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UNRAVELLING DECEPTION: A COMPREHENSIVE LITERATURE REVIEW OF THE FRAUD HEXAGON THEORY IN PREDICTING AND UNDERSTANDING FRAUDULENT FINANCIAL REPORTING

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Abstract: Financial reporting fraud (FFR) remains a significant threat to organizations, regulators, and shareholders, undermining the integrity of financial systems and leading to substantial financial and reputational losses. Traditional models, such as the Fraud Triangle that highlights pressure, opportunity, and rationalization, and the Fraud Diamond that adds the element of capability, have been increasingly criticized for their inability to fully address the complexity of modern fraud schemes. The Fraud Hexagon Theory introduces additional factors, emphasizing the critical role of collusion and the involvement of multiple players, both internal and external to organizations, in perpetuating and concealing fraudulent financial reporting (FFR). This study aims to conduct a comprehensive literature review on the influence of fraud hexagon theory elements on the likelihood of fraudulent financial reporting. The findings suggest that various proxies have been used for fraud hexagon theory elements with inconsistent results which offer empirical gaps for future study. Besides, previous studies address the limitations of narrowly defined variables and proxies in the fraud hexagon model, which may overlook nuanced fraud indicators across different contexts. Additionally, it explores moderating factors such as corporate governance mechanism systems to understand their influence on the relationship between hexagon elements and fraud incidence, aiming to enhance the model's predictive accuracy.

Keyword: Fraud Hexagon Theory, Fraudulent Financial Reporting

Introduction

Financial reporting fraud (FFR) is a circumstance where someone deliberately provides wrong financial information within an organization with an aim of deceiving others for his or her own advantages (Fleming, 2021). It involves the process of presenting a company's financial statements in a manner that conceals the truth; for instance, timing differences, hidden overheads and liabilities, erroneous disclosures and inaccurate asset valuation techniques amongst others (Demetriades & Owusu-Agyei, 2021). This portrays a better image of the company's financial situation or performance with a view of having a high share price, bonuses or retained earnings. Consequently, these FFR lead to major financial losses with more than \$4.7 trillion losses worldwide due to occupational fraud as stated in the findings of the recent occupational fraud survey by the Association of Fraud Examiners in 2022 (ACFE, 2022).

Previous studies have identified various factors influencing FFR as depicted in The Fraud Triangle. Introduced by criminologist Donald Cressey in 1954, it identifies three key elements necessary for fraud which are pressures such financial pressure, opportunity such as lack of internal controls and

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rationalization such as ethical reasoning for unethical act (Fauziah Aida Fitri & Syukur, 2019; Narsa et al., 2023). Other studies have identified additional elements of capabilities which finally lead to Fraud Diamond Theory (Indarto & Ghozali, 2016; Noble, 2019; Omukaga, 2020). The new addition made in the understanding of the fraud scheme is called capability which provides the fact that the fraudster, who intends to commit fraud, must have the requisite skills to take advantage of the opportunity (Khamainy et al., 2021). Next is the Fraud Pentagon which builds on this further by adding arrogance and competence, recognizing the impact of over-arching ego and the expertise necessary for sophisticated fraud (Fuad et al., 2020; Handoko & Aurelia, 2021).

Furthermore, the Fraud Hexagon Theory signifies an advancing comprehension of the kind of phenomenon that is involved in fraudulent activities. This theory adds a sixth element to the existing framework which is collusion or an agreement between two or more parties who agree to harm a third party, such as an act of fraud on the rights of the third party (Riyanti, 2021; Vousinas, 2019). The addition of collusion shows that there is cooperation between people both within or outside the organization; hence, increasing the risks of fraud since they are difficult to notice (Achmad et al., 2022). Due to the complexity and integration of fraudulent schemes in contemporary society, the Fraud Hexagon highlights how it is possible to have several people working together and thereby be valuable for the ongoing efforts to counter fraud in the society.

Understanding the factors that contribute to FFR is crucial for several reasons. It allows organizations, regulators, and auditors to identify weaknesses in financial systems and implement measures to prevent fraud. This is important because a series of amendments to the code of corporate governance in Malaysia in 2012, 2017 and 2021 respectively seems unable to curb the occurrence of FFR as evidenced by the recent false financial statement submission to the Securities Commission by Serba Dinamik Holdings Bhd in 2021 (Malaysian Securities Commission, 2021). By understanding the motivations and circumstances behind individuals manipulating financial data, such as pressure, opportunity, and rationalization, capabilities, arrogance and collusion, it can strengthen internal controls, improve oversight, and promote ethical behavior. This understanding is not only essential for protecting the financial integrity of organizations but also safeguarding the interests of investors, creditors, and the broader economy. This makes detection more difficult and emphasizes the need for more sophisticated strategies to prevent fraud. Thus, the objectives of this study are twofold; to review the existing literature on the Fraud Hexagon Theory, and to analyse its application in predicting and understanding FFR.

Literature Review

There has been a gradual understanding of the fraud theories which show an appreciation of the antecedent factors of fraudulent activities in financial reporting. The original model of Fraud Triangle Theory by Donald Cressey comprises three elements namely pressure, opportunity, and rationalization to commit fraud (Aviantara, 2021a; Fitri et al., 2019; Narsa et al., 2023; Rae & Subramaniam, 2008; Skousen, 2004; Surjaatmaja, 2018; Suyanto, 2009). Perceived pressures from financial and other difficulties, perceived opportunities from weaknesses in corporate governance and perceived rationalization to justify the wrongful acts could lead to the fraudulent activities (Saluja et al., 2021).

This was followed by the creation of the Fraud Diamond Theory with the fourth dimension known as capability; it is when the individual is able to have certain skills and personality traits which enable him to exploit the opportunities for fraud (Noble, 2019; Omukaga, 2020). This new theory argues that the fraudulent acts cannot be carried out with the presence of the three elements if the perpetrators do not have the relevant capabilities to do it (Khamainy et al., 2021; Noble, 2019; Omukaga, 2020; Pramono Sari et al., 2020; Tenku Sulaiman & Ahmad, 2017). Besides that, Saluja et al. (2021) stated the capabilities of the fraud perpetrators can be in the forms of his or her position in the company or adequate knowledge to undertake the fraud without trace or with minimal revelations

potential. Hence, the greater position of the executive management in a company would possibly pose greater capabilities for them to defeat the companies' internal control system.

In addition, Crowe Horwarth has identified two additional factors that lead to the fraudulent financial reporting in 2011, namely competence and CEO's arrogance to form a new theory known as fraud pentagon theory with five elements (Akbar, 2017; Devi et al., 2021; Puspitha & Yasa, 2018; Sahla & Ardianto, 2022; Victoria, 2018; Yulianti et al., 2019). Competence possesses the same characteristics as capabilities in the fraud diamond theory, such as the ability to circumvent internal control systems, devise concealment strategies, and exert control over social situations for personal gain (Sahla & Ardianto, 2022). On the other hand, arrogance represents a superior attitude of CEO or other top management toward their own rights when internal controls or company regulations do not apply to them (Sahla & Ardianto, 2022). This attitude can be proven by looking at the frequency of CEO's pictures in the companies' annual reports (Yulianti et al., 2019).

Finally, The Fraud Hexagon Theory has evolved by including an additional factor of collusion (Vousinas, 2019). This theory accepts the reality that most of the frauds running in the modern world are designed in a way that they cannot operate without involving other people within or outside the organization (Vousinas, 2019). Collusion which is defined as a deceitful agreement between few individuals to harm another party was added by Vousinas to form the fraud hexagon theory (Vousinas, 2019). Prior studies suggest that companies that pay high audit costs may engage in collusion. This situation has the potential to generate a conflict of interest in providing unbiased reports (unqualified opinions), as audit firms often maintain customer loyalty by cultivating strong relationships with them (Aviantara, 2021a). According to Aviantara (2021b), collusion is common in government procurement and tendering by manipulating prices or quality, especially in public procurement. Thus, prior research implies that e-procurement may reduce financial reporting fraud (Aviantara, 2021b; Sukmadilaga et al., 2022). Besides, prior studies also discovered that fraud firms that tend to have projects with the government are likely to commit an illegal act (Alfarago & Maburur, 2022; Handoko & Tandean, 2021).

In conclusion, the six elements of the Fraud Hexagon Theory namely pressures, opportunities, rationalization, capabilities, arrogance and collusion play different roles in fraud. Thus, it can be argued that levels of pressure guarantee the perpetration of fraud while opportunity and capability enable it. Rationalization allows a person to look for a plausible reason to commit an unlawful act, arrogance empowers a person to assert control over, and collusion describes the agreement between two or more parties to engage in fraudulent activities (Achmad et al., 2022; Indriaty & Thomas, 2023).

Methodology

This study employs a PRISMA method in identifying the sample studies following the previous studies by conducting the systematic literature review (Komal et al., 2022; Shahana et al., 2023). Regarding selection criteria, articles are included if they explicitly discuss the Fraud Hexagon Theory, present empirical data or theoretical insights pertinent to FFR, and published in reputable peer-reviewed journals. Exclusion criteria applies to studies lacking empirical evidence, focusing solely on outdated fraud models which are the Fraud Triangle, Fraud Diamond, Fraud Pentagon, or not being peer-reviewed, such as working papers or 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

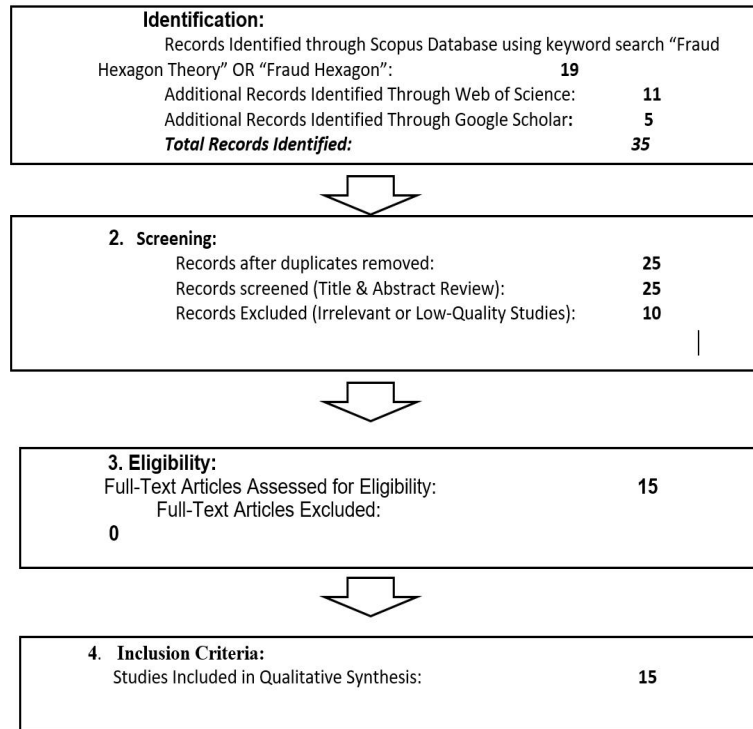


Table 1: Summary of previous studies on fraud hexagon theory and fraudulent financial reporting

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 from 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	Examine corporate governance's	Sample: 529 non-financial firms (IDX), secondary	Governance moderates fraud; stimulus, collusion,	Test additional models like F-Score, M-Score

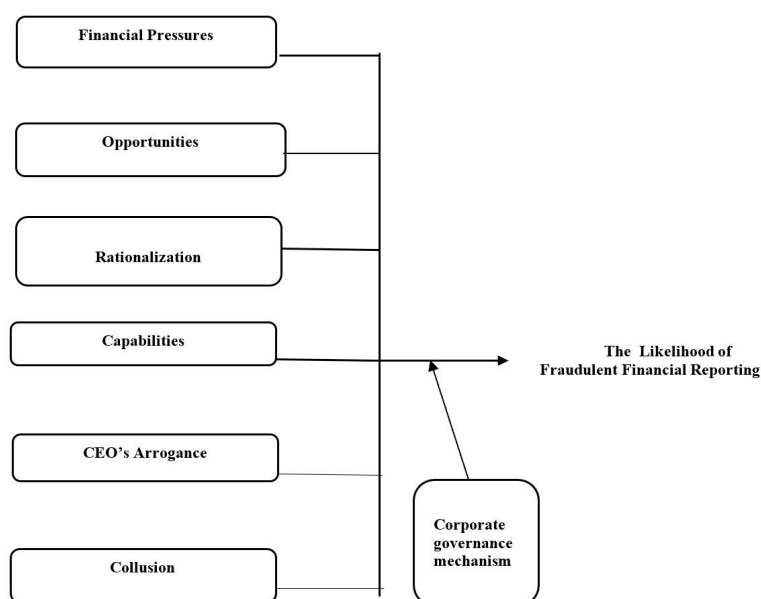
		Fraud Investigation With the S.C.C.O.R.E. Model	moderating effect on S.C.C.O.R.E. model factors	data	opportunity, and ego influence fraud	
6	Handoko & Salim (2022)	Fraud Detection Using Fraud Hexagon Model in Top Index Shares of KOMPAS 100	Explore fraud hexagon's relevance to top Indonesian stocks	Sample: Top index KOMPAS 100, quantitative study	Director changes and government projects impact fraud potential	Apply model to other top indexes globally for 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)	Determinants 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: Comparison Between OMI and Beneish Model	Test hexagon fraud with different scoring models	Sample: Non-financial companies (IDX 2016-2020), logistic regression	Stimulus and opportunity partially affect fraud; rationalization consistently affects fraud	Compare models during COVID-19; apply OMI model further
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 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	Examine hexagon model in government SOEs with	Sample: SOEs by asset size	Fraud hexagon model influences fraudulent reporting	Define unique proxies for variables like director change and government

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Based on the above review, there was limited use of variables and proxies within fraud hexagon studies which present a unique opportunity to enhance the model’s precision and adaptability in detecting financial fraud. Many existing studies rely on a limited set of generalized proxies, such as using financial stability for pressure or changes in directors for capability, which may not capture the full range of fraud indicators. This simplification risks overlooked nuanced behaviours or signals specific to certain industries or company structures. By expanding and diversifying these proxies, such as using personal financial needs or the quality of governance to measure pressure, or incorporating corporate governance indices to gauge capability, this study can achieve a more accurate reflection of each hexagon component. Using such detailed variables would improve predictive capabilities and lead to a more nuanced understanding of how different fraud motivators manifest within various organizational environments.

In addition, integrating moderating variables can further deepen insights into the conditions that strengthen or mitigate fraud risks associated with the hexagon model. Moderators such as tax incentives, whistleblowing systems, and corporate governance mechanisms could significantly alter the relationships between the hexagon’s elements and the occurrence of fraud. 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 is proposed.

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



Conclusion

The exploration of fraud theories, including the enhanced Fraud Hexagon, provides crucial insights into the mechanisms behind fraudulent financial reporting (FFR). This literature review illustrates the shift from traditional models, such as the Fraud Triangle, to a more comprehensive framework like the Fraud Hexagon, highlighting the complexity and multi-faceted nature of fraud. The incorporation of new dimensions, such as arrogance and collusion, strengthens the predictive capability of fraud models by acknowledging the wider range of factors contributing to unethical

behaviour in financial reporting. This expanded framework not only enhances theoretical understanding but also improves the practical ability of organisations and regulators to detect and mitigate fraudulent activities.

In conclusion, the research emphasises the importance of continually evolving fraud detection models to keep up with the dynamic nature of financial fraud. The enhanced Fraud Hexagon serves as a valuable tool for academics, auditors, and policymakers by offering a more nuanced understanding of the drivers behind FFR. Future research can build on this work by empirically testing the expanded framework in diverse settings, thereby refining strategies to combat financial misconduct. As fraud becomes increasingly sophisticated, the development of adaptive, comprehensive models like the Fraud Hexagon will remain essential in safeguarding the integrity of financial reporting systems.

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