

BLOCKCHAIN TECHNOLOGY FOR TRANSPARENT PUBLIC PROCUREMENT AND ACCOUNTABILITY IN EBONYI STATE, NIGERIA

By

Okey Reuben Okechukwu

Department of Education Administration and Planning

Abstract

Corruption, inefficiency and absence of transparency in public procurement procedures in the developing economies such as Nigeria are usually characterized by massive losses to economy and loss of confidence by the people. In this work, the possibility of the use of blockchain technology to improve transparency and accountability in the public procurement process in the state of Ebonyi, Nigeria, will be analyzed. The theoretical frameworks that are incorporated in the study to evaluate the viability of blockchain, using a mixed-method approach, include the Technology Acceptance Model and the Transaction Cost Theory. Structured surveys were administered to 250 participants, comprising of procurement officials, contractors and the citizens in Ebonyi State as primary data collection methods, and in-depth interviews conducted on 20 key stakeholders. Demographic logistics show that the pool of participants is mainly aged 31-50 (62%), with a biggest percentage of 55 being male, and a majority 45 being female with the largest proportion of 68 belonging to urban areas and most of the participants possessing a bachelors degree (74%). The results show that blockchain may lower the levels of corruption because it offers imoatility, automated compliance by utilizing smart contracts, and real-time auditing that can save as much as 25% of the procurement expenses according to the simulated model. Nevertheless, the issues of inadequacy in technological infrastructure, regulatory gaps, and opposition to adoption exist. The paper points out the ways in which blockchain is in line with the Public Procurement Act of 2007 signed into law in Nigeria, which provides an avenue to a more responsible way of allocating resources. It would be recommended to pilot the change in infrastructure works in Ebonyi State and capacity-building programs. The paper allows to add to the accounting literature by proving that blockchain can be used in forensic accounting and internal controls to combine past foundational research on distributed ledgers with current use of blockchain in governance. All in all, blockchain is a disruptive technology to promote responsibility in the resource-deprived environments, and the concept can be applied to the African scenes, in general.

Keywords: Blockchain technology, public procurement, transparency, accountability, Ebonyi State, Nigeria, corruption mitigation

Introduction

Public procurement is one of the most important aspects of government functioning as it takes significant share in the budget of most countries in the developing world. Public procurement expenditures in Nigeria form about 15-20 per cent of the gross domestic product hence its significance to the economic growth and provision of services. Nevertheless, the industry has remained marred with systemic problems such as corruption, favoritism, inefficiencies, which erode accountability and trust among the citizens. Ebonyi State is the example of these problems;

the claims of procurements anomalies have often been reported and the project is left behind, and the money is misplaced. The paper focuses on the analysis of the implementation of blockchain technology as a tool to promote greater transparency and accountability in the process of public procurements within the Ebonyi State using both the past and the current literature to construct a complex argument.

The history behind this inquiry is based on the general governance situation in Nigeria. Set up in 1996, the Ebonyi State was formed out of portions of the states of Abia and Enugu and covers approximately 5,935 square kilometers with an estimated population of 2.9 million in 2016 and is projected to increase to 3.2 million by 2022. It is mainly Igbo with small ethnic groups representing other neighboring areas and is largely dependent on agriculture and mining besides government sectors to continue economic sustainability. Infrastructure, health, education, and agricultural projects are the major infrastructure, health, education and agricultural projects that require tenders before being financed by federal provisions and international aid in the state. Although the state of Ebonyi has adopted the Ebonyi State Public Procurement Law in 2020 that replicates the state national Public Procurement Act of 2007, it is not fully implemented, creating environments where malpractice could thrive. Investigative agencies show that there is breach of contract award policies, which include sole sourcing to politically favored organizations and tax defaulters, thus costing the government billions of naira.

The problem statement is focused on the rampant corruption in the procurement sector that does not just deplete its resources but also contributes to inequality. The recent cases such as the awarding of multi-billion naira road contracts in Ebonyi State which should not have been given based on the procurement laws, as the contracts were awarded to family members of officials or to unqualified bidders, results in poor workmanship and social uproar. These activities undermine the accountability of the digital content since the paper-based or centralized digital systems are prone to manipulation, slowness and non-traceability. One of the solutions that can help is blockchain technology that has all the characteristics of a decentralized ledger, immutability, and smart contracts. The early definition of blockchain, introduced by Nakamoto (2008) in the context of cryptocurrencies, is based on the idea of transparency due to distributed consensus, and this notion can be applied to the work of the state sector as well. More recent research, as in the studies by Alketbi et al. (2018), is an indication of how blockchain can transform the model of governance by making it more efficient and less expensive.

The current literature indicates the relevance of blockchain in the transformative potential of procurement. As an example, a model suggested by Wust and Gervais (2018) considers how blockchain can be used in the public sector, particularly in fraud prevention due to the records that can not be altered. According to Kshetri (2018), blockchain has been tested in the land registries and supply chains in the African context to fight corruption. In particular, Ojo and Adebayo (2020) discuss the topic of blockchain-based e-procurement systems and suggest that they could enhance the effectiveness and transparency of the public tenders. This corresponds to global tendencies, in which blockchain is identified as a solution to sustainable procurement, as talk about Saberi et al. (2019), who point to the possibilities this technology has to track supply chains and make sure it is sourced ethically. The earlier efforts to conceptualize blockchain

outside finance, as in Swan, (2015), and in developing economies, such as Rana et al, (2023) provide groundwork in conceptualizing blockchains as solutions to the procurement problems in Ebonyi State, including the creation of a tamper-resistant audit trail, execution of contracts through smart contracts, and the ability of the blockchain system to allow stakeholders to monitor developments in real-time. Nonetheless, potential barriers to adoption such as infrastructural constraints and lack of skills have to be addressed, as recommended in the theoretical framework such as the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). Combining background examination with problem identification and literature review, this introduction provides the groundwork to an in-depth discussion on the use of blockchain within Ebonyi State within the scope of accounting research on internal controls and forensic auditing of public finances.

Literature Review

The history of blockchain technology as a niche cryptographic instrument and the subsequent prevalence of blockchain technology in transparent governance has been already recorded in both traditional and modern literature. Blockchain was originally considered one of the financial innovations, as the concept of an electronic money system based on a peer-to-peer file chain that was maintained by a chain of blocks was first introduced by Nakamoto (2008) in his seminal article on Bitcoin. Nevertheless, its decentralization, immutability and transparency properties immediately led to investigations into non-financial uses, such as public procurement. Swan (2015) extended this further, with a breakdown of blockchain into phases: Blockchain 1.0 currency, 2.0 contracts and 3.0 decentralized applications, stating that it might democratize access to information and lessen dependency on intermediaries when it comes to government processes.

Amid transparency, previous literature audited the potential blockchain had to address information asymmetry. Indicatively, Yermack (2017) has talked about how blockchain could add to corporate governance by offering verifiable records, which can be applied to the sphere of the populace. This is discussed in Pilkington (2016), who explored the use of blockchain to build trust in distributed systems to be used in high-corruption environments. Moving towards the applications relevant to procurement, Zheng et al. (2018) have conducted the review of blockchain usage in the supply chains, highlighting the enhancement of traceability that would help avoid fraudulent activities in bid systems. Most recently, Rana et al. (2023) performed a systematic review of blockchain in sustainable supply chains with results that blockchain increases accountability through end-to-end visibility with case study reports of 15-20 percent cost savings in procurement overheads.

Targeting the area of procurement by the government, the literature includes the possibility of registering blockchain, which helps to combat corruption with smart contracts. The e-government suggested by Ølnes et al. (2017) implied the use of blockchain due to its inaccessibility to the tampering criteria of the data to the population. In the third world, Allessie et al. (2019) studied the European Union pilots, and the project formed connections with African experience where the blockchain is fighting the procurement anomalies. In the case of Nigeria, Ojo and Adebayo (2020) have worked out a blockchain-based e-procurement concept framework,

where challenges such as regulatory difficulties are mentioned yet the concept remains promising in terms of meeting the requirements of the Bureau of Public Procurement. An example study by Falwadiya and Dhingra (2023) on the factors of government adoption incorporates the Technology-Organization-Environment framework and indicates that one of the enablers is technological preparedness.

These assertions are further supported by recent research made in 2020-2024. Taking the example of Hewavitharana et al. (2024) reviewing blockchain in building services procurement, they found 38 key publications that connect the expense to efficiency profits. Likewise, Falwaziya and Dhingra (2023) have combined the literature about adoption into government organizations and suggested a conceptual framework grounded in the Unified Theory of Acceptance and Use of Technology. A systematic review by Blockchain Technology and Maritime Logistics (2024) recognizes maritime of the industry as having a procurement complexity problem being solved by blockchain to increase transparency of logistics. The literature on economics, including Blockchain Procurement and Sourcing Intelligence Report (2030) reveal the growth of markets due to transparency needs, and empirical studies on the publication of Growing Sustainable Performance through Strategic Purchasing and Blockchain Technology (2025) showed that performance in manufacturing would be improved in the same way that it has in the case of public procurement.

The theoretical foundations can be seen in old literature, such as Buterin (2014) on Ethereum introducing smart contracts that will automate compliance and minimize human interference in tenders. This is different to new studies like the one by Leveraging Blockchain Technology to Enhance Transparency and Efficiency in Public Sector Project Bidding (2025), which assesses practical applications that have led to a lower corruption risk. Blockchain can bring objectivity, which Implementation of Blockchain in Public Procurement Reduces Corruption Risk (2020) proposes, in the Ebonyi State environment, where procurement scandals are reported by the violation of laws as presented in the investigative journalism (ICIR Nigeria, 2025). Spooaning these periods, the literature continues to promote blockchain as a tool of forensic accounting, which will allow auditors to follow transactions unquestionably and be consistent with accounting concepts of verifiability and reliability.

Theoretical Framework

This paper assumes an integrated theoretical approach that involves the use of both the Transaction Cost Theory (TCT) and the Technology Acceptance Model (TAM) in the study to explain the adoption of blockchain in the Ebonyi State public procurement. TCT, as espoused by Williamson (1985) makes organizational decisions on the basis of costs which surround transactions and include search, bargain and enforcement. High transaction costs in procurement contribute to corruption due to the presence of uncertainty and opportunism which stems out of the lack of transparency. Blockchain alleviates these with lower enforcement costs due to the use of smart contracts and immutable initiatives in the current frameworks, most recently by Theoretical Framework for Blockchain Technology Adoption in Public Sector Organizations (2023), which extends TCT to value-based adoption.

As a supplement to TCT, TAM (Davis, 1989) determines user acceptance, basing on the perceptions of usefulness and ease of use. In government case, perceived usefulness encompasses improvement in transparency, whereas ease of use combats infrastructural obstacles. Venkatesh et al. (2003) integrated TAM with the rest of the models, which included social influences and facilitating conditions, which is applicable in Ebonyi because the cultural resistance can hinder the acceptability. Factors Influencing Blockchain Adoption in Government Organization (2021) proposed a framework that combines these, which says that the fact that blockchain has decentralized governance fits the need of public management as stated by Blockchain Governance in the Public Sector (2021).

This is a hybrid model, which supposes that blockchain minimizes constrained rationality and asset specificity in procurement, increasing accountability. In this research, the validity of the empirical test can be assessed using primary data that demonstrates that the theoretical constructs can be converted into practical results in a resource-constrained environment.

Methodology

The study has utilized a mixed-method study to explore the role of blockchain to ensure the improvement of openness in procurement in the Ebonyi State. This mix will be achieved by a quantitative survey that will be done to analyze the statistical data and a qualitative interview that will be conducted to investigate in details. Structured questionnaires where 250 participants were selected through stratified random sampling process were the main tool of data collection among the procurement stakeholders. The sample size was made up of government officials (40 percent), contractors (30 percent), and citizens (30 percent), all of Ebonyi 13 local government areas. Semi-structured guides were used to interview 20 key informants such as senior procurement officers and representatives of the anti-corruption agency to help understand what perceptions they have about blockchain adoption.

The study design is explanatory sequential design in which the quantitative data is followed by qualitative to offer explanations of patterns. Variables such as perceived transparency (5-point Likert scale), incidences of corruption and barriers to adoption were measured in surveys and their reliability was assessed by Cronbach alpha (0.82). The scanning of the data took place between June and September 2025 and received an ethical consent of a nearby institutional review board. The subjects gave voluntary consent and anonymity was guaranteed.

Participants demography where there is a varied sample that is representative of the population of Ebonyi. The ages were between 18-60 years old, with majority of 62 years falling in between 31-50 years of age, which is mid-career professionals who are predominant in the procurement careers. It was 55:45 male: female which was slightly biased towards males because sector standards. In terms of education, 74% were bachelor degree holders, 20 percent diploma holders and 6 percent secondary school holders, which demonstrates the importance of capacity building. Also, the 68 percent lived in urban settings such as in Abakaliki, the state capital, and 32 percent of the population were located in rural locations, which cover diversified access to infrastructural formations. Half (45) being in the public service, three out of every five (35) in the private sector

as contractors, and the rest (20) leading the community, or as NGOs brought about balance of opinion.

Descriptive statistics and regression models were applied through Sign-rank tests and SPSS to quantitatively analyze the data, whereas NVivo was used to quantitatively analyze qualitative data by thematic coding. The methodology is consistent with the traditions of accounting research, where empirical rigor in measuring internal controls is important.

Results

The study of the survey data shows a high level of support to blockchain in procurement. Secondly, regarding transparency, 78 percent of the respondents stated that blockchain would allow maintaining records that could not be altered, minimizing risk of tampering. Table 1 shows demographic analysis of responses.

Demographic Variable	Sample Size	Agree with Blockchain Transparency (%)	Perceived Savings (%)	Cost Adoption Barriers Cited (%)
Age 18-30	50	72	18	65 (Infrastructure)
Age 31-50	155	82	28	55 (Skills Gap)
Age 51+	45	70	22	70 (Regulatory)
Male	138	80	26	60
Female	112	75	24	62
Urban	170	85	30	50
Rural	80	65	15	75
Bachelor's+	185	84	29	52
Below Bachelor's	65	60	16	80

TAM was supported by regression analysis in which the perceived usefulness was significantly positively correlated with the education level ($\beta = 0.45$, $p < 0.01$). Qualitative themes presented were immutability as a deterrent of corruption and piloting projects are necessary.

Corruption incidence data, which was self-reported, had 45 percent of the respondents reporting witnessing irregularities in previous procurements, and blockchain was anticipated to cut the number of such irregularities by 30 percent depending on simulated situations. Table 2 is a comparison of pre- and post-blockchain efficiency measures.

Procurement Phase	Traditional (Days)	Time Blockchain (Days)	Estimated Time Cost (%)	Reduction
Bidding	45	15	25	
Evaluation	30	10	35	
Awarding	20	5	40	
Monitoring	Ongoing	Real-time	20	

Discussion

The results are consistent with the literature, in which the transparency characteristics of blockchain would solve the procurement issues in Ebonyi, according to Ojo and Adebayo (2020). Demographic indicators show the existence of urban and rural gaps which require the investment in infrastructure. Theoretical implications bring TCT to a higher level of quantifying cost reduction, whereas practical ones imply the incorporation of blockchain with current laws.

Conclusion and Recommendations

To summarize, blockchain provides a potential solution of transparent procurement in Ebonyi State, which will reduce corruption and promote accountability. Some recommendations involve the creation of blockchain task force, Pilot in road project and training. Long-term effects should be assessed in future.

References

- Alketbi, A., Nasir, Q., & Talib, M. A. (2018). Blockchain for government services—Use cases, security benefits and challenges. 2018 15th Learning and Technology Conference (L&T), 112-119.
- Allessie, D., Sobolewski, M., Vaccari, L., & Pignatelli, F. (2019). Blockchain for digital government. Publications Office of the European Union.
- Blockchain Procurement & Sourcing Intelligence Report. (2030). Grand View Research.
- Blockchain Technology and Maritime Logistics. (2024). Logistics, 10(1), 12.
- Buterin, V. (2014). A next-generation smart contract and decentralized application platform. White Paper.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 319-340.
- Factors Influencing Blockchain Adoption in Government Organization. (2021). IEEE Xplore.
- Falwadiya, H., & Dhingra, S. (2023). Blockchain technology adoption in government organizations: a systematic literature review. Semantic Scholar.
- Growing Sustainable Performance Through Strategic Purchasing and Blockchain Technology. (2025). Sage Journals.
- Hewavitharana, T., et al. (2024). Application of blockchain in procurement and management of building services: A critical and systematic review. Western Sydney University.
- ICIR Nigeria. (2025). How Ebonyi government violated procurement laws in multi-billion naira road contracts. ICIR Nigeria.
- Implementation of Blockchain in Public Procurement to Reduce Corruption Risk. (2020). CMS Law.
- Kshetri, N. (2018). 1 Blockchain's roles in meeting key supply chain management objectives. International Journal of Information Management, 39, 80-89.
- Leveraging Blockchain Technology to Enhance Transparency and Efficiency in Public Sector Project Bidding. (2025). NIPES Journals.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. Bitcoin.org.
- Ojo, A., & Adebayo, S. (2020). A framework for the adoption of blockchain-based e-procurement systems in the public sector: A case study of Nigeria. PubMed Central.

- Ølnes, S., Ubacht, J., & Janssen, M. (2017). Blockchain in government: Benefits and implications of distributed ledger technology for information sharing. *Government Information Quarterly*, 34(3), 355-364.
- Pilkington, M. (2016). Blockchain technology: Principles and applications. *Research Handbook on Digital Transformations*, 225-253.
- Rana, S. K., et al. (2023). Blockchain adoption in the supply chain: Enablers, barriers, and opportunities from a systematic review. *ScienceDirect*.
- Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International Journal of Production Research*, 57(7), 2117-2135.
- Swan, M. (2015). *Blockchain: Blueprint for a new economy*. O'Reilly Media, Inc.
- Theoretical Framework for Blockchain Technology Adoption in Public Sector Organizations. (2023). *ResearchGate*.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 425-478.
- Williamson, O. E. (1985). *The economic institutions of capitalism*. Simon and Schuster.
- Wüst, K., & Gervais, A. (2018). Do you need a blockchain? 2018 Crypto Valley Conference on Blockchain Technology (CVCBT), 45-54.
- Yermack, D. (2017). Corporate governance and blockchains. *Review of Finance*, 21(1), 7-31.
- Zheng, Z., Xie, S., Dai, H. N., Chen, X., & Wang, H. (2018). Blockchain challenges and opportunities: A survey. *International Journal of Web and Grid Services*, 14(4), 352-375.