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Research Article

Blockchain for Accountability: A Systematic Review of Anti-Corruption Mechanisms in Nigeria's Public Finance Management

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Abstract

Corruption within Nigeria's public finance system continues to undermine economic growth, weaken institutions, and erode public trust. Despite interventions such as the Treasury Single Account (TSA), the Economic and Financial Crimes Commission (EFCC), and the Independent Corrupt Practices Commission (ICPC), fiscal irregularities persist due to limited transparency, weak oversight, and manual record-keeping. This study investigates how blockchain technology, with its features of decentralisation, transparency, immutability, and cryptographic security, can enhance accountability in Nigeria's public financial management. Using a Systematic Literature Review (SLR) guided by the PRISMA 2020 protocol, the research synthesised 45 peer-reviewed studies published between 2012 and 2024. Data were analysed thematically using NVivo, identifying four dominant themes: transparency and traceability, automation through smart contracts, identity integrity, and tokenisation. The findings reveal that blockchain mitigates corruption by providing tamper-proof records, automating compliance, and reducing information asymmetry in fiscal transactions. However, implementation barriers such as weak regulatory frameworks, inadequate technical skills, and fragmented governance must be addressed. Drawing on Principal–Agent and Institutional Theories, the study proposes a Blockchain-for-Accountability Framework tailored to Nigeria's fiscal governance systems (TSA, GIFMIS, IPPIS). The framework demonstrates how blockchain can function as both a technological and institutional reform mechanism to promote transparency, efficiency, and trust in public finance. Policy recommendations include developing a national blockchain strategy, enacting legal frameworks for smart contracts, and strengthening institutional capacity for phased implementation.

Keywords: Systematic Review; Blockchain for Accountability; Anti-Corruption Mechanisms; Public Finance Management; Smart Contracts

Introduction

Corruption in Nigeria's public finance management remains a significant obstacle to sustainable socioeconomic development. It hampers service delivery, weakens institutional capacity, and diminishes public trust in governance structures. Despite numerous anti-corruption initiatives since the return to democratic governance in 1999, such as the Economic and Financial Crimes Commission (EFCC), Independent Corrupt Practices Commission (ICPC), and the Treasury Single Account (TSA), financial irregularities still occur across government institutions. Nigeria continues to rank poorly in international comparisons; the 2023 Transparency International Corruption Perceptions Index placed the country 145th out of 180 nations, highlighting the ongoing extent of fiscal misconduct (Oladipupo, 2024; Transparency International, 2023).

The Nigerian public finance system is characterised by limited transparency, weak accountability mechanisms, and heavy reliance on manual record-keeping, all of which create systemic vulnerabilities. These vulnerabilities appear as payroll padding through ghost workers, inflated contract costs, diversion of public funds, and opaque procurement practices. The World Bank (2022) estimates that corruption and fiscal leakages cost Nigeria billions of dollars annually, resources that could have been allocated to critical infrastructure, healthcare, education,

and poverty reduction programmes. As a result, reforming Nigeria's financial governance architecture has become a key policy priority.

In recent years, blockchain technology has emerged as a transformative innovation with strong potential to address governance and accountability challenges in public finance. Originally designed as the infrastructure for cryptocurrencies such as Bitcoin, blockchain is a decentralised, distributed digital ledger that records transactions across multiple nodes, ensuring immutability, transparency, and cryptographic security (Aarvik, 2020; Crosby et al., 2016). These inherent characteristics make blockchain particularly suitable for contexts where trust, integrity, and traceability are essential, such as public financial management.

Globally, several countries have successfully piloted blockchain-based governance solutions. Estonia and Georgia have integrated distributed ledgers into land registries and property transactions, while Brazil has implemented blockchain-enabled procurement and tax administration systems, resulting in measurable efficiency and transparency gains (Aarvik, 2020; Syed et al., 2023; Zhu & Zhou, 2021). Studies from the UK banking sector also demonstrates that the adoption of Artificial Intelligence significantly enhances efficiency, accuracy, and transparency in risk management processes, underscoring the broader relevance of digital innovations for strengthening governance and accountability in financial systems (Olatunbosun & Olatunbosun, 2025). These international experiences demonstrate blockchain's potential to produce tamper-evident audit trails and automated compliance mechanisms that minimise opportunities for corruption.

Within Nigeria, emerging scholarship has begun to explore the relevance of blockchain to anti-corruption initiatives. Oladipupo (2024) examined blockchain's application within public administration, identifying its potential to strengthen transparency, accountability, and fiscal integrity. However, most existing studies remain conceptual and lack an integrated framework suited to Nigeria's institutional and technological realities. Addressing this gap, the present study aims to develop a comprehensive blockchain-based framework tailored to Nigeria's public finance system, integrating theoretical insights with practical implementation considerations.

Research Objectives

1. To examine blockchain-based mechanisms capable of mitigating corruption in Nigeria's public finance system.
2. To identify institutional, technical, and regulatory barriers affecting blockchain adoption.
3. To propose a context-specific implementation framework that aligns blockchain architecture with Nigeria's fiscal governance requirements.

Research Questions

1. How can blockchain enhance transparency, accountability, and trust in Nigeria's public finance system?
2. What contextual challenges may hinder institutional adoption of blockchain solutions?
3. What framework best integrates technological, regulatory, and organisational dimensions for effective implementation?

Research Hypotheses

H_{01}: Permissioned ledgers and smart contracts significantly reduce discretionary manipulation in public procurement.

H_{02}: Self-sovereign digital identity systems minimise payroll and identity-related fraud.

H_{03}: Tokenisation enhances traceability and valuation of public assets, thereby improving fiscal accountability.

Significance of the Study

This research provides a policy-relevant and theoretically grounded contribution to Nigeria's anti-corruption agenda. By integrating Principal–Agent Theory and Institutional Theory, it contextualises how blockchain can serve as both a technological and institutional reform mechanism. The study's framework is designed to guide policymakers, auditors, and public administrators in leveraging blockchain technology to enhance transparency, automate compliance, and restore trust in Nigeria's financial governance.

Literature Review

Theoretical Foundations of Corruption in Public Finance

Corruption in public finance management is fundamentally rooted in information asymmetry, principal-agent problems, and the centralisation of financial control. Traditional anti-corruption approaches have primarily focused on strengthening oversight institutions, enhancing legal frameworks, and promoting ethical conduct among public officials. While these measures have achieved some success, their effectiveness has been limited by implementation challenges, institutional resistance, and the adaptability of corrupt networks (Okafor, 2025).

The principal-agent theory provides a particularly relevant lens for understanding corruption dynamics in public finance. Citizens (principals) delegate authority to public officials (agents) to manage public resources on their behalf. However, information asymmetry, in which agents have more information about their own activities than principals do, creates opportunities for corruption. Blockchain technology addresses this fundamental issue by creating transparent systems where transactions are visible to all relevant parties, thereby reducing information asymmetry (Okafor et al., 2024; Syed et al., 2023).

Blockchain Technology: Core Concepts and Features

Blockchain technology represents a paradigm shift in how information is recorded, shared, and maintained across multiple stakeholders. At its core, a blockchain is a distributed digital ledger that records transactions in a verifiable and permanent way without relying on a central authority. Several key features make blockchain particularly relevant for anti-corruption applications:

1. ***Decentralization:*** Unlike traditional centralized databases controlled by a single entity, blockchain distributes control across a network of participants, reducing single points of failure and manipulation (Aarvik, 2020).
2. ***Immutability:*** Once recorded, transactions cannot be altered or deleted, creating a permanent audit trail that deters fraudulent alterations of financial records (Oladipupo, 2024).
3. ***Transparency:*** While privacy can be maintained through cryptographic techniques, blockchain enables appropriate transparency where all authorised participants can view transaction histories (Syed et al., 2023).
4. ***Automation through Smart Contracts:*** Self-executing contracts with terms directly written into code can automate compliance with financial rules and regulations, reducing discretionary implementation (Syed et al., 2023).

Global Applications of Blockchain in Public Finance

Internationally, various governments have begun experimenting with blockchain technology to enhance transparency in public financial management. Notable implementations include:

1. ***Georgia's Land Titling System:*** The Republic of Georgia implemented a blockchain-based system for property registration in collaboration with the Bitfury Group. The system has significantly reduced fraudulent property claims and streamlined the registration process, serving as a model for how blockchain can secure public records (Aarvik, 2020).
2. ***Brazil's Public Procurement Platform:*** The state of Rio de Janeiro implemented a blockchain system for public procurement, making the bidding process more transparent and reducing opportunities for collusion and kickbacks.
3. ***Kenya's Blockchain Initiative:*** Though still in early stages, Kenya has begun exploring blockchain technology for managing public finances and reducing corruption in benefit transfers, providing a relevant African case study for Nigerian applications.

These international examples demonstrate that while blockchain technology is not a silver bullet, when appropriately implemented alongside supporting institutional reforms, it can significantly reduce opportunities for corruption in public financial management.

Blockchain Research in the Nigerian Context

Research on blockchain applications in Nigeria's public sector is still emerging but growing rapidly. Oladipupo (2024) conducted a comprehensive analysis of blockchain technology and anti-corruption measures in Nigerian public administration, highlighting the potential advantages and risks associated with employing blockchain technology to fight corruption (Oladipupo, 2024). His research identified significant challenges to adoption, including regulatory uncertainty, technical skills gaps, and infrastructure limitations.

In addition, recent empirical evidence from the UK financial sector demonstrates that advanced digital technologies such as Artificial Intelligence can strengthen fraud detection, enhance real-time monitoring, and improve decision-making transparency, underscoring the broader relevance of technology-driven governance solutions for combating financial irregularities (Olatunbosun & Olatunbosun, 2025). These insights underpin the argument that technological innovations must contextually be adapted to local institutional realities. Accordingly, the research also emphasized the importance of adapting blockchain solutions to Nigeria's specific context rather than simply transplanting models from other jurisdictions. This includes considering the country's regulatory environment, institutional capacity, digital infrastructure, and socio-political dynamics. Our study builds directly on these findings by developing a more detailed implementation framework specifically for government finance systems.

Synthesis of Prior Studies

The systematic review identified **studies** on blockchain and anti-corruption published between 2012 and 2024. A synthesis of key contributions is summarised in **Table 1** below.

Table 1: Summary of Key Empirical Studies on Blockchain and Anti-Corruption

Author(s) & Year	*Focus*	*Key Findings*	*Region*	*Quality Rating*
Aarvik (2020)	Blockchain for property registries	Immutability reduced record fraud	Georgia	High
Syed et al. (2023)	Procurement transparency	Smart contracts improved compliance	Global	High
Oladipupo (2024)	Public finance application	Identified policy and infrastructure gaps	Nigeria	Medium
Pillai & Misra (2022)	Tax administration	Improved traceability and audit efficiency	India	High
Kassem & Higson (2020)	Technology in anti-corruption	Emphasised institutional integration	UK	High
Zhu & Zhou (2021)	Financial accountability	Distributed ledger improved public reporting	China	High
Dutta & Lanvin (2023)	Blockchain trust governance	Digital trust correlates with citizen confidence	Global	High
Munyoka & Deka (2022)	African public sector	Low awareness and skills impede adoption	Africa	Medium

Gaps in Existing Research

While existing research provides valuable insights, several gaps remain. First, there is limited research specifically focused on blockchain applications for government finance systems in Nigeria. Most studies take a broader public administration perspective without delving into the specific mechanisms of financial management. Second, existing research identifies challenges but offers limited practical strategies for overcoming them in the Nigerian context. Third, there is an inadequate exploration of how blockchain systems would interact with Nigeria's existing financial management laws and regulations.

This research seeks to address these gaps by developing a comprehensive framework specifically tailored to Nigerian government finance systems, with detailed implementation strategies and regulatory recommendations.

Methodology

Research Design

This study used a Systematic Literature Review (SLR) approach following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines. The SLR was selected because it allows a rigorous, transparent, and replicable synthesis of existing empirical and theoretical evidence on blockchain applications for anti-corruption in public finance. This method was appropriate for mapping the current state of knowledge, identifying research gaps, and creating an integrative framework tailored to the Nigerian context.

Review Protocol and Search Strategy

The review protocol described the scope, databases, and keywords used to identify relevant studies. Searches were conducted across Scopus, Web of Science, ScienceDirect, Google Scholar, Emerald Insight, JSTOR, and African Journals Online, as well as government websites and reputable international organisation repositories. Search terms included combinations of "blockchain," "anti-corruption," "government finance," "public financial management," "Nigeria," "transparency," and "smart contracts." The search strings combined key terms and Boolean operators such as: (“blockchain” OR “distributed ledger”) AND (“anti-corruption” OR “transparency” OR “public finance” OR “governance”) AND (“Nigeria” OR “Africa” OR “developing countries”).

The search covered the period 2012–2024**,** corresponding with the first decade of blockchain scholarship. Only peer-reviewed journal articles, conference papers, and institutional reports in English were included. Reference lists of selected papers were also scanned for additional sources (“snowballing”).

Inclusion and Exclusion Criteria

The inclusion and exclusion parameters ensured methodological quality and conceptual relevance. The criteria are summarised in table **2** below.

Table 2. Inclusion and Exclusion Criteria

Inclusion Criteria	***Exclusion Criteria***
Peer-reviewed empirical or conceptual studies (2012–2024)	Non-peer-reviewed sources or opinion pieces
Focus on blockchain use in anti-corruption, transparency, or governance	Studies focusing solely on cryptocurrency trading
Explicit discussion of public-sector or finance-related applications	Private-sector or purely technical implementations
English-language and accessible full-text papers	Non-English or unavailable full-text papers
Clear methodological description or conceptual framework	Inadequate methodological clarity

Screening and Selection Process:

The PRISMA-compliant screening process proceeded through four stages**:** Identification, Screening, Eligibility, and Inclusion**.**

1. **Identification:** A total of 120 studies were retrieved from database searches.
2. **Screening:** After removing duplicates, 96 studies were retained for title and abstract review.
3. **Eligibility:** 62 full-text papers were examined against the inclusion criteria.
4. **Inclusion:** 45 studies met all quality and relevance requirements and were included in the final synthesis.

The process is summarised in Figure 1 below.

Figure 1. PRISMA Flow Diagram:

Identification → Screening → Eligibility → Inclusion (45 studies included from 120 records)

Data Extraction and Coding

Data from each selected study were systematically extracted into a coding matrix capturing:

1. Author(s), year, and region
2. Study objective and methodology
3. Blockchain application area (procurement, auditing, tax, payroll, etc.)
4. Key findings and anti-corruption outcomes
5. Quality rating (high, medium, low)

The qualitative data were analysed thematically using NVivo 12 Plus. Initial open coding generated 86 descriptive codes that were gradually refined into 12 axial codes and then grouped into four core themes.

i. Transparency and traceability**,**
ii. Automation through smart contracts**,**
iii. Identity integrity and access control**,** and
iv. Tokenisation and asset verification**.**

Inter-coder reliability was verified by cross-checking a 20% random sample of coded documents, yielding a **Cohen's κ = 0.82,** indicating high agreement.

Thematic Synthesis and Conceptual Framework Development

The synthesis integrated empirical evidence and theoretical constructs from Principal–Agent and Institutional Theory perspectives. The conceptual framework (see Figure 2) was developed through pattern-matching, linking blockchain functionalities to anti-corruption outcomes.

Figure 2. Conceptual Framework

Inputs: Decentralised Ledger, Smart Contracts, Self-Sovereign Identity, Tokenisation

→**Mechanisms:** Traceability, Automation, Accountability

→ **Outcomes:** Transparency, Efficiency, Reduced Corruption.

The framework illustrates how blockchain functions as both a technological and institutional mechanism to improve accountability and reduce principal–agent opportunism within public finance ecosystems.

Validity and Reliability

To ensure methodological rigour, this review applied multiple quality safeguards:

1. **Comprehensive coverage** across five major databases and grey literature scanning.
2. **Dual-reviewer screening** to minimise selection bias.
3. **Transparency of coding rules** documented in an audit trail.
4. **Triangulation** of theoretical perspectives to reinforce interpretive validity.

These procedures ensured that the synthesis was both methodically replicable and conceptually sound.

Results and Thematic Analysis

Characteristics of Selected Studies

A total of 45 peer-reviewed studies published between 2012 and 2024 were included in the synthesis. Most were empirical case studies or conceptual analyses from Africa (12), Asia (10), Europe (13), Latin America (6), and global comparative studies (4). The majority employed qualitative or mixed-method approaches and focused on public procurement, budget monitoring, or digital identity management. Therefore, table 2 summarises the key features of representative studies.

Table 2. Characteristics of Selected Studies

Author(s) & Year	*Title / Focus*	*Methodology*	*Key Findings*	*Region*	*Quality*
Aarvik (2020)	Blockchain as an anti-corruption tool	Case analysis	Demonstrated blockchain's contextual effectiveness	Georgia	High
Syed et al. (2023)	Governance models supporting transparency	SLR	Identified seven blockchain governance frameworks	Global	High
Oladipupo (2024)	Blockchain & public administration in Nigeria	Qualitative	Highlighted regulatory and infrastructural gaps	Nigeria	Medium
Zhu & Zhou (2021)	Blockchain & financial accountability	Empirical survey	Showed improved audit efficiency	China	High
Pillai & Misra (2022)	Distributed ledger & public governance	Conceptual	Mapped policy pathways for adoption	India	High
Kassem & Higson (2020)	Technology in curbing corruption	Systematic review	Stressed integration with institutional reforms	UK	High
Munyoka & Deka (2022)	Blockchain adoption in African public sectors	Case synthesis	Found skill shortages & low awareness	Africa	Medium

PRISMA Flow Description

The review process is depicted conceptually in the PRISMA framework (Figure 1) and summarised numerically below.

Table 3: PRISMA Flow Summary

Stage	*Description*	*Number of Records (n)*
Identification	Records retrieved from databases (Scopus, WoS, ScienceDirect, Google Scholar, Emerald Insight)	120
Screening	Duplicates removed; titles and abstracts reviewed	96
Eligibility	Full-text papers assessed using inclusion/exclusion criteria	62
Inclusion	Studies meeting all criteria and quality thresholds	**45**

Thematic Analysis by Research Objective

The NVivo-based coding identified four dominant themes:

1. Transparency & Traceability
2. Automation & Smart Contracts
3. Identity Integrity & Access Control
4. Tokenisation & Asset Verification

Each research objective is interpreted below through these themes.

Objective 1: ***To examine blockchain-based mechanisms capable of mitigating corruption in Nigeria's public finance system.***

Evidence from 33 studies highlights blockchain's potential to enhance transparency and traceability in government transactions. The immutability of records prevents retroactive changes, while decentralised verification supports independent auditing.

1. Syed et al. (2023) and Aarvik (2020) show that distributed ledgers enhance accountability in procurement systems.
2. Zhu & Zhou (2021) found that smart contracts reduce opportunities for discretionary manipulation by automating approval processes.
3. Nigerian-specific insights (Oladipupo, 2024) emphasised that blockchain could plug leakages within the TSA and IPPIS frameworks if institutional resistance is overcome.

Interpretation

Blockchain reduces corruption by providing tamper-proof data storage and transparent, rule-based transactions that eliminate manual interference in fiscal processes.

Objective 2: To identify institutional, technical, and regulatory barriers affecting blockchain adoption.

Thematic coding from 22 studies highlighted infrastructural deficits, regulatory ambiguity, and limited human capacity as principal constraints.

1. Munyoka & Deka (2022) reported weak digital literacy and high entry costs across African administrations.
2. Pillai & Misra (2022) stressed the need for coherent legal frameworks to validate smart-contract transactions.
3. Kassem & Higson (2020) observed that lack of inter-agency coordination impedes institutionalisation.

Interpretation

Adoption barriers are not technological alone but structural, rooted in policy fragmentation, bureaucratic inertia, and inadequate digital infrastructure.

A national blockchain strategy and multi-agency coordination mechanism are required to ensure interoperability and standardisation.

Objective 3: ***To propose a context-specific framework aligning blockchain architecture with Nigeria's fiscal governance requirements.***

Synthesis across 15 core studies informed the proposed Blockchain-for-Accountability Framework (see Figure 2).

The model integrates four components: Decentralised Ledger, Smart Contracts, Self-Sovereign Identity, and Tokenization, each mapped to mechanisms of traceability, automation, and accountability, leading to outcomes of transparency, efficiency, and reduced corruption.

1. **Decentralised Ledger:** Ensures immutable and synchronised financial records accessible to authorised agencies.
2. **Smart Contracts:** Automate approval chains and conditional fund disbursements.
3. **Self-Sovereign Identity:** Links civil-service payrolls and supplier registries to verifiable digital identities.
4. **Tokenization:** Converts public-sector assets into traceable digital units to prevent misappropriation.

Interpretation
The framework demonstrates how blockchain operates simultaneously as a technological infrastructure and institutional governance mechanism for Nigeria's anti-corruption agenda.

Cross-Objective Discussion of Themes

Theme	*Description*	*Frequency (n)*	*Representative Studies*
Transparency & Traceability	Immutable ledgers & public audit trails	28	Aarvik (2020); Syed et al. (2023)
Automation & Smart Contracts	Reduced discretionary decision-making	17	Zhu & Zhou (2021); Pillai & Misra (2022)
Identity Integrity & Access Control	Biometric & digital identity verification	12	Oladipupo (2024)
Tokenization & Asset Verification	Digital representation of state assets	9	Dutta & Lanvin (2023)

Interpretation

The frequency analysis confirms that most studies focus on transparency and traceability, with automation and digital identity emerging as complementary themes. Together, they substantiate blockchain's multi-dimensional contribution to public-sector integrity.

Summary of Findings

i. Blockchain mechanisms address corruption through transparency, automation, and decentralisation.
ii. Institutional barriers stem from governance weaknesses rather than technology limitations.
iii. A four-component implementation framework can bridge Nigeria's accountability gap when integrated into existing financial systems (TSA, IPPIS, GIFMIS).

Discussion

Comparative Interpretation (Nigeria vs. Georgia, Brazil, and Kenya)

The findings from this systematic review reaffirm blockchain's increasing importance in improving public-sector accountability worldwide, yet adoption results differ considerably across governance environments.

Georgia offers a compelling example of success in which blockchain has been fully integrated into property registration and revenue management systems. According to Aarvik (2020), Georgia's model succeeded because of a centralised policy mandate and collaboration between the government and private technology partners, which reduced bureaucratic resistance.

Brazil, by contrast, integrated blockchain into procurement and budget-monitoring frameworks, supported by legal reforms under its National Digital Government Strategy. Zhu and Zhou (2021) observed measurable gains in audit transparency and procurement efficiency, emphasising the value of institutional alignment and regulatory clarity.

In Kenya, pilot initiatives such as the *Ajira Digital Program* and blockchain-enabled land registry reforms highlight Africa's gradual but experimental adoption pathway. As Munyoka and Deka (2022) note, political will and capacity-building remain the most significant determinants of sustainability.

Nigeria's situation falls between these scenarios: it has advanced anti-corruption agencies (EFCC, ICPC) and digital finance systems (TSA, GIFMIS, IPPIS), but still lacks policy coordination, inter-agency data sharing, and a legal framework to authenticate blockchain transactions. The comparison shows that technology alone is not enough; institutional coherence and regulatory foresight are key to the success of blockchain-led reforms.

Theoretical Implications

Basing the analysis on Principal–Agent and Institutional Theories offers a strong interpretive framework.

1. **Principal–Agent Theory** (Jensen & Meckling, 1976) underscores how public officials exploit asymmetric information and weak monitoring to pursue personal gains. Blockchain reduces this asymmetry by decentralising oversight and providing immutable, transparent records accessible to multiple principals (citizens, auditors, and oversight bodies).
2. **Institutional Theory** (North, 1990) highlights that corruption persists not because of individual misconduct alone but due to entrenched informal norms and institutional inertia. By codifying transactions through smart contracts and verifiable digital identities, blockchain reconfigures institutional routines and embeds transparency into bureaucratic processes.

This dual-theoretical approach strengthens the study's contribution by demonstrating how technological design and institutional reform must co-evolve to combat corruption effectively.

Policy Implications

The proposed Blockchain-for-Accountability Framework has three major policy implications for Nigeria and similar developing economies:

1. **Regulatory and Legal Reforms:**
   Nigeria must establish a National Blockchain Governance Policy that legitimises distributed ledger data as admissible evidence in audits and courts. Lessons from Georgia and Brazil show that regulatory certainty accelerates adoption and stakeholder confidence.

2. **Institutional Capacity and Interoperability:**
   Integrating blockchain into existing platforms such as TSA, GIFMIS, and IPPIS requires technical interoperability and data standardisation. Collaborations with technology firms and multilateral organisations can develop domestic expertise and strengthen infrastructure resilience.

3. **Phased Implementation Roadmap:**
   Implementation should start with high-risk corruption nodes, including procurement, payroll, and public contracts, before extending to taxation and budgeting systems. Pilot phases can showcase value and help lessen institutional resistance.

4. **Public Engagement and Transparency:**
   Open-access dashboards connected to blockchain networks can enable civil society and journalists to oversee transactions, strengthening social accountability mechanisms.

Conclusion

This study developed a comprehensive blockchain-based framework for tackling corruption in Nigeria's public finance management, synthesising findings from 45 empirical and conceptual studies published between 2012 and 2024. Using a PRISMA-aligned systematic review, it identified blockchain's functional mechanisms, decentralisation, immutability, and transparency as key enablers of accountability and trust.

The findings confirm that, once institutionalised, blockchain technology can automate compliance, prevent data manipulation, and improve fiscal integrity. However, implementation requires more than just technological adaptation: it demands institutional reform, policy coherence, and digital capacity-building.

A comparative analysis of Georgia, Brazil, and Kenya shows that successful blockchain governance occurs when policy, technology, and institutional incentives are aligned. Nigeria's anti-corruption infrastructure provides a promising foundation, but realising blockchain's full potential will need sustained political will, legal modernisation, and a culture of transparency.

Recommendations

1. Integrate Blockchain into Core Public Finance Systems:

The Nigerian government should embed blockchain applications in high-risk financial operations such as public procurement, payroll management, and budget disbursement systems. Integrating smart contracts and distributed ledgers within existing platforms like the Treasury Single Account (TSA) and Integrated Payroll and Personnel Information System (IPPIS) can automate compliance and minimise opportunities for manual manipulation. Studies have shown that blockchain's immutability and decentralisation enhance auditability and deter fraudulent alterations in financial transactions (Aarvik, 2020; Syed et al., 2023; Zhu & Zhou, 2021). In the Nigerian context, Oladipupo (2024) underscores that blockchain can reinforce transparency in procurement and payroll systems if implemented alongside digital governance reforms.

2. Develop a comprehensive National Blockchain Policy and Legal Framework

To address institutional and regulatory gaps, Nigeria should develop a comprehensive national blockchain policy establishing governance principles, interoperability standards, and accountability mechanisms. Legal recognition of smart contracts and distributed ledger data is essential to building institutional trust and supporting enforcement.

Comparative evidence from Brazil and Georgia shows that clear legal frameworks accelerate blockchain adoption and ensure data integrity in public registries and procurement systems (Aarvik, 2020; Pillai & Misra, 2022). Furthermore, scholars stress that without coherent regulation, blockchain's benefits mainly remain theoretical (Kassem & Higson, 2020; Munyoka & Deka, 2022). Aligning Nigeria's policy framework with these international best practices would help institutionalise blockchain governance and lessen regulatory uncertainty.

3. Adopt a Phased Implementation Framework with Capacity Building

Blockchain adoption should follow a phased rollout strategy, starting with pilot projects in selected ministries and gradually expanding to a national level. Implementation should be complemented by capacity-building initiatives to train public officials, ICT specialists, and auditors in distributed ledger technology.

Capacity development has been recognised as a key factor in sustainable blockchain deployment, especially in low- and middle-income countries (Munyoka & Deka, 2022; Casino et al., 2019). Moreover, international evidence indicates that successful blockchain governance depends on continuous knowledge transfer between government, academia, and private-sector innovators (Syed et al., 2023; Dutta & Lanvin, 2023). Building institutional expertise and technical skills will therefore be vital to operationalising the proposed Blockchain-for-Accountability Framework.

Contributions to Knowledge

This study advances knowledge on blockchain technology and anti-corruption in public finance, particularly within developing economies. It extends Principal–Agent and Institutional Theories by demonstrating how blockchain's decentralisation, transparency, and immutability can reduce agency problems, strengthen accountability, and embed trust in fiscal systems. Conceptually, it redefines blockchain as a governance mechanism, not merely a technological innovation, capable of institutionalising transparency through rule-based automation.

Methodologically, the study contributes by employing a Systematic Literature Review (SLR) guided by the PRISMA 2020 standards, an approach rarely used in blockchain governance research. Thematic synthesis of 45 peer-reviewed studies using NVivo coding produced four core themes: transparency and traceability, smart-contract automation, identity integrity, and tokenisation. This methodological rigour ensures replicability and empirical depth.

Practically, the proposed Blockchain-for-Accountability Framework links these technological components to outcomes such as transparency, efficiency, and reduced corruption. It provides a policy blueprint for integrating blockchain into Nigeria's fiscal systems, including TSA, GIFMIS, and IPPIS. Overall, the study contributes theoretically, methodologically, and practically by establishing blockchain as both a technological enabler and an institutional reform tool for promoting transparency and combating corruption in public finance.

References

Aarvik, P. (2020). *Blockchain as an anti-corruption tool: Case examples and introduction to the technology.* Chr. Michelsen Institute.

Casino, F., Dasaklis, T. K., & Patsakis, C. (2019). A systematic literature review of blockchain-based applications: Current status and future research directions. *Telematics and Informatics, 36*, 55–81. https://doi.org/10.1016/j.tele.2018.11.006

Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. *Applied Innovation Review, 2*(6), 71–76.

Dutta, S., & Lanvin, B. (2023). *Digital transformation and governance trust.* World Economic Forum Report.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kassem, R., & Higson, A. (2020). The role of technology in curbing corruption: A systematic review. *Public Money & Management, 40*(7), 480–489. https://doi.org/10.1080/09540962.2020.1714302

Munyoka, W., & Deka, G. (2022). Blockchain adoption in African public sectors: A review. *African Journal of Information Systems, 14*(3), 159–182.

North, D. C. (1990). *Institutions, institutional change, and economic performance.* Cambridge University Press.

Oladipupo, A. O. (2024). Blockchain technology and anti-corruption measures in Nigerian public administration. *African Journal of Law, Political Research and Administration, 7*(3), 69–79.

Pillai, V., & Misra, A. (2022). Distributed ledger technologies and public governance. *Government Information Quarterly, 39*(3), 101674. https://doi.org/10.1016/j.giq.2022.101674

Syed, M. H., Khan, S., & Rabelo, L. (2023). Blockchain-based governance models supporting transparency and anti-corruption. *Journal of Governance and Integrity, 5*(2), 112–125.

Okafor, S. O., Olalude, O. V. and Angelonu (Ejelonu), H. O. (2025). Impact of Big Data on Accounting Practices: Empirical Evidence from Nigeria. *International Journal of Data Science and Big Data Analytics*, 5(1), 1-20. doi: 10.51483/IJDSBDA.5.1.2025.1-20.

Okafor, S. (2025). Using Predictive Analytics for Credit Risk Evaluation in Nigerian Microfinance Organizations. *Global Journal of Applied, Management and Social Sciences (GOJAMSS)*; Vol.33, Sept 2025; P.21 – 32 (ISSN: 2276 –9013), Available at SSRN: https://ssrn.com/abstract=5449876 or http://dx.doi.org/10.2139/ssrn.5449876

Olatunbosun, I. E., & Olatunbosun, A. R. (2025). Artificial Intelligence and Risk Management in Financial Institutions: Evidence from the UK Banking Sector. *EthAIca*, *4*, 436. https://doi.org/10.56294/ai2025436

Olatunbosun, I. E., & Olatunbosun, A. R. (2025). Artificial Intelligence for Fraud Detection and Portfolio Optimization: Insights from UK Financial Institutions. EthAIca, 4, 437. https://doi.org/10.56294/ai2025437

Transparency International. (2023). *Corruption Perceptions Index 2023.* Transparency International Secretariat. https://www.transparency.org/en/cpi

World Bank. (2022). *World development indicators: Governance and corruption costs.* Washington, DC: World Bank. https://data.worldbank.org

Zhu, J., & Zhou, X. (2021). Blockchain and financial accountability in developing countries. *International Journal of Public Administration, 44*(12), 1068–1082. https://doi.org/10.1080/01900692.2020.1765796