



INTEGRATION OF INTERNAL AUDIT, ELECTRONIC AUDIT, AND AUDIT GOVERNANCE IN IMPROVING THE EFFECTIVENESS OF INTERNAL CONTROL AND REDUCING THE RISK OF FRAUD

INTEGRASI AUDIT INTERNAL, AUDIT ELEKTRONIK, DAN TATA KELOLA AUDIT DALAM MENINGKATKAN EFEKTIVITAS PENGENDALIAN INTERNAL DAN MENGURANGI RISIKO KECURANGAN

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Abstract

Digital transformation has increased the complexity of fraud risks within organizations, necessitating a more adaptive and integrated internal control system. This study aims to analyze the integration of internal audit, electronic audit, and audit governance in improving the effectiveness of internal control and mitigating fraud risks. This study uses a Systematic Literature Review (SLR) approach by analyzing various scientific literature relevant to the research topic. The results show that independent internal audit, the use of electronic audit technologies such as Big Data Analytics and Blockchain, and audit governance through Whistleblowing Systems and AI Governance have a synergistic relationship in strengthening organizational oversight systems. The integration of these three aspects can improve the effectiveness of fraud detection, maintain the integrity of audit data, and strengthen organizational transparency and accountability. This study provides a conceptual contribution in the form of a digital-based integrated oversight model as a strategy for strengthening internal control in the era of digital transformation.

Keywords : Internal Audit, Electronic Audit, Audit Governance, Internal Control, Fraud.

Abstrak

Transformasi digital telah meningkatkan kompleksitas risiko kecurangan dalam organisasi, sehingga memerlukan sistem pengendalian internal yang lebih adaptif dan terintegrasi. Studi ini bertujuan untuk menganalisis integrasi audit internal, audit elektronik, dan tata kelola audit dalam meningkatkan efektivitas pengendalian internal dan mengurangi risiko kecurangan. Studi ini menggunakan



pendekatan Tinjauan Pustaka Sistematis (SLR) dengan menganalisis berbagai literatur ilmiah yang relevan dengan topik penelitian. Hasil penelitian menunjukkan bahwa audit internal independen, penggunaan teknologi audit elektronik seperti Analisis Big Data dan Blockchain, serta tata kelola audit melalui Sistem Pelaporan Pelanggaran (Whistleblowing Systems) dan Tata Kelola AI memiliki hubungan sinergis dalam memperkuat sistem pengawasan organisasi. Integrasi ketiga aspek ini dapat meningkatkan efektivitas deteksi kecurangan, menjaga integritas data audit, dan memperkuat transparansi dan akuntabilitas organisasi. Studi ini memberikan kontribusi konseptual berupa model pengawasan terintegrasi berbasis digital sebagai strategi untuk memperkuat pengendalian internal di era transformasi digital.

Kata Kunci : Audit Internal, Audit Elektronik, Tata Kelola Audit, Pengendalian Internal, Kecurangan.

1. INTRODUCTION

The development of digital technology over the past decade has fundamentally transformed the audit process and the way organizations manage risk. Today's business dynamics demand internal control systems that are no longer merely reactive but capable of providing real-time protection against increasingly complex and evolving fraud schemes. While internal audit has traditionally been a key pillar of the oversight structure, its effectiveness now depends heavily on the ability to integrate with advances in digital technology and robust governance mechanisms.

The integration of electronic audits, which includes the use of Big Data Analytics and Blockchain technology, offers a solution to the limitations of conventional audit methods, which tend to rely on sample testing. Blockchain technology ensures the integrity of audit data due to its tamper-proof nature, while big data analytics enables the examination of entire data populations to systematically detect financial anomalies (Putra et al., 2022). However, the successful adoption of these technologies cannot stand alone; an ethical audit governance framework is required, including algorithmic oversight through AI Governance (Akula & Garibay, 2021) and a credible whistleblowing system to ensure accountability and transparency in the organization's oversight process (Castellani & Nuralissa, 2022).

Although various previous studies have discussed internal audit, electronic audit, and audit governance separately, there is limited research integrating these three aspects into a comprehensive internal control framework. Most previous studies have focused on the effectiveness of each variable individually, thus failing to provide a comprehensive picture of the synergistic relationship between these components in mitigating fraud risk in the digital era. Research by Hakim & Suryatimur, (2022) emphasizes the importance of internal audit independence in fraud prevention, while Engko, (2021) focuses more on the Fraud Diamond approach to understanding fraud perpetrator behavior. On the other hand, (Putra et al., 2022) highlight the role of Big Data Analytics in improving the effectiveness of financial crime detection, while (Castellani & Nuralissa, 2022) emphasize the importance of Whistleblowing Systems in strengthening organizational oversight. However, these studies only discuss each variable partially and fail to integrate internal audit, electronic audit, and audit governance into a comprehensive oversight model.

The novelty of this research lies in its effort to integrate internal audit, electronic audit, and audit governance into a single, adaptive and sustainable digital-based oversight model. This research not only discusses the effectiveness of each aspect individually but also emphasizes how the synergy between human auditors, digital technology, and organizational governance can create a more effective internal control system in minimizing the risk of fraud. This integration is strengthened through the use of tamper-proof blockchain technology (Wang, 2026), the implementation of AI governance to maintain the transparency of the artificial intelligence-based audit system (Akula & Garibay, 2021), and the strengthening of collaboration between internal audit and internal control to create a more accountable organization (Bramasto et al., 2022).



This study focuses on how the three domains of internal audit, electronic audit, and audit governance are integrated to strengthen the effectiveness of internal control and reduce the opportunities for fraud. Using the Systematic Literature Review (SLR) method, this study synthesizes various empirical and conceptual findings from recent research to formulate an integrated organizational oversight model. The main objective of this study is to provide a comprehensive understanding of the synergy between the roles of human auditors, digital audit instruments, and organizational governance in creating an internal control system that is transparent, accountable, and adaptive to the development of fraud risks in the era of digital transformation. Most previous studies still discuss internal audit, electronic audit, and audit governance separately, so there is not much research that integrates these three aspects into a comprehensive digital oversight framework for modern fraud mitigation.

2. RESEARCH METHOD

This research employed a qualitative approach using the Systematic Literature Review (SLR) method. This method was used to identify, evaluate, and synthesize various previous studies related to the integration of internal audit, electronic audit, and audit governance to improve the effectiveness of internal control and mitigate fraud risk. The SLR approach was chosen because it provides a systematic, structured, and comprehensive overview of research developments in the field of digital audit and internal control.

The literature search was conducted systematically, adapting the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) steps. Literature was obtained through various academic databases such as Google Scholar, ScienceDirect, and other scientific journals using a combination of keywords such as "internal audit," "electronic audit," "fraud prevention," "Big Data Analytics," "Blockchain," "AI Governance," and "internal control." The search included scientific articles published between 2021 and 2026 to identify research relevant to the development of digital transformation in auditing.

The inclusion criteria for this study included: (1) peer-reviewed scientific articles, (2) published between 2021 and 2026, (3) related to internal audit, electronic audit, audit governance, internal control, or fraud mitigation, and (4) available in both Indonesian and English. Exclusion criteria included non-scientific articles, articles not available in full text, and articles not directly relevant to the research focus.

The literature selection process was carried out in stages, starting with identification, screening, eligibility, and inclusion. In the initial stage, 120 articles were obtained from various search sources. After removing duplicate articles and screening based on titles and abstracts, 35 relevant articles were identified. A feasibility assessment was then conducted based on the suitability of the content and research focus, resulting in 18 eligible articles. Of these, the researchers selected 10 primary articles as the unit of analysis because they were deemed most relevant and provided substance that supported the research objectives.

Data analysis was conducted using content analysis with an interpretive approach. Researchers grouped the research findings based on key themes: internal audit, electronic audit, audit governance, and internal control effectiveness. Next, a synthesis and comparison process was conducted to identify relationship patterns, consistency of findings, and the development of digital-based oversight concepts for fraud mitigation. The synthesis results were then used to formulate an integrated oversight model relevant to modern audit developments.

3. RESULT AND DISCUSSION

The literature review indicates that research on internal audit and fraud mitigation in the 2021–2026 period is dominated by quantitative and descriptive qualitative approaches. The majority of studies confirm that internal audit has a significant influence on the effectiveness of internal controls and fraud prevention. Furthermore, recent research developments indicate the increasing use of digital



technologies such as Big Data Analytics, Blockchain, and Artificial Intelligence to support the effectiveness of modern audits.

Other findings indicate that audit governance through Whistleblowing Systems and AI Governance is a crucial aspect in maintaining transparency, accountability, and organizational integrity in the era of digital transformation. The integration of internal audit, electronic audit, and audit governance has been proven to strengthen the quality of organizational oversight in a more systematic and adaptive manner to the development of modern fraud risks.

1. General Description and Systematic Literature Mapping

The analytical procedures in this study are based on a systematic review of ten primary literatures representing the latest discourse in the domain of audit and organizational control between 2021 and 2026. The primary focus of this data extraction phase is to comprehensively examine how traditional oversight functions are transforming into proactive systems through the synergy of human capabilities (human intelligence), digital instruments (electronic audit), and managerial frameworks (governance). The data demonstrates that in a highly dynamic digital business ecosystem, the integration of these three pillars is no longer merely a complementary operational instrument but a fundamental prerequisite for building an internal control ecosystem resilient to modern fraud threats. The in-depth profiles, methodologies, and key findings from the ten literatures that serve as the unit of analysis in this study are presented in the following integrated synthesis matrix:

Table 1. Study Identification and Codes (Q1-Q10)

Kode Studi	Penulis & Tahun	Judul penelitian
Q1	Kusdianti Fatimah & Octavia Lhaksmi Pramudyastuti (2022)	Analysis of the Role of Internal Audit in Preventing and Detecting Accounting Fraud Tendencies
Q2	Cecilia Engko, N. Ahuluheluw & Rindy Ribka Selong (2021)	Analysis of the Role of Internal Audit in Fraud Prevention Using the Fraud Diamond Model
Q3	Luqman Nul Hakim & Kartika Pradana Suryatimur (2022)	The Effectiveness of the Role of Internal Audit in Fraud Prevention
Q4	Justinia Castellani & Anggita Nuralissa (2022)	The Influence of Internal Audit and Whistleblowing System Effectiveness on Fraud Prevention
Q5	Muhammad Akhtar, Kartini & Ratna Ayu Damayanti (2022)	The Influence of Internal Audit and the Effectiveness of Internal Control on Fraud Detection the Influence of Internal Audit and the Effectiveness of Internal Control on Fraud Detection
Q6	Olaoye. A. Samue & Adekoya. A. Augustine (2022)	Internal Audit Efficiency and Fraud Prevention: Empirical Study of Listed Manufacturing Companies in Nigeria
Q7	Zhaohui Wang (2026)	Who Audits the Auditor Tamper-Proof Fraud Detection with Blockchain-Anchored Explainable ML
Q8	Ramya Akula & Ivan Garibay (2021)	Audit and Assurance of AI Algorithms: Aframework to ensure ethical algorithmicpractices in Artivicial Intelligence
Q9	Iwan Putra, Urip Sulistiyo, Enggar Diah, Sri Rahayu & Syurya Hidayat (2022)	The Influence of Internal Audit, Risk Management, Whistleblowing System and Big Data Analytics on The Financial Crime Behavior Prevention
Q10	Ari Bramasto, Sri Dewi Anggadini, Uswatun Hasanah & Neneng Nur Azizah (2022)	Fraud Prevention with Internal Audit and Internal Control

**Table 2. Systematic Literature Synthesis Based on Study Codes**

Kode Studi	Fokus Variabel	Metode Penelitian	Temuan Utama & Kesimpulan Spesifik	Relevansi terhadap Penelitian ini
Q1	Audit Internal & <i>Fraud</i>	Qualitative	Internal audit plays a vital role in evaluating the effectiveness of operational systems to minimize gaps in accounting manipulation.	Strengthening the Internal Audit pillar as the primary evaluator in mitigating organizational risks.
Q2	<i>Fraud Diamond Model</i>	Qualitative	The capability elements in the Fraud Diamond are the determining factors that auditors must map to prevent complex fraud schemes.	Provides a behavioral dimension to Internal Audit to mitigate risks based on the psychological profile of the perpetrator.
Q3	Efektivitas Audit Internal	Descriptive Qualitative	The effectiveness of the role of internal audit in preventing fraud is largely determined by the degree of structural independence and the quality of auditor objectivity.	Affirming that Internal Audit must be based on independence to achieve credible control.
Q4	Whistleblowing System	Quantitative	The synergy between internal audit and the effectiveness of the Whistleblowing System significantly increases the probability of early detection of fraudulent acts.	Strengthening Audit Governance variables by providing transparent and secure reporting channels.
Q5	Pengendalian Internal	Quantitative	Strong internal controls, supported by proactive audit oversight, facilitate the accurate detection of financial anomalies.	Proving that integration of audit functions directly improves Overall Control Effectiveness.
Q6	Internal Audit Efficiency	Quantitative (Empirical)	The efficiency of the internal audit function contributes directly to asset protection and financial crime prevention at the corporate level.	Supporting Internal Audit variables as an active instrument in operational asset protection efforts.
Q7	Blockchain & Explainable ML	Experimental	Blockchain technology ensures the integrity of audit data due to its tamper-proof nature, permanently preventing manipulation of evidence by internal parties.	The technical basis of Electronic Audit variables in ensuring the absolute integrity of digital evidence.
Q8	AI Governance	Technical Overview	An assurance framework for AI algorithms is needed to ensure automated decision-making remains transparent, ethical, and accountable.	Theoretical basis of Governance in the era of artificial intelligence-based audit transformation.
Q9	Big Data Analytics	Quantitative	The use of Big Data enables auditors to identify financial crime patterns in large	Empirical evidence of the superiority of Electronic Audit in



			volumes of data through predictive analysis.	detecting systemic fraud that is not caught by manual methods.
Q10	Pengendalian Internal	Qualitative	Solid collaboration between internal audit and internal control functions creates a transparent and accountable organizational ecosystem.	Explain the strategic output of Audit Integration in creating a work environment that is free from fraud.

2. Description of Integrated Findings and Dynamics of Modern Oversight

Based on the comprehensive mapping of the matrix above, this study finds that the effectiveness of internal control in mitigating fraud risk is the result of the dynamic interaction between three key, functionally interlocking domains:

a. Transforming Internal Audit Capabilities through a Behavioral Perspective

The research findings consistently confirm that internal audit remains a key anchor in an organization's control architecture. Studies by Hakim & Suryatimur, (2022) ; Fatimah & Pramudyastuti, (2022) explicitly demonstrate that oversight effectiveness is highly dependent on the independence and quality of task execution in the field. However, the most significant contribution is found in the integration of behavioral psychology models into audit practice.

As explained in depth by Engko, (2021), understanding the "capability" element in the Fraud Diamond framework enables auditors to move beyond simply examining administrative documents. Auditors are now required to be able to map potential collusion and the strategic position of fraud perpetrators before the risk materializes. This is reinforced by findings (Akhtar & Damayanti, 2022), which confirm that the presence of proactive internal audit acts as a psychological deterrent for potential fraudsters, significantly strengthening the foundation of a company's internal control.

b. Electronic Audit Acceleration: Digital Security and Precision

Analytics Data demonstrates a radical methodological shift from traditional, reactive audits to preventative, real-time digital oversight. The use of Big Data Analytics, as described by (Putra et al., 2022), has revolutionized the way auditors work by eliminating the latent limitations of conventional sampling methods. Big data analytics capabilities enable the examination of 100% of the data population, technically mitigating the risk of failure to detect systemic financial crimes. Furthermore, futuristic findings from Wang, (2026) regarding Blockchain technology provide an answer to the vulnerability of digital audit evidence manipulation. Blockchain's tamper-proof nature ensures that every transaction trail is permanent and transparent. This integration between predictive analytics and digital data security creates a new standard in financial information integrity that cannot be interfered with by any party within the organization.

c. Audit Governance as an Ethical Framework and System Accountability

This study found that technological innovation and human capabilities require a strong governance framework to ensure functional accountability. An integrated whistleblowing system mechanism as studied by (Castellani & Nuralissa, 2022) acts as a crucial information channel that supplies intelligence data from operational lines directly to internal auditors. However, with the adoption of artificial intelligence, new challenges arise in the form of algorithmic bias. Research by (Akula & Garibay, 2021) provides a crucial theoretical contribution regarding the need for AI governance. Governance, in this context, functions as an "ethical brake" that ensures that automated oversight systems are not manipulated to justify wrong decisions. According to (Bramasto et al., 2022) : (Samuel & Augustine, 2022), the synergy between accountable managerial policies and technological innovation creates optimal asset protection through coordinated and systematic oversight.

3. Cumulative Synthesis: Multi-Layered Defense System Integration Model

Cumulatively, the results of this study confirm that the integration of independent internal audit, precise electronic instruments, and transparent governance creates a multidimensional model of an organizational defense system. This synergy has been empirically demonstrated. able to suppress all



elements of fraud risk by narrowing opportunities through digital technology, reducing pressure through proactive audit oversight, and eliminating rationalization through a culture of accountability enforced by strong governance. In conclusion, the quality and reliability of an organization's financial information in the future will no longer depend solely on procedural compliance, but rather on the reliability of a continuous, adaptive, and integrated oversight ecosystem across all levels of the organization.

Discussion

1. Synergy of Human and Technological Capabilities in Closing Fraud Gaps

The analysis of primary literature indicates that the main weakness of traditional internal control systems lies in their reactive nature and limited testing of data samples. This finding aligns with the argument (Putra et al., 2022), which emphasizes that in the digital era, massive transaction volumes require Big Data Analytics to identify anomalies that human auditors miss. However, this discussion highlights that technology is merely an instrument; effective detection still requires the auditor's analytical acumen in understanding the perpetrator's psychology.

As outlined in the Fraud Diamond perspective by (Engko, 2021), the "capability" element of the perpetrator is often related to the abuse of digital access rights. This is where the integration of electronic audits through Blockchain technology (Wang, 2026) plays a crucial role. When technology guarantees tamper-proof data integrity, internal auditors (Fatimah & Pramudyastuti, 2022) can focus their evaluations on areas with a high risk of collusion. This synergy demonstrates that the combination of human intelligence and digital precision creates a much more robust early detection system than a system operating in isolation.

Although electronic audit integration provides increased effectiveness of oversight organizations, implementing digital technology also faces a number of significant challenges. The use of Big Data Analytics and Blockchain requires significant infrastructure investment and adequate auditor competency in operating digital systems (Putra et al., 2022). Furthermore, the application of Artificial Intelligence in audits has the potential to create algorithmic bias if not balanced with strong ethical governance and oversight (Akula & Garibay, 2021). Therefore, digital audit transformation requires not only technological readiness but also human resource readiness and organizational regulations that are adaptive to the development of modern fraud risks.

2. Governance as a Guarantee of Audit Accountability and Ethics

Further discussion of audit governance reveals that the effectiveness of technology is highly dependent on the managerial framework that supports it. Castellani & Nuralissa, (2022) provide strong evidence that control systems are far more effective when supported by a credible whistleblowing system. This channel of employee information provides valuable intelligence for auditors conducting electronic investigative audits.

However, new challenges arise with the advent of automation and artificial intelligence in auditing. Findings Akula & Garibay, (2021) on AI governance provide a critical foundation for the need for algorithms to avoid becoming unaccountable "black boxes." The discussion in this study confirms that governance serves as an ethical instrument that ensures audit automation remains transparent. Without strong governance, the use of technology risks creating new loopholes through data bias. Therefore, the synergy proposed by Bramasto et al., (2022) ; Akhtar & Damayanti, (2022) regarding the integration between governance policies and audit operations is an absolute requirement in creating a transparent organizational environment.

3. Implications of Integration for Strengthening Internal Control

Theoretically, the integration discussed in this study has broad implications for modern internal control models. Whereas internal control was previously viewed as a static structure, this integrative model presents it as a dynamic and continuous ecosystem. The efficiency generated by robust internal auditing Samuel & Augustine, (2022) , combined with the speed of electronic auditing, creates added value for organizations in the form of real-time asset protection.



The alignment between auditor independence Hakim & Suryatimur, (2022) and digital data objectivity can systematically suppress the scope for fraudulent activity from all angles. This demonstrates that future fraud risk mitigation can no longer rely solely on administrative compliance but must be based on an intelligent oversight ecosystem (Putra et al., 2022) that holistically integrates human, technological, and governance policy aspects.

4. Development of an Integrative Framework: Towards Continuous Auditing.

The novelty offered in this research lies in the paradigm shift from periodic audits to continuous and integrated oversight. Analysis of the ideas of Wang, (2026) ; Putra et al., (2022) shows that digital infrastructure such as Blockchain and Big Data enable real-time audits. However, this discussion emphasizes that the speed of these technologies will be wasted if not accompanied by the readiness of human resources who understand modern fraud schemes.

Analysis of digital audit developments shows that technologies such as Blockchain, Big Data Analytics, and Artificial Intelligence enable audit processes to be conducted more real-time, continuously, and adaptive to modern financial anomalies (Putra et al., 2022) ; (Wang, 2026). These findings are also supported by research on digital transformation in internal auditing, which confirms that the integration of audit technology can systematically and sustainably improve the effectiveness of organizational oversight.

This integration creates a cycle of oversight that effectively closes the Fraud Diamond loophole. Internal (human) audits provide context and qualitative risk assessments, while electronic audits provide quantitative and definitive data verification. This entire process is governed by audit governance (Akula & Garibay, 2021), which ensures that technology use remains within ethical business practices. Therefore, the proposed integration model is not simply a combination of tools, but rather a holistic strategy for building a culture of transparency that is resilient to future developments in financial crime modus operandi.

4. CONCLUSION

1. The literature review reveals that research on internal audit and fraud mitigation from 2021 to 2026 is dominated by descriptive quantitative and qualitative approaches. The majority of studies confirm that internal audit has a significant impact on the effectiveness of internal controls and fraud prevention. Furthermore, recent research developments demonstrate the increasing use of digital technologies such as Big Data Analytics, Blockchain, and Artificial Intelligence to support the effectiveness of modern audits.
2. Other findings indicate that audit governance through the Whistleblowing System and AI Governance is a crucial aspect in maintaining transparency, accountability, and organizational integrity in the era of digital transformation. The integration of internal audit, electronic audit, and audit governance has been proven to strengthen the quality of organizational oversight in a more systematic and adaptive manner to the development of modern fraud risks.
3. This research still has limitations because it uses a literature review approach without direct empirical testing in specific organizations. Furthermore, most of the literature used focuses on conceptual approaches, so the effectiveness of digital audit integration in real-world practice requires further validation through field research.

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