
Challenges and Prevention Strategies for Internal Audits in AI and Blockchain-Based Accounting Information Systems

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Abstract:

This study aims to identify the main challenges and prevention strategies in the implementation of Artificial Intelligence (AI) and blockchain-based internal audits. The study used the Systematic Literature Review (SLR) method on 23 Scopus-indexed international articles published between 2015 and 2025. The analysis process was carried out through the stages of identification, selection, and synthesis of literature to obtain thematic patterns related to the challenges and strategies of implementing AI and blockchain-based internal audits. The results of the study indicate that the main challenges faced in the implementation of digital audits include data security and privacy risks, limitations in auditor competence regarding new technologies, regulatory and ethical gaps, and organisational resistance to change. The recommended strategies include improving the digital competence of auditors through continuous training, developing AI-based audit regulations and standards, implementing multi-layered security systems, and gradually integrating technology. This research provides new insights into mapping the relationship between human resource readiness, digital infrastructure, and organisational governance on the successful implementation of AI and blockchain in internal auditing. These findings confirm that the success of digital audit transformation depends not only on technological sophistication but also on organisational adaptation and the systematic development of auditor capacity.

Keywords: Artificial Intelligence, blockchain, internal audit, accounting information systems, data security, digital regulation.

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1. Introduction

The development of digital technology in the last decade has changed the paradigm of accounting and auditing practices in various sectors. This transformation is marked by the emergence of *Artificial Intelligence (AI)* and *blockchain*, which are gradually being integrated into internal audit systems to improve the effectiveness and efficiency of financial supervision (Han et al., 2023) . AI enables the audit process to run automatically through big data analysis, anomaly pattern detection, and increased

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accuracy in decision-making (Kokina et al., 2025) . On the other hand, blockchain technology provides data transparency and security through an immutable distributed ledger system (Y . The synergy between AI and blockchain promises a new audit model that is faster, more efficient, and more accountable in supporting organisational governance.

Despite its great potential, the application of these two technologies is not without challenges. Previous studies have shown that the main issues faced are data security and privacy, especially in the context of digital auditing involving the storage and transmission of sensitive information (Sheela et al., 2023) . Furthermore, the ability of human resources, particularly auditors, to understand and operate AI- and blockchain-based technologies is still limited (Tušek et al., 2021) . This situation creates a competency gap between the traditional skills of auditors and the increasingly complex requirements of modern technology. On the other hand, limitations in digital infrastructure and organisational unpreparedness for cloud-based systems and big data also slow down implementation (Akter et al., 2024) .

In addition to technical obstacles, there are also challenges in terms of governance and regulation. To date, there are no audit guidelines that explicitly regulate the use of AI and blockchain in financial auditing processes (Secinaro et al., 2022) . This creates legal uncertainty regarding the auditor's responsibility in the event of algorithmic errors or data bias in automated systems. From an ethical perspective, the use of AI in auditing also raises dilemmas between efficiency and professional independence (Della Valle et al., 2025) . This challenge is exacerbated by organisational resistance to change, with some auditors remaining sceptical about the reliability of technology-based systems and tending to stick to conventional auditing methods (Zobi et al., 2023) .

Several previous studies have highlighted the opportunities for applying AI and blockchain in internal auditing. Zhang et al., (2025) emphasise that blockchain has the potential to strengthen the reliability of financial reports through an automated verification system that cannot be manipulated. Meanwhile, Li & Goel, (2025) emphasise the importance of strengthening collaboration between auditors and IT experts to create effective AI-based auditing. However, most research is still descriptive and focused on the advantages of technology, with few studies systematically mapping the challenges (RQ1) and solution strategies (RQ2) from an internal audit perspective. In other words, literature reviews that integrate technical, human, and governance aspects in the context of digital auditing are still rare.

Therefore, there is a research gap in the form of a lack of systematic synthesis that identifies key issues and mitigation strategies in the application of AI and blockchain in internal auditing. Previous studies have discussed the efficiency or potential of technology, but have not elaborated on how organisational factors, auditor competencies, and regulatory frameworks affect the level of adoption success (Leocádio et al., 2024). This gap needs to be bridged so that the direction of digital audit development does not only focus on innovation, but also considers the readiness of resources and governance that support the sustainability of technology implementation.

Based on this description, this study aims to: (1) identify the main challenges faced in the implementation of *Artificial Intelligence* and *blockchain* in internal auditing, and (2) formulate strategies and solutions that have been offered in international literature to overcome these challenges. Using a *Systematic Literature Review (SLR)* approach to 23 Scopus Q1–Q2 indexed international articles, this study is expected to contribute academically by systematically mapping the relationship between challenges and strategies for implementing digital auditing. In addition, the results of this study are also expected to provide practical contributions to auditors, management, and regulators in building a more adaptive, transparent, and sustainable auditing system in the era of digital transformation.

2. Methodology

This study uses the Systematic Literature Review (SLR) method, which aims to compile literature in a structured manner to identify challenges and strategies for Internal Audit Prevention in AI and Blockchain-Based Accounting Information Systems. The SLR method in this study utilised Watase Uake to automatically map the results of article searches, as shown in the PRISMA diagram illustrating the stages of identification, screening, and selection of articles.

This study limited its literature sources to reputable scientific journals published in English during the period 2015–2025 to ensure that the research findings reflect the latest developments in data security and the digitisation of accounting systems. From the initial search results using Watase Uake, 12 articles relevant to the research topic were obtained. In addition, to enrich the review results and ensure the completeness of the literature, an additional search was conducted through several international academic databases, namely Scopus, ScienceDirect, IEEE Xplore, Taylor & Francis, and Google Scholar, which yielded 11 additional articles. Thus, a total of 23 articles were used in the study as research objects.

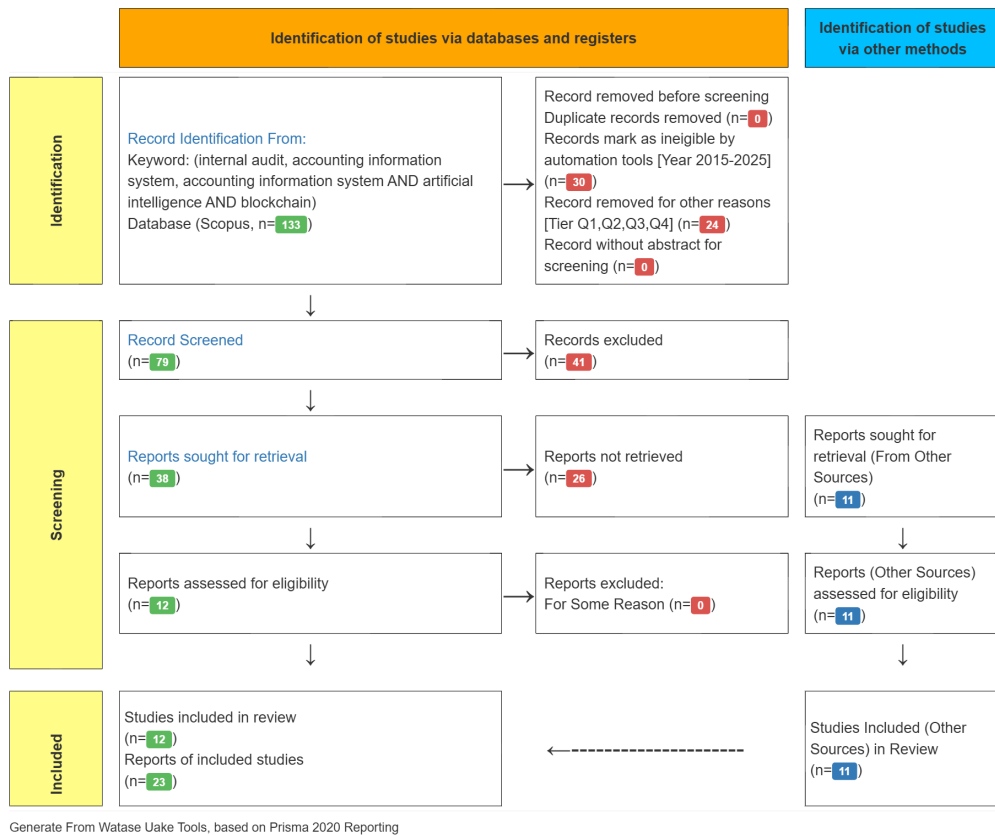


Figure 1. PRISMA Flow Diagram

3. Empirical Findings/Results and Discussion

Table 1. Discussion of Research Question (RQ1) – Challenges of AI & Blockchain Internal Auditing

Factors (Specific Issues)	Sub-Factors
Data Security and Privacy	Data leakage risks, cyber vulnerabilities, and blockchain network reliability in audit systems are major challenges. Several studies highlight the need for strong encryption and access control mechanisms ; Han et al., 2023 ; Qader & Cek, 2024 ; Sheela et al., 2023) .
Lack of Auditor Competence in New Technologies	The lack of auditors' ability to understand AI, blockchain, and data analytics hinders the effectiveness of internal audits. Limited technical competencies slow down the adoption of ; Kokina et al., 2025 ; Li & Goel, 2025 ; Leocádio et al., 2024) .
Limitations of Digital Infrastructure	Technological barriers such as legacy system integration, connectivity limitations, and lack of IT support pose challenges in implementing AI and blockchain-based audits 2021 ; Goncalves & Imoniana, 2022 ; Akter et al., 2024) .

Factors Issues)	(Specific	Sub-Factors
Regulatory Ethical Gaps	and	The absence of clear accounting guidelines and standards for the use of AI and blockchain in auditing leads to legal uncertainty and ethical risks (Secinaro et al., 2022 ; Y. Zhang et al., 2025 ; Della Valle et al., 2025) .
Resistance Organisational Change	to	Organisational unpreparedness in facing digital transformation leads to resistance from auditors and management 2023 ; Lois et al., 2020 ; Stefaniak, 2016) .
Data Quality System Transparency	and	The quality of input data and the inability of AI systems to interpret the context of audits are crucial issues that can reduce the reliability of audit results 2023 ; Abu Huson et al., 2024 ; Gad, 2020) .
The Complexity of Blockchain and AI Implementation	of	Integrating blockchain, IoT, and AI into audit systems requires high costs and significant technical complexity (Nofel et al., 2024 ; W. Zhang & Zhu, 2022 ; Akter et al., 2024) .

AI and blockchain-based internal audits face significant challenges related to data security and privacy. The risk of leaks and cyber attacks remains a major concern as digital audit systems rely on complex networks (W. Zhang & Zhu, 2022) . Encryption mechanisms and access controls are not yet fully capable of guaranteeing data integrity (Han et al., 2023) . Qader & Cek, (2024) emphasise that automatic audit trails need to be implemented to maintain transparency, while Sheela et al., (2023) highlight the importance of adaptive privacy policies for smart technologies. On the other hand, auditors' limited competence in AI and blockchain also hinders the effectiveness of audits. Auditors who do not understand analytical technology face difficulties in assessing digital audit evidence (Tušek et al., 2021) . Lack of technological literacy slows down the adoption of modern audit systems (Kokina et al., 2025 ; Li & Goel, 2025) .

In addition, limitations in digital infrastructure are a significant obstacle to the implementation of technology-based audit systems. Integration barriers between old and new systems reduce audit efficiency (Ionescu & Andronie, 2021) . Limitations in connectivity and IT support also slow down the implementation process (Goncalves & Imoniana, 2022 ; Akter et al., 2024) . Meanwhile, regulatory and ethical aspects are still not in line with technological developments. The absence of clear guidelines causes legal uncertainty and moral risks in the use of AI (Secinaro et al., 2022) . The lack of transparency in algorithms poses new ethical challenges in auditing practices (Y ; Della Valle et al., 2025).

Other challenges arise from organisational resistance and data quality. Some auditors and management resist change due to concerns about the role of technology and the loss of professional autonomy (Zobi et al., 2023 ; Lois et al., 2020 ; Stefaniak, 2016) . Poor data quality and input errors also impact audit accuracy (Han et al., 2023 ; Abu Huson et al., 2024) . Furthermore, the complexity of integrating AI and blockchain incurs high costs and risks of implementation failure if not properly planned (Nofel et al., 2024 ; W. Zhang

& Zhu, 2022 ; Akter et al., 2024) . This indicates that technical readiness, human resources, and policies need to be balanced to ensure the success of digital internal audits.

Table 2. Discussion of Research Question (RQ2) – Solutions & Strategies for AI & Blockchain Internal Audits

Specific Strategies/Efforts	Sub-Factors
Strengthening Digital Auditor Competencies	Continuous training and collaboration between auditors and IT experts are necessary to improve understanding of AI algorithms and blockchain structures ; Tušek et al., 2021 ; Kokina et al., 2025 ; Della Valle et al., 2025) .
Improving Governance and Regulation of Audit Technology	The development of ethical policies, AI audit standards, and blockchain regulations can strengthen accountability and public trust (Secinaro et al., 2022 ; Y. Zhang et al., 2025 ; Sheela et al., 2023 ; Ghasemi et al., 2022) .
Gradual Integration of AI and Blockchain Technology	A gradual approach through a hybrid system (AI + conventional audit) enhances effectiveness and reduces the risk of implementation failure (Leocádio et al., 2024 ; Akter et al., 2024 ; Nofel et al., 2024) .
Strengthening Data Security and Privacy Systems	The implementation of smart contracts, multi-layered authentication, and automatic audit trails strengthens data integrity and prevents manipulation of reports (Han et al., 2023 ; Qader & Cek, 2024 ; W. Zhang & Zhu, 2022) .
Infrastructure and Cloud Computing Optimisation	The use of AI-based cloud computing enables storage efficiency, scalability, and cross-entity collaboration in auditing (Ionescu & Andronie, 2021 ; Goncalves & Imoniana, 2022) .
Multidisciplinary Collaboration and Knowledge Sharing in	Synergy between accounting professionals, IT experts, regulators, and academics is key to strengthening the adaptation of digital auditing (Kokina et al., 2025 ; Han et al., 2023 ; Abu Huson et al., 2024) .
The Use of AI for Audit Anomaly Detection and Prediction	The use of machine learning and neural networks to analyse fraud patterns, improve audit quality, and accelerate decision-making (Bahrami et al., 2020 ; Kim, 2021 ; Della Valle et al., 2025) .

To address these challenges, the main strategy focuses on strengthening the competencies of digital auditors. Auditors need to receive ongoing training in understanding AI algorithms and blockchain mechanisms (Li & Goel, 2025) . Collaboration between auditors and IT experts is necessary to strengthen analytical capabilities (Tušek et al., 2021) . According to Kokina et al., (2025) , simulation-based training can improve auditors' practical understanding of digital auditing. Della Valle et al., (2025) add that cross-disciplinary learning helps auditors adapt to intelligent systems. On the other hand, improvements in audit technology governance and regulation need to be made through the establishment of ethical policies and specific standards for AI-based systems (Secinaro et al., 2022 ; Y. Zhang et al., 2025 ; Sheela et al., 2023) . Strong regulations are believed to increase public trust in digital audit results (Ghasemi et al., 2022) .

In addition to human resources aspects, technical strategies include gradual technology integration and data security reinforcement. A hybrid approach combining AI with conventional audit systems can reduce implementation risks (Leocádio et al., 2024) . A gradual transition also helps organisations adapt their infrastructure and work culture (Akter et al., 2024 ; Nofel et al., 2024) . Han et al., (2023) recommend the use of *smart contracts* to prevent data manipulation, while Qader & Cek, (2024) suggest implementing multi-layered authentication in audit systems. Automatic audit trails are also necessary to strengthen data integrity and increase auditor confidence in AI results (W . Cloud computing optimisation is an important solution for storage efficiency and cross-entity audit collaboration (Ionescu & Andronie, 2021 ; Goncalves & Imoniana, 2022) .

Additionally, multidisciplinary collaboration and the use of AI for audit anomaly detection are crucial pillars in strengthening the effectiveness of digital audits. Kokina et al., (2025) emphasise the importance of synergy between auditors, regulators, and IT experts to accelerate system adaptation. Han et al., (2023) show that collaboration with academics and policymakers can enhance the legitimacy of technology-based audits. Abu Huson et al., (2024) add that cross-disciplinary knowledge sharing accelerates the transfer of digital expertise. From a technical perspective, *machine learning* algorithms have proven effective in detecting fraud patterns and improving audit efficiency (Bahrami et al., 2020 ; Kim,2021) . Della Valle et al., (2025) emphasise that the use of AI not only speeds up analysis but also improves the quality of decision-making in modern internal audits.

4. Conclusions

The application of Artificial Intelligence (AI) and blockchain in internal auditing holds great potential for improving the efficiency, transparency, and reliability of the audit process. However, the adoption of this technology still faces various challenges, ranging from data security risks, limitations in auditor competence, regulatory gaps, to organisational resistance to change. The complexity of technology integration and suboptimal data quality also pose major obstacles to achieving effective and reliable digital auditing.

In response to these challenges, a comprehensive and sustainable strategy is required. Strengthening the digital competence of auditors, developing adaptive regulations and ethical standards, and gradually integrating technology are key steps in ensuring the success of audit transformation. In addition, strengthening cybersecurity, optimising cloud-based infrastructure, and multidisciplinary collaboration between auditors, regulators, and technology experts will strengthen an accountable digital audit ecosystem.

Thus, the successful implementation of AI and blockchain in internal auditing depends not only on technological aspects, but also on the readiness of human resources, governance, and mutually supportive regulations. The synergy between digital innovation and professional auditing values is the main foundation for more

adaptive, transparent, and competitive auditing practices in the era of digital transformation.

The theoretical implications of this research lie in mapping the relationship between technical aspects, human resource readiness, digital infrastructure, and organisational governance, which simultaneously influence the effectiveness of implementing Artificial Intelligence (AI) and blockchain-based internal audits. This research expands on previous literature, which tended to focus on technological superiority, by presenting a systematic synthesis that highlights organisational readiness, auditor competence, and digital infrastructure support as determinants of successful digital audit transformation. In practical terms, the findings of this study provide strategic guidance for auditors, management, and regulators in implementing adaptive, transparent, and sustainable digital audits. Strengthening the digital capacity of auditors, developing AI-based audit regulations and standards, and gradually integrating technology are expected to strengthen an accountable audit ecosystem in the era of digital transformation.

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