest-scoring dimension was cost savings (3.24), followed by overall satisfaction with procurement outcomes (3.02) and quality of goods and services (2.96). The lowest-scoring dimension was timeliness of delivery (2.86). These findings are consistent with the literature on procurement performance in Nigerian public institutions, which has documented moderate value-for-money outcomes, with cost savings often being more readily achieved than quality and timeliness. The finding that timeliness of delivery scored lowest (2.86) is significant, as delayed delivery can undermine the value of procurement even when costs are controlled. Table 5 presents value-for-money outcomes by staff category. Procurement staff reported higher value-for-money outcomes across all dimensions compared to finance and management staff, with the greatest difference in cost savings (3.32 vs. 3.18 and 3.20). This may reflect procurement staff's more direct involvement in procurement processes and their greater awareness of cost-saving measures. These findings are consistent with the literature on procurement performance, which has documented variations in perceptions of value for money across different stakeholder groups.

Research Question 4: What are the relationships among digital procurement transparency, contract management efficiency and value-for-money outcomes?

Table 6

Correlation Matrix of Key Variables (N = 240)

Variable	1	2	3	4	5
1. Digital procurement transparency	1				
2. Contract management efficiency	0.54**	1			
3. Value-for-money outcomes	0.58**	0.62**	1		
4. E-tendering adoption	0.48**	0.42**	0.46**	1	

Variable	1	2	3	4	5
5. Performance monitoring	0.52**	0.78**	0.56**	0.38**	1

Note. * $p < 0.05$, ** $p < 0.01$.

Table 7
Regression Analysis Predicting Value-for-Money Outcomes

Predictor	B	SE	β	t	p
Digital procurement transparency	0.32	0.06	0.36	5.33	<0.001
Contract management efficiency	0.38	0.07	0.42	5.43	<0.001
Staff category	0.08	0.06	0.09	1.33	0.184
Model Summary					
R ²	0.52				
Adjusted R ²	0.51				
F(3, 236)	85.24				<0.001

Table 6 presents the correlation matrix. Digital procurement transparency was positively associated with contract management efficiency ($r = 0.54$, $p < 0.001$) and value-for-money outcomes ($r = 0.58$, $p < 0.001$). Contract management efficiency was positively associated with value-for-money outcomes ($r = 0.62$, $p < 0.001$). The sub-dimensions of digital procurement transparency (e-tendering adoption) and contract management efficiency (performance monitoring) also showed significant correlations with value-for-money outcomes. Table 7 presents the regression analysis. The model explained 52% of the variance in value-for-money outcomes ($R^2 = 0.52$, $F(3, 236) = 85.24$, $p < 0.001$). Digital procurement transparency ($\beta = 0.36$, $p < 0.001$) and contract management efficiency ($\beta = 0.42$, $p < 0.001$) were significant predictors of value-for-money outcomes, with contract management efficiency having a stronger effect. Staff category was not a significant predictor. These findings are consistent with the literature on the relationships between digital procurement, contract management, and value for money, which has demonstrated that transparency and contract management efficiency are positively associated with value-for-money outcomes.

Table 8
Structural Equation Modelling Results: Mediation Analysis

Path	Direct Effect	Indirect Effect	Total Effect	Significance
Digital procurement transparency → Value-for-money outcomes	0.36**	-	0.36**	**
Digital procurement transparency → Contract management efficiency	0.54**	-	0.54**	**
Contract management efficiency → Value-for-money outcomes	0.42**	-	0.42**	**
Digital procurement transparency → Contract management efficiency → Value-for-money outcomes	-	0.22**	-	**

Note. ** $p < 0.01$. Bootstrapping with 5,000 resamples.

Table 8 presents the structural equation modelling results for mediation analysis. The direct effect of digital procurement transparency on value-for-money outcomes was significant ($\beta = 0.36$, $p < 0.01$), as was the direct effect of digital procurement transparency on contract management

efficiency ($\beta = 0.54$, $p < 0.01$) and the direct effect of contract management efficiency on value-for-money outcomes ($\beta = 0.42$, $p < 0.01$). The indirect effect of digital procurement transparency on value-for-money outcomes through contract management efficiency was significant and positive ($\beta = 0.22$, $p < 0.01$), indicating partial mediation. This means that while digital procurement transparency has a direct positive effect on value-for-money outcomes, it also has an indirect effect through improved contract management efficiency. The total effect of digital procurement transparency on value-for-money outcomes was $0.36 + 0.22 = 0.58$, indicating that the direct and indirect effects combine to explain the relationship. These findings are consistent with the literature on the mediating role of contract management efficiency in the relationship between procurement transparency and value-for-money outcomes. The mediation finding suggests that interventions to enhance digital procurement transparency should also strengthen contract management efficiency to maximise positive outcomes.

Research Question 5: What evidence-based recommendations can be generated to strengthen procurement digitalisation and governance?

Based on the findings of this study, several evidence-based recommendations were developed for strengthening procurement digitalisation and governance:

Short-term interventions (0–6 months): (1) Develop a comprehensive e-procurement roadmap that prioritises the digitalisation of strategic functions, including e-tendering and e-contract management; (2) Provide training for procurement staff on e-procurement tools and contract management best practices; (3) Establish clear procurement transparency policies that mandate the publication of procurement information, including contract awards and implementation; (4) Implement performance monitoring systems for contracts, with clear metrics and regular reporting; and (5) Conduct a procurement audit to identify gaps in transparency and contract management efficiency.

Medium-term interventions (6–24 months): (1) Implement an integrated e-procurement system that covers the full procurement lifecycle, from planning to contract closure; (2) Strengthen contract management capacity by establishing dedicated contract management units with qualified staff; (3) Develop and implement supplier performance evaluation systems to track compliance and quality; (4) Enhance transparency by publishing procurement information on institutional websites and portals; and (5) Establish a procurement oversight committee to monitor compliance with procurement policies and regulations.

Long-term approaches (2–5 years): (1) Develop a national framework for e-procurement in polytechnics, with clear standards, policies, and support mechanisms; (2) Strengthen linkages between the Bureau of Public Procurement and polytechnics to ensure consistent implementation of procurement regulations; (3) Build capacity for procurement research and innovation in polytechnics; (4) Advocate for policy reforms that support e-procurement adoption and strengthen accountability mechanisms; and (5) Develop partnerships with international organisations and development partners to support e-procurement implementation.

Discussion

The central finding of this study is the demonstration that digital procurement transparency and contract management efficiency are significant predictors of value-for-money outcomes in South-West polytechnics, with contract management efficiency partially mediating the relationship between transparency and value-for-money outcomes. The mean digital procurement transparency score of 2.68 (SD = 0.80) indicates moderate levels of transparency, with e-invoicing (54.2%) and online vendor registration (48.6%) being most adopted, while e-tendering (32.5%) and e-contract management (28.4%) were least adopted. These findings are consistent with the literature on e-procurement adoption in Nigeria, which has documented moderate and uneven adoption, with transactional functions being more readily digitalised than strategic functions. The finding that e-tendering and e-contract management are the least adopted tools is particularly significant, as these are the functions most directly linked to transparency and competition in procurement. Research has identified inadequate infrastructure, limited technical capacity, resistance to change, and weak regulatory enforcement as key barriers to e-procurement adoption in Nigeria.

The contract management efficiency findings reveal moderate overall efficiency (mean = 2.84), with performance monitoring (2.52) and compliance tracking (2.64) scoring lowest. These findings are consistent with the literature on contract management in Nigerian public institutions,



which has documented weaknesses in performance monitoring and compliance tracking. The finding that higher-value contracts had higher contract management efficiency scores suggests that higher-value contracts receive more attention and oversight, consistent with the literature on procurement. The value-for-money findings reveal moderate outcomes (mean = 3.02), with cost savings (3.24) scoring higher than quality (2.96) and timeliness (2.86). This pattern is consistent with the literature on procurement performance in Nigerian public institutions, which has documented moderate value-for-money outcomes, with cost savings often being more readily achieved than quality and timeliness. The finding that timeliness of delivery scored lowest is significant, as delayed delivery can undermine the value of procurement even when costs are controlled. The correlation and regression analyses revealed significant relationships among the three constructs. Digital procurement transparency was positively associated with contract management efficiency ($r = 0.54$, $p < 0.001$) and value-for-money outcomes ($r = 0.58$, $p < 0.001$), while contract management efficiency was positively associated with value-for-money outcomes ($r = 0.62$, $p < 0.001$). These findings are consistent with the literature on the relationships between digital procurement, contract management, and value for money. The regression model explained 52% of the variance in value-for-money outcomes, with both transparency and contract management efficiency contributing significantly. The structural equation modelling results showed that contract management efficiency partially mediates the relationship between digital procurement transparency and value-for-money outcomes (indirect effect = 0.22, $p < 0.01$), indicating that transparency affects value for money both directly and indirectly through improved contract management. This finding is consistent with the literature on the mediating role of contract management efficiency in the relationship between procurement transparency and value-for-money outcomes. The mediation finding suggests that interventions to enhance digital procurement transparency should also strengthen contract management efficiency to maximise positive outcomes. Overall, the findings confirm that digital procurement transparency and contract management efficiency are significant predictors of value-for-money outcomes in South-West polytechnics, and they provide evidence-based recommendations for strengthening procurement digitalisation and governance.

Conclusion

This study examined digital procurement transparency, contract management efficiency and value-for-money outcomes in polytechnics in South-West Nigeria. The findings revealed moderate levels of digital procurement transparency (mean = 2.68), with e-invoicing (54.2%) and online vendor registration (48.6%) being most adopted, and e-tendering (32.5%) and e-contract management (28.4%) being least adopted. Contract management efficiency was moderate (mean = 2.84), with performance monitoring (2.52) and compliance tracking (2.64) scoring lowest. Value-for-money outcomes were moderate (mean = 3.02), with cost savings (3.24) scoring higher than quality (2.96) and timeliness (2.86). Digital procurement transparency was positively associated with contract management efficiency ($r = 0.54$) and value-for-money outcomes ($r = 0.58$), while contract management efficiency was positively associated with value-for-money outcomes ($r = 0.62$). Structural equation modelling showed that contract management efficiency partially mediated the relationship between digital procurement transparency and value-for-money outcomes (indirect effect = 0.22). The study provides evidence-based recommendations for strengthening procurement digitalisation and governance in Nigerian polytechnics. The principal implication is that digital procurement transparency and contract management efficiency are significant predictors of value-for-money outcomes, and that interventions to enhance transparency and strengthen contract management would significantly improve procurement outcomes in Nigerian polytechnics. Future research should extend this work in several directions: longitudinal studies to track changes in procurement digitalisation and outcomes over time; comparative studies across different institutional types and sectors; intervention studies to evaluate the effectiveness of e-procurement and contract management interventions; and qualitative research to explore the lived experiences of procurement staff navigating digitalisation and governance reforms.

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Conflict of Interest

The authors declare that there are no competing financial interests or personal relationships that could have influenced the work reported in this study.

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