

Review Paper

Fraudulent Financial Reporting and Fraud Hexagon: Evidence from Infrastructure Companies in ASEAN

Reyhan Rifqi Naldo* and Rindang Widuri

Department of Accounting, School of Accounting - Master of Accounting, Bina Nusantara University, Jakarta, Indonesia

*Corresponding author: reyhan.naldo@binus.ac.id (ORCID ID: 0000-0003-0890-5018)

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ABSTRACT

This study aims to analyse the factors that may influence fraudulent financial reporting using the fraud hexagon model. The subjects of this study are the infrastructure sector companies listed on the stock exchanges of every ASEAN country for the period of 2019-2021. This study uses logistic regression with F-Score as the measurement for the dependent variable. The result of this study suggests that financial target, change in BOD, and CEO's education affect fraudulent financial reporting. While financial stability, external pressure, e-procurement, electronic whistle blowing system, change in auditor, and CEO's military or political connection do not affect fraudulent financial reporting. This study advances the knowledge of variables that may influence fraudulent financial reporting using a few new proxies for the fraud hexagon's element, namely the e-procurement, electronic whistle blowing system, CEO's education, and CEO's military or political connection. The findings of this study have provided several practical implications for the company's stakeholders to prevent fraudulent financial reporting. In the context of the fraud hexagon, this research is the first study to date that can show the significant and positive relationship between CEOs' education and fraudulent financial reporting. The limitations of this study are the short observation period and the low R-square of the model.

HIGHLIGHTS

- Using logistic regression, this study examine ASEAN listed infrastructure companies with the fraud hexagon theory. This study advances the knowledge of variables that may influence fraudulent financial reporting using a few new proxies for the fraud hexagon's element, namely the e-procurement, electronic whistle blowing system, CEO's education, and CEO's military or political connection.

Keywords: ASEAN, Fraud Hexagon, Fraudulent Financial Reporting, Infrastructure

The financial statements serve as a key channel of communication between the companies and the external users, which contains information about the firm's economic activities or transactions that take place over a specific period (Handoko & Natasya, 2019). Knowing the importance of the company's financial statements, the contents of the report must also reflect the actual situation. However, financial statements could be manipulated in such a way by the company, so that the information conveyed deceives and misleads users of financial statements, this unlawful act is one of the categories of fraud

that is usually referred to as fraudulent financial reporting (FFR) (Achmad *et al.* 2022). The reason why FFR occur could be explained by the agency theory. The agency theory explains a cooperative contract between the shareholder, referred to as the "principal" and the management, who is referred to as the "agent" (Jensen & Meckling, 1976). However,

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due to several factors, the contract is difficult to maintain. One of the causes is the fact that agents frequently put their wealth above the interests of the principal, which can result in fraud.

According to the report from the Association of Certified Fraud Examiners (ACFE) (2022), the cases of FFR are the fewest in the world when compared to other categories of occupational fraud such as corruption and asset misappropriation. The percentage of incidents for FFR is 9%, for corruption, it is 50%, and for asset misappropriation, it is 86% (ACFE, 2022). Although the percentage of incidence for FFR is the lowest, this fraud scheme has the largest median loss of \$593,000, much higher than asset misappropriation (\$100,000) and corruption schemes (\$150,000) (ACFE, 2022). The ACFE (2022) report also shows that the average losses on fraud in the Asia-Pacific region are the largest, which is \$2,310,000 with a total of 188 cases, of which 11% of the cases are FFR (ACFE, 2022). FFR cases in the Asia-Pacific region are not only detrimental to the Asia-Pacific society itself, but to the world as a whole. This matter demands special attention because each case is a tragedy for investors, creditors, and other stakeholders.

The region of Asia-Pacific has seen significant changes in terms of politics, economy, and business environments (Jan, 2018). This push emerging markets from developing countries in Asia-Pacific, such as countries in the Association of Southeast Asian Nations (ASEAN), to be more active to search for new investment opportunities (techcollectivesea.com, 2021). However, investing in developing countries has its challenges, they tend to manipulate their financial statements to make them more appealing to investors, and this, in turn, caused FFR incidents to occur more often (Jan, 2018).

In the past couple of decades, there have been several cases of FFR that happened in ASEAN countries. The first example is from Malaysia, one of Malaysia's most famous corporate scandals, Megan Media Holdings Bhd. They were discovered to have given Bursa Malaysia incorrect information on their income as reported in their quarterly reports for the fiscal year that ended on 31st January 2007, this inaccurate information relates to Megan Media's estimated RM 306 million in revenue (Surendran, 2017). Then, in Singapore, there is Noble Group, one of ASEAN's most recent FFR scandals. Between

2012 and 2016, Noble Group released financial statements that contained misleading information. It was discovered that they had misclassified their marketing contracts as financial instruments instead of service contracts, they recognize a lot of future payments from these contracts before providing the services, in turn, inflating Noble's stated earnings and net assets (Chambers, 2022). Lastly in Indonesia, there is a similar case from Garuda Indonesia, they perform financial statement manipulation by recognizing revenue prematurely. The case starts with a deal from a media startup, Mahata Aero Teknologi. The startup promised to pay a total of \$242 million to Garuda over the next 15 years from instalments of Wi-Fi services in Garuda airplanes. However, Garuda put the deal in its book as part of its 2018 revenue (Suzuki, 2019).

According to the previous examples, FFR may happen in a variety of industry sectors. In contrast, the infrastructure sector, particularly in ASEAN countries, needs more attention. According to Andrés *et al.* (2013), the need for infrastructure will increase significantly over the next decade as a result of the infrastructure discrepancy that exists in ASEAN countries. Many causes, including economic expansion, technical advancements, and urbanization, are responsible for the rising needs (Andrés *et al.* 2013). However, as a result, the infrastructure sector in ASEAN is under more strain conditions. The infrastructure gaps in ASEAN countries must be filled with a vast quantity of investment capital. This might lead to additional incentives or encouragement for businesses to commit FFR because of the necessity for the infrastructure sector to expand quickly.

A fraud detection model is required to foresee the various forms of FFR that may arise over the next few years. The fraud hexagon theory, the most recent fraud detection model, was introduced by Vousinas (2019). By including a new element called collusion, this model expands on the earlier fraud detection models, particularly the fraud triangle (Cressey, 1954), fraud diamond (Wolfe & Hermanson, 2004), and fraud pentagon (Horwath, 2012). Thus, the fraud hexagon theory's elements are stimulus (pressure), capability, collusion, opportunity, rationalization, and ego, sometimes also known as the S.C.O.R.E model (Vousinas, 2019). However, the fraud detection model from

the fraud hexagon theory cannot be used directly, therefore, a proxy for each element is needed. In this research, pressure will be proxied by financial stability, external pressure, and financial target. The capability will be measured by the change of board of directors (BOD) in a company. Collusion will be proxied by the implementation of an e-procurement system in a company. Opportunity will be measured by the existence of an electronic whistleblowing system. Rationalization will be proxied by a change in auditor. Lastly, arrogance will be proxied by the CEO's education and the CEO's military or political connection.

Several studies on the elements that affect FFR still generate conflicting results. Research by Achmad *et al.* (2022), shows that financial stability and external pressure have a significant and positive effect on FFR, while other factors such as auditor change, change in director, arrogance, collusion, and ineffective monitoring do not. Rahma *et al.* (2022), also indicate that only financial stability and rationalization affect FFR. Research by Herbenita *et al.* (2022) concludes that financial targets, financial stability, and personal financial needs affect FFR. Furthermore, Handoko and Tandean (2021) indicate that only collusion affects FFR. However, research by Aviantara (2021) concludes that arrogance proxied by CEO education and CEO military do not affect FFR, while other factors such as pressure, capability, collusion, opportunity, and rationalization do affect FFR.

The uniqueness of this study is that it advances knowledge of the variables that may influence FFR through the use of a few new proxies for the fraud hexagon's element, namely the e-procurement, electronic whistle blowing system, CEO's education, and CEO's military or political connection. There has not been much empirical research employing these factors, particularly in ASEAN infrastructure companies. This study intends to examine how the fraud hexagon model's various components interact to identify FFR. The financial statements of infrastructure companies are extremely important for the growth and advancement of the nation, as a result, it is important to identify and prevent fraud based on the financial statements provided by the company.

This paper will be divided into 5 parts. The introduction will be outlined in section 1, section

2 will show the literature review, section 3 will present methodology, data, and variables, section 4 will explain the results and discussion, and the conclusion will be given in the last section.

LITERATURE REVIEW

Agency Theory

According to the agency theory proposed by Jensen and Meckling (1976), the agency relationship begins when the shareholder, referred to as the "principal", enters a cooperative contract with the management, who is referred to as the "agent". Under the contract, the shareholders or principals of the firm surrender their obligations in making day-to-day decisions for the company to the manager, who is the shareholders' agent. However, several factors make the agent-principal relationship difficult to maintain. The term for these difficulties is agency conflict. Agency conflict occurred because there is a conflict of interest and information asymmetry between the principal and the agent. Conflict of interest happens when the principal's and the agent's objectives conflict; while information asymmetry occurs when the agent has more information about the company's financial condition and operational activities than the principal. As a result of this conflict, it is simpler for agents to commit FFR by abusing their knowledge about the business to fulfil their interests. This act is harmful to the principal and the stakeholder as the agent will provide falsified data.

Fraudulent Financial Reporting

According to Rezaee (2005), FFR is a purposeful misrepresentation of a company's financial condition that is done by an intentional misstatement in the company's financial statements. The perpetrators commit FFR to deceive the users of financial statements and to gain financial advantage. Those with greater levels of responsibility inside the organization, such as owners, executives, and managers, are often the ones who do this unlawful act (ACFE, 2022). The information reported in financial statements that have been successfully manipulated will give a misleading impression of the organization. This may cause the company's stakeholders to make poor decisions. It is illegal to release false financial statements, especially to gain a personal advantage.

Fraud Hexagon Theory

Researchers continue to develop fraud detection models to prevent or minimize fraud, one of the recent models is the fraud hexagon theory from Vousinas (2019). The fraud hexagon theory proposed by Vousinas (2019) is a development of several previous fraud theories, namely the fraud triangle (Cressey, 1954), fraud diamond (Wolfe & Hermanson, 2004), and fraud pentagon (Horwath, 2012). Cressey (1954) found that three factors always appear in fraud, namely pressure (incentive), rationalization, and opportunity, these three elements are then called the fraud triangle theory. Pressure or incentive refers to something that has happened in a person's personal life, which ultimately creates a need that motivates them to commit fraud (Singleton & Singleton, 2010). According to the Statement of Auditing Standards No. 99 (2002), there are four types of conditions in pressure that can lead to fraud, these are financial stability, external pressure, financial targets, and personal financial need. For rationalization, fraud perpetrators tend to justify their crimes, this can be a feeling that they are entitled to the results of the fraud or thinking that their actions will not hurt anyone (Abdullahi & Mansor, 2018). Different from the other two elements, opportunity took the perspective from the external side of the perpetrators, which is a situation that allows for fraud to be perpetrated (Handoko & Natasya, 2019). Along with the development of research related to fraud, Wolfe and Hermanson (2004) found that there is one new factor that causes fraud to occur, which is capability. Capability plus the other three factors from the fraud triangle theory creates the fraud diamond theory. The term "capability" refers to a person's position within an organization that gives them the capacity to take advantage of a fraud opportunity (Ratmono & Frendy, 2022). Without a trained individual, high-level fraud is impossible. An opportunity creates a door for fraud; however, the individual must be able to recognize the potential for fraud and be skilled enough to commit them (Ozcelik, 2020). Furthermore, many years later, Horwath (2012) updated the fraud triangle and the fraud diamond by changing the capability element into competence, which has the same meaning and term, then adding a new element which is arrogance, thus giving birth to the fraud

pentagon theory. Arrogance is someone with a sense of entitlement, superiority, or greed who believes that internal control does not apply to them, as a result, the perpetrators of fraud usually believe they may commit fraud without fear of being caught (Antawirya *et al.* 2019).

Vousinas (2019), further refined the fraud pentagon theory by adding a new element, called collusion. Collusion is defined as dishonest attitudes and behaviour between two or more persons to reach agreements established between corporate employees, groups of individuals in different companies, or companies operating jointly (Vousinas, 2019). The likelihood of fraud in a company will increase if collusion takes place. As a result, a higher level of collusion will have an impact on how likely it is that fraud will occur (Achmad *et al.* 2022). Together, these six elements namely pressure, capability, collusion, opportunity, rationalization, and arrogance create the fraud hexagon theory.

Hypothesis Formulation

The Effect of Financial Stability on Fraudulent Financial Reporting

Financial stability is a term used to characterize an entity's capacity to balance its finances (Sari and Khoiriah, 2021). Assets serve as a symbol of a company's wealth, therefore, changes in total assets through time can indicate how financially stable a company is (Handoko & Natasya, 2019). The users of financial statements, such as investors and creditors, will have more confidence in companies that have a stable financial condition. Due to the principal's encouragement to find and keep creditors and investors, the agent will always strive to preserve the company's financial stability. However, as a result, the agent will be under pressure to maintain a high degree of financial stability. This will force them to manipulate the performance of the financial statements. Hence, the company's likelihood of FFR increases with its level of financial instability. Rahmatika *et al.* (2019); Achmad *et al.* (2022); and Handoko and Natasya (2019) supported this hypothesis and shows that there is a significant and positive relationship between financial stability and FFR.

H₁: Financial Stability has a positive effect on Fraudulent Financial Reporting.

The Effect of External Pressure on Fraudulent Financial Reporting

External pressure is excessive pressure placed on management to fulfil the third parties' demands or expectations (Ozcelik, 2020). External pressure can occur when a company requires additional debt or sources of financing from external parties to remain competitive (Skousen *et al.* 2009). Therefore, the principal is exerting pressure on agents to maintain the third party's expectations for the company. This incentivizes/pressurizes agents to act in a variety of ways, such as falsifying the company's financial statements to display the company's best performance to fulfil the third parties' expectations. External pressure can be proxied by the leverage ratio, which is total debt to total assets. If the company has a high leverage ratio, it means that the company has a lot of debt, hence, the company has a lot of risk of not repaying its debt. This will make creditors or investors experience concerns about providing additional funding to the company (Wicaksono & Suryandari, 2021). So, the more significant the leverage ratio is, the higher the possibility of companies committing FFR. Research by Puspitha and Yasa (2018) and Achmad *et al.* (2022) shows that external pressure has a significant and positive effect on FFR and is one of the aspects that can be used to predict FFR.

H₂: External Pressure has a positive effect on Fraudulent Financial Reporting.

The Effect of Financial Target on Fraudulent Financial Reporting

Financial targets are management's obligations to meet the financial performance goals of the shareholders (Herbenita *et al.* 2022). However, management may feel under pressure because of the unrealistic expectations for profitability from the principal. When the principal's specified financial target is not met, more pressure arises. This can encourage management to commit FFR. Profitability ratios such as return on assets are often used as a proxy for the financial target. Hence, low ROA encourages management to commit FFR because the profitability goals set by the principal are not met. Research by Ozcelik (2020) finds that financial target

proxied by ROA has a significant and negative relationship to FFR. However, research by Puspitha and Yasa (2018) provides a different result, where financial target proxied by ROA does not affect FFR.

H₃: Financial Target has a negative effect on Fraudulent Financial Reporting.

The Effect of Change in BOD on Fraudulent Financial Reporting

According to Wolfe and Hermanson (2004), some of the characteristics of capability are a person's position/function, self-confidence, intelligence, and ability to deal with stress. These four characteristics can be represented by the company's directors. Many researchers use change in BOD as a proxy for capability, with the assumption that the process of change of BOD is indicated to be able to create high-stress situations in the work environment, hence, increasing the possibility of FFR to occur (Puspitha and Yasa, 2018; Achmad *et al.* 2022; and Aviantara, 2021). However, it is not always the case. Occasionally, a company undergoes some changes in its BOD because the previous director has an indication of fraud and has to be dismissed (Sari and Khoiriah, 2021). Another possibility of change in the company's BOD is because the company wants to improve its performance by hiring more qualified individuals (Handoko & Natasya, 2019), thus, reducing the possibility of FFR to occur. If the newly appointed director is more qualified and more capable than the previous director, then this can minimize agency conflicts. This concludes that appointing a new director with enough capability can help the company to reduce or prevent FFR. This hypothesis is supported by Sari and Khoiriah (2021) and Handoko and Natasya (2019) who found that the change in BOD has a negative effect on FFR.

H₄: Change in BOD has a negative effect on Fraudulent Financial Reporting.

The Effect of E-Procurement on Fraudulent Financial Reporting

According to Nasrun Mohd Nawi *et al.* (2016), e-procurement is a modern approach to conducting purchase and procurement activities from business to business through an online system, this system can assist in providing and selling products and services through the use of internet-based

technology. Throughout the procurement process, information asymmetry could occur. This is due to inadequate information, such as insufficient contract information, a lack of monitoring procedures, and a lack of knowledge regarding project configuration costs (Neupane *et al.* 2014). The majority of businesses in the infrastructure sector use projects acquired through a tendering or procurement process to carry out their daily operations. However, collusion could emerge during the fulfilment of this tender procedure, specifically when business players agree to raise the selling price or lower the quality of the goods or services provided, hence increasing the likelihood of FFR (Aviantara, 2021). According to Ikbal *et al.* (2020), FFR carried out by the infrastructure companies in the procurement process are reporting of physical infrastructure development but it was not finished; manufacturing fictitious infrastructure; purchasing goods for one unit but recorded for two or more units; construction of physical infrastructure that has been built but rebuilt; waste of purchasing goods; and markup on goods prices. The e-procurement system will increase transparency and accountability for each project carried out. Therefore, it is hoped that the application of e-procurement can prevent FFR caused from collusion by reducing information asymmetry. This hypothesis is supported by the research from Aviantara (2021), which shows that collusion proxied by e-procurement has a significant effect on FFR. Then, Sukma Danuta (2017), finds that the implementation of e-procurement has proven to be able to reduce the incidence of fraud through the transparency of e-procurement.

H₅: E-procurement has a negative effect on Fraudulent Financial Reporting.

The Effect of Electronic Whistle-blowing System on Fraudulent Financial Reporting

Opportunities arise mostly as a result of the company's poor internal controls for fraud prevention. The deployment of a whistle-blowing system is one of the internal controls that can limit the formation of opportunities for fraud. The whistle-blowing system's goal is to limit fraud opportunities by providing a mechanism for exposing fraudulent acts committed by the company. As a result, companies that do not have whistle-blowing system could open up opportunities

for fraud. According to the agency theory, each party usually puts its interests first, and the agent does not always carry out the principal's interest. By releasing agency costs, principals can reduce agency problems and conflicts of interest. Implementing a whistle-blowing system, which is made as a kind of agent monitoring system, is one type of agency cost. However, as time goes on, not only are fraudulent actions becoming more complex, but the preventive system is becoming more sophisticated as well. This can be observed from changes in the whistle-blowing system, which used to simply be a telephone hotline, now modernized by adopting the use of information technology and the internet, becoming an email or web-based whistle-blowing system. According to ACFE (2022), the use of telephone hotlines as a whistle-blowing reporting mechanism has decreased substantially, while the use of whistle-blowing mechanisms via email and web/online has surpassed the use of telephone hotlines. This finding shows that the whistle-blowing reporting method preferred and used by the whistle-blower is growing, especially regarding online and electronic forms, so the use of an email or web-based whistle-blowing system will be more effective in the company to reduce or prevent fraud. Aviantara (2021) show that opportunity proxied by the whistle-blowing system is proven to have a significant effect on FFR.

H₆: Electronic Whistleblowing System has a negative effect on Fraudulent Financial Reporting.

The Effect of Change in Auditor on Fraudulent Financial Reporting

Rationalization is an attempt to find justification for the acts of fraud committed, one of the proxies for measuring rationalization is by looking at the change of auditors taken by the company (Antawirya *et al.* 2019). A firm may change its auditor to conceal fraud that the previous auditor had uncovered. This is because the company may believe that its actions, such as falsifying financial statements, are correct and do not need to be corrected (Achmad *et al.* 2022). Changing auditors would help agents who commit fraud since management will be able to get rid of crucial information or occurrences that the principal is unaware of, hence information asymmetry occurs (Wicaksono & Suryandari, 2021). A change in auditor can remove evidence of fraud

since it is unlikely that the new auditor would find the fraud and because the new auditor may not be completely aware of the state of the firm as a whole. Therefore, the likelihood of FFR increases with the increase in auditor turnover rate (Antawirya *et al.* 2019). As a result, the company's justification for its deceptive behaviour takes the appearance of a change in auditors. Research by Ozcelik (2020); Puspitha and Yasa (2018); and Syahria (2019) shows that there is a significant relationship between change in auditor and FFR. However, research by Handoko and Natasya (2019); Handoko and Tandean (2021); and Achmad *et al.* (2022) indicates that there is no significant effect between change in auditor and FFR.

H₇: Change in Auditor has a positive effect on Fraudulent Financial Reporting.

The Effect of CEO's Education on Fraudulent Financial Reporting

Superiority, greed, and self-interest are some examples of ego or arrogance's characteristics. CEO's level of education can bring out those characteristics. According to Daboub *et al.* (1995), someone with a higher educational background had decreased moral development because there is an increasing self-interest behaviour. The research from Truluck and Courtenay (2002) also supports the finding, which shows that higher educational levels were associated with higher stages of ego development. As a result, the greater the educational degree of a CEO, the more likely the CEO would be arrogant. A high level of arrogance in CEOs is dangerous because it will amplify their feeling of superiority due to their status and position. This feeling of superiority may lead to the likelihood of FFR because they will believe that internal control no longer applies to them. This hypothesis is supported by the report from ACFE (2022), which shows that 65% of perpetrators of fraud have a higher academic background than the other 35%. This group also had higher median losses than individuals with lower education levels. Hence, a CEO with a higher educational background will be more likely to commit FFR and as a result, increasing agency costs. Several studies on the influence of CEO educational level on FFR, however, had the same conclusion that CEO education had no effect on FFR. Masrurroh and Carolina (2022) reveal that CEO traits like

age, education, and employment history cannot be utilized as indications to detect FFR. Aviantara (2021) also shows the same conclusion, that FFR is unaffected by the ego that is proxied by the CEO's educational background.

H₈: CEO's Education has a positive effect on Fraudulent Financial Reporting.

The Effect of CEO's military or political connection on Fraudulent Financial Reporting

How governments and businesses interact politically has a big influence on how businesses behave when it comes to financing and investing (Cheng *et al.* 2021). Research by Harymawan (2020) also stated that firms with a militarily-connected CEO influence the way company choose their auditors, which they are less likely to appoint one of the Big 4 auditors. CEO's political connections allow companies to gain more benefits, such as bank loans, property rights protection, government subsidies, tax preferences, and land use rights (Cheng *et al.* 2021). However, sometimes CEO may make use of this privilege to perpetrate fraud, including FFR (Haqq and Budiwitjaksono, 2020; Oppong & Bruce-Amartey, 2022; Pungulescu, 2022). The CEO takes advantage of the benefits because they believe that internal control no longer applies to them, which is the characteristic of arrogance. Furthermore, the CEO's political and military connections widen the gap in interests between the agent and the principal. As a result, a deeper agency conflict is triggered. Research by Haqq and Budiwitjaksono (2020) and Wicaksono and Suryandari (2021) show that political connection has no effect on FFR and that political connections cannot be used to detect FFR. Similarly, research by Aviantara (2021) indicates that CEOs with military backgrounds do not affect FFR.

H₉: CEO's Military or Political Connection has a positive effect on Fraudulent Financial Reporting.

RESEARCH METHODOLOGY

Data Population, Samples, and Collection

This research studies the effect of financial stability, external pressure, financial target, change in BOD, e-procurement, electronic whistle-blowing system, change in auditor, CEO's education, and CEO's military or political connection on FFR. The population for this study is the infrastructure

sector companies listed on the stock exchanges of every ASEAN country for the period of 2019-2021. The sample in this study was taken based on the purposive sampling method, where the sample was selected using predetermined criteria. The criteria for the sample are as follows: (1) infrastructure sector companies listed consecutively in the stock exchanges of ASEAN countries for the period of 2019-2021; (2) company that publishes complete annual reports in full English for the whole period of observation (2019-2021). The total samples collected are presented in Table 1.

Table 1: Sampling Criteria

Criteria	Total
Infrastructure companies listed in the stock exchanges of every ASEAN country for the period of 2019-2021.	380
Missing or incomplete data from OSIRIS for the period of 2019-2021	(59)
Incomplete annual report for Vietnam in OSIRIS	(176)
Infrastructure companies that do not publish a complete annual report and use a language other than English during the period of 2019-2021	(30)
Infrastructure companies in ASEAN that meet the criteria	115
Total research sample (115 × 3)	345

The data was collected from the OSIRIS database, the company’s annual report, and the company’s

website. OSIRIS was used to gather the initial samples of companies and all financials-related data for the period of 2019-2021. Other non-financial data such as the e-procurement system, the company’s BOD, the company’s whistle-blowing system, the company’s auditor, and CEO’s background are taken from both the company’s annual report and the company’s website.

Measurement of the Key Variables

The dependent variable in this study is FFR, which is measured by calculating the fraud score model or F-score (Dechow *et al.* 2011). The F-Score model is a development of the Beneish M-Score, which uses elements in the financial statements to form a fraud detection model for the company’s financial statements. The F-Score model has shown consistent results for being able to detect FFR effectively, even better than the Beneish M-Score fraud detection model (Aghghaleh *et al.* 2016).

As for the independent variable, this research uses financial stability, external pressure, financial target, change in BOD, e-procurement, electronic whistle-blowing system, change in auditor, CEO’s education, and CEO’s military or political connection. The measurements used by each independent variable are presented in Table 2.

Table 2: Independent Variable Measurement

Elements of Fraud Hexagon	Variable	Measurement	Source
Pressure	Financial Stability (ACHG)	$((Total\ Asset\ (t) - Total\ Asset\ (t-1))) / (Total\ Asset\ (t-1))$	(Skousen <i>et al.</i> 2009)
	External Pressure (EP)	$Total\ Debt / Total\ Asset$	(Skousen <i>et al.</i> 2009)
	Financial Target (ROA)	$Net\ Income / Total\ Asset$	(Skousen <i>et al.</i> 2009)
Capability	Change in BOD (BODCHG)	Coded 1 if there is a change in the company’s BOD, 0 otherwise	(Wolfe & Hermanson, 2004)
Collusion	E-procurement (EPROC)	Coded 1 if the company have e-procurement system in place, 0 otherwise	(Aviantara, 2021)
Opportunity	Electronic Whistle-blowing System (EWBS)	Coded 1 if the company implement electronic whistle-blowing system, 0 otherwise	(Aviantara, 2021)
Rationalization	Change in Auditor (CHGAUD)	Coded 1 if there is a change of company’s auditor, 0 otherwise	(Skousen <i>et al.</i> 2009)
Arrogance	CEO’s Education (CEOEDU)	Coded 1 if the company’s CEO has PhD / doctoral degree, 0 otherwise	(Aviantara, 2021)
	CEO’s Military or Political Connection (CEOMP)	Coded 1 if the company’s CEO has military or political connection, 0 otherwise	(Aviantara, 2021) and (Cheng <i>et al.</i> 2021)

Data Analysis

The descriptive statistic will be carried out to explain all the data that has been collected by the mean, standard deviation, maximum, and minimum of the data. A classification test was also performed to determine the frequency of expectations based on empirical data of the dependent variable. This study uses logistic regression since the dependent variable is a dummy, which only has two possibilities between 0 and 1 and does not require the assumption of data normality on the independent variable. The Hosmer and Lemeshow’s Goodness of Fit Test, which evaluates the overall model fit based on the likelihood function of the model, is used to determine if the regression model is feasible. Furthermore, Nagelker’s R Square is used to calculate the coefficient of determination. This study utilized regression model with a significance level of 5%.

RESULTS

Based on Table 3, FFR that is measured using F-score has a mean value of 0.44928, which means that 44.9% of companies from the total observation have an indication of committing FFR. Table 4 provides a demographic of each ASEAN country for each variable. Based on the classification test result in Table 5, the overall classification accuracy in this study is 64.3%.

Table 3: Descriptive Statistic

Variable	Obs.	Mean	Std. Dev.	Min	Max
FFR	345	0.449	0.498	0	1
ACHG	345	0.012	0.112	-0.184	0.260
LEV	345	0.141	0.128	0.001	0.439
ROA	345	0.014	0.049	-0.099	0.106
BODCHG	345	0.492	0.500	0	1
EPROC	345	0.194	0.396	0	1
EWBS	345	0.744	0.436	0	1
CHGAUD	345	0.066	0.249	0	1
CEOEDU	345	0.115	0.320	0	1
CEOMP	345	0.040	0.197	0	1

Table 4: Country Demographic

	ID	MY	PH	SG	TH	Total
Obs.	66	138	9	84	48	345
FFR	32	55	5	37	26	155

ACHG (Avg.)	-0.00	0.00	0.06	0.04	0.04	0.01
LEV (Avg.)	0.13	0.12	0.19	0.15	0.17	0.14
ROA (Avg.)	-0.00	0.01	0.06	-0.00	0.04	0.01
BODCHG	35	78	5	32	20	170
EPROC	17	20	2	0	28	67
EWBS	47	107	7	55	41	257
CHGAUD	7	7	0	3	6	23
CEOEDU	3	14	0	8	15	40
CEOMP	0	5	0	9	0	14

Table 5: Classification Table

Observed	Predicted		Percentage Correct	
	FFR	Percentage Correct		
0	1			
0 (190)	147	43		77.4
FFR	1 (155)	80	75	48.4
Overall Percentage				64.3

The Hosmer and Lemeshow test in Table 6 resulted in a significant number of 0.448 > the significance level of 5%, indicating that the model in this study can explain the data and that there is no discrepancy between the model and its observational value. This also suggests that the logistic regression model utilized in this study can be used to explain the relationship between the independent and dependent variables.

Table 6: Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.848	8	.448

Based on the result in Table 7, the value of Nagelkerke R Square is equal to 0.112, which indicates that 11.2% of the dependent variable can be explained by the independent variable used in this research. The remaining 88.8% is influenced by other variables outside of the research model.

Table 7: Coefficient Determination Test

Step	-2 Log likelihood	Cox and Snell R Square	Nagelkerke R Square
1	444.459	.084	.112

Furthermore, the model’s feasibility test can be observed in Table 8 by using the Omnibus Test. The Chi-Square shows a value of 30.256 > 16.919 with the

df of 9 independent variables or with a significance of $0.001 > 0.05$, thus rejecting H_0 , indicating that the addition of independent variables can have a natural influence on the model, or in other words, the model is deemed fit.

Table 8: Omnibus test

Omnibus Test	Chi-Square	df	Sig.
Step 1 Step	30.256	9	0,001
Block	30.256	9	0,001
Model	30.256	9	0,001

The results of the logistic regression in Table 9 indicate that financial target, capability, and CEO’s education have an effect on FFR because their significance value is less than 0.05. While financial stability, external pressure, e-procurement, electronic whistleblowing system, change in auditor, and CEO’s military or political connection have no effect on FFR because their significance value is more than 0.05.

Table 9: Logistic Regression

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
ACHG	1.411	1.099	1.648	1	.199	4.098
LEV	-.840	.900	.871	1	.351	.432
ROA	-12.05	2.699	19.93	1	.001*	.000
BODCHG	-.514	.232	4.901	1	.027*	.598
EPROC	.391	.299	1.712	1	.191	1.479
EWBS	-.086	.270	.102	1	.750	.917
CHGAUD	.539	.461	1.368	1	.242	1.715
CEOEDU	.853	.367	5.406	1	.020*	2.347
CEOMP	-.299	.571	.274	1	.601	.742
Constant	.172	.293	.345	1	.557	1.188

DISCUSSION

Financial stability proxied by changes in total assets (ACHG) shows an insignificant value of 0.199 (>0.05), which implies that financial stability does not affect FFR therefore, H_1 is rejected. This is an unexpected discovery because many previous studies have indicated that the element of pressure proxied by the change in total assets influence FFR (Rahmatika *et al.* 2019; Achmad *et al.* 2022; and Handoko and Natasya, 2019). However, the result could be explained by the samples used in this research, which revealed a steady movement of assets and no substantial movement with a minimum value of -18% and a maximum value of

26%, implying that the overall movement of assets is only 44%. As a result, if the company managed its assets correctly, the agent will face no pressure from the principal to commit FFR hence, agency conflict would not arise because agents act in the principal’s best interest. This research finding is similar to the study by Ozcelik (2020), which shows that changes in total assets do not affect FFR.

External pressure proxied by the leverage ratio (LEV) shows an insignificant value of 0.351 (>0.05), which indicates that external pressure does not affect FFR thus, H_2 is rejected. Management may be encouraged to engage in FFR if they are under pressure to address the concerns of outside parties over the amount of debt the firm is carrying. However, that isn’t always the case. Management does not feel under pressure to go as far as engaging in FFR since management may come up with numerous plans and strategies to repay their debt (Achmad *et al.* 2022). Additionally, management has options for financing the company other than debt, such as the issuance of stock, thus management is not under pressure from the debt default (Handoko and Tandean, 2021). As a result, this would not trigger agency conflict since agents act in the principal’s best interest. This finding is supported by Herbenita *et al.* (2022); Rahma *et al.* (2022); and Handoko and Tandean (2021) that show external pressure does not affect FFR. However, research by Puspitha and Yasa (2018) and Achmad *et al.* (2022) shows a conflicting result where external pressure does affect FFR.

Financial target proxied by the ROA shows a significant value of 0.001 (<0.05) and a coefficient of -12.051, which indicates that financial target has a significant and negative effect on FFR therefore, H_3 is accepted. Indeed, if the financial target of the company set by the principal is not met, the agent will experience pressure and encourages to commit FFR. Another possibility is that the target set by the principal is so unrealistically high, that the managements have no other way to fulfil the principal’s expectation other than committing FFR. The study’s findings are supported by Herbenita *et al.* (2022) and Ozcelik (2020) which show that financial target proxied by ROA has a significant and negative effect on FFR. However, a study by Puspitha and Yasa (2018) finds that financial target proxied by ROA does not affect FFR.

Capability proxied by change of BOD (BODCHG) shows a significant value of 0.027 (<0.05) and a coefficient of -0.514, which implies that change in BOD has a significant and negative effect on FFR therefore, H5 is accepted. Companies' BOD may experience some adjustments. However, this does not necessarily mean that it will encourage FFR. Sometimes, a better meaning might be implied. Occasionally, companies will change their BOD to boost productivity by bringing in more competent personnel (Handoko & Natasya, 2019). This will lower the risk of FFR thus, reducing agency costs. Another possibility is that changes in the company's BOD are a result of the prior director being removed because they have an indication of fraud (Sari and Khoiriah, 2021). This happens because the former director who served for a long time may have the capability to utilize opportunities to commit fraud because they may be aware of the company's flaws and vulnerabilities (Wolfe & Hermanson, 2004). Thus, replacing change in BOD could minimize the occurrence of FFR. This finding is supported by Sari and Khoiriah (2021) and Handoko and Natasya (2019) which show that the change in BOD has a negative effect on FFR.

Collusion proxied by e-procurement (EPROC) shows an insignificant value of 0.191 (>0.05), which suggests that the implementation of e-procurement does not affect FFR hence, H5 is rejected. This discovery is possible because the company's internal control and governance in place for the procurement process are strong enough to prevent collusion without the use of an e-procurement system. Creating a BOD committee specifically dedicated to procurement is one of the things that companies may do to strengthen this control. This is also one of the ways to reduce information asymmetry. The Procurement Boards will provide more layers of authority, which will lessen the possibility of collusion. This study generates a unique finding that conflicted with the result from Aviantara (2021) and Sukma Danuta (2017), which shows that the implementation of e-procurement has proven to be able to reduce the incidence of fraud.

Opportunity proxied by electronic whistle-blowing system (EWBS) shows an insignificant value of 0.750 (>0.05), which suggests that the implementation of an electronic whistle-blowing system does not affect FFR hence, H6 is rejected. The whistleblowing is a

system used to strengthen monitoring and lessen malpractices. Whistle-blowing system also acts as a monitoring system for agents by principals. Technology advancements have caused the whistle-blowing system to evolve into an electronic whistle-blowing system that uses the internet and information technology. However, the modification of the whistle-blowing system is not necessarily affecting FFR. This could happen because even though the use of a telephone hotline as one of the whistle-blowing methods is in decline, some people still would prefer to use the old methods of whistle-blowing. It may be due to security and privacy concerns as there is still a digital footprint. The finding of this study differs from Aviantara (2021), in which that opportunity proxied by the whistle-blowing system is proven to have a significant effect on FFR. However, there is still no study regarding the effect of electronic whistle-blowing on FFR.

Rationalization proxied by the change in auditor (CHGAUD) shows an insignificant value of 0.242 (<0.05), which implies that change in auditor does not affect FFR thus, H7 is rejected. The insignificant result might be explained by the fact that not many firms in the study's sample changed their auditor, as seen by the mean value of just 6.6%. Companies did not replace their auditor since it was possible that the auditor had previously agreed on the company's accounting methods and had a match in terms of the company's budgeted audit costs (Haqq and Budiwitjaksono, 2020). However, companies that change auditors may be motivated by the desire to go from non-big four to big four public accounting firms that have a higher quality. This change would also benefit the principals as they will feel safe that their company is being audited by one of the Big 4, hence reducing agency cost. As a result, a change in auditor does not affect FFR. This finding is in line with the study by Achmad *et al.* (2022); Haqq and Budiwitjaksono (2020); and Handoko and Natasya (2019).

Arrogance proxied by CEO's education (CEOEDU) shows a significant value of 0.020 (<0.05) and a coefficient of 0.853, which implies that the CEO's education has a significant and positive effect on FFR therefore, H8 is accepted. Indeed, the CEO's high level of education can amplify arrogant characteristics such as superiority, greed, and self-interest due to their status and position. This will

increase the likelihood of FFR because they will believe that internal control no longer applies to them, therefore, increasing agency costs. However, research from Aviantara (2021) and Wicaksono and Suryandari (2021) shows a different result, that is CEO's education does not affect FFR. The results obtained from this study are the only study that shows a significant relationship between a CEO's education and FFR in the context of the fraud hexagon.

Arrogance proxied by CEO's military or political connections (CEOMP) shows an insignificant value of 0.601 (>0.05), which implies that the CEO's military or political connections have no effect on FFR therefore, H9 is rejected. CEO with military or political connections may abuse their privilege to commit FFR. However, that is not always the case. CEOs could use their military or political connection only as an effort to support the company with no intention of fraud. Especially in the infrastructure industries, those connections could further support the procurement process, such as helping the company win a tender in government projects and in turn reducing conflict of interest because the agent act in the best interest of the principals. This finding is supported by Haqq and Budiwitjaksono (2020); Aviantara (2021); and Wicaksono and Suryandari (2021).

CONCLUSION

With the many incidences of FFR cases that happened in the past, there needs to be a fraud detection model that could foresee the various forms of FFR that may arise over the next couple of years. One of the recent fraud detection models is the fraud hexagon. Using the six elements from the fraud hexagon model, this study aims to analyze the factors that may influence FFR. Those factors are financial stability, external pressure, financial target, change in BOD, e-procurement, electronic whistle-blowing system, change in auditor, CEO's education, and CEO's military or political connection. The result of this study suggests that financial target, capability, and CEO's education affect FFR. While financial stability, external pressure, e-procurement, electronic whistle-blowing system, change in auditor, and CEO's military or political connection do not affect FFR.

The findings of this study have provided several practical implications for the company's stakeholders to prevent FFR. In practice, principals now may rethink and reconsider their financial targets for the company to minimize pressure on management to anticipate fraudulent acts, this could also help the company to reduce agency costs. In the future, principals should be more thoughtful and cautious in considering the CEO's educational background before appointing the new one. The same could be said for investors and creditors, they need to consider not just the financial performance of the company, but also the CEO's education as additional information before giving out their funding. Lastly, the management should consider a change in the composition and arrangements of their BOD, this is to reduce the agency cost and hence, minimize FFR. In addition, this study also provides implications for the research community. Where in the context of the fraud hexagon, this study is the first study to date that shows a significant and positive relationship between CEOs' education and FFR. Therefore, a CEO's education can be used as a proxy for arrogance in future research replacing previous proxies used for arrogance such as the frequency of CEO pictures, which have shown its insignificance many times. The result of this study also provides implications for the hexagon theory, where pressure, capability, and arrogance do indeed affect FFR. However, this study still has several limitations, the first is regarding the period analyzed, which is only between the year 2019 and 2021, future study is encouraged to expand this time horizon to increase the number of observations. The second is this research model's Nagelkerke R Square, which only has a value of 11.2%, future studies are expected to add more proxies to the mix to explain the remaining 88.8%.

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