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Global Strategies in Fraud Prevention and Detection: A Systematic Review

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Abstract

This study used a qualitative descriptive design of a systematic review of Scopus-indexed journals on fraud detection and prevention from 2021-2025, and the result was 39 relevant articles. The results highlight that fraud prevention and detection both require a harmonized approach through internal auditing, internal controls, technology solutions, and organizational factors like leadership and professional skepticism. The use of sophisticated technologies such as machine learning, deep learning, and big data analytics significantly enhances detection capabilities, especially in the case of financial transactions. Besides internal control systems, auditor skills, and whistleblower systems, there are also significant roles to be played. Ethical concerns, such as privacy and transparency issues within AI-driven systems, have been noticed as well. Managerial implications consist of keeping organizational internal controls robust, utilizing technological tools, and encouraging a culture of skepticism as well as ethical governance. Future research may focus on the long-term effectiveness of these methods, such as ethical considerations in AI, sectoral applications, and the cost-effectiveness of implementing these solutions in resource-constrained environments.

Keywords: Fraud Prevention, Fraud Detection, Systematic Review, Artificial Intelligence, Internal Control.

Introduction

Fraud is a universal and evolving threat across sectors, causing massive financial and reputational losses globally. (Karpoff, 2021). Along with growing online transactions, complex financial structures, and internationalized business processes, fraud risk has become more sophisticated and difficult to detect (Pham & Vu, 2024). To respond to it, governments, institutions, and organizations globally have adopted several mechanisms for preventing and detecting fraud (Taherdoost, 2021). These range from traditional internal controls and auditing

techniques to advanced technology interventions such as artificial intelligence (AI), machine learning (ML), and big data analytics (Qatawneh, 2024).

There has been increased academic interest in recent years in identifying the effectiveness, usability, and impact of these measures, particularly in the wake of increasing digitalization and regulatory demands (Amankwah-Amoah et al., 2021; Meilita Rizkynanda et al., 2023). This systematic review combines outcomes from Scopus-indexed papers between 2021 and 2025 to map global trends and innovations in fraud detection and prevention. By categorizing methods by country, industry, and methodology, the study aims to provide a general overview of new best practices and success factors.

Research Questions:

RQ1: What are the methods of fraud prevention that have been reported in Scopus-indexed journals between 2021 and 2025?

RQ2: What are the most commonly discussed fraud detection methods in Scopus-indexed literature between 2021 and 2025?

Literature Review

Fraud is an intentional act of deceit for personal or financial gain, often involving the manipulation of information or systems (Acree, 2021; Singh et al., 2022). It includes forms such as financial, procurement, and identity fraud, affecting both the public and private sectors (Ali & Mohd Zaharon, 2024; Karpoff, 2021; Modrušan et al., 2021). Fraud typically exploits control gaps and is driven by opportunity, pressure, and rationalization, as the fraud triangle defines (Kagias et al., 2022). Its consequences include financial loss, damage to reputation, legal sanctions, and erosion of public trust (Gottschalk & Hamerton, 2025). As fraud evolves, becoming increasingly complex, organizations must continue to strengthen their detection and prevention measures to protect their assets and uphold integrity (Taherdoost, 2021).

Fraud prevention involves the proactive reduction of the risk of fraud before it being perpetrated. It involves effective internal controls, ethical culture, governance, risk assessment, training employees, and reporting mechanisms (Taherdoost, 2021). Emerging technologies like big data, AI, and e-procurement have raised the level of real-time identification of vulnerabilities (Raghul et al., 2024). Fostering integrity, whistleblowing, and leadership support also play significant roles (Zakiy & Satyarini, 2025). Effective prevention not only guards assets but ensures public trust as well, especially in financial and public institutions (Renigier-Bilozor et al., 2024).

Detection of fraud is identifying suspicious transactions or activity patterns that may indicate wilful deception (Hilal et al., 2022). Historically based on internal control, whistleblowing, and physical audits, detection has become smarter with the technology of complex fraud and big data (Putra et al., 2022). Detection nowadays employs machine learning, data mining, neural networks, and AI to analyze masses of data, recognize patterns, and adapt when new fraud ruses emerge (Olushola & Mart, 2024). These technologies improve speed and accuracy, making fraud detection essential across industries like banking, insurance, e-commerce, and the public sector (Al-Hashedi & Magalingam, 2021). Besides preventing financial loss, it also improves stakeholder trust and regulatory compliance (Morić et al., 2024).

Research Method

This study employed a qualitative descriptive design with a systematic literature review following PRISMA guidelines (Anwar et al., 2025; Pardosi et al., 2025; Rethlefsen & Page, 2021; Sulistyowati, Anwar, et al., 2025; Sulistyowati, Pardosi, et al., 2025; Sulistyowati & Husda, 2023; Sulistyowati & Sukati, 2024) of Scopus-indexed journals concerning fraud prevention and detection between 2021 and 2025. The initial search via the Scopus database was conducted on May 13, 2025, with research article title querying keywords: "Fraud Prevention" OR "Fraud Detection" OR "Anti-Fraud Strategies" OR "Systematic Literature Review" OR "Global Governance" OR "Internal Control Systems" OR "Risk Management" OR "Forensic Auditing" OR "Financial Crime" OR "Technology in Fraud Detection." There were 58,536 papers from this search. The search was also filtered by the following: publication years (2021–2025), subject areas ("Business, Management and Accounting" and "Economics, Econometrics and Finance"), document type ("Article"), publication stage ("Final"), keyword (Fraud Detection, Fraud Prevention"), source type ("Journal"), language ("English"), and open access availability. The advanced search query was:

TITLE ("Fraud Detection" OR "Fraud Prevention" OR "Anti-Fraud Strategies" OR "Systematic Literature Review" OR "Global Governance" OR "Internal Control Systems" OR "Risk Management" OR "Forensic Auditing" OR "Financial Crime" OR "Technology in Fraud Detection") AND (LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "ECON")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (OA, "all")) AND (LIMIT-TO (EXACTKEYWORD, "Fraud Detection") OR LIMIT-TO (EXACTKEYWORD, "Fraud Prevention")). The last search resulted in 39 relevant articles to be included in the subsequent analysis. The flow diagram is presented below:

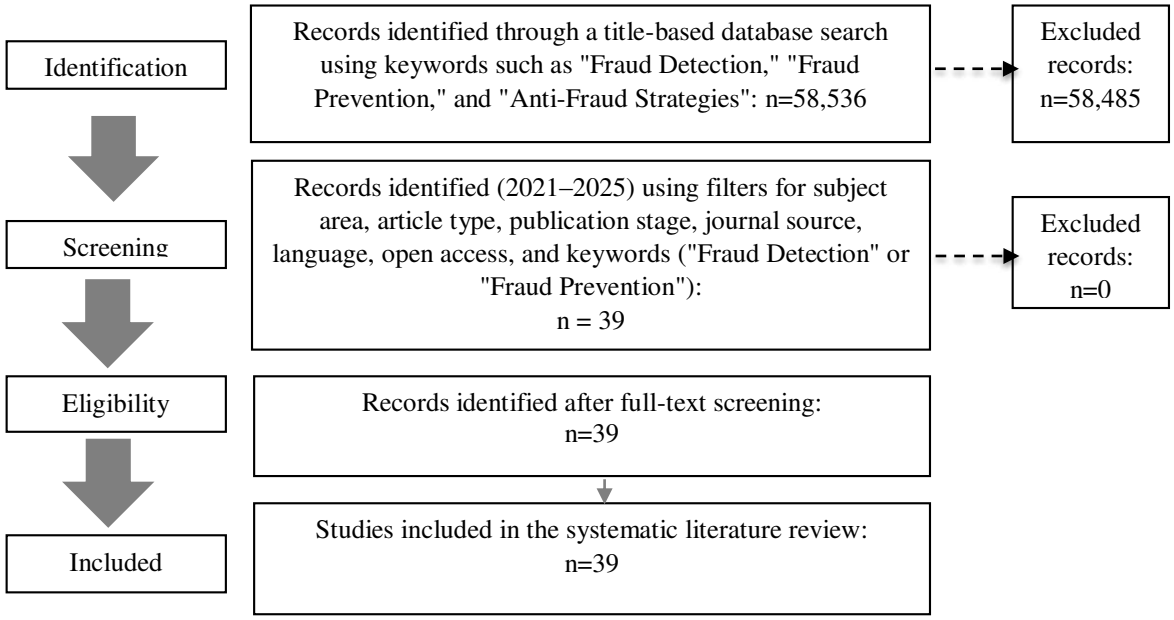

Figure 1. PRISMA Flow Diagram of the Literature Review Method Source: (Anwar et al., 2025; Pardosi et al., 2025; Sulistyowati, Anwar, et al., 2025; Sulistyowati, Pardosi, et al., 2025)

Result and Discussion

The 39 items in Table 1 encompass a wide variety of methodologies, methods, and fraud detection and prevention settings by industry and country. One general trend in the majority of the studies (Aslam et al., 2022; Baesens et al., 2021; Xu et al., 2023; Yang et al., 2024) is using machine learning (ML), deep learning (DL), or AI techniques to maximize precision and effectiveness in fraud detection, particularly in credit card, loan, medical insurance, and online transactions. Other research (Khikmah et al., 2023; Riadi et al., 2025; Wahidahwati & Asyik, 2022) also focuses intensely on human factors such as auditor ethics, ability, political will, and leadership in enhancing fraud detection and prevention in public institutions. Others (Gabrielli et al., 2024; Mardjono et al., 2024) speak of the growing importance of big data and forensic accounting, arguing that technological competence can enhance or enable the efficacy of internal controls.

However, the studies differ widely in topic and scope. For instance, (van Bekkum & Borgesius, 2021) and (Gabudeanu et al., 2021) have touched on legality and morality more thoroughly in the context of the war of data privacy against surveillance in fraud systems. Some of them put a special emphasis on systemic and policy-driven analysis (Baumgärtler et al., 2024; Haliah et al., 2025), and others are algorithm performance-driven or technical. The regional breakdown also reflects regional interests: Indonesian studies predominantly focus on internal audit, governance, and public accountability, while European and Chinese ones rather apply state-of-the-art AI methods. Lastly, a few like (Putra et al., 2022) and (Joseph et al., 2021) define content analysis or literature reviews rather than empirical testing owing to methodological heterogeneity. Overall, while a notion appears to exist that technological and institutional measures need to be used to combat fraud, and everyone agrees with this fact, heterogeneity between data, methods, and context goes to helps point to the intricacy of fraud research.

Table 1. Scopus-Indexed Articles on Fraud Prevention and Detection (2021–2025)

No	Author (Year)	Country	Scope	Method	Data	Finding
1	(Baesens et al., 2021)	Belgium	Fraud detection using ML	Data engineering & ML models	Real payment transactions dataset	Improved performance and interpretability using data and feature engineering techniques
2	(Aslam et al., 2022)	Pakistan	Auto insurance fraud detection	ML (SVM, Logistic, NB), Boruta	Public auto insurance dataset	SVM has the highest accuracy; key features: fault, policy, age
3	(Van Belle et al., 2023)	Belgium	Credit card fraud detection	Network RL (CATCHM)	Real-life credit card data	CATCHM outperforms others; reduces manual feature engineering, uses transaction networks

No	Author (Year)	Country	Scope	Method	Data	Finding
4	(van Bekkum & Borgesius, 2021)	Netherlands	Legal implications of fraud detection	Legal case study	Dutch SyRI court case	SyRI ruled illegal; stresses privacy, transparency, and data protection
5	(Velasco et al., 2021)	Brazil	Procurement fraud risk assessment	DSS, data mining, graph theory	Public procurement datasets (~$50B)	DSS aids investigation, identifies fraud patterns (e.g. collusion, conflicts of interest)
6	(Wahidahwati & Asyik, 2022)	Indonesia	Auditor traits & fraud detection	Survey & regression analysis	57 auditors from East Java	Experience, ethics, skepticism, and personality significantly affect fraud detection
7	(Xu et al., 2023)	China	General fraud detection	Deep Boosting Decision Trees (DBDT)	Real fraud datasets	DBDT improves accuracy and interpretability by merging neural nets with boosting
8	(Mqadi et al., 2021)	South Africa	Credit card fraud with imbalanced data	SMOTe + classical ML classifiers	Imbalanced credit card dataset	SMOTe improves the model ability to detect positive (fraud) classes
9	(Chen et al., 2022)	China	Loan fraud with diverse falsification types	Hierarchical multi-task learning	Real-world loan application data	Fraud broken into subtasks; approach improves accuracy and handles info heterogeneity
10	(Putra et al., 2022)	Indonesia	Fraud prevention strategy review	Literature review	90 journal articles (1990–2021)	Internal audit, risk mgmt, whistleblowing, big data influence fraud prevention via mediation
11	(Farbmacher et al., 2022)	Germany	Health insurance fraud detection	Deep learning, comparative analysis	Private health insurer data	Deep learning model adapted from text classification outperforms conventional ML in handling unstructured claim data.
12	(Gabudeanu et al., 2021)	Romania	Transactional fraud vs. privacy in the EU	Legal analysis, survey	425 survey responses	Explores tension between fraud detection and data privacy; proposes compliance recommendations.
13	(Miao, 2024)	China	Financial fraud detection	Literature-based analytical study	Secondary literature	Traditional models struggle with complexity; deep learning offers promise in feature extraction and pattern recognition.

No	Author (Year)	Country	Scope	Method	Data	Finding
14	(Mardjono et al., 2024)	Indonesia	Forensic accounting, Big Data, and internal control	Quantitative, SEM	331 auditors in Indonesia	BDA mediates the link between COSO/internal control & intent to use forensic accounting; strong IC + BDA aids fraud control.
15	(Khikmah et al., 2023)	Indonesia	Fraud prevention in state universities	Quantitative (SPSS)	65 internal auditors	Internal audit and transformational leadership significantly improve fraud prevention.
16	(Joseph et al., 2021)	Malaysia & Indonesia	Fraud disclosure on university websites	Content analysis	106 universities	Malaysian univ. Stronger in audit/bursary; Indonesians are better in governance/policy; overall, low disclosure levels.
17	(Mappanyukki et al., 2024)	Indonesia	Emotional intelligence, professional commitment, and skepticism	Quantitative (SmartPLS)	42 SKPD staff in Gowa Regency	EI affects fraud prevention via skepticism; skepticism does not moderate the PC-FP link.
18	(Junaidi et al., 2024)	Indonesia	Political skill, Big Data, and fraud detection	Quantitative (SEM via SmartPLS)	147 auditors (BPKP & BPK)	Political skill and Big Data positively influence fraud detection ability.
19	(Detthamrong et al., 2024)	Thailand	Banking fraud detection	ML model comparison	Bank transaction dataset	CatBoost outperforms others; ensemble methods and data sampling enhance accuracy.
20	(Ghrib et al., 2024)	Global	Card-based fraud detection	Deep learning (BiLSTM + BiGRU)	Card transaction data	Ensemble model achieves 89.22% detection rate; outperforms traditional ML classifiers.
21	(Pramono, 2023)	Indonesia	Fraud prevention factors	Qualitative descriptive; CFA	30 BPK RI auditors	Auditor experience and task-specific knowledge are key to fraud prevention.
22	(Silalahi et al., 2023)	Indonesia	E-procurement and fraud prevention	Quantitative; SmartPLS	85 procurement officers in Riau	E-procurement and internal control significantly reduce fraud in government procurement.
23	(Nguyen et al., 2024)	Vietnam	Internal audit effectiveness and fraud detection	Quantitative; SPSS & SmartPLS	325 joint stock firms	Internal audit quality, team capability, independence, and leadership support

No	Author (Year)	Country	Scope	Method	Data	Finding
						improve audit effectiveness, which enhances fraud detection.
24	(Lubis et al., 2024)	Indonesia	Fraud prevention in government	Quantitative; PLS	61 internal auditors (North Sumatra Inspectorate)	Internal audit and internal control significantly prevent fraud; audit quality has no effect.
25	(Gabrielli et al., 2024)	Italy	Big data in forensic accounting	Qualitative; Interviews	17 forensic accountants	Big data enhances fraud detection via visual analytics and deeper analysis (affordances).
26	(Baumgärtler et al., 2024)	EU countries	EU Structural & Investment Funds	Quantitative, secondary data	454 EU funds (2014–2020)	High GDP and transparency levels improve fraud detection; federal states are more effective.
27	(Kim, 2023)	South Korea	Online sales fraud detection	Deep learning model	Smart supply chain dataset	The DL model detects regions and patterns of sales fraud based on customer/payment data.
28	(Benligiray et al., 2025)	Turkey	Fraud detection without historical data	Expert-based scoring	Financial & expert opinion data (Istanbul Exchange)	New fraud detection scoring performs competitively without needing large training datasets.
29	(Riadi et al., 2025)	Indonesia	Auditor competence & fraud detection	Quantitative; PLS-SEM	152 government auditors	Audit quality mediates the influence of ethics, professionalism, and competence on fraud detection.
30	(Zhu et al., 2025)	China	Financial fraud via supply chain analysis	GNN (ieHGCN)	Multi-year financial & supply chain data	IEHGCN outperforms traditional methods; fraud propagates through supplier links.
31	(Haliah et al., 2025)	Indonesia	Political will, IT, and fraud prevention	Quantitative; PLS-SEM	325 village officials in South Sulawesi	Political will improves fraud prevention but not financial reporting quality; IT improves both fraud prevention and reporting quality.
32	(Yaseen & Al-Amarneh, 2025)	UAE & Qatar	AI fraud detection in banking	Quantitative; PLS-SEM & MGA	409 bank professionals	Transparency builds trust, the main driver of AI adoption; fairness perception reduces bias;

No	Author (Year)	Country	Scope	Method	Data	Finding
						compliance supports adoption.
33	(Cholakov & Stoyanova-Doycheva, 2024)	Bulgaria	AI-enhanced fraud detection agent (FraudDetector)	Qualitative; experimental	Software agent integration with ChatGPT	AI integration (ChatGPT) improves fraud detection precision; open architecture supports future enhancements.
34	(Achmad et al., 2024)	Indonesia	Forensic accounting skills and fraud detection	Quantitative; Regression with moderation	537 external auditors	Communication and auditing skills enhance self-efficacy; GAS boosts fraud detection; whistleblowing has no moderating effect.
35	(Damayanti & Agustia, 2024)	Indonesia	Commitment, religiosity, and auditor responsibility	Quantitative; SEM-PLS	101 government auditors (BPK)	All commitment types and religiosity positively impact auditor responsibility for fraud detection.
36	(Paranoan et al., 2024)	Indonesia	Whistleblowing, integrity, and fraud prevention	Quantitative; Multiple regression	70 auditors in South Sulawesi and Makassar	Whistleblowing and integrity significantly reduce fraud; transparent culture is crucial.
37	(Usman & Sundari, 2024)	Indonesia	Village financial system and fraud prevention	Quantitative; Regression	51 village officials in Pinrang	Financial system, transparency, and internal control all significantly prevent fraud.
38	(Yang et al., 2024)	China	Credit card fraud detection using AI	Quantitative; MoE + DNN-SMOTE	Public credit card dataset	Combining MoE and DNN-SMOTE enhances fraud detection, achieving high accuracy and balance (MCC = 0.7883).
39	(Nadirsyah et al., 2024)	Indonesia	IAF, IC, FP, and governance	Quantitative; SEM-PLS	117 internal auditors (AIGIA)	IAF improves IC and governance; fraud prevention mediates IAF–governance link, but IC does not.

Source: Scopus, as of May 13, 2025

RQ1: What are the methods of fraud prevention that have been reported in Scopus-indexed journals between 2021 and 2025?

Between 2021 and 2025, Scopus-indexed journals reported a variety of fraud prevention practices that reflect a growing convergence of technology, governance processes, and

institutional reforms. One such practice is the application of internal audit and internal control mechanisms. Studies in Indonesia (Khikmah et al., 2023; Lubis et al., 2024; Nadirsyah et al., 2024) confirmed that these mechanisms are essential in mitigating fraud risks, particularly in government institutions. The other interesting trend is the use of digital solutions such as e-procurement systems (Silalahi et al., 2023) and village financial information systems (Usman & Sundari, 2024), which enhance transparency and accountability. Organizational and individual-level factors are also emphasized; for example, transformational leadership, auditor capability, professional skepticism, and political will (Haliah et al., 2025; Mappanyukki et al., 2024) have been identified to be linked with more successful fraud prevention. Whistleblowing mechanism and ethical culture were also established to reduce fraud occurrence (Paranoan et al., 2024). Additionally, big data and forensic accounting is also a strategic prevention method (Gabrielli et al., 2024; Mardjono et al., 2024) that offers advanced insight into abnormalities. These findings suggest that fraud prevention requires a multi-dimensional approach combining robust internal processes, digital technology, and human resource development.

RQ2: What are the most commonly discussed fraud detection methods in Scopus-indexed literature between 2021 and 2025?

During the period 2021-2025, fraud detection methods in Scopus-indexed papers have been focused primarily on machine learning (ML), deep learning (DL), forensic accounting, internal audit, and big data analytics. Most studies employed ML and DL algorithms, such as Support Vector Machines (SVM), Boosting Trees, BiLSTM-GRU models, and neural networks (Baesens et al., 2021; Ghrib et al., 2024; Xu et al., 2023; Yang et al., 2024). These methods enhance accuracy, scalability, and the ability to detect faint fraud patterns, particularly for financial transactions, credit card data, and health insurance claims. Feature engineering and oversampling approaches like SMOTe (Mqadi et al., 2021) have been combined in some studies to tackle imbalanced datasets. Others introduced new models, such as CATCHM (Van Belle et al., 2023) and hierarchical multi-task learning (Chen et al., 2022), that outperform traditional classifiers and reduce human effort.

As a complement to the technological solutions, literature also emphasizes the significance of internal control systems, auditor knowledge, whistleblowing systems, and organizational ethics (Paranoan et al., 2024; Riadi et al., 2025; Wahidahwati & Asyik, 2022). Indonesian studies particularly highlight the internal audit role, auditor skepticism, and leadership style in supporting fraud prevention and detection (Damayanti & Agustia, 2024; Khikmah et al., 2023). Moreover, big data analytics and supply chain knowledge graphs (Mardjono et al., 2024; Zhu et al., 2025) reveal new possibilities for the detection of network-based and intricate fraud.

Legal and ethical concerns were also brought up, specifically on the side of privacy and transparency in AI-driven systems (Gabudeanu et al., 2021; van Bekkum & Borgesius, 2021), indicating mounting debate about the surveillance-civil rights balance. Finally, the most universally debated methods incorporate sophisticated analytics (AI/ML/DL), forensic auditing, strong internal controls, and ethical governance models to enhance fraud detection efficiency in numerous business sectors and geographical locations.

Conclusion

Fraud prevention and detection methods analyzed in Scopus-published journals from 2021 through 2025 reveal that fraud prevention and detection both require a combined, multi-dimensional approach. Internal auditing, internal controls, digital solutions like e-procurement and village financial systems, and organizational traits such as leadership and professional skepticism were critical to reduce fraud risk for fraud prevention. The synergy between forensic accounting and big data also turned out to be a powerful tool in detecting potential threats. These findings emphasize the need for synergy between good governance practices and technological innovation and human resource capacity building in anti-fraud activities. As for fraud detection, the main methodologies focus on high-tech methods such as machine learning (ML), deep learning (DL), and big data analytics, which provide higher precision and scalability in the detection of sophisticated fraud patterns, particularly in financial transactions. Moreover, internal control systems, auditor competencies, and whistleblowing procedures were emphasized as supporting considerations in the delivery of effective fraud detection. Legal and ethical concerns, particularly privacy and transparency issues within AI-driven systems, were also noted as salient ones. In general, both fraud prevention and detection methodologies stress the need for ensuring a balance between innovation in technology and efficient regulation and ethical reasoning in combating fraud across industries.

Declaration of conflicting interest

The authors declare that there is no conflict of interest in this work.

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