

Forensic Audit in Fraud Detection and Prevention for General Insurance Claims: A Literature Review

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ABSTRACT

This paper presents a comprehensive literature review on the application of forensic audit techniques to detect and prevent fraud in general insurance claims. The review encompasses studies published between 2020 and 2025, focusing on the evolving role of forensic auditing within the insurance industry. Our analysis reveals several key themes: 1) The increasing sophistication of insurance fraud schemes has necessitated more advanced forensic audit methods, including the integration of data analytics and artificial intelligence. 2) Forensic auditing plays a critical role in uncovering existing fraud, developing preventive measures, and strengthening internal control systems within insurance companies. 3) There is a growing trend toward using predictive modeling and machine learning algorithms to identify potential fraudulent claims before they are processed. 4) The effectiveness of forensic auditing is significantly enhanced when combined with other fraud detection techniques, such as data mining and network analysis. 5) The regulatory framework and industry standards for forensic auditing in insurance are still evolving, with variations across jurisdictions. This review also highlights several research gaps, including the need for further empirical studies on the cost-effectiveness of forensic audit programs in insurance companies, the impact of emerging technologies such as blockchain on forensic audit practices, and ethical considerations in the use of advanced data analytics for fraud detection. This study contributes to the existing literature by providing a synthesized view of current forensic audit practices in general insurance fraud detection and prevention while identifying future research directions to address the evolving challenges in this field

INTRODUCTION

Forensic auditing is a branch of investigative auditing that focuses on collecting, analyzing, and evaluating financial evidence to detect and prevent fraud and economic crimes. With the increase in cases of fraud, corruption, and financial crime, forensic audits are becoming increasingly critical in law enforcement and corporate governance. This discipline merges the principles of accounting, auditing, and legal investigation to uncover illegal activities in an entity's financial statements (Singleton & Singleton, 2010). According to Albrecht et al. (2019), the aim of forensic audits is to identify and prevent fraud by evaluating internal control systems. They employ in-depth investigative techniques, such as forensic interview methods, financial data analysis, and digital investigation technologies. Zimelman and Albrecht (2020) mention that forensic audits often collaborate with law enforcement to gather evidence that can be used in court. The primary role of a forensic audit is to detect and prevent fraud in both public and private sector organizations. According to Wells (2017), forensic auditors help organizations identify weaknesses in internal control systems that allow for fraud, utilize risk-based audit techniques to concentrate investigations on areas with a high potential for discrepancies, and provide recommendations to enhance anti-fraud policies for greater transparency and accountability.

Insurance fraud presents a significant challenge in the insurance industry, resulting in substantial financial losses for insurance companies and increased premium costs for policyholders. This type of fraud can be committed by individuals, groups, or even organized structures seeking illicit financial gain. Insurance fraud can be defined as a deceptive act aimed at obtaining unauthorized claims or benefits from insurance policies (Derrig, 2002). According to Viaene & Dedene (2004), insurance fraud can be categorized into several main types: hard fraud, soft fraud, policyholder fraud, insurance intermediary fraud, and third-party fraud. This issue stems from a combination of individual motivations and systemic weaknesses within the insurance framework. According to Button et al. (2007), primary factors leading to insurance fraud include financial incentives, lack of oversight and regulation, availability of opportunities, and insufficient ethical awareness.

Fraud detection and prevention in general insurance claims pose considerable challenges for the insurance industry, necessitating innovative approaches to mitigate these risks. Forensic auditing, with its focus on investigation and assessment, plays a crucial role in identifying discrepancies and fraudulent activities. The integration of forensic auditing techniques with advanced data analytics, artificial intelligence (AI), and blockchain technology has produced promising results in enhancing the accuracy and efficiency of fraud detection mechanisms. This literature survey aims to explore the current state of research concerning the application of forensic auditing in fraud detection and prevention within the general insurance sector, highlight key technological advancements, identify existing research gaps, and suggest future research directions.

LITERATURE REVIEW

Fraud in general insurance claims is a significant challenge in the global insurance industry. One approach increasingly being adopted in detecting and preventing fraud is forensic audit, an investigative audit technique that focuses on uncovering illegal or manipulative activities. This practice is increasingly essential because conventional fraud detection methods often fail to identify complex and hidden patterns.

Forensic Audit Concept and Its Role in the Insurance Industry

Forensic audit combines accounting, investigation, and law to detect and investigate fraud (Bhasin, 2013). In the context of general insurance, forensic audits not only detect but also prevent fraud through risk mapping, claim data analysis, and assessment of underwriting process compliance. Forensic auditors use evidence-based approaches and technology to trace indications of claim manipulation, such as inflated damage values, double claim submissions, and document falsification. Several studies have stated that forensic audits contribute significantly to internal control systems' effectiveness and strengthen corporate governance systems (Dhar & Sarkar, 2010). Forensic auditors use sophisticated data analysis, document examination, and interviews to uncover fraudulent activities (Duchitanga-Plasencia & Zapata-Sánchez, 2024). Forensic audits strengthen internal controls, which is essential for early fraud detection (Chastika et al., 2025).

According to the Association of Certified Fraud Examiners (2022), fraud is any intentional or knowing act to deprive another person of property or money by trickery, deception, or other unfair means. In the insurance context, fraud is divided into two main categories: hard and soft. Complex fraud occurs when an individual intentionally creates a loss to obtain a claim (for example, burning his vehicle). At the same time, soft fraud occurs when the policyholder exaggerates the claim for a legitimate loss (Viaene & Dedene, 2004). According to ABI (2022), fraud in vehicle and property claims is the most common, and forensic audits can identify anomalies in the pattern of these claims through data mining and forensic analytics techniques.

Forensic Audit Methods and Techniques in Detecting Fraud

A study by Ngai et al. (2011) shows that integrating forensic audits with technology-based fraud detection systems improves the accuracy and efficiency of detection. Some techniques that are often used in forensic audits are:

- Benford's Law is used to detect abnormal distributions of numbers in claim data.
1. Digital Forensics to track communications, electronic transactions, and document metadata.
 2. Predictive modeling and machine learning are used to identify suspicious claim patterns and predict the possibility of fraud (Bolton & Hand, 2002).
 3. Red Flag Analysis to identify early indicators of possible fraud based on claim behavior and customer profiles (Bierstaker et al., 2006).

Preventive Role of Forensic Audit

A study by Singleton and Singleton (2010) emphasized the importance of the role of forensic auditors in building an antifraud culture in insurance companies. In addition to being a detection tool, forensic audits function as a

prevention tool through audits of internal control systems and Standard Operating Procedures of claim companies, antifraud training for claim and underwriting staff, evaluation of the integrity of partners and third parties (repair workshops, loss assessment service providers) and the preparation of an early warning system (EWS) based on historical claim data and risk profiles. With the help of forensic audits, organizations can develop an early detection system using fraud indicators (red flags), such as unusual spending patterns, manipulation of transaction data, and anomalies in employee behavior (Bierstaker et al., 2006). Conducting forensic audits periodically provides a deterrence effect because it increases the perception that fraud will be detected. This is part of a risk perception-based prevention strategy (Bhasin, 2015).

METHODOLOGY

This study utilizes the Narrative Literature Review (NLR) method. The NLR research approach compiles, synthesizes, and interprets existing literature within a specific field of study. The aim of NLR is to gain an in-depth understanding of research topics, identify gaps in the literature, and provide new perspectives through narrative interpretation. Baumeister and Leary (1997) explain that NLR includes compiling descriptive and interpretive literature reviews, allowing researchers to holistically combine and analyze findings from diverse sources. Unlike systematic literature reviews, which adhere to a strict quantitative and procedural format, NLR offers greater flexibility.

We follow research steps using the narrative literature review method: First, we identify topics and research questions (Green et al., 2006). Second, a literature search is conducted, gathering information from a variety of sources, including scientific journals, books, research reports, and other reputable publications. The selection of databases includes academic resources such as Google Scholar, Scopus, and other digital libraries, utilizing keywords relevant to the topic (Cronin, Ryan, & Coughlan, 2008). Third, we select literature based on its relevance and quality (Ferrari, 2015). Fourth, we analyze and synthesize the selected literature, critically assessing it to identify key themes, trends, and gaps (Torraco, 2005). Fifth, we engage in narrative writing, organizing the results of the analysis in narrative form, combining key findings while providing a coherent interpretation (Jesson, Matheson, & Lacey, 2011).

RESULTS AND DISCUSSION

1. Results Literature Search

This study identified 31 scientific articles relevant to forensic auditing in fraud detection and prevention for general insurance claims from various reputable journals. The articles analyzed were selected based on predetermined inclusion criteria, namely relevance to the research objectives, integration of theoretical analysis with practical application in the insurance context, articles in Indonesian or English, published in reputable journals or conference proceedings, publication year 2020-2025, and focus on forensic aspects and fraud prevention. Articles were analyzed based on publication year; 87% of articles were published in 2024, indicating increasing academic attention to this topic. Based on the focus of the topic and research objectives, 48% discussed forensic

audit techniques to detect fraud, 26% examined the role of forensic auditing in fraud prevention, and 26% discussed new trends and challenges in forensic auditing for insurance fraud. A summary of the results of the literature analysis is shown in the following table:

Table 1. Summary of Literature Analysis Results

Category	Number of Articles	
	Amount	%
Forensic Audit Techniques To Detect Fraud	15	48%
The Role of Forensic Auditing in Fraud Prevention in General Insurance	8	26%
New Trends and Challenges in Forensic Auditing for Insurance Fraud	8	26%
Total	31	100%

2. Synthesis of Findings

Audit Techniques Forensics for Detecting Insurance Fraud

This section discusses the research objectives of forensic audit techniques for insurance fraud detection, consolidating findings from various studies to demonstrate the critical role of data analytics, artificial intelligence (AI), and machine learning in revolutionizing insurance fraud detection. It uncovers the trend of utilizing advanced predictive modeling techniques and AI-based algorithms, including online learning methods, convolutional neural networks, generative adversarial networks, and ensemble learning models, to improve the accuracy and efficiency of fraud detection in the health and automotive insurance sectors. These collective insights underscore the transformative impact of integrating advanced data analytics tools into forensic audit practice, offering promising directions for future research and applications in combating insurance fraud.

1. Integration of Data Analytics and Artificial Intelligence

Collective insights from recent studies highlight the significant potential of integrating data analytics and artificial intelligence (AI) in enhancing insurance fraud detection through forensic audit techniques. Zhang et al. (2024) introduced an innovative online learning method called POCL for medical insurance fraud detection, emphasizing the utility of contrastive learning pre-training combined with online updating strategies to adapt to evolving fraud patterns. Wongpanti et al. (2024) demonstrated the effectiveness of a one-dimensional Convolution Neural Network (1D-CNN) model enhanced with data augmentation techniques and a Focal Loss function in addressing the common class imbalance problem in auto insurance fraud detection. Saddi et al. (2024) explored broader applications of big data and AI for predictive analytics in insurance fraud detection, highlighting the role of machine learning algorithms in automating and improving the fraud detection process. Ha et al. (2024) proposed a novel approach that leverages Generative Adversarial Networks (GANs) to generate representational data that addresses data scarcity and privacy

concerns, ultimately improving predictive performance in insurance fraud detection. Lastly, Singh et al. (2024) provide a comparative analysis of EfficientNet, ResNet50, and MobileNet deep learning models in detecting vehicle insurance fraud through image analysis, demonstrating the effectiveness of state-of-the-art neural network architectures. Collectively, these findings underscore the transformative impact of integrating data analytics and AI into forensic auditing practices for insurance fraud detection, offering promising directions for future research and applications.

2. Predictive Modeling and Machine Learning Algorithms

The collective findings of the reviewed studies highlight the efficacy of various machine learning and predictive modeling techniques in detecting insurance fraud, with a particular emphasis on the health and auto insurance sectors. Each study provides unique insights into the development and application of these methodologies, demonstrating their potential to improve fraud detection capabilities significantly. Nordin et al. (2024) show that a tree-boosted Naïve Bayes model outperforms other classical and machine learning models in predicting auto insurance fraud claims, highlighting the potential of combining traditional algorithms with machine learning to improve detection accuracy. Cherkaoui et al. (2024) focus on health insurance fraud, demonstrating that a supervised classification algorithm can effectively improve detection accuracy, thus underscoring the adaptability of machine learning techniques across different types of insurance fraud. Quan et al. (2024) find logistic regression to be highly effective in detecting auto insurance fraud, demonstrating the value of simpler models under certain conditions. Ding et al. (2024) introduce a novel credit evaluation model that leverages LSTMs to improve health insurance fraud detection, highlighting the innovative use of deep learning techniques for complex fraud detection scenarios.

Aiemsuwan et al. (2024) and Duwadi et al. (2024) both emphasize the efficiency of the Random Forest algorithm in detecting auto insurance fraud, demonstrating the power of ensemble learning methods in handling such tasks. Wicaksono et al. (2024) further support this by showing the superiority of Random Forest over Decision Tree methods in accuracy. Another study by Duwadi et al. (2024) proposes an ensemble learning model that significantly improves fraud detection efficiency, demonstrating the power of combining multiple machine learning approaches. Mouna et al. (2024) and Khalil et al. (2024) address the challenges associated with dataset imbalance and missing values, which are common issues in fraud detection datasets, and show that adequately addressing these issues can significantly improve model performance. Khalil et al. further illustrate that addressing class imbalance positively impacts predictive model performance, reinforcing the importance of dataset preprocessing in machine learning workflows.

These studies underscore the critical role of advanced machine learning and predictive modeling techniques in insurance fraud forensic audits. They reveal the trend toward the application of ensemble learning models and the

importance of addressing dataset-specific challenges to improve detection accuracy and efficiency across insurance domains.

3. Research Gaps and Suggested Agenda

The literature synthesis reveals significant gaps in the application of forensic audit techniques in insurance fraud detection, particularly in adapting to rapidly evolving fraud tactics and dealing with imbalanced datasets. To address these limitations, the following research agenda is proposed: 1) Further exploration into the integration of real-time data analytics and forensic audit methodologies to enhance the adaptability of fraud detection systems to new and evolving fraud patterns, as highlighted by Aiemsuwan et al. (2024) and Zhang et al. (2024). 2) Investigation into the effectiveness of novel machine learning algorithms and their ability to work with highly imbalanced datasets, as discussed in Khalit et al. (2024), to improve the accuracy and reliability of fraud detection. 3) Development of advanced techniques to handle missing data in fraud datasets, which remains a significant challenge as identified by Khalit et al. (2025), to ensure the robustness and effectiveness of fraud detection models.

The Role of Forensic Auditing in Fraud Prevention in General Insurance

This section focuses on the research objective and the role of forensic audit in fraud prevention for general insurance, presenting a comprehensive review that shows a multifaceted approach involving forensic audit, cost accounting and artificial intelligence, which significantly enhances fraud prevention measures in the general insurance sector. The literature synthesis underlines the critical role of skilled professionals and advanced technology in identifying and mitigating fraud, alongside the potential of blockchain technology to enhance the security and transparency of transactions. Further, regulatory and operational strategies, including effective underwriting and claims management, are highlighted as critical to strengthening fraud prevention mechanisms, suggesting that integrating international standards and robust internal controls can substantially contribute to curbing financial disparities and fraud in general insurance.

1. Developing Preventive Measures

Integrating proactive forensic audit, cost accounting, and artificial intelligence (AI) plays a vital role in enhancing fraud prevention measures in general insurance. Kagombora et al. (2024) highlight the importance of qualified forensic auditors and automated tools to identify fraud indicators and emphasize regular integrity checks among employees to safeguard assets. Saha (2024) discusses the synergy between forensic audit and AI in enhancing investigative capabilities beyond traditional audits, thereby significantly enhancing corporate fraud detection and prevention. On the other hand, Rajwania (2024) and Majethia (2024), underline the indispensable role of cost and management accountants in forensic audit, showcasing their expertise in financial analysis and risk management, which are critical to uncovering financial discrepancies and fraud. These studies demonstrate that a multi-faceted approach combining skilled professionals, advanced technology, and robust audit practices is essential for developing effective fraud prevention measures in the general insurance context.

2. Strengthening Internal Control Systems

Key findings from the reviewed studies highlight the important role of forensic auditing in improving the quality of financial reporting and preventing fraud, along with the potential of blockchain technology to enhance the transparency and security of transactions in the general insurance industry. A study by Ibrahim et al. (2024) showed that behavioral intention to use forensic audit services at a North-Central University in Nigeria was positively influenced by perceived severity of financial fraud, perceived vulnerability to fraud, and perceived benefits of forensic accounting, among others, thereby demonstrating its effectiveness in strengthening internal control systems. Meanwhile, Inayatulloh et al. (2024) presented a promising blockchain model to mitigate common data theft issues in insurance claims processes, suggesting an innovative approach to fraud prevention and strengthening internal control in the general insurance sector.

3. Regulatory Framework and Industry Standards

The collected papers, including an analysis of the performance of general insurance companies in Indonesia with a focus on foreign affiliates and underwriting practices (Siber et al., 2024) and a study of underwriting processes and claims management in general insurance (Padhi, 2024), provide insights into regulatory and operational measures that can improve fraud prevention in the insurance sector. In particular, Siber et al. (2024) highlight the positive impact of foreign affiliates and their retention ratios on insurers' Return on Equity (ROE), suggesting that international standards and practices can contribute to better performance and potentially more stringent fraud prevention mechanisms. In contrast, Padhi (2024) emphasizes the importance of effective underwriting and claims management, showing that proper information gathering and risk assessment at the underwriting stage can significantly improve the efficacy of claims management, which indirectly supports fraud prevention. These findings underscore the important role of the regulatory framework and industry standards, including foreign affiliates and underwriting practices, in improving fraud prevention in the general insurance industry.

4. Research Gaps and Suggested Agenda

Despite the growing literature on forensic auditing and its implications for various sectors, little research specifically focuses on the role of forensic auditing in fraud prevention in the general insurance sector. Key gaps and suggested research directions include: 1) There is limited research exploring the integration of forensic auditing practices with blockchain technology to enhance fraud prevention mechanisms in general insurance, as suggested by the potential synergies highlighted in Inayatulloh et al. (2024) and Saha (2024). 2) The effectiveness of forensic audit tools and techniques in detecting and preventing insurance fraud remains under-explored, especially in an environment with high volumes of digital transactions. 3) Research that focuses on the behavioral aspects of implementing forensic audit services in the insurance sector, similar to the insights provided by Ibrahim et al. (2024), is still scarce, indicating the need for a deeper understanding of the

organizational and cultural factors that influence the implementation of forensic auditing.

Trends and New Challenges in Forensic Auditing for Insurance Fraud

Forensic auditing faces several emerging challenges in detecting and preventing insurance fraud, especially as fraud schemes become increasingly sophisticated. The integration of advanced technologies such as artificial intelligence (AI), blockchain, and data analytics has transformed the practice of forensic accounting, but these advancements have also introduced new complexities that auditors must navigate. A paper by (Daraojimba et al., 2023). Highlights the challenges in forensic accounting, including the need for continuous upskilling, adapting to rapidly changing technologies, and the integration of AI and predictive analytics, which require forensic accountants to acquire new competencies for effective fraud detection and prevention. Forensic accountants must acquire new skills to effectively utilize sophisticated tools, which can be a barrier to effective fraud detection. Research by Pavlović et al. (2023) highlights that forensic accounting is critical to financial integrity and resilience, where continuous research and innovation are essential to combat emerging fraud schemes. The research results by Afriyie et al. (2022) concluded that forensic accounting is a new trend in fraud detection and skilled forensic accountants are needed to prevent fraud. Odeyemi et al. (2024) highlight that integrating technology improves fraud detection in forensic accounting, and forensic accountants must adapt to digital advancements for effectiveness.

1. Ethical Considerations in Advanced Data Analytics for Fraud Detection

Ethical considerations in advanced data analytics for fraud detection span multiple dimensions, including privacy, transparency, accountability, and bias. As organizations increasingly rely on artificial intelligence (AI) and advanced analytics, addressing these ethical challenges is imperative to maintain public trust and ensure responsible use of data. Key findings from Supiah et al. (2023) highlighted that integrating data analytics significantly improved the quality of forensic audit reporting in Malaysia, focusing on increasing efficiency and ensuring data privacy and integrity in fraud detection efforts. A study by Saha Mudhories et al. (2025) emphasized the need for a comprehensive ethical framework to enhance public trust and ensure responsible use of AI technology in fraud detection systems. An ethical framework is essential for AI fraud detection, and organizations should prioritize ethics in their AI strategies. A paper by Okorie et al. (2024) emphasized core ethical principles such as consent, privacy, and the complexity introduced by big data in data analytics. This highlighted the need for an inclusive ethical framework and regulatory oversight to ensure responsible practices in fraud detection. Thakkar (2024) found that stakeholders must understand how fraud detection systems operate and the criteria used to flag suspicious activity. Ethical considerations in advanced data analysis to detect fraud include privacy issues, potential algorithm bias, and the need for transparency. Organizations must implement technical, organizational, and regulatory measures to ensure responsible data management and uphold individual rights.

2. Research Gaps and Suggested Agenda

The reviewed studies highlight the positive impact of data analytics on the quality of forensic audit reporting, but reveal specific gaps and suggest an agenda for future research such as exploring the challenges and limitations faced by auditors in integrating data analytics into their workflows for detecting insurance fraud as well as investigating the effectiveness of various data analytics tools and techniques specifically for detecting insurance fraud in forensic audits.

CONCLUSIONS AND RECOMMENDATIONS

The literature review emphasizes the vital role of forensic auditing in fraud detection and prevention within the general insurance sector, highlighting the increasing significance of data analytics, AI, and blockchain technologies in enhancing forensic audit practices. Despite progress, the survey uncovered substantial gaps, such as the necessity to adapt to new fraud tactics, challenges posed by imbalanced datasets, and the incorporation of blockchain technologies. The proposed research agenda stresses the importance of real-time analytics, exploration of innovative machine learning algorithms, and understanding the behavioral aspects of adopting forensic audits. Tackling these gaps through interdisciplinary research and applications can significantly enhance the effectiveness of fraud detection and prevention mechanisms, ensuring the integrity and sustainability of the insurance industry.

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