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Assessing the Impact of Digitalization on Public Procurement Efficiency in Nigeria: A Case Study of the Bureau of Public Procurement (BPP) and the Government Electronic-Procurement & Payment System (GePPS)

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Abstract: Governments looking to improve service delivery, lower transaction costs, and combat corruption, digitizing public procurement has become a strategic goal. The Bureau of Public Procurement (BPP) of Nigeria launched the Government Electronic-Procurement & Payment System (GePPS) in 2017. The effectiveness of government procurement between 2016 and 2022 is empirically assessed in this study. The study concludes that digitalization decreased average procurement cycle time by 27% and bid prices by 6.4% while increasing the number of qualified bidders per tender by 38% using a mixed-method design that incorporates difference-in-differences (DiD) analysis of 1,847 contracts with policy documents, academic literature, and institutional reports. Qualitative data indicates that the main mechanisms are vendor pre-qualification, real-time monitoring, and e-reverse auctioning. However, vendor reluctance, low digital literacy, and restricted internet coverage hinder improvements. Policy ideas for expanding digital procurement while addressing structural limitations are included in the paper's conclusion,

Keywords: *E-Procurement, Digitalization, Public Procurement Efficiency, Bureau of Public Procurement, Nigeria, GePPS.*

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I. INTRODUCTION

In developing nations, public procurement makes up 15–20% of GDP (OECD, 2021). 60% of the N17.1 trillion (US $39 billion) allotted to capital projects in Nigeria's 2022 federal budget comes from procurement transactions (Budget Office, 2022). The procedure has historically been beset by corruption, delays, and cost overruns (Adeyemo, 2019).

In response, the Government Electronic-Procurement & Payment System (GePPS) was introduced by the Bureau of Public Procurement (BPP) in January 2017 to automate contract award, tendering, bid evaluation, and payment. Although global academic reviews indicates that e-procurement can cut costs by 5–30% and cycle times by 20–50% (World Bank, 2020), results are dependent on contextual factors including infrastructure, human capital, and institutional quality (Pathak & Prasad, 2022). 1.This study asks: To what extent has GePPS improved the efficiency of federal procurement in Nigeria, and through which mechanisms?

II. LITERATURE REVIEW

- *Theoretical Foundations*

According to New Public Management (NPM), ICT adoption and market-oriented reforms boost productivity (Hood, 1991). Digital platforms reduce knowledge asymmetry and opportunism, according to transaction-cost economics

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(Williamson, 1985). According to institutional theory, performance is determined by both formal rules (such as e-procurement requirements) and informal norms (such as vendor trust) (North, 1990).

➢ *Empirical Evidence*

According to Zheng et al. (2021), meta-analyses of 67 e-procurement studies show average cost savings of 8.7% and cycle time savings of 24%. The Government e-Marketplace (GeM) in India lowered median prices by 9–12% (Srivastava & Satyanarayana, 2022). Chile-Compra reduced procurement times in Latin America from sixty to twenty-two days (OECD, 2019). There is little evidence from Africa. Rwanda's e-procurement program saved 7% of contract value, but uptake was still low (AfDB, 2021). Nigeria-specific research lacks counterfactual analysis and is primarily descriptive (Ogbu, 2020; Eze & Eze, 2021).

➢ *Conceptual Model*

Drawing on the literature, the study hypothesizes:

- H1: GePPS adoption reduces procurement cycle time.
- H2: GePPS adoption lowers winning bid prices.
- H3: GePPS adoption increases bidder participation.

Mediating variables include transparency, competition, and administrative burden; moderating variables include digital infrastructure and vendor capacity.

III. METHODOLOGY

A. Research Design

A convergent mixed-method design combined quasi-experimental quantitative analysis with qualitative case study (Creswell & Plano Clark, 2018).

B. Quantitative Component

➢ *Data Sources*

The study extracted micro-data from the BPP Contract Awards Database (CAD) for 1,847 works and goods contracts valued above N100 million awarded by eight-line ministries between 2016 and 2022. GePPS became mandatory for these categories in 2017 Q2.

➢ *Variables*

The following variables affect the outcome: (i) cycle time (days from advertisement to contract signature); (ii) winning bid price in relation to the engineer's estimate; and (iii) number of eligible bidders.
GePPS usage (binary) is the treatment variable.
Contract value, sector, ministry, fiscal year, region, and internet penetration are covariates (ITU, 2022).

➢ *Estimation Strategy*

The study employed a two-way fixed-effects difference-in-differences (DiD) model:

$$Y_{it} = \alpha + \beta_1 \, Treat_i \times Post_t + \beta_2 \, X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where $Treat_i = 1$ if contract i was processed via GePPS, $Post_t = 1$ after 2017 Q2, μ_i and λ_t are ministry and year-quarter fixed effects. Standard errors are clustered at the ministry level (Bertrand et al., 2004).

C. Qualitative Component

➢ *Sample*

Purposive sampling yielded 42 findings: 12 BPP officials, 15 procurement officers from four ministries, 10 registered contractors, and 5 civil-society observers.

➢ *Data Collection*

Policy documents, academic literature, and institutional reports with semi-structured interviews and recorded (2024-25), transcribed, and coded thematically using NVivo 14.

➢ *Trustworthiness*

Triangulation across data sources, member checking, and audit trail enhanced credibility (Nowell et al., 2017).

D. Ethical Considerations

Approval was obtained from the BPP Research Management (office of the DG) Informed consent and anonymity were guaranteed.

IV. RESULTS

➢ *Descriptive Statistics*

pre-GePPS mean cycle time was 142 days (SD = 38), falling to 104 days (SD = 29) post-adoption. Average bid ratio declined from 0.97 to 0.91, while mean bidder count rose from 4.2 to 5.8.

➢ *DiD Estimates*

Results shows that GePPS reduced cycle time by 38 days (27 %, $p < .01$), bid ratio by 0.06 (6.4 %, $p < .05$), and increased bidder count by 1.6 (38 %, $p < .01$). Event-study plots confirm parallel pre-trends.

➢ *Robustness*

Results survive placebo tests using hypothetical treatment dates, alternative windows, using inverse-proensity-weighted (IPW) DiD . Wooldridge's test finds no evidence of selection bias ($p = .18$).

➢ *Qualitative Findings*

The study attributed efficiency gains to:

- E-reverse auctioning—"bidders undercut themselves in real time" (P13, BPP).
- Automated bid evaluation—"Excel macros cut technical review from 3 weeks to 3 days" (P22, Ministry of Works).

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- Vendor pre-qualification—"permanent database reduced repetitive paperwork" (P31, contractor).

Conversely, poor rural connectivity—"hard printed hard copies as backup" (P18, Ministry of Health)—and high registration fees—"US $525 is steep for SMEs" (P35, contractor)—limit inclusiveness.

V. DISCUSSION

The 27% cycle time reduction is in line with the global median (Zheng et al., 2021) and surpasses the 15% stated by AfDB (2021) for Rwanda, indicating that Nigeria's higher baseline bureaucracy allowed for more space for improvement. Given that GePPS does not have an integrated e-auction module for all categories, the 6.4% price reduction is not as significant as Chile's 14% (OECD, 2019). In line with data from India's GeM, increased bidder involvement supports the competition-enhancement hypothesis (H3) (Srivastava & Satyanarayana, 2022).

Gains are uneven, as explained by institutional theory: Informal practices undercut formal regulations (Public Procurement Act 2007, e-Procurement Regulations 2020); certain MDAs continue to split contracts in order to circumvent GePPS requirements. Digital literacy gaps (46% of suppliers lack basic ICT skills) and infrastructure deficiencies (internet penetration 51% vs. 80% in Chile) moderate outcomes, supporting contingent models of e-government success (Pathak & Prasad, 2022).

VI. CONCLUSION AND POLICY IMPLICATIONS

This study provides the first quasi-experimental evidence that digitalization has significantly improved Nigeria's federal procurement efficiency.

To consolidate gains this study recommend the following:
This study offers the first quasi-experimental proof that Nigeria's federal procurement efficiency has been greatly enhanced by digitization.

This study suggests the following in order to consolidate gains:

- Expand rural broadband via the Universal Service Provision Fund to raise vendor participation.
- Introduce tiered registration fees and SME training vouchers to enhance inclusivity.
- Mandate end-to-end e-auctioning for all goods and works above N50 million.
- Amend the PPA 2007 to criminalize circumvention of GePPS.
- Embed a real-time red-flag algorithm that triggers audits when bid ratios exceed 1.2 or single-bid tenders persist.
- Future research should explore downstream effects on contract execution quality and sustainability outcomes.

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