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# Artificial Intelligence in Fraud Detection and Governance: A Systematic Literature Review

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Abstrak

***Perkembangan teknologi digital telah meningkatkan kompleksitas praktik penipuan dan mendorong organisasi untuk memperkuat sistem deteksi penipuan melalui integrasi mekanisme tata kelola dan Kecerdasan Buatan (AI). Studi ini bertujuan untuk secara sistematis meninjau perkembangan penelitian terkait Kecerdasan Buatan dalam deteksi dan tata kelola penipuan. Penelitian ini menggunakan pendekatan Tinjauan Literatur Sistematis (SLR) dengan kerangka kerja PRISMA. Artikel yang ditinjau diperoleh dari jurnal internasional terkemuka yang diterbitkan antara tahun 2021 dan 2026 dan dianalisis berdasarkan fokus penelitian, metode, variabel, temuan, dan peluang penelitian di masa mendatang. Hasil menunjukkan bahwa Kecerdasan Buatan meningkatkan efektivitas, efisiensi, dan akurasi deteksi penipuan melalui deteksi anomali, analitik prediktif, dan sistem pemantauan waktu nyata. Mekanisme tata kelola seperti sistem pelaporan pelanggaran, pengendalian internal, kompetensi, dan perilaku organisasi juga memainkan peran penting dalam mendukung pencegahan dan deteksi penipuan. Namun, studi yang mengintegrasikan AI, tata kelola, faktor perilaku, dan deteksi penipuan ESG masih terbatas, khususnya di sektor pendidikan tinggi dan negara berkembang. Studi ini berkontribusi dengan menyediakan pemetaan komprehensif penelitian deteksi penipuan berbasis AI dan mengusulkan arah penelitian di masa mendatang yang terkait dengan tata kelola, keberlanjutan, dan pencegahan penipuan digital.***

*Keywords : Artificial Intelligence, Fraud Detection, Governance, ESG Fraud, Systematic Literature Review*

## INTRODUCTION

The rapid advancement of digital technology has significantly transformed organizational governance, internal control systems, and financial reporting practices. While digital transformation offers organizations greater operational efficiency and improved decision-making capabilities, it has also increased the complexity of fraud schemes. Fraud has evolved from conventional financial

manipulation into more sophisticated forms, including cyber fraud, digital transaction manipulation, identity theft, and misuse of information systems. Consequently, organizations are increasingly challenged to develop more adaptive and technology-driven fraud detection mechanisms (Chhabra Roy & Prabhakaran, 2023).

Artificial Intelligence (AI) has emerged as one of the most promising technologies for strengthening fraud detection systems. AI enables organizations to analyze large volumes of structured and unstructured data, identify anomalous patterns, perform predictive analytics, and support real-time monitoring of suspicious activities. Recent studies have demonstrated that AI-based fraud detection models significantly improve fraud identification accuracy and operational efficiency compared to traditional auditing approaches (Ramoju et al., 2026; Tan et al., 2025). The integration of machine learning, deep learning, and predictive analytics has therefore become an increasingly important component of modern fraud prevention strategies.

Despite the growing adoption of AI, effective fraud detection cannot rely solely on technological capabilities. Governance mechanisms remain essential in ensuring organizational transparency, accountability, and control effectiveness. Previous studies emphasize the importance of governance components such as whistleblowing systems, internal controls, internal audits, auditor competence, and organizational behavior in preventing and detecting fraudulent activities (Kamila & Munajat, 2025; Purwohedi et al., 2025; Sari Hasibuan et al., 2025). Strong governance structures enable organizations to identify risks more effectively, enhance monitoring processes, and establish a culture of integrity that supports fraud prevention initiatives.

In the higher education sector, governance has become increasingly important due to institutional autonomy and accountability demands. State Universities with Legal Entity status (PTNBH) are expected to manage their financial resources independently while maintaining transparency and accountability to stakeholders. Previous studies indicate that effective internal auditing, governance systems, and accountability mechanisms contribute significantly to improving organizational performance and financial management within higher education institutions (Pahala et al., 2019; Hariyati et al., 2025; Marlina & Fitriyah, 2020). Furthermore, internal audit effectiveness has been identified as a critical factor in supporting governance quality and organizational sustainability in universities (Purwohedi et al., 2025).

The development of governance research has also expanded beyond financial reporting to include Environmental, Social, and Governance (ESG) disclosure and sustainability reporting. Increasing stakeholder expectations regarding sustainability performance have encouraged organizations to provide broader disclosures related to environmental and social responsibilities. However, this trend has also generated concerns regarding ESG fraud and greenwashing practices, where organizations intentionally manipulate non-financial information to create a misleading image of sustainability performance. Wang and Wang (2023) highlight that ESG fraud may undermine reporting credibility and stakeholder trust, while Sutrisno et al. (2026) emphasize the importance of organizational behavior, governance mechanisms, and anti-fraud culture in supporting sustainability reporting transparency.

Although studies on Artificial Intelligence, fraud detection, governance, internal auditing, whistleblowing systems, and sustainability reporting have grown substantially in recent years, the existing literature remains fragmented. Most prior studies focus on individual aspects of fraud detection, governance, or AI applications independently, with limited integration among these themes (Tan et al., 2025; Purwohedi et al., 2025). Furthermore, empirical studies predominantly examine financial institutions and corporate sectors, while research within higher education institutions and developing countries remains relatively limited (Hariyati et al., 2025; Sari Hasibuan et al., 2025). More importantly, there is still a lack of systematic literature reviews that comprehensively synthesize the relationships among Artificial Intelligence, governance mechanisms, fraud detection, and sustainability-related fraud risks.

Given these gaps, a comprehensive review of the existing literature is necessary to provide a broader understanding of how Artificial Intelligence contributes to fraud detection and governance effectiveness. Therefore, this study aims to systematically analyze the development of research on Artificial Intelligence in fraud detection and governance using a Systematic Literature Review (SLR) approach. By applying the PRISMA framework and reviewing articles published between 2021 and 2026, this study seeks to identify major research themes, map current research trends, reveal existing knowledge gaps, and propose future research directions.

This study contributes to the literature by providing a comprehensive synthesis of research related to Artificial Intelligence, fraud detection, governance, internal auditing, and ESG fraud. In addition, the findings are expected to offer practical insights for organizations, auditors, policymakers, and higher education institutions in designing more effective, adaptive, and technology-based fraud detection systems to enhance organizational accountability and sustainability in the digital era.

## LITERATURE REVIEW

### Artificial Intelligence and Fraud Detection

The increasing complexity of digital fraud has encouraged organizations to adopt more advanced technologies for fraud prevention and detection. Artificial Intelligence (AI) has emerged as one of the most widely discussed technologies due to its ability to process large volumes of data, identify hidden patterns, and detect anomalies in real time. Recent studies suggest that AI-based fraud detection systems outperform traditional rule-based approaches by providing higher accuracy and faster response times.

Several researchers have investigated the application of AI in fraud detection from different perspectives. Ramoju et al. (2026) developed a fraud detection model based on a Coupled Modular Simplicial Graph Neural Network integrated with Snow Ablation Optimization, demonstrating significant improvements in identifying fraudulent transactions in digital payment systems. Similarly, Tan et al. (2025) found that AI-driven analytics and Natural Language Processing (NLP) enhanced organizational capabilities in detecting suspicious activities and supporting real-time fraud monitoring.

The growing relevance of AI is also reflected in the findings of Chhabra Roy and Prabhakaran (2023), who argued that the rapid growth of digital transactions has created new fraud risks that cannot be effectively managed using conventional auditing approaches alone. Their study emphasized the need for adaptive and intelligent fraud detection mechanisms capable of responding to increasingly sophisticated fraud schemes.

Although the existing literature consistently highlights the benefits of AI in fraud detection, most studies focus primarily on technological development and predictive performance. Relatively limited attention has been given to how AI interacts with governance mechanisms, internal controls, and organizational oversight systems. Consequently, understanding the relationship between AI adoption and governance effectiveness remains an important area for further investigation.

### Governance Mechanisms in Fraud Prevention and Detection

While technological innovation plays an important role in fraud detection, governance mechanisms remain fundamental in ensuring organizational accountability and transparency. Governance encompasses a range of control mechanisms, including internal control systems, internal audits, accountability frameworks, and whistleblowing channels that collectively support fraud prevention and organizational integrity.

Research in higher education institutions has increasingly emphasized the importance of governance practices. Kamila and Munajat (2025) demonstrated that internal audit functions contribute significantly to the implementation of Good University Governance (GUG) by strengthening accountability and improving financial management practices in State Universities with Legal Entity status (PTNBH). Similarly, Hariyati et al. (2025) found that effective governance practices positively influence university performance, indicating that governance quality is closely linked to institutional sustainability.

The importance of governance is also evident in studies focusing on accountability and financial management. Pahala et al. (2019) argued that accountability in higher education extends beyond financial reporting and includes broader responsibilities toward stakeholders, transparency, and organizational legitimacy. Furthermore, Sari Hasibuan et al. (2025) reported that effective internal control systems and high-quality internal audits significantly improve financial management performance in PTNBH institutions.

These findings suggest that governance mechanisms function as critical safeguards against fraud. However, the reviewed studies generally examine governance components independently and rarely explore how governance systems can be strengthened through emerging technologies such as Artificial Intelligence. This limitation creates opportunities for future research examining the integration of governance and AI-based fraud detection systems.

### Internal Audit Effectiveness and Auditor Competence

Internal auditors play a central role in supporting governance effectiveness and fraud detection activities. As organizations face increasingly complex operational environments, auditors are expected not only to possess technical competencies but also to demonstrate professional judgment, skepticism, and adaptability to technological change.

Several studies have highlighted the importance of auditor competence in improving audit effectiveness. Purwohedi et al. (2025) found that auditor competence positively influences internal audit effectiveness in Indonesian public universities. Their findings further revealed that role ambiguity can weaken the positive impact of competence on audit performance, suggesting that organizational factors remain important determinants of audit effectiveness.

Similarly, Handoko and Sardjono (2022) reported that auditor competence enhances audit quality in remote auditing environments, particularly as organizations increasingly rely on digital technologies. Marlina and Fitriyah (2020) also found that management support and auditor professionalism contribute significantly to the effectiveness of internal audit functions within Indonesian PTNBH institutions.

In addition to competence, professional skepticism has been identified as a key factor in detecting fraud. Khairunnisa et al. (2025) demonstrated that auditors with higher levels of professional skepticism are more capable of identifying fraud indicators and irregularities. Consistent with this finding, Nurleni et al. (2024) emphasized the importance of auditor training and integrity in strengthening fraud detection capabilities within public sector organizations.

Collectively, these studies indicate that human factors remain essential in fraud detection despite the rapid advancement of Artificial Intelligence. Rather than replacing auditors, AI appears to complement auditor expertise by enhancing analytical capabilities and improving decision-making processes.

**ESG Fraud and Sustainability Governance**

The scope of fraud-related research has expanded considerably in recent years, extending beyond financial reporting to include sustainability reporting and Environmental, Social, and Governance (ESG) disclosures. As organizations face increasing pressure to demonstrate sustainable performance, concerns regarding ESG fraud and greenwashing have become more prominent.

Wang and Wang (2023) highlighted that ESG fraud can significantly undermine stakeholder trust and reduce the credibility of sustainability reporting. Their findings suggest that organizations may manipulate non-financial information to create a favorable image, thereby misleading investors and other stakeholders. In response to these risks, Artyukhov (2024) emphasized the importance of whistleblower protection systems and anti-fraud cultures in promoting transparency and accountability.

Within the higher education context, Sutrisno et al. (2026) found that pressure, opportunity, and organizational behavior significantly influence sustainability reporting practices. Their study further demonstrated that governance quality and anti-fraud culture play important roles in supporting transparent and reliable sustainability disclosures.

The emergence of ESG-related fraud issues indicates that organizations must adopt broader fraud detection approaches that encompass both financial and non-financial reporting. This development also highlights the potential role of Artificial Intelligence in supporting sustainability governance through automated monitoring and anomaly detection within ESG reporting processes.

**Research Gap and Study Positioning**

The reviewed literature demonstrates substantial progress in research related to Artificial Intelligence, governance, internal auditing, and ESG fraud. However, several important gaps remain. First, most studies focus on individual themes rather than examining the interrelationships among AI, governance mechanisms, and fraud detection. Second, empirical research remains concentrated in financial institutions and corporate settings, while studies in higher education institutions are still relatively limited. Third, the growing issue of ESG fraud has received increasing attention, yet research integrating ESG governance with AI-based fraud detection remains scarce.

Furthermore, although numerous empirical studies have investigated specific determinants of fraud detection effectiveness, relatively few studies have systematically synthesized the existing body of knowledge to identify overarching trends, dominant themes, and future research directions. Therefore, this study addresses these gaps by conducting a Systematic Literature Review (SLR) that integrates findings from previous studies on Artificial Intelligence, governance mechanisms, internal auditing, and ESG-related fraud issues. Through this approach, the study aims to provide a comprehensive

understanding of current research developments and establish a foundation for future investigations in this field.

## METHOD

This study uses a qualitative approach with the Systematic Literature Review (SLR) method to analyze the development of research related to Artificial Intelligence in fraud detection and governance. The SLR approach was chosen because it can provide a systematic, comprehensive, and structured research mapping regarding the development of research topics, dominant themes, research gaps, and future research directions. This study uses the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines in the process of identifying, selecting, evaluating, and synthesizing research articles. The scope of the study focused on scientific articles discussing Artificial Intelligence, fraud detection, governance, whistleblowing systems, internal control, auditor competence, professional skepticism, sustainability reporting, and ESG fraud. The articles used are from reputable international journals published between 2021 and 2026. This period was selected to obtain an overview of the latest research developments related to digital transformation and the use of Artificial Intelligence in fraud detection and governance.

Data collection techniques were conducted through documentation studies by searching for scientific articles from various academic databases such as Scopus, ScienceDirect, Emerald, Springer, Taylor & Francis, and Google Scholar. The article search process used several keywords such as "Artificial Intelligence", "Fraud Detection", "Governance", "Whistleblowing System", "Internal Control", "ESG Fraud", "Sustainability Reporting", and "Digital Fraud". The articles obtained were then selected based on the research inclusion and exclusion criteria. The inclusion criteria in this study include: (1) articles discussing Artificial Intelligence in fraud detection or governance; (2) articles published in reputable international journals; (3) articles published in the 2021–2026 period; and (4) articles available in full paper form. Meanwhile, the exclusion criteria include articles that are irrelevant to the research topic, duplicate articles, and articles that do not have discussions related to fraud detection and governance.

Table 1. Research Article Selection Criteria

| **Criteria** | **Explanation** |
|---|---|
| Research Topics | Artificial Intelligence, Fraud Detection, Governance, ESG Fraud |
| Article Type | National and International Journal |
| Publication Period | 2021–2026 |
| Article Language | English and Indonesian |
| Database | Scopus, ScienceDirect, Emerald, Springer, Google Scholar |
| Inclusion Criteria | Articles relevant to AI and fraud detection/governance |
| Exclusion Criteria | Irrelevant, duplicate, and non-full paper articles |

Source: data processed by researchers (2026)

The analysis process was conducted in several stages following the PRISMA framework, namely identification, screening, eligibility, and inclusion. After the article selection process was completed, the selected studies were systematically reviewed using a thematic content analysis approach. Each article was carefully examined and extracted into a literature matrix containing information on the author(s), publication year, research objectives, methodology, research focus, key findings, and identified research gaps.

The extracted articles were subsequently classified into several major themes based on their dominant research focus. These themes included: (1) Artificial Intelligence in Fraud Detection, (2) Governance and Internal Control, (3) Internal Audit Effectiveness and Auditor Competence, (4) Whistleblowing Systems and Fraud Prevention, and (5) ESG Fraud and Sustainability Governance. The thematic classification enabled the researchers to identify similarities, differences, and emerging patterns across studies.

Furthermore, a cross-study synthesis was conducted to compare research findings, identify dominant trends, evaluate methodological approaches, and highlight inconsistencies among previous studies. This synthesis process facilitated the identification of underexplored areas and future research opportunities regarding the integration of Artificial Intelligence and governance mechanisms in fraud detection. The

findings from the thematic content analysis were then narratively synthesized to develop a comprehensive understanding of current research developments and future research directions in the field.

**Table 2. Article Analysis Framework**

| Analysis Component | Description |
|---|---|
| Author and Year | Identification of publication source |
| Research Objective | Purpose of the study |
| Methodology | Research design and analytical approach |
| Research Focus | Main variables/themes investigated |
| Key Findings | Major research results |
| Research Gap | Limitations and future research opportunities |

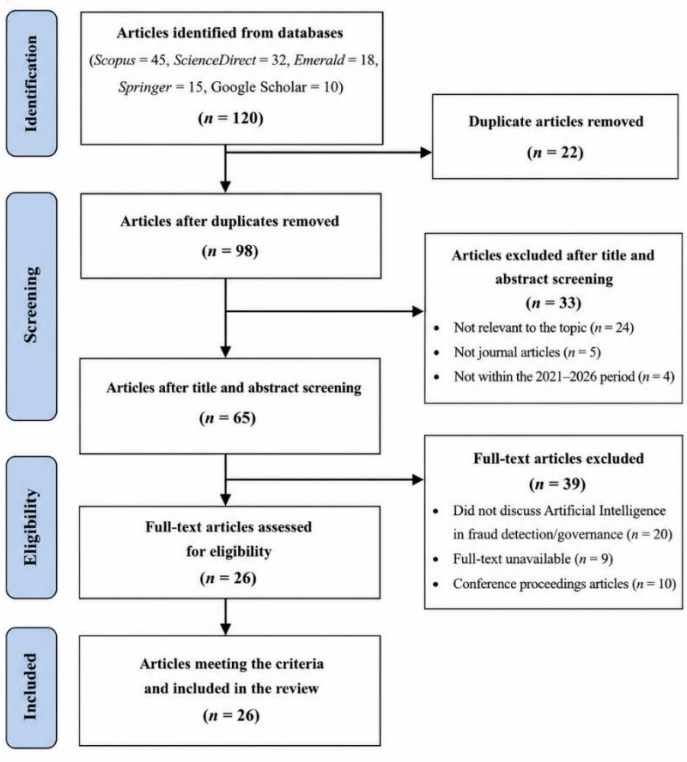
## RESULTS AND DISCUSSION

Based on the PRISMA screening and selection process, a total of 26 articles met the inclusion criteria and were included in this systematic literature review. The selected studies were published between 2021 and 2026 and covered a range of topics related to Artificial Intelligence (AI), fraud detection, governance mechanisms, internal auditing, whistleblowing systems, auditor competence, sustainability reporting, and ESG fraud.

The thematic analysis revealed four dominant research streams within the literature: (1) the application of Artificial Intelligence in fraud detection, (2) the role of governance mechanisms in fraud prevention, (3) the evolving role of internal auditors and auditor competence in the digital era, and (4) emerging challenges related to ESG fraud and sustainability governance. These themes reflect the growing recognition that effective fraud prevention requires not only technological innovation but also strong governance structures, competent human resources, and organizational accountability.

The following sections discuss the major findings emerging from the reviewed studies, identify recurring patterns across the literature, and highlight potential directions for future research.

Figure 1. PRISMA diagram




*Source: Processed by the authors (2025).*

### Emerging Trends of Artificial Intelligence in Fraud Detection

The reviewed literature indicates that Artificial Intelligence (AI) has become a dominant topic in fraud detection research, particularly in response to the increasing complexity of digital transactions and cyber-related fraud risks. Studies conducted by Ramoju et al. (2026), Tan et al. (2025), and Chhabra Roy and Prabhakaran (2023) consistently demonstrate that AI technologies, such as machine learning, deep learning, anomaly detection, and predictive analytics, significantly improve the effectiveness of fraud detection systems. These technologies enable organizations to process large volumes of data, identify unusual patterns, and support real-time monitoring activities.

A common pattern emerging from the literature is the shift from reactive fraud detection toward predictive fraud prevention. Traditional fraud detection mechanisms primarily focused on identifying fraudulent activities after losses had occurred. However, AI-based systems allow organizations to anticipate potential risks and detect suspicious behavior at earlier stages. This finding suggests that fraud detection is increasingly evolving into a strategic risk management function rather than merely an investigative activity.

Another important observation is that AI should not be viewed solely as a technological solution. The reviewed studies collectively indicate that the effectiveness of AI-based fraud detection depends on the availability of reliable data, adequate governance structures, and effective oversight mechanisms. Consequently, future developments in fraud detection are likely to involve a stronger integration between intelligent technologies and governance frameworks. This trend reflects the growing recognition that technological innovation alone is insufficient to address increasingly sophisticated fraud schemes.

**Governance as a Critical Enabler of Fraud Prevention**

Governance emerges as one of the most consistent themes across the reviewed studies. Research conducted by Kamila and Munajat (2025), Hariyati et al. (2025), Pahala et al. (2019), and Sari Hasibuan et al. (2025) highlights the importance of governance mechanisms, including internal controls, accountability systems, internal audits, and whistleblowing channels, in supporting fraud prevention and organizational transparency.

The literature suggests that governance contributes to fraud prevention through two primary mechanisms. First, governance reduces opportunities for misconduct by strengthening monitoring and control processes. Second, governance promotes organizational accountability by encouraging transparency and ethical behavior among stakeholders. These findings indicate that governance should not be understood merely as a compliance requirement but as a strategic framework that supports organizational sustainability and risk management.

Interestingly, the reviewed studies reveal that governance effectiveness is highly dependent on organizational commitment and implementation quality. Organizations may formally establish governance structures; however, their effectiveness depends on how consistently those mechanisms are applied in practice. This finding is particularly relevant in higher education institutions, where increasing autonomy and financial responsibility require stronger accountability systems. Therefore, governance should be viewed as a dynamic process that integrates oversight, accountability, and organizational culture.

**The Evolving Role of Internal Auditors in the Digital Era**

The findings of this review consistently demonstrate that auditor competence remains a critical factor in supporting effective fraud detection. Studies by Purwohedi et al. (2025), Handoko and Sardjono (2022), Khairunnisa et al. (2025), Nurleni et al. (2024), and Marlina and Fitriyah (2020) emphasize the importance of professional competence, skepticism, integrity, and continuous training in enhancing audit effectiveness.

A significant insight emerging from the reviewed literature is that technological advancement does not diminish the importance of human judgment. Instead, AI and auditor competence appear to function as complementary resources. While AI improves analytical efficiency and facilitates the processing of large datasets, auditors provide contextual understanding, professional skepticism, ethical reasoning, and decision-making capabilities. As a result, the future of auditing is unlikely to involve the replacement of auditors by technology; rather, it will require stronger collaboration between human expertise and intelligent systems.

The literature further suggests that organizations need to invest not only in technological infrastructure but also in auditor development programs. The effectiveness of AI-based fraud detection systems

ultimately depends on the ability of auditors and internal control personnel to interpret analytical outputs and transform them into meaningful organizational actions. Consequently, digital transformation should be accompanied by investments in human capital development to maximize the benefits of technological innovation.

**ESG Fraud and Emerging Governance Challenges**

The review also identifies ESG fraud and sustainability governance as emerging areas within the fraud detection literature. Studies by Wang and Wang (2023), Artyukhov (2024), and Sutrisno et al. (2026) demonstrate that fraud risks are no longer limited to financial reporting but increasingly involve the manipulation of sustainability disclosures and ESG-related information.

An important trend identified in the literature is the growing concern regarding greenwashing practices, where organizations intentionally provide misleading information regarding their environmental or social performance. This phenomenon creates significant governance challenges because ESG fraud is often more difficult to detect than traditional financial fraud. Unlike financial statements, sustainability disclosures frequently contain qualitative information that is less standardized and more difficult to verify.

The reviewed studies suggest that effective governance mechanisms, whistleblower protection systems, and anti-fraud organizational cultures are essential in addressing ESG-related misconduct. Furthermore, the increasing complexity of sustainability reporting creates opportunities for the application of Artificial Intelligence in monitoring ESG disclosures and identifying reporting anomalies. Therefore, ESG fraud represents an important area for future research, particularly regarding the integration of AI-based monitoring systems and sustainability governance frameworks.

Table 2. Articles Used in the Review

| No | Name (year) | Tittle |
|---|---|---|
| 1 | Tan, C., Cynthia, C., & Handoko, B. L. (2025) | *Integration of NLP, AI-driven data analysis, risk assessment, and electronic whistle-blowing systems in fraud detection*. |
| 2 | Khairunnisa, H., Zairin, G. M., Amirul, S. M., Prihatni, R., & Rachman, H. (2025) | *Unveiling the auditor's lens: Impact of workload, time pressure, professional skepticism, and competence to fraud detection* |
| 3 | Ramadhany, Erlina, Sadalia, & Fachrudin (2025) | Enhancing Fraud Detection Performance: The Interplay of Red Flag Awareness, Self-Efficacy, and Professional Skepticism |
| 4 | Blackwell, Maynard, Malm, Pyles, Snyder, & Witte (2024) | *Who Gets Duped? The Impact of Education on Fraud Detection in an Investment Task* |
| 5 | Nurleni, Darmawati, & Mediaty (2024) | *Enhancing Fraud Detection Capacities: The Role of Auditor Training, Professional Skepticism, and Integrity in Government Internal Control Mechanisms in Indonesia* |
| 6 | Handoko & Sardjono (2022) | *The Impact of Auditor's Competency, Audit Risk, and Professional Skepticism to Audit Quality in Fraud Detection Using Remote Audit* |
| 7 | Handoko & Rosita (2022) | *The Effect of Skepticism, Big Data Analytics to Financial Fraud Detection Moderated by Forensic Accounting* |
| 8 | Hamshari, Ali, & Alqam (2021) | *The Relationship of Professional Skepticism to the Risks of Auditing and Internal Control, and the Discovery of Fraud and Core Errors in the Financial Statements in Jordan* |
| 9 | Wahidahwati & Asyik (2022) | *Determinants of Auditors Ability in Fraud Detection* |
| 10 | Husan, H., Sari, R., & Mapparenta. (2024). | *The effect of professional skepticism on fraud detection with auditor training as a moderating variable*. |
| 11 | Amyar, F., Rahma, A. E., Azis, N. A., & Suwarno, S. (2023). | *The effect of auditor's professional skepticism and whistleblowing system on fraud detection: Evidence from Indonesian public sector audit*. |

| | | |
|---|---|---|
| 12 | Anggiriawan, I. P. B., Jayawarsa, A. A. K., & Pratama, I. G. S. (2024) | *Auditor independence and experience in fraud detection: The crucial role of professional skepticism* |
| 13 | Citranagari, M. P. (2022). | *The effect of professional skepticism, experience of investigative auditors and whistleblowing system on auditor's ability in detecting fraud*. |
| 14 | Zahra, F., Abdullah, M. I., Din, M., Fadli, M., Besar, H. A. H., & Ali, J. K. (2024) | *Investigating the structural model of whistle blowing system on government procurement fraud: Examining mediating effect of investigative audit.* |
| 15 | Achmad, T., Huang, C.-Y., Putra, M. A., & Pamungkas, I. D. (2024). | *Forensic accounting and risk management: Exploring the impact of generalized audit software and whistleblowing systems on fraud detection in Indonesia*. |
| 16 | Maulidi, A., Girindratama, M. W., Putra, A. R., Sari, R. P., & Nuswantara, D. A. (2024) | *Qualitatively beyond the ledger: Unravelling the interplay of organisational control, whistleblowing systems, fraud awareness, and religiosity*. |
| 17 | Prasetya, H. A., Liu, X., Murata, T., & Matono, A. (2026) | A Multi-Rounded Adversarial Scenario for Graph-Based Promo Fraud Detection. |
| 18 | Suhayati, E., & Thufailah, A. A. (2024). | *Fraud detection: Professional skepticism and quality control system.* |
| 19 | Syamsuddin, Rahmawati, Indrijawati, & Bandang (2023) | *Effect of Competence, Whistleblower, and Probity Audit on the Detection of Fraud in the Procurement of Goods/Services with Emotional Intelligence as a Moderating Variable* |
| 20 | Alessi & Fugini (2026) | *Adaptive Real-Time Financial Fraud Detection with Explainable AI Tools* |
| 21 | Darwish, EL-Naggar, & Elkaffas (2026) | Securing Financial Transactions: Exploring the Role of Lightweight Blockchain-Enabled Deep Learning for Fraud Detection in FinTech Systems |
| 22 | Prasetya, Liu, Murata, & Matono (2026) | A Multi-Rounded Adversarial Scenario for Graph-Based Promo Fraud Detection |
| 23 | Ramoju, Biswal, Kotecha, Pandurangan, & Parashar (2026) | Coupled Modular Simplicial Graph Neural Network with Snow Ablation Optimization for Real-Time Fraud Detection in Payment Systems |
| 24 | Sharma & Sharma (2024) | Comparison of Machine Learning and Deep Learning Models in Enhancing Fraud Detection in Digital Finance |
| 25 | Chakraborty et al. (2024) | Hybrid Adversarial Machine Learning and Blockchain for Real-Time Insurance Fraud Detection |
| 26 | Sutrisno, Djaddang, & Suratno (2026) | Antecedents of Pentagon Fraud against Sustainability Reporting and Behavioral Organization as Intervening |

Source: data processed by researchers (2026)

**Research Gaps and Future Research Agenda**

The synthesis of the reviewed literature reveals several important research gaps that provide opportunities for future investigations. Although studies on Artificial Intelligence, fraud detection, governance, internal auditing, and sustainability reporting have increased considerably in recent years,

the existing body of knowledge remains fragmented and concentrated within specific contexts and perspectives. The findings indicate that future research should move toward more integrative and interdisciplinary approaches to better understand emerging fraud risks in increasingly complex digital environments.

**Integration of Artificial Intelligence and Governance Mechanisms**

One of the most significant gaps identified in the literature is the limited integration between Artificial Intelligence and governance mechanisms. Existing studies tend to examine AI-based fraud detection systems from a technological perspective, focusing on machine learning models, predictive analytics, and anomaly detection techniques (Ramoju et al., 2026; Tan et al., 2025). In contrast, governance-related studies primarily investigate internal controls, accountability systems, internal audits, and Good University Governance practices (Kamila & Munajat, 2025; Hariyati et al., 2025).

This separation limits the understanding of how technological capabilities can be embedded within organizational governance systems to create a more comprehensive fraud prevention framework. The reviewed studies suggest that effective fraud prevention requires both technological innovation and governance effectiveness. Therefore, future research should develop integrated models that combine Artificial Intelligence, internal control systems, internal auditing, and governance mechanisms to provide a more holistic understanding of fraud prevention and detection processes.

**Expansion Beyond Financial and Corporate Contexts**

Another important gap concerns the concentration of previous studies within financial institutions, banking sectors, and corporate organizations (Chhabra Roy & Prabhakaran, 2023; Wang & Wang, 2023). Although these sectors are highly exposed to fraud risks, the findings may not be fully generalizable to other organizational environments.

The reviewed literature indicates that relatively limited attention has been given to higher education institutions, public sector organizations, and non-profit entities despite their increasing accountability and governance challenges (Pahala et al., 2019; Sari Hasibuan et al., 2025; Hariyati et al., 2025). This limitation suggests the need for future studies to examine the implementation of AI-based fraud detection and governance mechanisms in broader institutional settings. Such research would contribute to a more comprehensive understanding of fraud risks across different organizational contexts.

**Human Factors in the Era of Artificial Intelligence**

Although recent research increasingly emphasizes technological innovation, the reviewed studies consistently highlight the continuing importance of human factors in fraud detection. Auditor competence, professional skepticism, integrity, and continuous training remain critical determinants of audit effectiveness and fraud detection capability (Handoko & Sardjono, 2022; Khairunnisa et al., 2025; Nurleni et al., 2024; Purwohedi et al., 2025).

However, the interaction between Artificial Intelligence and human competencies remains relatively underexplored. Existing studies tend to examine technological and behavioral factors separately, resulting in a limited understanding of how AI influences auditor judgment, professional skepticism, decision-making processes, and fraud risk assessments. Future research should therefore investigate the complementary relationship between intelligent technologies and human expertise in modern auditing and governance environments.

**Emerging Issues of ESG Fraud and Sustainability Governance**

The review also identifies ESG fraud and sustainability governance as emerging areas that require further scholarly attention. Recent studies have highlighted growing concerns regarding greenwashing practices, misleading sustainability disclosures, and the manipulation of non-financial information (Wang & Wang, 2023; Artyukhov, 2024; Sutrisno et al., 2026). These issues indicate that fraud risks are no longer limited to financial reporting but increasingly involve sustainability-related disclosures.

Despite growing academic interest in sustainability reporting, research examining the integration of Artificial Intelligence into ESG fraud detection remains limited. Consequently, future studies should explore how AI-based monitoring systems, data analytics, and automated assurance mechanisms can support sustainability governance and improve the credibility of ESG disclosures. Such investigations would contribute to the development of more effective approaches for addressing emerging sustainability-related fraud risks.

**Cross-Country and Comparative Research Opportunities**

Another gap identified in the literature is the limited number of comparative studies across countries and institutional environments. Most reviewed studies focus on single-country contexts, making it

difficult to understand how cultural, regulatory, and institutional factors influence fraud detection and governance effectiveness.

Comparative research involving developed and developing countries, public and private organizations, or different governance systems would provide valuable insights into contextual factors affecting the implementation of Artificial Intelligence and governance mechanisms. Such studies could contribute to the development of more adaptive and context-sensitive fraud prevention frameworks.

**Future Research Agenda**

Based on the identified gaps, future research should prioritize the development of interdisciplinary frameworks that integrate Artificial Intelligence, governance mechanisms, internal auditing, and sustainability governance. Researchers are encouraged to move beyond isolated investigations of individual variables and instead adopt broader perspectives that capture the complexity of contemporary fraud risks.

Furthermore, several promising research directions emerge from this review, including AI-assisted auditing, digital whistleblowing systems, AI governance frameworks, ESG fraud analytics, sustainability assurance mechanisms, and AI-driven internal control systems. These topics are expected to become increasingly relevant as organizations continue to experience rapid digital transformation and heightened demands for transparency, accountability, and sustainability.

Overall, the findings of this review suggest that the future of fraud detection research lies not only in advancing technological capabilities but also in understanding how intelligent technologies can be effectively integrated with governance structures, human competencies, and sustainability objectives. Such an integrated perspective is essential for developing adaptive and resilient fraud prevention systems in the digital era.

## CONCLUSION AND SUGGESTIONS

This study aimed to systematically review the development of research related to Artificial Intelligence in fraud detection and governance. By analyzing 26 articles published between 2021 and 2026, this study provides a comprehensive overview of the current state of knowledge regarding AI-based fraud detection, governance mechanisms, internal auditing, auditor competence, and ESG-related fraud issues.

The findings indicate that Artificial Intelligence has emerged as a transformative technology in fraud detection, enabling organizations to move from reactive fraud investigation toward predictive fraud prevention. The reviewed studies consistently demonstrate that AI technologies improve analytical capabilities, enhance monitoring effectiveness, and support data-driven decision-making processes. However, the findings also reveal that technological advancement alone is insufficient to ensure effective fraud prevention. Governance mechanisms, including internal controls, internal auditing, whistleblowing systems, and organizational accountability, remain essential components of successful fraud detection frameworks.

Another important finding of this review is the continuing importance of human factors. Auditor competence, professional skepticism, integrity, and continuous professional development continue to play a critical role in supporting fraud detection effectiveness. Rather than replacing human expertise, Artificial Intelligence appears to complement and strengthen auditor capabilities. Furthermore, the emergence of ESG fraud and sustainability governance issues indicates that fraud risks are evolving beyond traditional financial reporting and increasingly involve non-financial disclosures and stakeholder accountability.

From a theoretical perspective, this review contributes to the literature by integrating findings from multiple research streams that are often examined separately, namely Artificial Intelligence, governance, internal auditing, and sustainability governance. The study highlights the importance of adopting a more holistic perspective when examining fraud prevention and detection in contemporary organizations. The review also identifies several research gaps that may serve as a foundation for future investigations.

From a practical perspective, the findings suggest that organizations should not focus exclusively on technological investment but should also strengthen governance structures, internal control systems, and human resource capabilities. Effective fraud prevention requires a balanced integration of intelligent technologies, organizational governance, and professional expertise. This implication is particularly relevant for higher education institutions, public sector organizations, and entities facing increasing demands for transparency and accountability.

Despite its contributions, this study has several limitations. First, the review only included articles published between 2021 and 2026, which may exclude relevant earlier studies. Second, the review focused on selected international databases and may not fully capture research published in other academic sources. Third, the thematic synthesis approach adopted in this study emphasizes conceptual interpretation rather than quantitative meta-analysis.

Future research is encouraged to investigate the integration of Artificial Intelligence and governance mechanisms in greater depth, particularly within higher education institutions, public organizations, and sustainability governance contexts. Additional studies examining AI-assisted auditing, ESG fraud analytics, digital whistleblowing systems, and cross-country governance comparisons would further enrich the literature and support the development of more adaptive fraud prevention frameworks in the digital era.

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