

LEVERAGING EMERGING TECHNOLOGIES FOR EFFICIENT PUBLIC PROCUREMENT MANAGEMENT IN EBONYI STATE, NIGERIA

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Abstract

The challenges that have persistently inhibited the economic growth and services in the developing region, in this case Ebonyi State, Nigeria, include the corruption, inefficiency and lack of transparency in the public procurement management. This paper considers the possibilities of new technologies such as e-procurement systems, artificial intelligence, blockchain, and data analytics as ways to improve the efficiency of overseeing the processes of public procurement. Using the mixed-methodology, the primary data were gathered via surveys and interviews conducted with 150 procurement officials and Ebonyi State stakeholders using secondary data sources both past and present. The theoretical framework will use the Technology-Organization-Environment (TOE) model in examining factors of adoption. The results indicate that the awareness of technologies is average (58% of the participants knew about e-procurement) but the adoption is limited by the infrastructural shortage, change unwillingness, and level of regulation. Demographic analysis indicates that the respondents are mainly male (72%), between 35-50 years (65%), and possess bachelor degrees (48%) and 5-15 years experience (62). Findings show that the adoption of e-procurement has the potential of saving procurement cycle times by up to 40 per cent and eliminate corruption by conducting bidding in an open way. The analysis has provided advantages such as cost reductions and enhanced accountability but has emphasized such limiters as digital divide, and lack of skills. Some of the recommendations include technology integration, capacity building and public-private partnerships policy reforms. The study is relevant in the literature of business management in offering empirical findings on technology mediated procurement reforms in sub-Saharan Africa with focus on sustainable development goals. Research needs to be carried out on long term effects after adoption.

Keywords: public procurement, emerging technologies, e-procurement, Ebonyi State, Nigeria, TOE framework, efficiency

Introduction

In the developing economies, public procurement represents a huge part of the state spending which is an essential source of resource allocation, an important method of developing infrastructure, and a means of providing services. The concern of public procurement in Nigeria takes up about 60-70 percent of the national budget, which highlights that it is an essential element of economic governance (Williams and Adeniran, 2024). Nevertheless, systemic inefficiencies, such as bureaucratic slowness, corruption, shrouded processes, and the like have afflicted the industry as a phenomenon, resulting in hefty financial losses and loss of faith in the

systems among the people. An example of these difficulties in a regional context is the Ebonyi state, which is a state in southeastern Nigeria. The state was also formed in 1996 and underwent reforms to follow the federal guidelines, including the Public Procurement Act of 2007, but these gaps continue to exist, leading to poor performance (Ojelabi et al., 2020).

The history of the procurement system in Nigeria dates to the colonial system where the procurement was centralized, but the system did not have a way of ensuring accountability. After gaining independence, the industry has been changing based on several reforms, such as the creation of the Bureau of Public Procurement in 2007 to apply due process (Afolabi & Ojelabi, 2018). The passage of the State Public Procurement Law No. 016 of 2020 in the Ebonyi State constituted an acquired milestone to regulate the procurement provision and enhance the sphere of transparency (Ebonyi State Government, 2020). Although these Latitudes of legislation have been made, it has been reported there are violations, e.g., awards made to shell companies and politically connected firms, which are in contravention of the procurement laws, and overcharging (Oyedeki, 2025). The socioeconomic characteristics of the state worsen these problems; the state has almost 2.9 million people (as of 2016) with a predominantly Igbo ethnicity, and its land is only 5,935 square kilometers, which are highly dependent on agriculture and mining, which could become the victims of procurement mismanagement (National Population Commission, 2016).

The problem statement focuses on the ineffectiveness of the conventional procurement practices in the Ebonyi State, which are the reason behind the sluggish implementation of the project, cost increase, and corruption. An example is the way a World Bank evaluation manifested that Nigeria wastage up to 60 nairas out of 100 given to procurement owing to anomalies (World Bank, 2000). Recent enquiries in Ebonyi showed multi-billion naira deals on road contracts were given out without competition bidding worsening the state of infrastructure shortages (ICIR Nigeria, 2025). The solution can be found in emerging technologies: e-procurement solutions may adapt bidding to automation, artificial intelligence may forecast supply requirements, blockchain may provide an unchanged record of transactions. Digital literacy and institutional resistance have been the barriers to adoption in developing countries such as Nigeria, however, driven by infrastructural constraints (Adesanya et al., 2023). The presented work fills the mentioned gap as it considers how these technologies can be used to become efficient with references to both outdated literature focusing on introducing essential reforms (Obigbemi, 2010) and more recent ones on digital transformation (Roman et al., 2019).

The existing literature emphasizes the reformation promise of technology in procurement. Similar factors drove earlier research studies, including the one by Neupane et al. (2012), to investigate the role of e-procurement in diminishing corruption in developing states, whereas new research by Addo (2024) considers artificial intelligence to predictive analytics within the supply chains in the public sector. In Nigeria, consideration of the procurement reforms can be associated with economic development being transparent (Ojelabi et al., 2020), but no large-scale empirical data of subnational scale such as Ebonyi are provided. The OECD (2025) survey

shows that in developed economies, particularly, data analytics and robotic process automation are the most commonly used technologies and they increase efficiency by 30-50, whereas in Africa, the contextual barriers to adoption still exist (AfDB, 2018). The research is based on these speculations, which propose that the adoption of technology can address such issues with the following research questions: What are the existing procurement inefficiencies in Ebonyi State? What do they require through emerging technologies? What contributes to adoption? It is important because it offers practical implications to the policymakers and it also leads to the sustainable development targets such as SDG 16 (peace, justice and strong institutions) and improved business management procedures in the public administration.

Literature Review

The process where governments procure goods, services and works to meet the needs of the masses and focuses on the value of money, transparency as well as fairness is called public procurement (Arrowsmith, 2010). Procurement can be considered a strategic role in the business management that prepares and fits organizational aims, which has an impact on the supply chain effectiveness and cost-management (Monczka et al., 2015). The development of procurement theories historically consisted of the development of the transactional approaches up to the relational one, as well as the inclusion of the stakeholder theory to prioritize the ethical concerns (Freeman, 1984). Procurement is a process used in economic development in third world countries but it is associated with economic challenges such as corruption and inefficiency (Thai, 2009).

The serious attempt at reforms in public procurement started in 2001 with the Budget Monitoring and Price Intelligence Unit in Nigeria and with the enactment of the Public Procurement Act in 2007 (Fayomi, 2013). In this act, the Bureau of Public Procurement was established to supervise the processes, which facilitates competition and accountability (Bureau of Public Procurement, 2007). Nonetheless, the barrier to implementation is still present, such as the political interference and lax enforcement (Afolabi, 2019). The local procurement bureau is active in the state of Ebonyi, where it is mandatory to design policies, yet the fact of breaking the rules in road contracts speaks of structural failures (Oyedeki, 2025). According to old literature, like Basheka (2008), these are caused by the institutional weaknesses in African settings, when recent research by Williams and Adeniran (2024) proposes the use of e-procurement as a way of enhancing equity and efficiency.

The new technologies in the procurement sector are e-procurement that digitizes the bidding and contract management, artificial intelligence to predict demand, blockchain that can ensure low-risk transactions, and big data analytics to monitor performance (Roman et al., 2019). The e-procurement, specifically, is praised with cutting administrative expenditures in the developing countries by 20-30 percent (Neupane et al., 2012). In Ghana, just like in Nigeria, through the use of blockchain the processes were streamlined which reduced fraud (Addo, 2024). In the sectors of the general population, they consist of resistance and deficit of technological infrastructure (Toktaş-Palut et al., 2023). According to the OECD, digital transformation good practice report,

artificial intelligence and machine learning are the most important in predictive procurement, although they should be accompanied by strong data governance (OECD, 2025).

There is contradictory literature on e-procurement in developing countries. A systematic review created by Adesanya et al. (2023) lists such factors as perceived usefulness and institutional pressures as driving factors, relying on the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). This is because in Rwanda, e-procurement enhanced transparency, although low digital literacy posed a problem there (Nkurunziza, 2019). In the case of Nigeria, Adebayo (2015) focuses on the views of the public sector by mentioning that e-systems can decrease corruption, but their implementation is slow because of cultural and organizational influences. The earlier studies such as Gunasekaran and Ngai (2008) focus on the supply chain integration with technology, whereas the modern studies by GEP (2024) use generative artificial intelligence to automate the contracts.

Technology adoption has a theoretical basis in the public sector whereby the Technology-Organization-Environment (TOE) model has been widely used, which states that the factors of technology branding include technological readiness, organizational capacity and environmental pressures (Tornatzky and Fleischer, 1990). This has been implemented in blockchain in government agencies, where transaction costs have been cut (Al-Ashmori et al., 2024). The other approach is the Diffusion of Innovations theory that describes the rates of adoption in terms of the attributes of innovations (Rogers, 2003). In government procurement, the models are useful to examine such obstacles as regulatory conditions in Nigeria (Ojelabi et al., 2020). The given research adopts the TOE framework and organizes the analysis incorporating the internal (organizational) and external (environmental) factors with technological characteristics.

There are also gaps in the empirical research of subnational levels where there is plenty of research on national levels (Fayomi, 2013), and the situation in Ebonyi needs more specific knowledge given its agrarian economy and demographic characteristics of the population (National Population Commission, 2016). The interest of the population (for example, young population (more than 40 percent under 15)) and gender disbalances in positions of authority change the procurement (Health Policy Plus, 2025). This review organizes the outdated foundational theories (Freeman, 1984) with the fresh empirical facts (OECD, 2025) that provides the preparation of the main investigation.

Methodology

This research paper has adopted the mixed-method as a research design to understand fully the exploitation of emerging technology in the efficient public procurement in Ebonyi State. Quantitative part employs surveys to collect organized information about the level of adoption and efficiency rates, and the qualitative part of the work is based on interviews that will offer detailed information on the issues and feelings. The method is consistent with paradigms of research in business management that focus on empirical validation (Creswell and Creswell, 2018). The theoretical framework is the TOE model according to which the variables will be

chosen: the technological variables (ex. compatibility of the system), the organizational variables (ex. staff level), and the environmental variables (ex. regulatory support) (Tornatzky and Fleischer, 1990).

It includes the procurement officials, contractors, and stakeholders in the public sector of Ebonyi State, achieving a population of 500, according to the state bureau records (Ebonyi State Bureau of Public Procurement, 2024). The selection of the 150 participants was done using a purposive sampling method, whereby there was representation of ministries, departments, and agencies in procurement. The inclusion criteria were a minimum of two years experience in the process of procurement. A structured questionnaire with Likert-scale (1-5) questions about technology awareness, barriers to adoption, and perceived benefits were used as data collection methods, which was pilot-tested and had a Cronbach of $\alpha=0.85$. Also, semi-structured interviews with 20 key informants that are bureau directors and IT specialists were held in order to unveil nuanced perspectives. The collection of primary data took place between 2025: September and December, following the code of ethics of informed consent and anonymity.

Participants were studied in terms of demographic factors that could be used to place findings in perspective. Gender differences in the Nigerian public administration manifested in the sample gendered at 72% and 28% males and females respectively (UN Women, 2015). The age distribution was 65, 20, and 15, which were 35-50, under 35, and over 50, respectively, making the age distribution predominantly of the mid-career group. Education levels were 48 bachelor degrees, 30 master degrees and 22 diplomas and lower. The experience was between 5-15 years (62) with 25% having more than 15 years and 13% less than 5 years. Procuring officer (55%), Manager (25%), Contractor (15%), and IT personnel (55%). These audience statistics imply an informed yet maybe a conservative audience that is likely to be resistant to technological changes (Venkatesh et al., 2003).

The analysis of data included the quantitative data, which were analyzed using SPSS with the following statistics; means, frequencies, and correlations. Adoption intent, testing of relationships between TOE factors and inferential statistics (regression analysis) were tested. NVivo was used to thematically analyze qualitative data, and the identification of patterns, such as patterns like infrastructural barriers and policy needs. Triangulation facilitated the increase of the validity due to cross-checking survey and interview findings (Yin, 2018). One of the limitations is that the study was specific to Ebonyi and thus one can not extrapolate but can use the study as a template to use in other states.

Results

The survey data shows that the awareness of the participants of emerging technologies is moderate, as 58% of respondents know about e-procurement, 42 percent about artificial intelligence, 35 percent about blockchain, and 28 percent about data analytics. The adoption rates are low: just 22% said they used e-procurement platforms on a regular basis, mostly utilizing the portal of the state (Ebonyi E-Procurement, 2024). Perceived benefits were rated very high whose

means were 4.2, efficiency gains and transparency improvement on a scale of five. Challenges were also salient with corruption (mean 4.6), deficiency in infrastructural (4.5) and skill gaps (4.3) topped the list of barriers.

Table 1*Demographic distribution*

Characteristic	Category	Frequency	Percentage
Gender	Male	108	72%
	Female	42	28%
Age	Under 35	30	20%
	35-50	97	65%
	Over 50	23	15%
Education	Diploma/Lower	33	22%
	Bachelor's	72	48%
	Master's	45	30%
Experience	Under 5 years	19	13%
	5-15 years	93	62%
	Over 15 years	38	25%
Role	Procurement Officer	82	55%
	Manager	38	25%
	Contractor	22	15%
	IT Staff	8	5%

The regression analysis results revealed that the intent to adopt is an important variable that is significantly predicted by organizational (0.45, $p = 0.01$) and environmental (0.38, $p = 0.05$) factors and it was marginally predicted by technological factors (0.29, $p = 0.06$). These were supported by interviews, where the themes of the need to train emerged (15/20) and the matter of policy enforcement (12/20). One interviewee pointed out that e-procurement would reduce time taken to finish the bidding process by months to weeks but poor internet connectivity in rural locations is a challenge.

According to efficiency metrics of the respondents, it is estimated that technology adoption might decrease both the cycle time and cost by 40 and 25 percent respectively, which is consistent with the literature estimates (OECD, 2025). But 68% gave a reason of lack of funds.

Table 2*Summary of challenge rankings*

Challenge	Mean Score	Standard Deviation
Corruption	4.6	0.7
Infrastructural Deficits	4.5	0.8
Skill Gaps	4.3	0.9

Regulatory Gaps	4.1	1.0
Resistance to Change	3.9	1.1

Discussion

The findings support the state of the art on procurement issues in Nigeria, in which the problems of corruption and ineffectiveness prevail (Williams and Adeniran, 2024). The low adoption rates resonate with the developing nations, which is caused by the presence of TOE factors (Adesanya et al., 2023). The readiness of the organization, especially the skill, fits the previous findings in older studies on human capital in administration of a particular government (Basheka, 2008). The environmental forces, such as regulatory facilitation, are paramount, as witnessed in areas of exclusion of the procurement law in Ebonyi (Ebonyi State Government, 2020).

The demographic data demonstrates the gender and age prejudice, which may suppress the range of attitudes towards technology (UN Women, 2015). The levels of high experience imply knowledge but may create inertia which is consistent with the diffusion theory (Rogers, 2003). The gains in efficiency attained will be comparable to those in the global basis where e-procurement has achieved 20-50 per cent improvements (Neupane et al., 2012; OECD, 2025). But the digital divide is aggravated in Ebonyi to its rural population due to infrastructural barriers (National Population Commission, 2016).

The research contributes to business management by ensuring that the connection between TOE and procurement is made empirically, which provides such a model to sub-Saharan contexts. Limitations Self-report data has the disadvantage of bias, proposing a future longitudinal study.

Conclusion

The potential transformations to the efficiency of Ebonyi State in terms of digitization and analytics can be leveraged to transform the public procurement with the help of emerging technologies. Primary data reveal the awareness gap and barriers but demonstrate such advantages as cost reduction and increased transparency. Application of TOE framework demonstrates complex effect on adoption with focus on holistic reforms.

Recommendations

Infrastructure investments and training programs should be the priority of the policymakers. Technology implementation can be promoted through the public-private partnerships, whereas implementation of rules will reduce the breaches. Male and juvenile officials capacity building would make views diverse. The monitoring systems, based on the use of blockchain, would provide long-term efficiency.

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