

# FROM HEXAGON TO HORIZON: EXPLORING GAPS AND FUTURE RESEARCH IN FRAUDULENT FINANCIAL REPORTING USING SYSTEMATIC LITERATURE REVIEW

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**Abstract:** *Financial reporting fraud pose great problem for many organizations, regulators, and shareholders because it threatens the workings of the financial systems and incurs massive losses on them both financially as well as in reputation. Focusing on fraud in its contemporary form of fraudulent financial reporting, is a broader concept that has covered many new obstacles including illegal reporting using traditional schemes such as the Fraud Triangle and the Fraud Diamond. The former includes the Triad comprising of motivation, opportunity, and rationalization, while the latter adds an element of capability as one develops opportunities to commit fraud. Fraud hexagon theory brings in other aspects, in this regard, stressing the importance of collusion as well as more than one person, whether in the organization or external to it, who can work together to commit and hide fraudulent financial activities. This review attempts to holistically analyze the relationship between elements of fraud hexagon theory and the tendency of committing fraudulent financial reporting. The objective is to evaluate literature related to the fraud hexagon theory focus on the causal elements which have impact on the probability of FFR. It was determined that there are different proxies associated with the elements of fraud hexagon theory that have not yielded incoherent results which provide empirical gaps for future research. The article introduces other facets of the pointing such as arrogance and collusion as a behavioral dimension.*

**Keywords:** *fraud hexagon theory, fraudulent financial reporting, systematic literature review*

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## Introduction

Financial reporting fraud (FFR) happens when a person or organization intentionally commits a fraud, enrolling a wrong and detrimental financial disclosure within its internal operations, with the purpose of deceiving others and for personal gain (Fleming, 2021). It could be the act of withholding expenses and liabilities or erroneous disclosures among other tricks in which a wrong and untrue view of the financial position is generated (Demetriades & Owusu-Agyei, 2021). It is done to show that the company has a better financial situation or performance with a view to creating a high price for its shares, bonuses or retained earnings. Subsequently, these FFRs cause financial misfortunes as more than \$4.7 trillion have been lost due to occupational fraud worldwide as per the latest survey on occupational fraud by the Association of Fraud Examiners in 2022.

Previous studies have identified various factors influencing FFR. The Fraud Triangle, introduced by criminologist Donald Cressey in 1954, identifies three key elements necessary for fraud: pressures, such as financial stress; opportunity, exemplified by a lack of internal controls; and rationalization, or the ethical reasoning that justifies unethical acts (Fauziah Aida Fitri & Syukur, 2019; Narsa, Afifa, & Wardhaningrum, 2023). Building on these elements, other studies introduced an additional factor known as capabilities, leading to the development of the Fraud Diamond Theory (Indarto & Ghozali, 2016; Noble, 2019; Omukaga, 2020). This new perspective emphasizes that a fraudster must possess the requisite skills to exploit opportunities for fraudulent acts (Khamainy, Ali, & Setiawan, 2021).

Further advancing this framework, the Fraud Pentagon Theory builds on the previous theories by incorporating two more elements: arrogance and competence. This addition acknowledges the significant role that an over-arching ego and the expertise necessary for more sophisticated fraud play in the dynamics of FFR (Fuad, Lestari, & Handayani, 2020; Handoko & Aurelia, 2021). By recognizing these traits, the Fraud Pentagon expands our understanding of the motivations driving individuals toward fraudulent behavior.

Continuing this progression, the Fraud Hexagon Theory signifies an even deeper comprehension of the phenomena involved in fraudulent activities. This theory adds a sixth element: collusion, representing an agreement between two or more parties to commit fraud against a third party (Riyanti, 2021; Vousinas, 2019). The inclusion of collusion highlights the cooperative aspect of fraud, which can occur among individuals both within and outside an organization, thus amplifying the risks of fraud as these schemes are often more difficult to detect (Achmad, Ghozali, & Pamungkas, 2022). As fraudulent schemes become increasingly complex, the Fraud Hexagon emphasizes the potential for collaboration and the necessity for enhanced strategies to combat fraud in contemporary society.

Understanding the factors associated with the FFR is very important because it enables organizations, regulators, and auditors to identify weaknesses in financial systems and take remedial actions to avert fraud. Just as the introduction of a series of amendments to the code of corporate governance in Malaysia in 2012, 2017, and 2021 has apparently not brought fraud to an end, as was recently demonstrated by the submission of false financial statements by Serba Dinamik Holdings Bhd to the Securities Commission in 2021 (Malaysian Securities Commission, 2021), so, knowing what drives and conditions individuals into manipulating financial data, such as pressure and opportunity, rationalization, capabilities, arrogance, and collusion, organizations can have internal controls strengthened, improve oversight, and perhaps encourage ethical behavior. Apart from keeping the finances of organizations intact,

these would also help protect investors, creditors, as well as the economy at large. There is no doubt that there is a complicated nature of fraud; hence, the strategies to prevent it would need to be sophisticated. Therefore, the focus of this study would be on two aspects: the first is to undertake a review of relevant literature employed in the previous studies on the Fraud Hexagon Theory, and the second is to uncover the existing literature gaps and make recommendations for future research.

### Literature Review

There has been a gradual but significant understanding of the various fraud theories, demonstrating a growing appreciation for the antecedent factors that contribute to fraudulent activities in financial reporting. The original model of the Fraud Triangle Theory, pioneered by criminologist Donald Cressey, comprises three critical elements: pressure, opportunity, and rationalization, which together offer a robust framework for understanding why individuals may commit fraud (Aviantara, 2021a; F.A. Fitri, Syukur, & Justisa, 2019; Narsa et al., 2023; Rae & Subramaniam, 2008; Skousen, 2004; Surjaatmaja, 2018; Suyanto, 2009). These elements interact in complex ways, where the perceived pressures—often stemming from financial distress, unrealistic corporate expectations, or personal crises—can push an individual towards considering fraudulent acts as viable solutions. Furthermore, the perceived opportunities arise from noted weaknesses in corporate governance structures, inadequate internal controls, and a culture that overlooks ethical considerations, providing fertile ground for the misappropriation of resources. Coupled with this is the process of rationalization, where individuals create justifications for their actions, often convincing themselves that they are entitled to the funds or that their actions won't cause any real harm. This triad presents a compelling narrative on human behavior within organizations and highlights the importance of fostering a robust ethical culture that actively addresses these pressure points (Saluja, Aggarwal, & Mittal, 2021). Understanding these dynamics is crucial not only for developing preventive measures but also for creating an environment where ethical behavior is valued and fraud is less likely to occur.

Recognizing the limitations of the Fraud Triangle, which primarily focuses on the motivations and rationalizations behind fraudulent behavior, the Fraud Diamond Theory was introduced to provide a more comprehensive understanding of fraud. This theory incorporates a fourth dimension known as capability, emphasizing that an individual must possess specific skills, knowledge, and personality traits that enable them to identify and exploit opportunities for fraudulent acts (Noble, 2019; Omukaga, 2020). The notion of capability suggests that simply having the motivation or opportunity to commit fraud is insufficient; the perpetrator must also have the tools and acumen necessary to carry out such actions effectively. It posits that the presence of the traditional three elements—pressure, opportunity, and rationalization—alone cannot lead to fraudulent acts if the perpetrators lack the requisite capabilities to execute their schemes successfully (Khamainy et al., 2021; Noble, 2019; Omukaga, 2020; Pramono Sari, Kiswanto, Rahmadani, Khairunnisa, & Pamungkas, 2020; Tenku Sulaiman & Ahmad, 2017).

Furthermore, Saluja et al. (2021) shed light on how these capabilities can be influenced by an individual's position within the company and their familiarity with the internal workings and vulnerabilities of the organization. For instance, individuals occupying higher executive positions may have greater access to sensitive information and increased authority, which can provide them with the leverage necessary to navigate or circumvent a company's internal control mechanisms. This power dynamic not only heightens their capacity to commit fraud but also positions them to manipulate circumstances in a way that makes detection more challenging. Thus, a comprehensive understanding of fraud must account for all facets of the

Fraud Diamond Theory, where capabilities directly interplay with the other dimensions, ultimately framing a more robust model for comprehending and addressing fraudulent activities within organizations.

Building on this framework, Crowe Horwath introduced the Fraud Pentagon Theory in 2011 by adding two more critical factors—competence and the CEO's arrogance. These elements address aspects that had been largely neglected in the previous models, offering a more nuanced perspective on the dynamics of fraud. Competence shares similarities with capabilities highlighted in the Fraud Diamond Theory, emphasizing the specialized skills and knowledge employed by individuals to not only evade internal controls but also to design sophisticated strategies for concealment, making detection more challenging (Akbar, 2017; Devi, Widanaputra, Budiasih, & Rasmini, 2021; Puspitha & Yasa, 2018; Sahla & Ardianto, 2022; Victoria, 2018; Yulianti, Pratami, Widowati, & Prapti, 2019). This notion of competence is particularly important in a rapidly evolving business environment, where individuals in high-ranking positions often possess advanced technological proficiencies coupled with a deep understanding of organizational nuances that facilitate fraudulent activities. Conversely, the inclusion of the CEO's arrogance as a factor in the Fraud Pentagon Theory hints at a broader cultural issue within organizations. This reflects a troubling detachment from internal regulations, suggesting that such leaders often develop a sense of entitlement that positions them above standard accountability measures (Sahla & Ardianto, 2022). This phenomenon can be demonstrated through the frequency and prominence of CEOs' images in company annual reports, which serve as powerful symbols of their influence and control within the organization. Such imagery may inadvertently reinforce a narrative of invincibility, making it seem as though these leaders are above reproach and fostering an environment where malpractice can thrive unnoticed (Yulianti et al., 2019).

Finally, the evolution to Fraud Hexagon Theory integrates collusion as an essential factor, emphasizing that many modern fraud schemes necessitate collaboration with others within or outside the organization (Vousinas, 2019). In today's complex business environment, where technology and networks have intertwined, this addition offers a critical lens through which to analyze the multifaceted nature of fraud. The interdependence among individuals often leads to a web of deceitful agreements designed to exploit vulnerabilities for mutual benefit, thus broadening our understanding of how fraud manifests and persists in various sectors (Vousinas, 2019).

Prior research highlights that firms incurring high audit costs might engage in collusion, revealing a troubling conflict of interest for auditors. This dynamic poses ethical dilemmas, as auditors may prioritize maintaining lucrative client relationships over ensuring impartial and accurate financial reporting (Ryan Aviantara, 2021). In many cases, this results in a culture where short-term financial goals overshadow long-term integrity, fostering an environment conducive to unethical practices.

Furthermore, evidence indicates that collusion is particularly prevalent in government procurement processes, where manipulation of prices and quality occurs (Aviantara, 2021b). This scenario can undermine public trust and divert valuable resources away from their intended purposes. Consequently, it is suggested that utilizing e-procurement systems could serve as a powerful tool to mitigate financial reporting fraud and increase transparency (Aviantara, 2021b; Sukmadilaga, Winarningsih, Handayani, Herianti, & Ghani, 2022). By centralizing procurement data and automating processes, e-procurement can significantly reduce

opportunities for fraudulent activities by making it easier to detect anomalies and enforce compliance.

Additionally, companies involved in government projects demonstrated a higher likelihood of committing unlawful acts, often exploiting loopholes within bureaucratic systems (Alfargo & Mabur, 2022; Handoko & Tandean, 2021). The intersection of large budgets, minimal oversight, and the complexity of regulations creates a breeding ground for unethical behavior. This environment highlights the urgent need for more robust regulatory frameworks and rigorous oversight mechanisms to deter collusion and enhance accountability in public spending.

In conclusion, the six elements of the Fraud Hexagon Theory such as pressures, opportunities, rationalization, capabilities, arrogance, and collusion, each play a distinct and interconnected role in the landscape of fraudulent activities. Pressure often emanates from various sources, including personal financial struggles, competitive business environments, or unrealistic performance expectations set by stakeholders. Opportunities, on the other hand, arise from weaknesses in organizational controls, lack of oversight, or even intentional blind spots created by management. These environmental factors serve as gateways that enable individuals to exploit situations for personal gain, often without immediate detection. Capabilities refer to the skills and knowledge that individuals possess, which may include not only technical expertise but also an understanding of loopholes in regulatory frameworks that can be manipulated.

Furthermore, rationalization is a psychological mechanism that allows individuals to transform their guilt or discomfort into justifications for their actions. It creates a narrative that aligns their behavior with their self-image, enabling them to view themselves as victims of circumstance rather than willing participants in unethical conduct. Arrogance among perpetrators can foster a sense of superiority, where individuals believe they are above the rules that govern ordinary behavior, leading to an entitlement mentality that disregards ethical considerations.

Lastly, collusion highlights a crucial aspect of fraud that often goes unnoticed; it signifies the collaborative efforts among different actors to achieve deceitful objectives. This can manifest in various forms, such as employees conspiring with external vendors or other stakeholders to defraud the organization. The intricate web of relationships formed through collusion complicates the detection and prevention of fraud, underscoring the necessity for organizations to foster a culture of integrity and transparency. Together, these elements intricately intertwine, painting a comprehensive picture of how fraud perpetuates in various environments (Achmad et al., 2022; Indriaty & Thomas, 2023).

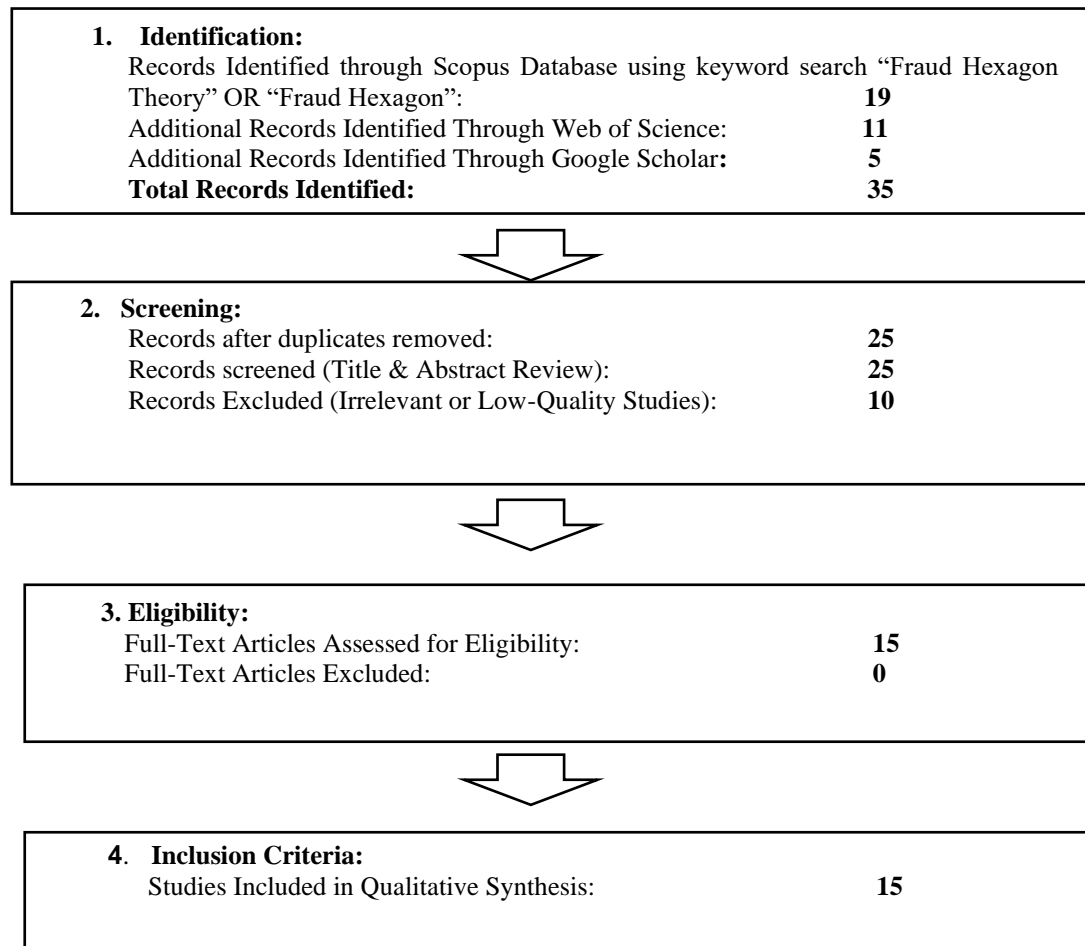
## Methodology

Following the prior studies that performed the systematic literature review (Komal, Bilal, Ye, & Salem, 2022; Shahana, Lavanya, & Bhat, 2023), this study adopts PRISMA method in identifying the sample studies. Selection criteria will include whether articles specifically mention the Fraud Hexagon Theory, whether they provide anything new in terms of data or theory relevant to FFR, and whether they are published in recognised peer-reviewed journals. However, exclusion criteria will be those studies that do not provide empirical evidence, studies that train fraud models only and do not have empirical evidence, which of the triangle, diamond, and pentagon, and studies that are not peer-review, working papers, conference proceedings. This approach aims to compile a diverse yet focused set of literature that critically



examines the Fraud Hexagon Theory, ultimately identifying theoretical and empirical gaps for future research.

The following is the flowchart of PRISMA for the systematic review of Fraud Hexagon Theory:



**Figure 1: Flowchart of PRISMA**

## Findings and Discussions

**Table 1: Summary of Previous Studies on Fraud Hexagon Theory and Fraudulent Financial Reporting**

Bil	Author(s)	Title	Objectives	Methodology	Findings	Suggestions for Future Research
1	Achmad, Ghozali, Helmina, Hapsari, & Pamungkas, (2023)	Detecting Fraudulent Financial Reporting Using the Fraud Hexagon Model: Evidence from the Banking Sector in Indonesia	Examine the fraud hexagon theory's factors on fraudulent reporting in banking	Sample: 215 banking firms (IDX 2017–2021), SPSS 25 software	External pressure and arrogance influence fraud; other factors do not	Use varied proxies and moderating variables to enhance accuracy
2	Achmad et al., (2022)	Hexagon Fraud: Detection of Fraudulent Financial Reporting in State-Owned Enterprises Indonesia	Detect fraud using hexagon analysis in state-owned enterprises	Sample: State-owned firms (IDX 2016–2020), logistic regression	Financial stability and external pressures affect fraud; others do not	Measure collusion with legally proven samples, improve variable measurements
3	Alfarago & Mabrur, (2022)	Do Fraud Hexagon Components Promote Fraud in Indonesia?	Test fraud hexagon alongside Beneish M-score	Sample: 76 manufacturing firms (IDX 2015–2019)	Financial stability, leverage, and government projects increase fraud risk	Use proxies like personal financial need for pressure, CGI for capability; expand sample beyond manufacturing
4	Alfarago, Syukur, & Mabrur, (2023)	The Likelihood of Fraud from the Fraud Hexagon Perspective: Evidence from Indonesia	Study fraud hexagon elements' impact on fraud likelihood	Sample: 76 firms (IDX 2015–2019)	Asset growth increases fraud probability; other factors less significant	Apply model to other sectors, test Dechow F-Score Model
5	Arum, Wijaya, & Wahyudi, (2024)	Moderation of Corporate Governance in Financial Statement Fraud Investigation With the S.C.C.O.R.E Model	Examine corporate governance's moderating effect on SCCORE model factors	Sample: 529 non-financial firms (IDX), secondary data	Governance moderates fraud; stimulus, collusion, opportunity, and ego influence fraud	Test additional models like F-Score, M-Score
6	Handoko & Salim, (2022)	Fraud Detection Using Fraud Hexagon Model	Explore fraud hexagon's	Sample: Top index KOMPAS 100,	Director changes and government	Apply model to other top indexes globally for

		in Top Index Shares of KOMPAS 100	relevance to top Indonesian stocks	quantitative study	projects impact fraud potential	comparative studies
7	Handoko & Tandean, (2021)	An Analysis of Fraud Hexagon in Detecting Financial Statement Fraud (Empirical Study of Banking Companies)	Detect fraud in IDX-listed banking firms using fraud hexagon	Sample: 41 banking firms (IDX 2017–2019), logistic regression	Only collusion affects fraud detection	Improve internal controls in banking to reduce fraud risk
8	Sari et al., (2022)	The Audit Committee as Moderating the Effect of Hexagon's Fraud on Fraudulent Financial Statements in Mining Companies	Test fraud hexagon's effect moderated by audit committee in mining sector	Sample: 73 mining firms (IDX 2018–2020), panel data regression	Director turnover reduces fraud; industry nature increases it; audit committee moderates some variables	Increase independent variables, test moderating factors like tax evasion
9	Suryandari et al., (2023)	Determinant of Fraudulent Behavior in the Indonesian Rural Bank Sector Using the Fraud Hexagon Perspective	Examine fraud hexagon elements in rural banks, using ethical values as a moderator	Sample: 351 respondents in 128 rural banks	Pressure, opportunity, rationalization, and ego drive fraud; ethical values counter fraud	Strengthen ethical training, consider power distance as an additional element
10	Sukmadilaga et al., (2022)	Fraudulent Financial Reporting in Ministerial and Governmental Institutions in Indonesia: An Analysis Using Hexagon Theory	Examine fraud hexagon elements in governmental reporting	Sample: 32 governmental institutions (2018–2020)	Opportunity, arrogance, and collusion increase fraud risk	Replicate study with advanced analysis techniques
11	Rahma & Sari, (2023)	Detection of Fraud Financial Statements through the Hexagon Model Vousinas Fraud Dimensions	Detect fraud in companies on Jakarta Islamic Index	Sample: 66 companies (JII 2019–2021)	Financial stability and ego affect fraud; other elements do not	Expand collusion measurement with external project info
12	Nugroho & Diyanty, (2022)	Fraud Hexagon and Fraudulent Financial Statement:	Test hexagon fraud with different	Sample: Non-financial companies (IDX 2016–2020),	Stimulus and opportunity partially affect fraud;	Compare models during COVID-19; apply OMI model further

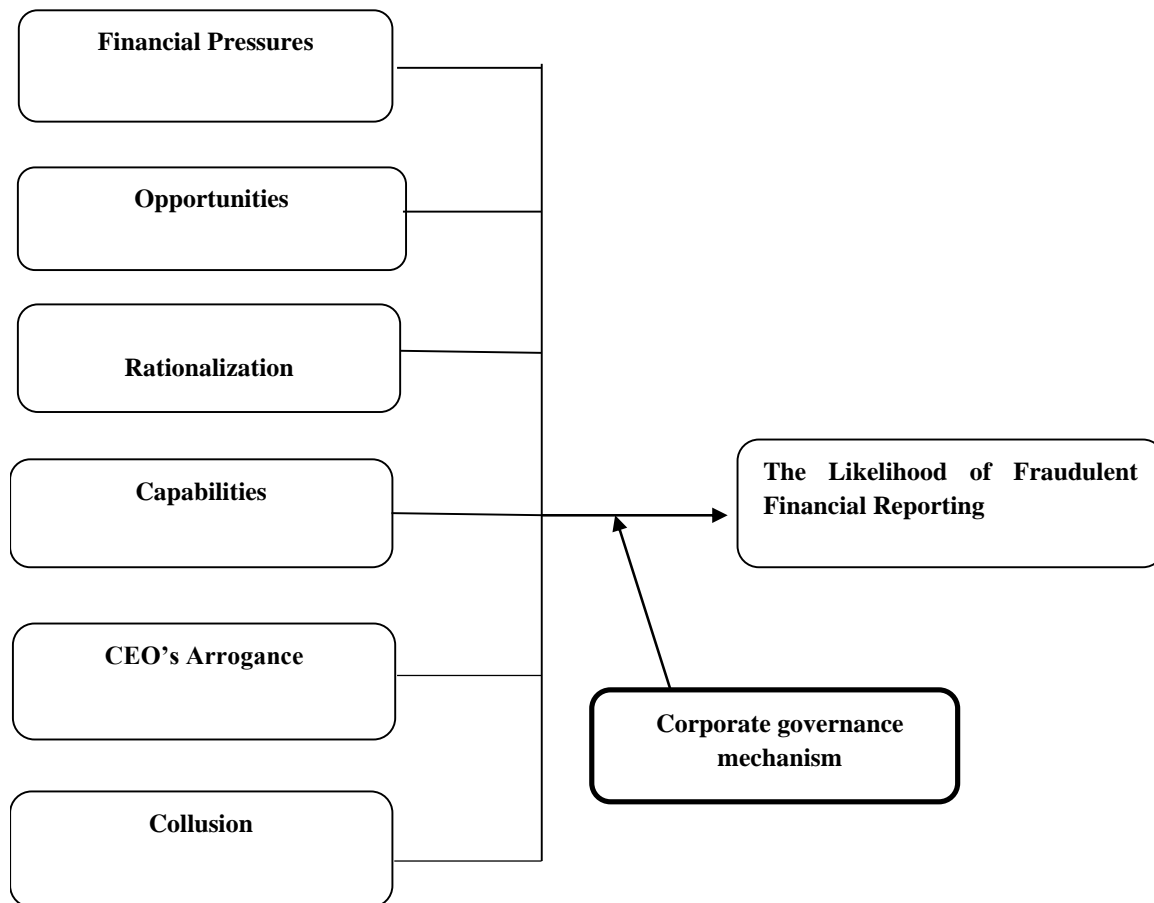


		Comparison Between OMI and Beneish Model	scoring models	logistic regression	rationalization consistently affects fraud	
13	Indriaty & Thomas, (2023)	Analysis of Hexagon Fraud Model, The S.C.C.O.R.E Model Influencing Fraudulent Financial Reporting on State-Owned Companies	Analyze the fraud hexagon in SOEs through respondent insights	Sample: 96 respondents from 16 SOEs	Opportunity, arrogance, and capability increase fraud risk	Use moderating variables to test hexagon components' influences
14	Nuryatno Amin, (2022)	Detecting Fraudulent Financial Reporting Through Hexagon Fraud Model: Moderating Role of Income Tax Rate	Test hexagon elements with income tax rate as moderator	Sample: 480 manufacturing firms (2015–2019)	Stimulus, rationalization, and ego positively impact fraud; income tax moderates capability and ego	Test model in banking; explore collusion in government partnerships
15	Aviantara, (2021)	The Association Between Fraud Hexagon and Government's Fraudulent	Examine hexagon model in government SOEs with Dechow F-Score	Sample: SOEs by asset size	Fraud hexagon model influences fraudulent reporting	Define unique proxies for variables like director change and government ownership

Despite significant contributions from existing studies on fraudulent financial reporting utilizing the Fraud Hexagon Model, critical gaps remain for future research to explore. A major limitation in the current literature is the insufficient examination of moderating and mediating variables. For instance, while research by Achmad et al. (2023) and Alfarago & Mabur (2022) offers valuable insights, it predominantly highlights the direct influence of the Fraud Hexagon components such as opportunity, pressure, and rationalization on fraudulent activities. Yet, fraud encompasses a multifaceted issue driven by an array of interacting factors. The overlooked roles of moderators, such as corporate governance, tax policy, or regulatory oversight, alongside mediators like financial distress, managerial incentives, or internal controls, are crucial for a deeper understanding of this phenomenon. Incorporating the moderating effects of corporate governance could significantly enhance our interpretation of the opportunity component, demonstrating how robust governance frameworks can effectively mitigate the potential for fraud. Furthermore, while Nuryatno Amin (2022) made strides by considering income tax rates as a moderator, investigating the impact of ethical culture as a mediator is equally vital. This approach could elucidate how ethical norms influence the pressures faced by managers, thereby shaping their rationalization of fraudulent behavior. To advance the field, future studies must focus on integrating interaction effects and mediation analysis, thus providing a more nuanced comprehension of fraud risk.

One critical gap in current fraud research is the lack of cross-sector and cross-country comparisons. Many studies, such as those by Handoko & Salim (2022) and Sari et al. (2022), largely restrict their focus to specific industries in Indonesia, including banking, manufacturing, and state-owned enterprises. While these investigations provide essential insights, they often overlook the fact that the opportunity for fraud varies enormously across different sectors due to unique regulations and operational vulnerabilities inherent to each industry. This variability can significantly influence the opportunities available for fraudulent activities. Furthermore, the prevailing research tends to concentrate solely on the Indonesian context, thus neglecting the broader spectrum of how fraud risk may diverge across countries with distinct legal frameworks, cultural norms, and economic conditions. Expanding the scope of research to include diverse sectors and international contexts is imperative, as it would bolster the generalizability of fraud theories—particularly concerning the regulatory environment featured in the Fraud Hexagon Model. Such an expansion would also empower policymakers with the critical insights needed to devise more effective anti-fraud strategies that resonate on a global scale.

Addressing these gaps is crucial for enhancing the robustness of fraud detection models. Future studies must delve into new moderating and mediating factors associated with opportunity, pressure, and rationalization to fully capture the intricate dynamics of fraud. Moreover, expanding the research scope to encompass various industries and international contexts is essential for greater applicability. This holistic approach will empower researchers to craft more refined fraud risk assessment models, thereby ensuring their effectiveness across diverse organizational and regulatory landscapes. By doing so, we can establish a stronger foundation for combating fraud and ultimately safeguard economic interests globally. For instance, corporate governance may moderate the impact of collusion, as strong governance structures reduce the risk of collusion-related fraud. Thus, the following conceptual framework was proposed:



**Figure 2: Conceptual Framework for the Influence of Fraud Hexagon Theory's Elements and the Likelihood of Fraudulent Financial Reporting**

## Conclusion

In conclusion, with reference to the enhanced Fraud Hexagon, the study of theories of fraud has opened important insights into the processes through which fraudulent financial reporting becomes operational. Such a literature review displays the move from older forms, such as the Fraud Triangle, to new larger constructs-for example, the Fraud Hexagon-proofs of the multidimensional and more complex nature of fraud. Adding more dimensions-like arrogance or collusion-substantively improves the predictive power of fraud models since these dimensions illuminate the broad spectrum of factors that drive unethical behaviour in financial reporting. Thus, this broadened frame not only extends theoretical understanding but also improves the practical ability of organizations and regulators to detect and curtail fraud.

Taking the practicalities of the application of the Fraud Hexagon, organizations would then adopt it in several ways in their risk assessment and fraud detection activities. There are training sessions that an organization can host in a workshop for the key personnel on the parts of the Fraud Hexagon yet relating to how these factors manifest in specific environments, such as arrogance and collusion. With the culture of awareness, employees can be more alert and more active in monitoring actions that may indicate an intent to fraud. Such assessments would include regular assessments of each dimension opportunity, pressure, rationalization, arrogance, and collusion, and may include the analysis of financial data and the study of employee actions and interactions, as well as the inclusion of indicators concerning the external

market in search of vulnerabilities. However, such thorough evaluations would enable an effective tailored strategy for an organization toward fraud prevention. Furthermore, the analytical tools may aid coupled with the Fraud Hexagon framework in augmenting the detection prowess of an organization towards the identification of anomalies and red flags that point to possible fraudulent activities. Analysis too can be predictive and provide in-time analysis as to why events are happening, which enables timely interventions. Last but not least, departments should be working with one another, building an entity integration of finance compliance and human resources collectively in gathering experiences and learnings from different departments on fraud detection, ensuring that all fronts of the Fraud Hexagon are consistently integrated under the organization's holistic approach to fraud prevention.

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