The Fraud Hexagon as an Analytical Framework for Predicting Financial Statement Fraud: A Systematic Literature Review

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ABSTRACT

This article analyzes the Fraud Hexagon model as a framework for detecting financial statement fraud across various sectors and geographic contexts using the Systematic Literature Review (SLR) approach. The model incorporates six elements: pressure, opportunity, rationalization, capability, ego, and collusion. The study reviewed 12 SCOPUS-indexed articles focusing on the banking, manufacturing, SMEs, and infrastructure sectors in national and regional contexts. Financial statement fraud results in the highest financial losses among fraud types. The Fraud Hexagon, an evolution of earlier theories, provides a comprehensive approach to fraud detection. This study aims to evaluate the application of the Fraud Hexagon model across sectors to identify critical factors influencing fraud and offer strategic recommendations for improving internal and external controls. Using the PRISMA framework, the study employs the SLR approach to filter and analyze relevant SCOPUS-indexed literature. The study examined fraud detection through stages of keyword analysis, highlighting pressure and collusion in regulated industries. Corporate governance and audit quality enhance detection, but limitations include a lack of behavioral and sector-specific focus. Future research should integrate behavioral and cultural dynamics with advanced analytics.

Keywords: *Fraud Hexagon; Systematic Literature Review; Financial Statement Fraud*

INTRODUCTION

Occupational fraud has long been a critical issue impacting organizations globally, leading to significant financial losses and eroding public trust. According to Occupational Fraud 2024: A Report to the Nations, fraud prevention can be effectively achieved through the implementation of robust anti-fraud controls. This report highlights that organizations with proactive measures such as Anti-Fraud Training, External Financial Audits, Firm Anti-Fraud Policies, Proactive Data Monitoring, Surprise Audits, and Fraud Reporting Hotlines experience considerably reduced fraud risks and losses. Despite these proven measures, occupational fraud remains pervasive, with losses often exceeding billions of dollars annually across industries. The report

indicates that organizations without adequate anti-fraud controls face significantly higher vulnerability, leading to prolonged fraud schemes and larger financial impacts. This underscores the necessity of implementing comprehensive fraud prevention strategies to mitigate risks effectively.

The urgency of addressing occupational fraud is further amplified by evolving organizational structures and advancements in technology. As digital transformation accelerates, the complexity of fraud schemes has also increased, making traditional fraud detection methods less effective. For instance, cyber-enabled fraud has become a growing concern, with perpetrators leveraging sophisticated tools to exploit vulnerabilities in digital systems. Consequently, the integration of advanced technologies such as data analytics, machine learning, and artificial intelligence into fraud prevention frameworks has become paramount. Moreover, the human factor remains a significant challenge in combating occupational fraud. The 2024 Report to the Nations emphasizes that a lack of awareness and training among employees often contributes to the success of fraud schemes. This highlights the importance of fostering a culture of integrity and accountability within organizations through regular anti-fraud training and awareness programs. Such initiatives not only equip employees with the knowledge to identify and report fraudulent activities but also strengthen organizational commitment to ethical practices.

The implications of occupational fraud extend beyond financial losses, impacting organizational reputation, employee morale, and stakeholder confidence. For instance, high-profile cases of fraud have demonstrated how reputational damage can lead to long-term consequences, including diminished customer trust and regulatory scrutiny. As a result, the urgency of addressing occupational fraud transcends financial considerations, encompassing the broader goal of ensuring sustainable organizational growth and resilience. In conclusion, while the Occupational Fraud 2024: A Report to the Nations provides valuable insights into effective anti-fraud controls, it also highlights the persistent challenges organizations face in combating fraud. By prioritizing the implementation of comprehensive anti-fraud strategies, leveraging advanced technologies, and fostering a culture of ethical behavior, organizations can significantly reduce the prevalence and impact of occupational fraud. This research seeks to contribute to this critical area by exploring the effectiveness of various anti-fraud measures in contemporary organizational contexts, thereby addressing a pressing need for actionable insights into fraud prevention. (ACFE, 2024). Financial statements play a crucial role in conveying a company's financial information to various stakeholders, such as investors, creditors, and regulators. Moreover, these statements serve as the primary basis for economic decision-making (Marheni & Suryati, 2021). However, the reliability of financial statements is often threatened by manipulation performed by management to present an appearance of better performance than the reality (Sari et al., 2024). Profitability is the primary goal of business, enhancing company value, competitiveness, and attracting investors. Nevertheless, efforts to maximize profits often lead to unethical behavior, including fraud. According to ACFE, fraud is classified into

three categories: corruption, asset misappropriation, and financial statement fraud, with financial statement fraud causing the largest losses despite its lower occurrence (Larum et al., 2021)

The development of the Fraud Triangle Theory to the Fraud Hexagon began with the Fraud Triangle, which comprises three elements: Pressure, Opportunity, and Rationalization (Clinard & Cressey, 1954). This theory evolved into the Fraud Diamond with the addition of the Capability element. The Fraud Diamond elements include Pressure, Opportunity, Rationalization, and Capability, as developed by Wolfe & Hermanson (2004). The Fraud Diamond further evolved into the Fraud Pentagon, introducing a new element, Arrogance. The Fraud Pentagon consists of Pressure, Opportunity, Rationalization, Competence, and Arrogance (Marks, 2012). Subsequently, the theory developed into the Fraud Hexagon by Georgios L. Vousinas. The Fraud Hexagon includes six elements: Pressure, Opportunity, Rationalization, Capability, Arrogance, and Collusion, representing the latest framework for measuring fraudulent behavior (Vousinas, 2019)

The chronological evolution of the Fraud Triangle to the Fraud Hexagon is illustrated in Figure 1: Roadmap of Fraud Theory Development. The diagram begins with the three core elements of the Fraud Triangle and shows the progressive addition of new elements in the Fraud Diamond, Fraud Pentagon, and Fraud Hexagon. This visualization demonstrates the relationships between the elements, the stages of their expansion, and how the theory has adapted to more comprehensively detect financial statement fraud.
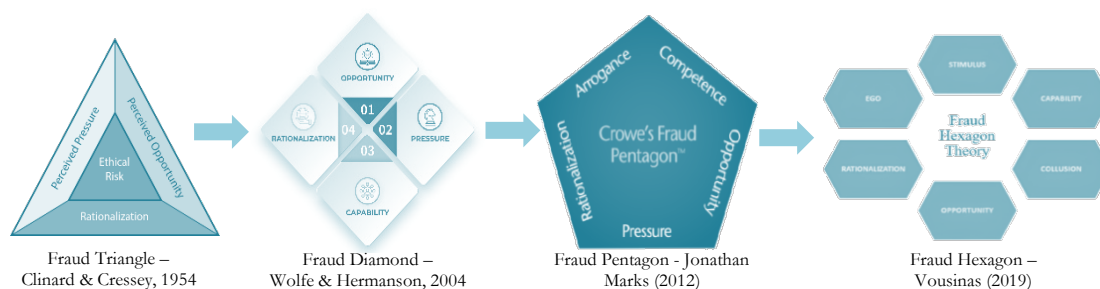

Fraud Triangle – Clinard & Cressey, 1954   Fraud Diamond – Wolfe & Hermanson, 2004   Fraud Pentagon - Jonathan Marks (2012)   Fraud Hexagon – Vousinas (2019)

Figure 1. Roadmap of Theory Development

This study focuses on the elements of the Fraud Hexagon. According to the Association of Certified Fraud Examiners (ACFE), fraud is classified into three categories: corruption, asset misappropriation, and financial statement fraud. Among these, financial statement fraud has the most significant impact, with an average loss of up to $954,000, despite representing only 10% of total fraud cases. Financial statement fraud includes actions such as misreported expenses, fictitious revenues, or manipulated asset values. Empirical studies reveal that these elements influence the likelihood of fraud occurrence. All elements of the Fraud Triangle affect the likelihood of fraud except rationalization (Skousen et al., 2009). Meanwhile, studies based on the Fraud Diamond and Fraud Pentagon have also demonstrated that specific elements, such as financial pressure and CEO narcissism, have a significant influence (Marks, 2014; Wolfe & Hermanson, 2004)

This study aims to examine the elements of the Fraud Hexagon using the Beneish M-Score model to detect potential fraud in companies. The research is expected to provide insights into the causes of fraud and propose more effective prevention

strategies for Indonesia's manufacturing industry (Alfarago et al., 2023) . In 2018, Garuda Indonesia faced a fraud case after reporting a net profit of USD 809,850, contrasting sharply with the losses of the previous year. However, this report was rejected by two commissioners who suspected improper revenue recognition under PSAK. The Financial Services Authority (OJK) identified violations of financial reporting standards and imposed a fine of Rp 100 million on the company and related parties (Hartomo, 2019). Similarly, in 2024, a fraud case emerged at PT Indofarma Tbk, where the Supreme Audit Board (BPK) uncovered state losses of Rp 371.83 billion due to financial irregularities. This highlights weaknesses in internal controls and risk management practices, evidencing gaps in the implementation of Good Corporate Governance (Roszandi, 2024). In the banking sector, a case of credit card manipulation involving over 100,000 cards at Bank Bukopin underscores inadequate oversight and internal control systems, which should act as primary barriers against fraud (Achmad et al., 2023). In Southeast Asia, including Indonesia, the challenge of detecting financial statement fraud is intensifying due to regional and global competitive pressures, with the region experiencing the highest financial losses, eroding investor confidence in the integrity of financial markets (Bader et al., 2024). As a developing region, ASEAN faces higher risks of financial statement manipulation, driven by weak corporate governance and insufficient external oversight (Arum et al., 2024).

In Malaysia, the case of Megan Media Holdings Bhd. demonstrated financial statement manipulation through the misstatement of RM 306 million in revenues, mirroring patterns seen in some Indonesian cases. In Singapore, Noble Group was involved in a financial statement fraud scandal by misclassifying marketing contracts as financial instruments, resulting in inflated revenues and net assets (Naldo & Widuri, 2023). The Fraud Hexagon approach remains rarely applied systematically in Indonesia and Southeast Asia. Most previous research has focused on individual elements, such as pressure or rationalization, without exploring the complex interactions between elements, even though each sector exhibits unique fraud risk characteristics (Handoko & Salim, 2022). With the increasing complexity of financial statement fraud cases, comprehensive studies are required to evaluate the application of the Fraud Hexagon across sectors and regions (Arum et al., 2024). The dynamics of interactions among elements, such as collusion and ego/arrogance, with external pressures and internal weaknesses in organizations need to be understood to assess their influence on fraud risk (Bader et al., 2024).

Identification of Research Gap

Research on detecting financial statement fraud has evolved through the Fraud Triangle, Fraud Diamond, and Fraud Hexagon theories, yet significant limitations persist. Most studies focus solely on individual aspects such as pressure or opportunity without examining the holistic interaction of elements. For instance, research in Indonesia's banking sector highlights the influence of external pressure and arrogance while neglecting collusion and managerial capability (Achmad et al., 2023; Handoko & Salim, 2022). In the SME sector, studies emphasize asset misappropriation but fail to compare its characteristics with other sectors, such as manufacturing or infrastructure. Meanwhile, research in ASEAN identifies pressure and capability as significant factors in detecting fraud in the infrastructure sector, without exploring cross-sector patterns (Naldo & Widuri, 2023; Talib et al., 2024)

Developing countries like Indonesia face challenges involving a collective work culture, weak regulations, and inadequate internal oversight. In this context, elements

such as pressure and collusion are relevant, yet research remains limited to non-financial sectors without cross-sector or cross-country analyses (Arum et al., 2024; Bader et al., 2024). Previous studies also tend to adopt quantitative approaches using secondary data, lacking systematic literature reviews that consolidate findings to comprehensively understand the interactions of Fraud Hexagon elements (Achmad et al., 2023; Naldo & Widuri, 2023).

Research Objectives

This study explicitly aims to address the critical gaps in the literature and practical challenges surrounding the Fraud Hexagon framework, focusing on its application across sectors and geographies. It seeks to analyze how the six elements of the Fraud Hexagon—pressure, opportunity, rationalization, capability, ego, and collusion—interact uniquely within various sectors, such as banking, manufacturing, and infrastructure. By doing so, the study will elucidate the sector-specific dynamics that influence the occurrence and detection of financial statement fraud. For instance, elements such as pressure and collusion are dominant in regulated industries like banking, while ego and opportunity play significant roles in (Achmad et al., 2023; Beneish, 1999; Vousinas, 2019). Furthermore, the research aims to systematically evaluate and compare consistent and inconsistent patterns in the literature, highlighting the most impactful Fraud Hexagon elements, such as collusion and ego, in different regional and sectoral contexts. For example, ASEAN countries, including Indonesia and Malaysia, face distinct challenges due to regulatory weaknesses and cultural factors (Landaburu, 2016; Naldo & Widuri, 2023). Finally, the study seeks to provide actionable recommendations for regulators, organizations, and industry professionals. These include strategies to strengthen both internal and external oversight mechanisms, improve corporate governance practices, and integrate advanced fraud detection tools. Recommendations leverage insights from the literature to address specific fraud risks in developing countries, emphasizing contextually relevant approaches (Alfarago et al., 2023; Arum et al., 2024). By addressing these objectives, this research seeks to advance the application of the Fraud Hexagon framework in fraud detection and prevention, bridging theoretical insights with practical implementations..

Research Contributions

This study provides theoretical contributions by enhancing the Fraud Hexagon theory through the exploration of interactions among elements such as collusion and ego, which have rarely been discussed, and by developing a more holistic and contextually relevant fraud detection model for developing countries (Tommasetti et al., 2021). Practically, the study aims to improve fraud detection effectiveness for companies through Fraud Hexagon-based analysis and offers recommendations to strengthen corporate governance, particularly in monitoring collusion and opportunity elements. This research is also unique as it focuses on the context of developing countries, specifically Indonesia, which faces challenges such as collective cultural norms and weak regulatory frameworks. It further explores under-researched sectors, such as SMEs and infrastructure, to gain broader insights into fraud patterns (Bader et al., 2024)

THEORY

The Fraud Hexagon Theory has been selected as the most suitable theoretical framework for this study due to its ability to provide a comprehensive approach to analyzing financial statement fraud. This theory is an advancement of previous models, namely the Fraud Triangle, Fraud Diamond, and Fraud Pentagon, by integrating six key elements: Pressure, Opportunity, Rationalization, Capability, Arrogance, and Collusion. These elements are designed to offer a holistic perspective, enabling in-depth exploration of the factors driving fraud and the interactions among these elements across various sectoral and geographical contexts (Vousinas, 2019).

METHOD

This study employs the Systematic Literature Review (SLR) approach, designed to systematically, transparently, and structurally identify, evaluate, and synthesize relevant literature. The approach aims to summarize existing evidence, analyze trends, patterns, and relationships in prior research, and identify research gaps (Cronin, 2011). SLR enables researchers to collect and analyze literature in a replicable and accountable manner, supporting the validity of research findings (Petticrew, 2008). In this study, the SLR focuses on literature discussing the application of the Fraud Hexagon in detecting financial statement fraud across various sectors and regions (Naldo & Widuri, 2023). The process utilizes the PRISMA framework (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Hidayatullah et al., 2023), which provides standardized guidelines for reporting literature review results, including identification, screening, eligibility, and inclusion stages (Snyder, 2019)

The identification stage involves searching for literature using keywords such as "Fraud Hexagon," "Fraud Pentagon," "Fraud Diamond," "Fraud Triangle," and "Financial Statement Fraud" in the Scopus database. This is followed by initial screening based on relevant inclusion criteria, evaluation of article eligibility, and finally, selecting articles meeting the criteria for final analysis. The data collection process is conducted selectively from three main sources: academic databases, reputable journals, and other literature (Khoerunnisa et al., 2022). Scopus serves as the primary database due to its extensive coverage and high-quality indexed articles, including reputable journals across various disciplines. Articles from esteemed publishers like MDPI, SAGE, Springer, and Elsevier complement this process by offering in-depth theoretical and empirical perspectives on the Fraud Hexagon, particularly in sectors such as banking and manufacturing. Grey literature, such as conference proceedings, is also considered if relevant to the research topic.

Literature screening is conducted based on stringent inclusion and exclusion criteria. Priority is given to articles directly related to the Fraud Hexagon, encompassing theoretical discussions or empirical analyses of its six key elements: stimulus, capability, collusion, opportunity, rationalization, and ego. Articles available only as abstracts, inaccessible in full text, or unrelated to the Fraud Hexagon theory are excluded. This approach ensures the literature selected is of high relevance and quality, offering a comprehensive understanding of the Fraud Hexagon's application in detecting and preventing financial statement fraud. The process strengthens the theoretical foundation and provides practical guidance for stakeholders across sectors, both nationally and internationally (Scopus, 2024). The articles selected for the study review are detailed in Table 1 below.

Table 1. List of Articles Used for the Literature Review Study

NO	AUTHORS	TITLE	JOURNAL	PUBLISHER
1.	(Tommasetti et al., 2021)	Revisiting the Accounting Fraud Components: A Bottom-Up Approach Using the Twitter Platform	SAGE Open	SAGE Publications Inc.
2.	(Sari et al., 2022)	The audit committee as moderating the effect of hexagon fraud on fraudulent financial statements in mining companies listed on the Indonesia stock exchange	Cogent Business and Management	Cogent OA
3.	(Handoko & Salim, 2022)	Fraud Detection Using Fraud Hexagon Model in Top Index Shares of KOMPAS 100	2022 12th International Workshop on Computer Science and Engineering, WCSE 2022	International Workshop on Computer Science and Engineering (WCSE)
4.	(Suryandari et al., 2023)	Determinant of fraudulent behavior in the Indonesian rural bank sector using the fraud hexagon perspective	Banks and Bank Systems	LLC CPC Business Perspectives
5.	(Achmad et al., 2023).	Detecting Fraudulent Financial Reporting Using the Fraud Hexagon Model: Evidence from the Banking Sector in Indonesia	Economies	MDPI
6.	(Alfarago et al., 2023)	The Likelihood of Fraud from The Fraud Hexagon Perspective: Evidence from Indonesia	ABAC Journal	Assumption University
7.	(Naldo & Widuri, 2023).	Fraudulent Financial Reporting and Fraud Hexagon: Evidence from Infrastructure Companies in ASEAN	Economic Affairs (New Delhi)	AESSRA
8.	(Siahaan et al., 2024)	When internal organizational factors improve detecting corruption in state-owned companies	Journal of Financial Crime	Emerald Publishing
9.	(Talib et al., 2024)	Determinants of asset misappropriation in small and medium enterprises: Evidence from Malaysia	Journal of Management World	Editorial Team of JoMW
10.	(Sari et al., 2024)	Analysis of Hexagon on Fraudulent Financial Reporting with The Audit Committee and Independent Commissioners as Moderating Variables	Quality - Access to Success	SRAC - Romanian Society for Quality
11.	(Arum et al., 2024)	Moderation Of Corporate Governance in Financial Statement Fraud Investigation with The Sccore Model	Revista de Gestao Social e Ambiental	ANPAD - Associacao Nacional de Pos-Graduacao e Pesquisa em Administracao
12.	(Bader et al., 2024).	Predicting Risk of and Motives behind Fraud in Financial Statements of Jordanian Industrial Firms Using Hexagon Theory	Journal of Risk and Financial Management	Multidisciplinary Digital Publishing Institute (MDPI)

RESULT AND DISCUSSION

Result

This study began by identifying 45,329 articles from the Scopus database, one of the leading platforms for academic literature. The process utilized specific keywords such as "Fraud Triangle," "Fraud Diamond," "Fraud Pentagon," and "Fraud Hexagon," along with related terms like "Financial Statement Fraud." From the initial search, more than 45,000 articles were identified, which were narrowed down to 929 articles explicitly discussing financial statement fraud in various contexts. Further refined searches using specific keywords yielded 351 articles for "Fraud Triangle," 74 articles for "Fraud Diamond," and 30 articles for "Fraud Pentagon." After the initial screening based on relevant inclusion criteria, 16 articles were deemed eligible for research focusing on the "Fraud Hexagon" model, and finally, 12 articles were selected for detailed analysis. These articles were chosen for their relevance and methodological quality, aligning with the Fraud Hexagon framework (Lauwrens & Yanti, 2022)

The literature search and selection process consisted of several stages. During the identification stage, a combination of keywords was used to narrow down the search results. In the screening stage, irrelevant or duplicate articles were eliminated, resulting in 74 articles that were further evaluated for eligibility. Of these, 16 articles were shortlisted, and 12 were confirmed to meet the criteria as the primary literature for further analysis. The final inclusion stage resulted in 12 articles being selected as the main sources for this study. The article selection process, conducted using the PRISMA method, is illustrated in Figure 2 below.
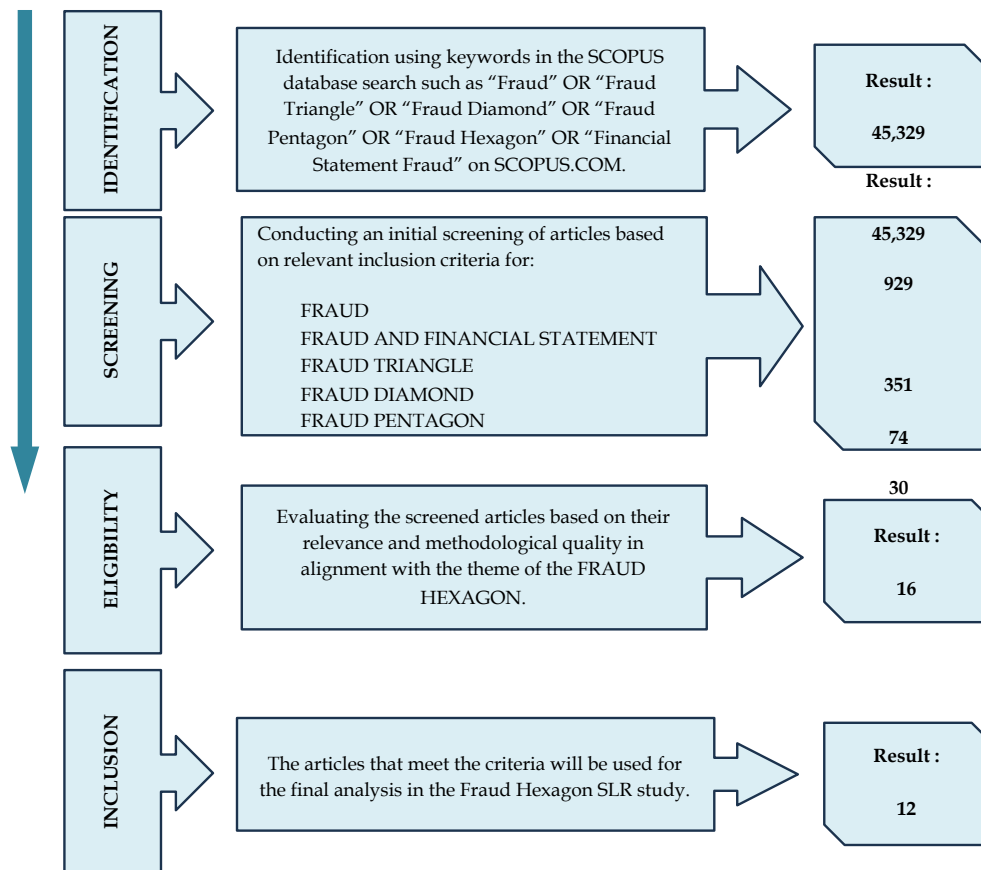

Figure 2. SLR Framework Model

This study highlights a strong geographical focus on Southeast Asia, particularly Indonesia, Malaysia, and several other ASEAN countries. This geographical distribution reflects the relevance of the Fraud Hexagon in the context of developing countries, where weaknesses in corporate governance and regulatory oversight often pose significant challenges. Indonesia emerges as the largest contributor to this research due to the high number of reported financial statement fraud cases in the banking and infrastructure sectors (Scopus, 2024).

From an industry perspective, the distribution of literature reveals a dominance of research in certain sectors. This sectoral distribution provides insights into different fraud risk patterns across industries and how the Fraud Hexagon can be adapted to each context. The dominance of research in the reviewed articles is presented in Table 2 below:

Table 2. Distribution of Research Dominance

No	Research Dominance	Percentage %
1.	The primary focus is on the manipulation of financial data to meet the expectations of shareholders or regulators in the banking sector.	40%
2.	Discussing cases of asset misappropriation and inventory report manipulation in manufacturing companies.	30%
3.	Examining the Impact of Weak External Oversight on Fraud Opportunities in Infrastructure.	20 %
4.	Highlighting specific challenges such as collusion with external vendors and the lack of formal governance in SMEs.	10%

Source: Results of Systematic Identification of Literature Review

The articles analyzed employed various methodological approaches tailored to the context of their research. Most studies utilized quantitative methods, such as logistic regression and other statistical analyses, to evaluate the relationship between Fraud Hexagon elements and the likelihood of fraud. These approaches provided empirical evidence on the relevance of elements such as pressure, opportunity, and rationalization in triggering manipulative actions (Scopus, 2024). Additionally, several studies applied models like the Beneish M-Score to numerically detect financial statement manipulation. This model aids in identifying anomaly patterns in financial statements, often serving as early indicators of fraud.

On the other hand, qualitative analyses were used to explore elements that are harder to measure directly, such as collusion and ego (Vousinas, 2019). These approaches often relied on interviews and case study analyses to understand the cultural and organizational contexts that facilitate fraud. These methodologies provide a robust foundation for evaluating the effectiveness of the Fraud Hexagon in detecting financial statement fraud, both theoretically and practically. The conclusions from this analysis form the basis for more specific strategic recommendations across various sectors and geographic regions.

The findings indicate that the Fraud Hexagon model is consistently applied across diverse contexts, encompassing public and private sectors at global, national, and regional levels. Key elements, such as pressure, opportunity, rationalization, capability, ego, and collusion, have been proven relevant for analyzing financial statement fraud. These studies encompass a wide range of independent variables, including leverage, auditor changes, and financial stability, which contribute to dependent variables such as financial statement fraud, fraud detection, or asset misappropriation.

Each element of the Fraud Hexagon demonstrates a strong correlation with fraudulent practices in specific sectors, ranging from large corporations to SMEs. This

research also highlights the role of culture, regulations, and governance in strengthening oversight and preventing fraud. Thus, the Fraud Hexagon serves as an effective framework for detecting and preventing fraud in various economic sectors, as presented in Table 3 – Results of the Reviewed Studies below:

Table 3. Results of the Reviewed Studies

NO	CITATION	FRAUD HEXAGON ELEMENTS	COUNTRY	INDEPENDENT VARIABLES	DEPENDENT VARIABLES
1.	(Tommasetti et al., 2021)	1) Financials, 2) Fraudster, 3) Defrauded, 4) Materiality, 5) Consequences, 6) Watchdog	Global	Not explicitly defined but based on fraud-related behavior keywords in social media.	Public opinion on fraud
2.	(Sari et al., 2022)	1) Pressure, 2) Rationalization, 3) Opportunity, 4) Ego, 5) Capability, 6) Collusion	Indonesia.	Leverage, auditor changes, accounts receivable-to-sales ratio, CEO duality, director changes, political connections	Financial Statement Fraud (F-Score)
3.	(Handoko & Salim, 2022)	1) Financial Target, 2) Change of Director, 3) Government Project, 4) Ineffective Monitoring, 5) Change in Auditor, 6) Frequent CEO Picture	Indonesia	Financial pressure, director turnover, government projects, internal monitoring, auditor rationalization, CEO ego indications	Fraudulent financial reporting
4.	(Suryandari et al., 2023)	1) Pressure, 2) Opportunity, 3) Rationalization, 4) Ego, 5) Capability, 6) Collusion	Bali.	Key Performance Indicators (KPIs), internal supervision, fraud rationalization, organizational authority, reputation/ego, collusion	Fraudulent behavior
5.	(Achmad et al., 2023)	1) Stimulus, 2) Capability, 3) Collusion, 4) Opportunity, 5) Rationalization, 6) Arrogance	Indonesia	ROA, SALTA, leverage, internal monitoring, auditor turnover, number of CEO photos	Fraudulent financial reporting
6.	(Alfarago et al., 2023)	1) Stimulus, 2) Capability, 3) Collusion, 4) Opportunity, 5) Rationalization, 6) Ego	Indonesia	Financial stability, director turnover, government projects, related-party transactions, auditor changes, CEO ego	Fraud Indicators (Beneish M-Score)
7.	(Naldo & Widuri, 2023)	1) Pressure, 2) Capability, 3) Collusion, 4) Opportunity, 5) Rationalization, 6) Arrogance	ASEAN.	ROA, leverage, director turnover, e-procurement, whistle-blowing system, CEO education	Fraudulent financial reporting
8.	(Siahaan et al., 2024)	1) Governance, 2) Audit Quality, 3) Management Commitment, 4) Financial Performance	Indonesia.	Governance policies, internal audit, ethical philosophy, pressure, opportunity, rationalization, collusion	Fraud detection

NO	CITATION	FRAUD HEXAGON ELEMENTS	COUNTRY	INDEPENDENT VARIABLES	DEPENDENT VARIABLES
		Fraud Hexagon 1) Stimulus, 2) Capability, 3) Collusion, 4) Opportunity, 5) Rationalization, 6) Ego,			
9.	(Talib et al., 2024)	1) Pressure, 2) Opportunity, 3) Rationalization, 4) Capability, 5) Ego, 6) Collusion	Malaysia	Workload, Key Performance Indicators (KPIs), Internal Controls, Fraud Rationalization, Self-Perception of Morality, Fraud Collaboration	Asset misappropriation
10.	(Sari et al., 2024)	1) Financial Stability 2) Auditor Change 3) Political Connection 4) CEO Duality 5) Nature of Industry 6) Change of Directors **Moderation:** 1) Audit Committe 2) Independent Commissioner	Indonesia.	Financial stability, auditor turnover, political connections, CEO duality, industry characteristics	Fraudulent financial reporting
11.	(Arum et al., 2024)	1) Stimulus, 2) Capability, 3) Collusion, 4) Opportunity, 5) Rationalization, 6) Ego	Indonesia.	Financial targets, director turnover, political connections, accounts receivable/sales, auditor changes, CEO photograph	Fraudulent financial reporting
12.	(Bader et al., 2024)	1) Pressure, 2) Opportunity, 3) Rationalization, 4) Capability, 5) Collusion, 6) Arrogance	Yordania	ROA, inventory, independent audit committee members, related party transactions, auditor turnover, CEO photograph	Fraudulent financial reporting

Analysis of Systematic Literature Review Results

The Fraud Hexagon model demonstrates its versatility as a comprehensive framework for detecting fraud across various sectors and geographic contexts. From an analysis of 12 SCOPUS-indexed research articles, key elements such as pressure, opportunity, rationalization, capability, ego, and collusion collectively provide a holistic perspective on fraud dynamics. Approximately 70% of the reviewed studies identified 'pressure' as a dominant factor, while 50% emphasized the role of 'collusion' in fostering fraudulent activities. For instance, the study by Tommasetti et al. (2021), which analyzed 43,655 tweets, highlighted how public opinion mirrors fraud risks globally (Tommasetti et al., 2021). However, cultural, linguistic, and technological access biases influence the interpretation of this data. Similarly, Sari et al. (2022) identified financial pressure and collusion as primary determinants of fraudulent financial reporting in the mining sector. Despite valuable sector-specific insights, their findings limit generalizability to other industries (Sari et al., 2022). In the banking sector, 40% of reviewed studies, including

Handoko & Salim (2022), revealed the critical role of internal monitoring and social pressure in detecting fraud among KOMPAS100-listed companies (Handoko & Salim, 2022). Conversely, localized cultural dynamics, such as those in Bali's rural banks, demonstrated how Hindu values significantly mediate fraud through rationalization and collusion ((Suryandari et al., 2023). Studies focusing on SMEs, like Talib et al. (2024), found collusion and rationalization as prevalent fraud factors in Malaysian service and retail sectors, with 59.5% of respondents being young female workers (Talib et al., 2024).

Regionally, research in ASEAN highlighted collusion and capability as significant in cross-border fraud detection, influenced by diverse regulatory environments (Naldo & Widuri, 2023). Bader et al. (2024) emphasized 'pressure' and 'collusion' as fraud drivers in Jordan's industrial firms, showcasing region-specific applications of the Fraud Hexagon (Bader et al., 2024). These insights underscore the need for tailoring fraud detection strategies to cultural, sectoral, and regulatory contexts. In large corporations, Handoko & Salim (2022) emphasized how social pressure and internal monitoring are crucial for detecting fraud in large companies listed on the KOMPAS100 index. However, the sample's focus on large corporations reduces the relevance of the findings for smaller enterprises (Handoko & Salim, 2022). Conversely, Suryandari et al. (2023), which focused on rural banks in Bali, revealed that local culture and Hinduism significantly influence fraudulent behavior, particularly through rationalization and collusion (Suryandari et al., 2023). While these findings offer unique perspectives, they are difficult to generalize beyond the local context. Research by Achmad et al. (2023) and Alfarago et al. (2023) highlighted stimulus and CEO arrogance as significant factors in detecting fraud within Indonesia's banking and manufacturing sectors. However, the lack of individual behavioral data limits the human aspect of the analysis. In the ASEAN context, Naldo & Widuri (2023) demonstrated how differences in regulations between countries influence the relationship between Fraud Hexagon elements, such as capability and collusion, in cross-border fraud detection.

Studies focusing on SMEs, such as Talib et al. (2024), identified collusion and rationalization as primary determinants of asset misappropriation in Malaysia. The predominantly young female respondents provided an intriguing perspective on fraud dynamics within the service and retail sectors. Another study by Siahaan et al. (2024) emphasized governance and audit quality as critical variables in detecting fraud in Indonesian state-owned enterprises. Additionally, Sari et al. (2024) and Arum et al. (2024) explored the role of moderating variables, such as audit committees and corporate governance, in strengthening the relationship between Fraud Hexagon elements and fraud. Their findings indicate that factors such as CEO duality and political connections play significant roles in the mining and non-financial sectors. Bader et al. (2024) complemented the discussion by highlighting pressure and collusion as primary determinants of fraud in Jordan's industrial sector, although the findings are limited to a specific region.

Overall, the SLR findings affirm that the Fraud Hexagon model is a versatile tool for fraud detection. However, its effectiveness is highly dependent on adapting the fraud elements to sectoral, geographic, and cultural contexts. Combining these elements with appropriate moderating and control variables can enhance the accuracy of fraud detection. For future research, strengthening the focus on human behavior and cultural contexts could provide broader and deeper insights into fraud dynamics. The results of the analysis are presented in Table 4 - Analysis of Systematic Literature Review Results below:

Tabel 4. Analisis Hasil Sistematic Literatur Review

NO	AUTHOR	TITLE	SAMPLE SIZE	DEMOGRAPHICS	ANALYSIS
1.	(Tommasetti et al., 2021)	Revisiting the Accounting Fraud Components: A Bottom-Up Approach Using the Twitter Platform	43,655 tweet.	The data originates from Twitter, with a global user base predominantly aged 18–40 years, and potential demographic bias due to disparities in technology access.	This large sample provides global insights; however, the analysis must account for cultural and linguistic variations that influence the way ideas about "accounting fraud" are conveyed. As a social media-based dataset, there is an inherent bias toward public opinion rather than concrete facts.
2.	(Sari et al., 2022)	The Audit Committee As Moderating The Effect Of Hexagon's Fraud On Fraudulent Financial Statements In Mining Companies Listed On The Indonesia Stock Exchange	A total of 173 analysis units from 73 mining companies in Indonesia.	The data includes financial statements from companies in Indonesia's mining sector. While the financial statements do not provide individual demographic information, the sample represents companies with varying scales of operation.	The representation is adequate for the mining sector but does not account for other sectors, making the results non-generalizable. As this report is company-based, there is a possibility that human elements, such as employees and management, are overlooked.
3.	(Handoko & Salim, 2022)	Fraud Detection Using Fraud Hexagon Model in Top Index Shares of KOMPAS 100	57 Companies Listed on the KOMPAS100 Index in Indonesia	The sample consists of companies with high liquidity and large capitalization. It does not include small or medium-sized sectors, introducing a bias toward established corporations.	The data provides a strong perspective on how large corporations manage potential fraud. However, elements such as workplace culture, social pressure, and the internal environment of large companies may differ significantly from those in smaller enterprises.
4.	(Suryandari et al., 2023)	Determinant Of Fraudulent Behavior In The Indonesian Rural Bank Sector Using The Fraud Hexagon Perspective	351 questionnaires from Rural Banks (BPR) in Bali.	The majority of respondents were female (60.7%), with a bachelor's degree education level (71.8%), and identified as Hindu (92%). The sample is highly localized, representing the microfinance sector in Bali with its unique cultural climate.	The local Balinese culture and Hinduism play a significant role in responses and behaviors related to fraud. This study provides unique insights but cannot be generalized to banks outside Bali.
5.	(Achmad et al., 2023)	Detecting Fraudulent Financial	215 Indonesian banking companies	Focus on company data, without individual details. The	This study primarily emphasizes financial data and management

NO	AUTHOR	TITLE	SAMPLE SIZE	DEMOGRAPHICS	ANALYSIS
		Reporting Using the Fraud Hexagon Model: Evidence from the Banking Sector in Indonesia		majority are large and medium-sized companies.	structures without exploring individual demographic elements. There is potential bias towards large banking sectors, while smaller banks may face different challenges in fraud.
6.	(Alfarago et al., 2023)	The Likelihood Of Fraud From The Fraud Hexagon Perspective: Evidence From Indonesia	76 manufacturing companies in Indonesia	There is no individual demographic information available. The data is focused on the company's financial statements. The selected companies are large in size and exhibit higher levels of stability.	This study is relevant for understanding how the manufacturing sector addresses fraud; however, it lacks social data that could strengthen arguments related to fraudulent behavior.
7.	(Naldo & Widuri, 2023)	Fraudulent Financial Reporting and Fraud Hexagon: Evidence from Infrastructure Companies in ASEAN	115 infrastructure companies in ASEAN.	Countries covered: Indonesia, Malaysia, the Philippines, Singapore, and Thailand. The company demographics include CEOs with higher education backgrounds and political or military connections.	This study is geographically diverse, covering multiple countries across ASEAN, but it may encounter bias due to varying fraud regulations in each country.
8.	(Siahaan et al., 2024)	When Internal Organizational Factors Improve Detecting Corruption In State-Owned Companies	197 respondents from state-owned enterprises (SOEs) in Indonesia.	The majority are male (65.48%), primarily located on the island of Java (95.65%), and represent various sectors.	Respondents from state-owned enterprises (SOEs) tend to possess extensive knowledge of regulations and anti-fraud implementation, providing a rich context for this study. Limitation: Low representation outside Java, which may affect generalizability.
9.	(Talib et al., 2024)	Determinants of Asset Misappropriation in Small and Medium Enterprises: Evidence from Malaysia	306 SMEs in Malaysia	The majority of respondents were female (59.5%), under the age of 30 (55.2%), and had less than 3 years of work experience (39.9%). Most respondents were from the service	This study is unique in its exploration of SMEs, with a focus on the demographics of young and female workers. However, the results may differ for other SME sectors, such as manufacturing.

NO	AUTHOR	TITLE	SAMPLE SIZE	DEMOGRAPHICS	ANALYSIS
				sector (44.4%) and the retail sector (20.3%).	
10.	(Sari et al., 2024)	Analysis of Hexagon on Fraudulent Financial Reporting with The Audit Committee and Independent Commissioners as Moderating Variables Maylia	95 Units of Analysis from 27 Mining Companies	The focus is on Indonesian mining companies without individual-level data.	This data is relevant for assessing fraud in the mining sector but does not cover related sectors such as energy or technology.
11.	(Arum et al., 2024)	Moderation Of Corporate Governance In Financial Statement Fraud Investigation With The Sccore Model	529 non-financial sector companies in Indonesia.	Companies with diverse industrial sector backgrounds. Data is based on financial statements and does not include individual characteristics.	This study is broad and comprehensive for the non-financial sector, but the lack of individual-level data weakens the behavioral analysis.
12.	(Bader et al., 2024)	Predicting Risk of and Motives behind Fraud in Financial Statements of Jordanian Industrial Firms Using Hexagon Theory	349 reports from 63 industrial companies in Jordan	Large industrial company data, with a higher level of financial statement fraud compared to other sectors.	Focusing on high-fraud-risk sectors provides unique insights; however, the generalization of findings is limited to Jordan.

Discussion

This study examines the application of the Fraud Hexagon model in detecting financial statement fraud across various sectors and geographic contexts. Through a systematic literature review, it was found that the Fraud Hexagon, comprising six key elements—pressure, opportunity, rationalization, capability, ego, and collusion—serves as a comprehensive framework for analyzing fraud dynamics. The findings indicate that this model can be adapted to various sectors, such as banking, manufacturing, SMEs, and microfinance, with differing emphasis on specific elements depending on sectoral characteristics.In the banking sector, pressure and opportunity emerge as dominant elements, while collusion and capability are more prominent in manufacturing and infrastructure. In SMEs and microfinance, the influence of organizational culture and workforce demographics adds a new dimension to fraud analysis. Geographic context also plays a crucial role, particularly in Southeast Asia, where weak regulatory frameworks and collective work cultures affect the model's application. Furthermore, moderating variables such as corporate governance and audit quality have been shown to enhance the effectiveness of the Fraud Hexagon in detecting fraud. However, significant limitations exist in most studies, including the lack of individual behavioral data, an overemphasis on specific sectors, and minimal cross-sector comparisons. These

findings highlight the need for integrating qualitative methods to explore elements like ego and rationalization, which are difficult to measure, and for broadening the scope of sectors and geographic regions to provide a more holistic perspective.

CONCLUSION

This study demonstrates that the Fraud Hexagon model is an effective and flexible framework for detecting financial statement fraud. The findings confirm that the model's key elements—pressure, opportunity, rationalization, capability, ego, and collusion—can be adapted to various sectors and regions. This provides valuable insights into understanding the patterns and dynamics of fraud across banking, manufacturing, SMEs, and microfinance sectors.

Implications

Practically, this research has significant implications for various stakeholders. For regulators, the Fraud Hexagon can serve as a foundation for designing more effective anti-fraud regulations, particularly in high-risk sectors such as banking and infrastructure. For companies, the model helps enhance internal oversight systems and strengthens corporate governance through audits that focus on the Fraud Hexagon elements. For academics, this research creates opportunities for further studies integrating data analytics and qualitative methods to deeply explore the complex interactions among Fraud Hexagon elements.

Limitations of the SLR

While the Fraud Hexagon model demonstrates its effectiveness, this research has several limitations. One major limitation is the lack of individual behavioral representation, as most studies rely on quantitative data, such as financial reports and organizational structures, leaving elements like ego and collusion underexplored. Furthermore, the research has a limited sectoral focus, primarily addressing banking, manufacturing, and infrastructure sectors, while emerging sectors such as technology and energy remain underrepresented. Geographically, the studies are dominated by Southeast Asia and Jordan, limiting the generalizability of findings to other regions. Lastly, the minimal cross-sector comparisons restrict broader insights into fraud patterns that might be universal or sector-specific.

Recommendations for Future SLR Research

To address these limitations, future SLR studies should take several targeted steps. First, qualitative analyses such as structured interviews with fraud investigators, detailed case studies of specific fraud cases in high-risk industries, and observational studies of organizational behavior should be conducted. For example, analyzing the decision-making processes of executives involved in fraud could shed light on the role of ego and rationalization. Second, expanding sectoral coverage to include emerging industries like financial technology (FinTech), renewable energy projects, and telemedicine can uncover sector-specific fraud risks, such as cybersecurity threats in FinTech or data manipulation in healthcare analytics. Third, leveraging advanced analytics tools like anomaly detection algorithms or predictive models in machine learning, combined with real-time big data from financial systems, can enhance the precision of fraud detection. For instance, machine learning could identify patterns in financial transactions that indicate collusion. Fourth, cross-sectoral and geographic studies should focus on comparing fraud dynamics in developing regions like Southeast

Asia with those in highly regulated markets like Europe or North America, highlighting universal versus region-specific patterns. Lastly, fostering collaborative efforts between academics and industry practitioners can result in applied tools, such as sector-specific fraud detection frameworks or training programs for auditors, making research findings directly actionable.

By implementing these specific recommendations, future studies will provide actionable insights and further enhance the Fraud Hexagon model's role as a cornerstone for detecting and preventing financial statement fraud.

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