

Integrating Internet of Things and Blockchain Technology in Accounting Information Systems: Opportunities, Challenges, and Implications for Accounting Information Quality

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Publication Date: 2026/10/26

Abstract: The swift advancement of digital technology has generated novel prospects for enhancing the efficiency of Accounting Information Systems (AIS). Among these innovations, the Internet of Things (IoT) and blockchain has significant capacity to revolutionize the gathering, processing, validation, and dissemination of accounting data. The Internet of Things facilitates the automatic and real-time collection of operational data through interconnected devices and sensors, whereas blockchain offers a communal, immutable ledger of transactions that enhances traceability and accountability. Incorporating these technologies could enhance the promptness, dependability, clarity, and verifiability of financial data. This study explores the prospective amalgamation of IoT and blockchain in Accounting Information Systems, concentrating on inventory accounting, fixed-asset oversight, transaction validation, financial reporting, and ongoing auditing. It employs a theoretical research methodology grounded in an examination of pertinent scholarly literature. The document also highlights significant obstacles to adoption, including as cybersecurity threats, data privacy issues, costs of implementation, interoperability, regulatory obligations, and the dependability of information gathered from physical devices. The article suggests a cohesive structure where IoT devices document operational occurrences, blockchain maintains authenticated transaction records, and the AIS compiles accounting entries and produces financial statements. The research determines that the integration of IoT and blockchain could enhance the quality of accounting information, contingent upon the implementation of suitable internal controls, governance structures, and expert supervision.

Keywords: *Internet of Things; Blockchain; Accounting Information Systems; Accounting Information Quality; Continuous Auditing; Digital Transformation.*

How to Cite: Dr. Romany Zareef Shafik; Dr. Angie Waddah Hassan; Dr. Amr Sami Jadallah (2026) Integrating Internet of Things and Blockchain Technology in Accounting Information Systems: Opportunities, Challenges, and Implications for Accounting Information Quality. *International Journal of Innovative Science and Research Technology*, 11(10), 1692-1695. <https://doi.org/10.38124/ijisrt/26oct990>

I. INTRODUCTION

Digital transformation is altering the methods by which firms gather, manage, retain, and convey financial data. Conventional accounting frameworks frequently rely on manually inputted information, regular reconciliations, and documentation gathered post-transaction. While these processes are still crucial, they can lead to delays, inconsistencies, and potential human errors.

The Internet of Things (IoT) provides a method for the automatic collection of operational data via interconnected sensors, intelligent devices, radio-frequency identification

technologies, and surveillance systems. In accounting, these technologies can facilitate the monitoring of inventory transitions, oversight of fixed assets, validation of deliveries, and documentation of operational occurrences with financial implications.

Blockchain technology offers an additional enhancement by sustaining a decentralized ledger where transactions are documented and authenticated in accordance with established network protocols. Its attributes facilitate transaction traceability, validation, and the safeguarding of historical documentation. Nonetheless, blockchain does not

autonomously ensure the veracity of the initial data input into the system.

Incorporating IoT and blockchain into an Accounting Information System could link tangible business operations with electronic accounting documentation. For instance, upon the arrival of a shipment at a warehouse, an IoT-integrated system can document the delivery occurrence, whilst a blockchain framework can safeguard pertinent data and facilitate the validation of the corresponding transaction. The accounting system can thereafter utilize the validated information to commence or facilitate the relevant accounting entry, contingent upon predetermined authorization and acknowledgment protocols.

Contemporary studies have started to investigate the integrated application of IoT, blockchain, and digital reporting technologies within accounting information systems. Nofel et al. (2024) examine the prospective amalgamation of IoT, blockchain, and XBRL to enhance digital financial reporting. Nonetheless, effective execution necessitates meticulous attention to technological, organizational, financial, and regulatory elements.

This study examines the interplay between IoT and blockchain inside accounting systems and assesses their potential impact on the quality of accounting information and auditing methodologies.

➤ *Research Problem*

Notwithstanding the growing integration of digital technologies, numerous firms nonetheless encounter challenges in guaranteeing that accounting records faithfully represent operational activities. Hindrances in transaction documentation, manual data input, discrepancies between tangible and financial records, and constraints in audit-trail validation may diminish the efficacy of accounting information.

The Internet of Things can facilitate automated data gathering; nevertheless, the data produced by interconnected devices may be erroneous, insufficient, altered, or transmitted without proper consent. Blockchain can enhance the traceability of documented data; nevertheless, it cannot inherently verify that a physical event transpired as indicated by a sensor.

The study issue thus pertains to the design of IoT and blockchain integration aimed at enhancing the quality and auditability of accounting data while managing the related technological and organizational risks.

➤ *Research Objectives*

The primary aim is to provide a conceptual model for the incorporation of IoT and blockchain within Accounting Information Systems.

The particular aims are to:

- Analyze the roles of IoT and blockchain inside accounting information systems.

- Identify accounting procedures that could gain from their amalgamation.
- Examine the anticipated impacts on the precision, promptness, clarity, and dependability of financial data.
- Examine the ramifications for internal governance, transaction validation, and auditing processes.
- Ascertain the technological, organizational, and regulatory obstacles linked to execution.
- Propose a theoretical framework and avenues for forthcoming empirical investigation

➤ *Research Questions*

The research examines the subsequent inquiries:

- RQ1: In what ways may IoT technology enhance data acquisition and transaction management inside Accounting Information Systems?
- RQ2: In what ways may blockchain enhance the integrity, traceability, and validation of financial records?
- RQ3: In what ways could the amalgamation of IoT and blockchain influence the caliber of accounting information?
- RQ4: What obstacles might hinder the successful implementation of these technologies?
- RQ5: What internal governance mechanisms and control measures are essential for guaranteeing dependable execution?

II. LITERATURE REVIEW

➤ *Accounting Information Systems*

An Accounting Information System gathers, processes, retains, and disseminates information pertinent to an organization's financial operations. Its aim is to furnish pertinent information for financial reporting, managerial decision-making, internal oversight, and regulatory compliance.

The efficacy of an AIS is contingent upon the caliber of its foundational data, the dependability of its processing methodologies, the robustness of access controls, and the capacity to provide prompt and pertinent reports. Digital technologies have the potential to enhance these functions; however, their advantages are contingent upon suitable system architecture and oversight.

➤ *Internet of Things in Accounting*

The Internet of Things (IoT) pertains to a network of interconnected tangible devices that gather and transmit data over communication networks. In accounting settings, these instruments can furnish proof of operational occurrences that influence financial documentation.

Possible utilizations encompass:

- Stock oversight: Tracking inventory levels, placement, transit, and environmental conditions.
- Asset accounting: Monitoring the whereabouts, usage, and condition of machinery.

- Acquiring and accepting: Documenting delivery occurrences and contrasting them with procurement orders.
- Manufacturing accounting: Documenting machinery operations and production metrics pertinent to expense distribution.
- Transportation: Documenting shipping stages that could facilitate revenue acknowledgment or inventory alignment.

Automated data acquisition could diminish manual processing and enhance the promptness of financial records. Nevertheless, sensors necessitate calibration, upkeep, verification, and suitable access restrictions. Moreover, a documented operational occurrence does not inherently dictate the accounting approach; relevant accounting regulations and contractual stipulations must still be taken into account.

➤ *Blockchain in Accounting Information Systems*

Blockchain is a decentralized ledger system that facilitates the recording and verification of transactions within a network based on established protocols. Depending on the architecture, it may offer a communal transaction ledger, cryptographic authentication, and immunity to illicit modifications of earlier documented entries.

In the realm of accounting, blockchain could facilitate:

- Monitoring and aligning transaction records.
- Maintenance of corroborative transaction documentation.
- Exchanged documentation among permitted commercial associates.
- Automated implementation of established protocols via smart contracts.
- Enhanced audit methodologies and validation of transaction records.

➤ *Integrating IoT and Blockchain*

The Internet of Things and blockchain fulfill distinct yet synergistic needs. The Internet of Things offers insights into tangible and operational occurrences, while blockchain maintains a verified record of sanctioned digital transactions and their corresponding evidence.

Their incorporation may be organized in the following manner:

- An IoT apparatus records an operational occurrence, such as a warehouse receipt.
- The system verifies the device and assesses the integrity and validity of the data.
- Pertinent evidence is conveyed securely to an integration platform.
- A blockchain transaction documents a validation outcome, a timestamp, or a cryptographic link to the corroborating evidence.
- The AIS assesses the occurrence in accordance with relevant accounting standards and approval protocols.

- An accounting entry is created or suggested for endorsement.
- Financial statements and audit documentation are revised, accompanied by suitable reconciliation and assessment.

➤ *Proposed Conceptual Framework*

The suggested framework links five elements:

- Element 1: Gathering operational data. IoT devices collect data regarding inventory, assets, shipments, and manufacturing processes.
- Element 2: Verification of data integrity and protection. Authentication, data quality assessments, access restrictions, and exception management mitigate the likelihood of erroneous or illegal entries.
- Element 3: Evidence management utilizing blockchain technology. Authorized transactions, timestamps, approvals, and cryptographic references are documented on a permissioned blockchain as necessary.
- Element 4: Processing of accounting information. The AIS employs accounting policies, authorization protocols, categorization methodologies, and reconciliation measures to ascertain the suitable accounting treatment.
- Element 5: Documentation and verification. Financial statements, managerial reports, and audit logs are generated from accounting documentation substantiated by verifiable proof.

The suggested architecture indicates that optimal advantages may emerge when automated data gathering is integrated with independent verification and recognized accounting rules. Blockchain offers a ledger of what the system has acknowledged and documented; it does not autonomously verify the veracity of the initial physical occurrence.

III. RESEARCH METHODOLOGY

This study employs a theoretical, literature-driven research framework. It utilizes scholarly research related to blockchain in accounting, IoT-driven accounting methodologies, digital financial disclosures, and technological assimilation.

The evaluation is structured around five key themes: the quality of accounting information, automation of operations, traceability of transactions, auditing and internal controls, and problems in implementation.

Pertinent research is analyzed to discern shared conclusions, variations in focus, and domains necessitating additional inquiry. The literature is subsequently employed to construct a conceptual framework and research hypotheses.

The current research neither gathers primary survey data nor does experiments, so it does not assert the establishment of statistically meaningful causal links. Subsequent investigations might evaluate the suggested correlations by surveys distributed to accountants and auditors, case analyzes of entities adopting these

technologies, or assessments of accounting-process efficacy pre- and post-implementation.

IV. CONCLUSION

The amalgamation of the Internet of Things and blockchain technology signifies a prospective advancement in Accounting Information Systems. The Internet of Things can facilitate the automation of operational data gathering, whereas blockchain technology can enhance transaction traceability and safeguard digital evidence. When combined with conventional accounting practices, these technologies could enhance the promptness, clarity, and reliability of accounting data.

Nonetheless, their efficacy relies on factors outside the technologies alone. Dependable execution necessitates precise source information, secure apparatus, robust system design, suitable accounting practices, efficient corporate governance, and expert supervision. Blockchain is unable to autonomously verify the veracity of data provided by IoT devices, and automated transaction processing cannot substitute for accounting discernment.

Future empirical studies ought to examine if combined IoT-blockchain systems yield quantifiable enhancements in the quality of accounting information, audit efficacy, error identification, and organizational performance. Such investigations would aid in differentiating the prospective advantages of the technologies from the results that are genuinely realized in practice.

REFERENCES

- [1]. Dai, J., & Vasarhelyi, M. A. (2017). Toward blockchain-based accounting and assurance. *Journal of Information Systems*, 31(3), 5–21. <https://doi.org/10.2308/isisys-51804>
- [2]. Garanina, T., Ranta, M., & Dumay, J. (2021). Blockchain in accounting research: Current trends and emerging topics. *Accounting, Auditing & Accountability Journal*, 35(7), 1507–1533. <https://doi.org/10.1108/AAAJ-10-2020-4991>
- [3]. Han, H., Shiwakoti, R. K., Jarvis, R., Mordi, C., & Botchie, D. (2023). Accounting and auditing with blockchain technology and artificial intelligence: A literature review. *International Journal of Accounting Information Systems*, 48, Article 100598. <https://doi.org/10.1016/j.accinf.2022.100598>
- [4]. Nofel, M., Marzouk, M., Elbardan, H., Saleh, R., & Mogahed, A. (2024). Integrating blockchain, IoT, and XBRL in accounting information systems: A systematic literature review. *Journal of Risk and Financial Management*, 17(8), Article 372. <https://doi.org/10.3390/jrfm17080372>
- [5]. Wang, Y., & Kogan, A. (2018). Designing confidentiality-preserving blockchain-based transaction processing systems. *International Journal of Accounting Information Systems*, 30, 1–18. <https://doi.org/10.1016/j.accinf.2018.06.001>