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Research Article

Examining the Hexagonal Dimensions of Fraud and its Implications for Financial Statement Fraud Likelihood of Philippine Publicly Listed Manufacturing Companies

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ABSTRACT
This study aimed to provide investors with a guide to selecting corporations with a lower likelihood of fraud. Despite regulations, fraud remains a prevalent issue in the investment industry, leaving investors vulnerable. Limited studies exist in the Philippines on fraud detection. This research identified the hexagonal elements of fraud as predictors to the likelihood of fraud in manufacturing publicly listed companies (PLCs) in the Philippines. The Beneish M-score was used as the dependent variable, and binomial logistic regression tests were conducted to test the hypotheses. Results provided that the Beneish M-score is 72.7% correct in identifying the likelihood of fraud and that the only fraud hexagon element of capability was statistically significant in predicting the likelihood of fraud with an inverse effect. Finally, the model, relationship of the hexagonal dimensions of fraud to the likelihood of fraud, was found statistically significant. Responding to the call of the United Nations' 8th Sustainable Development Goal, this study provided an infographic guide on the effect of capability to fraud for use by investors and companies.

INTRODUCTION

Background of the Study

The Philippines has been grappling with cases of fraud for years, with corruption, financial statement fraud, and investment scams being prevalent. The Association of Certified Fraud Examiners (ACFE) revealed that in 2022, Asia-Pacific accounted for 194 cases of 10% of the fraud cases in the world, 12 of which were cases from the Philippines. These fraud cases are related to corruption, financial statement fraud, investment scams, estafa, and pyramiding schemes evidenced by the conviction of four people behind a 3-billion-peso investment scam of ICS Export Inc. that duped thousands of policemen and military officers (Punay, 2018). Also, the leaders of Rigen Wellness Product Marketing scammed people through the corporation with a promised 400 percent return of investment within a span of thirty days (Palicte, 2023). Furthermore, corporations have been used as instruments in the commission of such crimes of fraud. This paper aims to shed light on the different elements of fraud and its models, and to emphasize the importance of ethical investing as a way to hold companies accountable and protect investors from being victims of fraud. The paper also provided actionable steps that individuals and organizations can take to prevent and detect fraud.

Fraud is defined as the intentional act by one or more individuals among management, those charged

with governance, employees, or third parties, involving the use of deception to obtain an unjust or illegal advantage (Escala, Bercasio, & Carandang, 2022). One example of fraud is in financial reporting where the management presents intentional misstatements including omissions of amounts or disclosures in financial statements to deceive the users of financial statements. Some activities include manipulation and falsification of records and reports, misrepresentation of information, and the intentional misapplication of accounting principles.

Sutherland and Cressey (1978), as mentioned by Prascient Analytics (2022) noted that individuals who commit crimes, like financial fraud, have enough feelings and reasons to violate the law to validate their prosocial rationalization. Criminal behavior is taught and will emerge when opportunities or perceived rewards for illegal activity outweigh those for lawful behavior. Such became the backbone of Albrecht's (2014) Fraud Triangle composed of stimulus (pressure), rationalization, and opportunity. Stimulus or pressure provides the motivation to commit the act. Rationalization provides justification on the commission of the act. Opportunity shows loopholes on how to get through with the scheme.

Over the years, several inputs included a fourth element, capability, to create the fraud diamond. Capability presumes that the person involved in the commission of fraud is the right person with the right abilities to do so (Wolfe & Hermanson, 2004 as mentioned by Latan, Jabbour, and Jabbour, 2019).

A fifth element was added which formed the SCORE model or the fraud pentagon (Vousinas, 2019). Ego or arrogance signify the sense of superiority of a company. They desire entitlement and to stay in power. These are signified by statements mostly focused on the first person using 'I' and 'we' pronouns. Such was the case of Madoff's Ponzi scheme. In Madoff's statements, it can be noted that 'I' was used forty times in his statement (2009).

Further, Vousinas expanded the SCORE model into six elements forming a hexagon model. Collusion was introduced as a vital element as justified by the crimes of Enron, WorldCom, and Parlat. Collusion occurs when more than one perpetrator is involved in the commission of fraud. This suggests that fraud is an organized crime. Collusion conceals fraud from controls established to detect irregularities through blending with the processes.

According to Cutler (2020), the Philippines lack enforcement capacity on the Securities and Exchange Commission, Bangko Sentral ng Pilipinas, and the Anti-Money Laundering Council. With such, publicly listed companies are vulnerable and the country is attractive to financial fraud highlighting the recent cases of money laundering through RCBC (Villegas, 2019) and the involvement in the Wirecard scandal of some of the top banks of the country (Ordonez, 2022). Several corporations have also been established to pose as "ghost suppliers" when committing tax evasion and economic sabotage as what was done by Brenterprise International Inc. (Cayabyab, 2023).

Investors are susceptible to becoming victims of fraud if they invest in these companies. Adverse ef-

fects of falling into scams like these include irrecoverable loss of their investment in the financial aspect and trauma in the psychological aspect (Commonwealth Fraud Prevention Centre, n.d.) Identifying the likelihood of fraud to companies will assist current and potential investors in choosing companies that are ethically and socially aligned to their values and preferences. In a study of Haber, Kepler, Larcker, Seru, and Tayan (2022), 70% of the young demographic of investors aged 18-41 prefer to invest in ethically and socially conscious companies and are willing to sacrifice returns on the benefit of supporting companies aligned to their values. The idea of ethical investing is novel in the country despite 64% of Filipinos are aware and engaged on social issues and 43% hold individuals and companies accountable for their actions and/or statements (Agile Data Solutions, 2023). Ethical investing is one way to hold companies accountable and to protect the investors from being victims of fraud.

Objectives of the Study

This study specifically aimed the following:

1. Account for the likelihood of financial statement fraud of publicly listed manufacturing corporations of the Philippines for the years 2018 to 2022.
2. Describe the hexagonal dimensions of fraud on publicly listed manufacturing corporations of the Philippines for the years 2018 to 2022.
3. Predict the likelihood of financial statement fraud of publicly listed manufacturing corporations of the Philippines through the hexagonal dimensions of fraud for the years 2018 to 2022.
4. Provide a guide to assist investors in selecting corporations to invest in and for companies to prevent or deter fraud by identifying areas of that could affect possible likelihood of fraud.

Review of Related Literature

According to Heneke (2020), there are three themes that provide stimuli to the commission of fraud by Chief Financial Officers (CFOs) – financial motivation, external pressures, and internal pressures. Financial motivation is focused on what the person committing fraud will benefit from, thus centered on greed. External pressures are connected to a company's commitment to loans, to financing, and to hide practices with consequences of penalties from regulatory bodies. Managements are expected to show investors that the company is afloat. Internal pressures are created by corporate culture sometimes conceived by external pressures. The study of Kakati and Goswami (2019) provided that companies commit fraud due to integrity of the individual responsible, obtaining finance, and these three elements concurring with Heneke: financial pressures, high competition in the market, and achieving aggressive targets. According to Achmad, Ghozali, and Pamungkas (2022), on state-owned enterprises in Indonesia, it was revealed that financial stability and external pressure had a positive effect on the likelihood of fraud. Pressures on maintaining companies' stability afloat in presentation and to keep investor confidence.

The study of Skousen, Smith, and Wright (2008) as mentioned by Rashid and Khan (2019) applied the

fraud triangle elements, stimulus, opportunity, and rationalization to the likelihood of fraud. Through this, they have identified five proxies for stimulus and two for opportunity. One proxy that could be used for stimulus is asset change as this shows manipulation of financial information to stabilize the perception of the company. For rationalization, it was noted that a change in auditor is a proxy for it is perceived to be a measure to conceal the likelihood and commission of fraud to the previous auditor.

Supri, Rura, and Pontoh (2018) analyzed the effect of fraud diamond elements to the detection of fraud on the Indonesia Stock Exchange. The findings demonstrated that external pressure, financial targets, financial stability, and auditor change provided favorable and significant effects on the likelihood of fraud in financial statements. Financial statement fraud is negatively and significantly impacted by the effectiveness of monitoring activities. Finally, financial statements fraud was not significantly impacted by the changes of directors. Capability is represented by the change of director for it is presumed that the previous director was changed due to their inability to commit fraud.

Sari and Nugroho (2020) studied how each fraud hexagon model component affected the ability to identify financial statement fraud. Collusion occurs through government projects. The findings demonstrated the influence of ego (arrogance), the industry's nature as an opportunity factor, the stimulus factor (personal financial need), and the collusion effect on financial statement fraud. Additional factors that have no bearing on financial statement fraud include the stimulus factor in terms of financial stability, external pressure, and financial targets; the capability factor; the opportunity factor in terms of efficient monitoring; and rationalization. Sari and Nugroho (2020) stated that fraud can be evident through bribery and involvement with the government as public projects are vulnerable to corruption.

Hasnan, Rahman, and Mahenthiran (2013) studied ten factors in the act of financial statement fraud on 53 firms convicted with securities fraud and 53 firms that are non-fraud. They found that rationalization comprising the founding board of directors and prior violations positively and significantly affected the likelihood of financial statement fraud. On the other hand, family ownership negatively and significantly affected the likelihood of financial statement fraud. Additionally, for pressure, financial distress affected the likelihood of financial statement fraud. For opportunity, audit quality and multiple directorships significantly and positively affected the likelihood of financial statement fraud. Opportunity can also be found on related party transactions as this can be manipulated by the company easily and without detection.

Yusof, Khair, and Simon (2015) applied three fraud models, fraud triangle, fraud diamond, and the fraud pentagon adding arrogance as an element, to Malaysian publicly-listed companies. They argued that the frequency of a Chief Executive Officer's (CEO's) photos represent the company's ego as the CEO is perceived as a celebrity rather than a businessman. Somehow a company is likely to commit fraud to save face for the CEO setting a tone of preserving the ego.

The likelihood of fraud in relation to the fraud pentagon of Indonesian companies applying ASEAN corporate governance scorecard were observed in the study of Pamungkas and Utomo (2018). The likelihood of fraud was studied using the F-score model. They provided that stimulus, rationalization, and capability had a positive effect on the likelihood of fraud. External pressure and the nature of the industry provided a negative effect on the likelihood of fraud. Financial target, audit opinion, and change of directors provided positive effects however they are not significant.

In Zimbabwe, financial statements for 2011 to 2018 of banks listed in their local stock exchange were tested using the Beneish M-Score to identify their likelihood of fraud (Mavengere and Dlamini, 2023). The results provided the probability of fraud in the year 2011, 2013, and 2015. Other years were not found to have been manipulated.

Research Framework

Theoretical Framework

The M-score model is a statistical method formulated by Messod Beneish in 1999 to detect financial fraud through utilization of financial ratios. A typical manipulator of earnings possesses three identifiable characteristics namely, quick growth, deteriorating fundamentals, and application of aggressive accounting practices like increase of receivables that are not aligned with growth of sales. Included in the formula is Days' Sales in Receivable Index (DSRI) providing a ratio to detect irregular increase in receivables, a sign of bloating of revenue. Another ratio is the Gross Margin Index (GMI) comparing prior year and current year gross margin ratios. Should the value be greater than 1, the gross margin is deemed deteriorated. Third ratio is Asset Quality Index (AQI), focusing on changes in non-current assets other than property, plant, and equipment. A value greater than 1 signifies that these non-current assets are instruments to cost deferrals. The percent change of sales from the current year to the prior year is the fourth ratio called Sales Growth Index (SGI). Although growth is not an indicator of manipulation, companies showing growth are likely to commit financial statement fraud due to the pressures to maintain good figures. Following this is Depreciation Index (DEPI), where the prior year depreciation's ratio is compared with the current year's depreciation ratio. Greater than 1 value manifests a change in accounting estimate through increasing the useful life of the asset or any method that increases profitability. Sales, General, and Administrative Expenses Index (SGAI) comparing changes in the ratio of SGA over sales for the prior and current years provide that disproportionate increase in sales signify a negative signal on the company's intentions in the future. Another ratio that will be used is Total Accruals to Total Assets (TATA), where the weight of current year operating income minus cash flows from operating activities is assessed with the current year total assets. Higher positive accruals signify less cash flow, thus indicating a higher degree of manipulation. Finally, the Leverage Index (LVGI) determines the company's leverage on debts, both current and non-current, in relation to assets. Increase in LVGI signals manipulation of earnings to meet commitments, especially with debt.

The M-score is calculated by assigning weights for every ratio. Empirically, an M-score higher than -2.22 signifies the likelihood of fraud through earnings manipulation on the company.

Conceptual Framework

This research adopted the study of Alfarago, Syukur, and Mabrur (2023) and applied it on Publicly Listed Corporations in the Philippines. The framework aimed to examine the effect of the fraud hexagon elements on the likelihood of fraud quantitatively using secondary data. The hexagonal elements consisting of stimulus (pressure), capability, collusion, opportunity, rationalization, and ego (arrogance) through their respective proxies were examined on their significant effect in the detection of the likelihood of fraud. Binomial logistic regression was used to test the hypotheses. In their study in an Indonesian setting, stimulus, proxied with financial stability as shown in asset change, was shown to provide a direct effect to the likelihood of fraud. It was indicated that more financially stable companies are more likely to commit fraud. Financial stability of a company can entice a company to produce financial reports that would provide investors' confidence to the company.

Operational Framework

Figure 1 presented the direction of this study to examine the predictive effect of the elements of the fraud hexagon to the likelihood of fraud in publicly listed companies (PLCs) of the Philippines. PLCs were represented by manufacturing corporations under the industrial sector of the Philippine Stock Exchange. Adopting the framework of Alfarago et al, the six elements under the fraud hexagon formulated by Vousinas, stimulus (pressure), capability, opportunity, collusion, rationalization, and ego (arrogance), served as independent variables. These elements were represented by their respective proxies. The likelihood of fraud was the dependent variable, which was computed through the Beneish M-Score. Finally, the predictive effect of the independent variables were tested to the independent variable using binomial logistic regression.

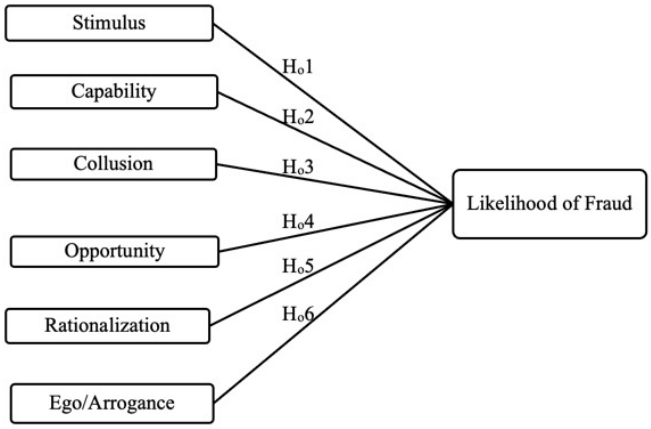

Figure 1. Operational Framework

Hypotheses

Aligned with the research objectives and the conceptual framework, the following were this study's hypotheses:

H_{o1} - Stimulus does not predict the likelihood of financial statement fraud of Philippine manufacturing PLCs.

H_{o2} - Capability does not predict the likelihood of financial statement fraud of Philippine manufacturing PLCs.

H_{o3} - Collusion does not predict the likelihood of

financial statement fraud of Philippine manufacturing PLCs.

H_{o4} - Opportunity does not predict the likelihood of financial statement fraud of Philippine manufacturing PLCs.

H_{o5} - Rationalization does not predict the likelihood of financial statement fraud of Philippine manufacturing PLCs.

H_{o6} - Ego does not predict the likelihood of financial statement fraud of Philippine manufacturing PLCs.

Significance of the Study

This study held significant importance in the field of fraud detection and prevention. It aimed to identify the relationship between the elements of fraud and the likelihood of fraud in publicly listed companies, which was essential in developing effective fraud detection and prevention measures. Moreover, the study proposed the application of the fraud hexagon model and Beneish M-Score in detecting fraudulent activities in the industrial sector of the Philippines' PLCs, which may have contributed to the existing body of knowledge on fraud detection and as confirmatory to the study of Alfarago et al (2023). Furthermore, the study proposed an infographic guide to assist investors in their selection of companies to invest into as aligned to their preferences and values and for companies to prevent or deter fraud by identifying areas of that could affect possible likelihood of fraud. The findings of this study may potentially benefit various stakeholders, including investors, regulators, and companies, in their efforts to prevent and mitigate the risks of fraud thus answering the call of the United Nations' Sustainable Development Goal 8 (SDG 8) to provide decent work and pave the way to economic growth.

MATERIALS AND METHODS

Research Design

This study is descriptive in design to provide for the characteristics of the variables, hexagonal dimensions of fraud on publicly listed corporations of the Philippines for the years 2018 to 2022 and the likelihood of fraud in mean and standard deviation. It is also causal in design to identify the significance of the predictive effect of the hexagonal dimensions of fraud to the likelihood of financial statement fraud of publicly listed corporations of the Philippines for the years 2018 to 2022. Additionally, this study used quantitative data to account for the likelihood of financial statement fraud of publicly listed corporations of the Philippines for the years 2018 to 2022.

Data Sources

The researcher applied secondary data that were gathered from all audited financial statements and annual reports for the calendar years ended 2018 to 2022 of industrial companies specifically subsectors of: (1) food, beverage, and tobacco; (2) chemicals; (3) electrical components and equipment; and (4) other industrial in the Philippine Stock Exchange. These subsectors comprised the manufacturing listed companies. Companies that were listed in 2018 to 2024 were removed because annual reports are not publicly available prior to being listed. Also, holdings companies whose subsidiaries are listed companies and are part

of the subsector, companies whose financial statement periods are in fiscal year, companies whose presentation currency during the periods is not in Philippine Peso, and companies with missing data are excluded. With this, a total of 110 annual reports, derived from 22 companies for calendar years served as samples. Data collected from audited financial statements and annual reports were used to calculate the ratios that will serve as basis for the proxies of the independent variables.

Table 1. Sampling Criteria

No	Criteria	Number of Companies
1	Listed companies in the PSE as of February 26, 2024	73
2	Companies that were listed in 2018-2024	(8)
3	Holdings companies whose subsidiaries are listed companies	(1)
4	Electricity, energy, power, and water companies	(17)
5	Construction, infrastructure, and allied services companies	(9)
6	Companies whose financial statement periods are in fiscal year	(3)
7	Companies that did not use PHP as the presentation currency during the periods	(5)
8	Companies with missing data	(8)
Sample Size		22
Number of observations (sample size x 5 years)		110

Research Tools and Instruments

The Likelihood of Fraud

For the dependent variable, the Beneish M-Score was used to compute the likelihood of fraud in the financial statements of PLCs. Through the Beneish M-score model, the researcher has identified the likelihood of fraud in the provided financial statements. This statistical method was formulated by Messod Beneish in 1999 to detect financial fraud through ratios. Included in the formula is Days' Sales in Receivable Index (DSRI) where the ratio between receivables and sales is divided with prior year's ratio between receivables and sales. Irregular increase in receivables is a sign of bloating of revenue.

Another ratio is the Gross Margin Index (GMI) where the prior year gross margin ratio, the difference between sales and cost of goods sold divided by sales, was divided by the gross margin ratio of the current year. Should the value be greater than 1, the gross margin is deemed deteriorated.

Third ratio is Asset Quality Index (AQI) where the current year ratio of non-current assets which are not property, plant, and equipment to total assets was divided with the ratio of the current year non-current assets which are not property, plant, and equipment to total assets. A value greater than 1 signified that these non-current assets are instruments to cost deferrals.

The percent change of sales from the current year to the prior year was the fourth ratio called Sales Growth Index (SGI). Although growth is not an indicator of manipulation, companies showing growth were likely to commit financial statement fraud due to the pressures to maintain good figures.

Following this was Depreciation Index (DEPI) where the prior year depreciation's ratio, depreciation divided by the total of depreciation and of property, plant, and equipment, was divided with the current year's depreciation ratio. Greater than 1 value manifested a change in accounting estimate through increasing the useful life of the asset or any method that increases profitability.

Sales, General, and Administrative Expenses Index (SGAI) provided that disproportionate increase in sales signify a negative signal on the company's intentions in the future. SGAI was computed by dividing the current year SGA ratio, SGA expenses over Sales, with the prior year's SGA ratio.

Another ratio that was used was the Total Accruals to Total Assets (TATA) where current year operating less cash flows from operating activities was divided with the current year total assets. Higher positive accruals signified less cash flow thus indicating a higher degree of manipulation.

Finally, the Leverage Index (LVGI) determined the company's leverage on debts, both current and noncurrent, in relation to assets. Increase in LVGI signals manipulation of earnings to meet commitments, especially with debt.

The Beneish M-score per financial statement was calculated by assigning weights for every ratio. Empirically, an M-score higher than -2.22 signifies the likelihood of financial statement fraud on the company for the year ended. The aforementioned weights are distributed as follows:

*M-Score = -4.84 + 0.92*DSRI + 0.528*GMI + 0.404*AQI + 0.892*SGI + 0.115*DEPI - 0.172*SGAI + 4.679*TATA - 0.327*LVGI*

Where:

DSRI = (Receivables$_t$/Sales$_t$) / (Receivables$_{t-1}$/ Sales$_{t-1}$)

GMI = [(Sales$_{t-1}$ - COGS$_{t-1}$) / Sales$_{t-1}$] / [(Sales$_t$ - COGS$_t$) / Sales$_t$]

AQI = [1 - ((Current Assets$_t$ + PPE$_t$) / Total Assets$_t$)] / [1 - ((Current Assets$_{t-1}$ + PPE$_{t-1}$) / Total Assets$_{t-1}$)]

SGI = Sales$_t$ / Sales$_{t-1}$

DEPI = [Depreciation$_{t-1}$ / (PPE$_{t-1}$ + Depreciation$_{t-1}$)] / [Depreciation$_t$ / (PPE$_t$ + Depreciation$_t$)]

SGAI = (SGA Expense$_t$ / Sales$_t$) / (SGA Expense$_{t-1}$ / Sales$_{t-1}$)

TATA = (Income from Operating$_t$ – Cash Flow from Operating$_t$)/ Total Assets$_t$

LVGI = [(Current Liabilities$_t$ + Long Term Debt$_t$) / Total Assets$_t$] / [(Current Liabilities$_{t-1}$ + Long Term Debt$_{t-1}$) / Total Assets$_{t-1}$]

Companies found likely to commit fraud based on the computations were marked as '1', while companies that were not were marked as '0' as presented on Table 2.

Table 2. The Likelihood of Fraud

Variable	Proxy	Indicators	Formula	Reference
Likelihood of Fraud		Ln(Fraud/ 1−Fraud)	1 = fraud firms; 0 = otherwise	Beneish (1999)

The Fraud Hexagon

The independent variables were derived from Vousinas' fraud hexagon model with their related proxies as shown in the financial statements in order to be measured. Stimulus or pressure is represented by financial stability in which Alfarago et al mentioned that financial distress motivates companies to drastic and unethical measures. Financial stability is computed through asset change (ACHANGE) where the changes in total assets from the prior year to the current year is divided with the current year total assets. Financial stability of a company can entice a company to produce financial reports that would provide investors' confidence to the company according to Skousen, Smith, and Wright (2008) as mentioned by Rashid and Khan (2019). For capability, change of

director (DIRCHANGE) serves as proxy as it is presumed that the previous director was changed due to their inability to commit fraud (Supri, Rura, and Pontoh, 2018). Such presumption is not conclusive but a procedure on professional skepticism. A change in director within the reporting period will be marked as 1, otherwise 0. Collusion is proxied with government projects (GOVTPROJECT) as Sari and Nugroho (2020) stated that fraud can be evident through bribery and involvement with the government as public projects are vulnerable to corruption. Having contract projects with the government results in a mark of 1, otherwise 0. Related party transactions (RPT) proxies opportunity since related parties can be ghost companies that will be used only to transfer assets and create false transactions. RPT is the ratio of the receivable of related parties over the total receivables. Rationalization is the fifth element proxied by auditor change (AUDCHANGE). A change in auditor is perceived to be a measure to conceal the likelihood and commission of fraud to the previous auditor. AUDCHANGE would be marked as 1 should the company change auditors; otherwise, 0 as presented also by Skousen, Smith, and Wright mentioned by Rashid and Khan. Finally, the last independent variable is ego measured through the number of photos of the company's chief executive officer (CEOPIC) according to Yusof, Khair, and Simon (2015).

Table 3. The Fraud Hexagon

Variable	Proxy	Indicators	Formula	Reference
Stimulus	Financial Stability	Asset Change (ACHANGE)	(Total Assets$_t$ – Total Assets$_{t-1}$) / Total Assets$_t$	Skousen, Smith, and Wright (2008)
Capability	Director Change	DIRCHANGE	1 = Changing Director; 0 = otherwise	Supri, Rura, and Pontoh (2018)
Collusion	Project with Governments	GOVTPROJECT	1 = Having projects; 0 = otherwise	Sari and Nugroho (2020)
Opportunity	Related Party Transactions	Related party transactions (RPT)	Receivable of Related Parties / Total Receivable	Hasnan, Rahman, and Mahenthiran (2013)
Rationalization	Auditor Change	AUDCHANGE	1 = Changing auditor; 0 = otherwise	Skousen, Smith, and Wright (2008)
Ego	Number of CEO's Pictures	Total number of CEO's Pictures (CEOPIC)	Total number of CEO's images shown in the annual report	Yusof, Khair, and Simon (2015)

Test for Outliers and Multicollinearity

Using Cook's Distance (Di) to detect potential outliers, it was found that out of the 110 samples, none were found to be Di > 1.00. Additionally, the independent variables were tested for multicollinearity as presented by Table 4. Variable inflation factors for the five independent variables i.e. Stimulus, Capability, Opportunity, Rationalization, and Ego showed moderate multicollinearity signifying that the independent variables did not intervene with the binomial logistic regression model.

Table 5. Multicollinearity Test

	Collinearity Statistics		
	Tolerance	***VIF***	***Interpretation***
Stimulus	*0.947*	*1.056*	*Moderate multicollinearity*
Capability	*0.941*	*1.063*	*Moderate multicollinearity*
Opportunity	*0.955*	*1.048*	*Moderate multicollinearity*
Rationalization	*0.980*	*1.020*	*Moderate multicollinearity*
Ego	*0.101*	*1.028*	*Moderate multicollinearity*

Dependent Variable: Likelihood of Fraud

Data Analysis and Interpretation

For this research, descriptive statistics presented the mean and standard deviation for the independent variables and the dependent variable. Additionally, the reliability of the Beneish M-score model was tested using classification matrix test. This tested the percentage correctness of the model by identifying the true positives, false positives, true negatives, and false negatives. A percentage correctness of more than 50% signified correctness of the Beneish M-score in com-

puting the likelihood of fraud.

Binomial logistic regression tests through SPSS were used to test the hypotheses for the dependent variable and several independent variables were represented by 1 or 0 only. Regression analysis provided the predictive effect between the dependent variable, the hexagonal dimension of fraud, and the independent variables, the likelihood of fraud. A p-value greater than 0.05 suggests that the variable is not statistically significant.

Finally, the Homer and Leme show test was used to identify whether the operational framework is a model fit. This was applied as the study is binomial logistic regression. Opposite to the conventional test of significance where p-value < 0.05 is significant, this test identified significance where p-value > 0.05.

CONCLUSION AND RECOMMENDATIONS

Descriptive Statistics Analyses

The Likelihood of Fraud

Figure 2 presented the frequency for the dependent variable, the likelihood of fraud. The sample size was categorized as: with likelihood of fraud, labeled as '1', and without likelihood of fraud, labeled as '0', based on the calculated Beneish M-Score. Amounts were derived from the audited financial statements. It was found that out of the 110 calendar year financial statements, 31 or 28.18% showed an M-score greater than -2.22 while 79 or 71.82% were found to have an M-score less than or equal to -2.22. This signifies that there were irregularities that may lead to the likelihood of fraud in the expected indexes comprising the Beneish M-score for 31 companies' financial statements for the calendar years ended 2018 to 2022. Kumalasari and Puspaningsih (2024) also used the Beneish M-Score that showed 69% of companies were categorized as non-fraud while 31% of companies were classified as fraud companies. The result demonstrated that a significant portion of Indonesian manufacturing enterprises were found to have the ability to falsify financial statements. Investors are reminded by this to practice caution in choosing companies to invest into in order to prevent losses, further highlighting the importance of the use of the Beneish M-score.

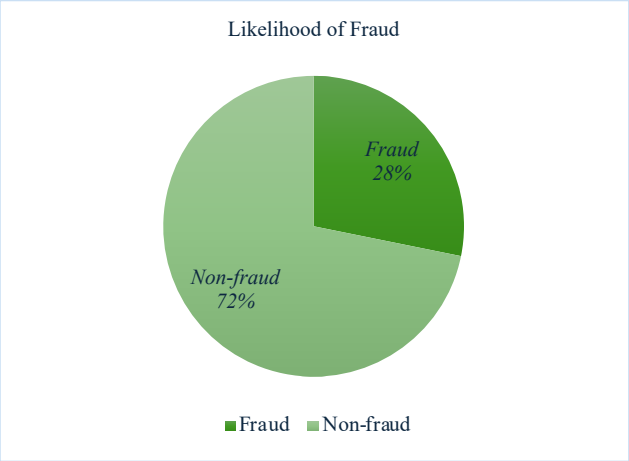

Figure 2. Pie Chart on the Percentages of Fraud and Non-Fraud Companies Based on Beneish M-Score

The Hexagonal Dimensions of Fraud

Table 5 presented the descriptive statistics of the elements of the fraud hexagon, which are the independent variables of the study. Stimulus, proxied by asset change, had a mean of 0.0624 and a standard deviation of 0.21536. Asset change is the percent change from prior year to current year. It can be noted that not all results were positive for the minimum of stimulus is -1.73 as brought about by the Covid-19 pandem-

ic and supported by figure 2 with the average asset change dropping in 2020. Naldo and Widuri (2023) studied infrastructure companies' financial statements for 2019 to 2021 in ASEAN covering the pandemic period. They presented a mean of 0.012 and standard deviation of 0.112. Highest asset change 0.260 while the lowest was -0.184.

For Capability, represented by director change, the change in director for the calendar year will constitute a 1. Should there be no changes, 0 will represent it. The mean of data from annual reports was 0.3364 signifying that the majority of the samples had no change in board of directors in the annual reports. Naldo and Widuri presented a mean of 0.492 and standard deviation of 0.5000 signifying that 49.2% of the annual reports had changes in the composition of the members of their board of directors.

There were no government projects as manufacturing companies' extent of partnership with the government is through becoming their suppliers only. With this, collusion, as proxied by government projects, were excluded in the binomial logistic regression analysis.

Related party transactions (RPT) were computed by assessing the percentage of related party receivables from the total receivables. RPT represented the independent variable opportunity. The results showed a maximum of 0.98 of receivables were related party transactions while the lowest was none. Mean of opportunity was 0.1792 and standard deviation was 0.26577, signifying a wide range of differences between companies. As presented by figure 2, there was a decline on the average RPT over total receivable, however, comparative to the covered periods, averages were relative from each other as compared to asset change. Means of RPT in the study of Alfarago et al (2023) were 0.33 for fraud corporations and 0.27 for non-fraud corporations showing that RPT was higher for companies with the likelihood of fraud.

For rationalization, it was found that 0.0364 have changed auditors during the covered periods. Standard deviation was 0.18805 providing that only 18.805% of financial statements have changed auditors. It was observed that only the signing audit partners in the audit reports are being rotated. SRC Rules 68 and 68.1, as amended (2005) required that "the external auditors shall be rotated every after five (5) years of engagement. In case of a firm, the signing partner shall be rotated every after the said period."

Ego or arrogance is represented by the number of photos of the CEO or Chairman of the Board, in the annual report. For SEC submission, the annual reports do not require photos of CEOs or Chairmen. Published annual reports of several companies for public dissemination contained photos of the CEO/ Chairman along with their message to investors and on the page of the board of directors for them to be introduced. Maximum ego per annual report was 3.00 and the minimum was 0.00. A mean of 0.2818 and standard deviation of 0.45194 show that only a few companies deviate with the minimum requirement of SEC. Ahmad et al (2024) showed a mean of 0.1432 and standard deviation of 0.8624. Maximum number of photos of CEOs was 9 and the lowest was none.

Table 5. Descriptive Statistics – Independent Variables

	N	Minimum	Maximum	Mean	Std. Deviation
Stimulus	110	-1.73	0.67	0.0624	0.21536
Capability	110	0.00	1.00	0.3364	0.47463
Collusion	110	0.00	0.00	0.0000	0.00000
Opportunity	110	0.00	0.98	0.1792	0.26577
Rationalization	110	0.00	1.00	0.0364	0.18805
Ego	110	0.00	3.00	0.4636	0.76239
Likelihood of Fraud	110	0.00	1.00	0.2818	0.45194
Valid N (listwise)	110				

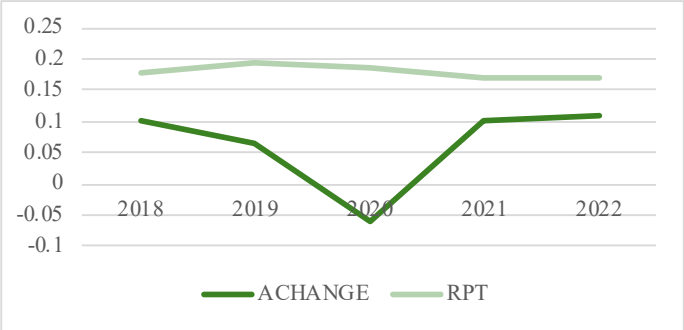

Figure 3. Averages of Asset Change and Changes in Related Party Transactions for the years 2018 to 2022

Classification Matrix Test

The reliability of the Beneish M-score's predictability of the likelihood of fraud was tested in all 110 cases. Table 5 presented a 74.5% reliability which was composed of 75 true positives and 4 false positives on financial statements without likelihood of fraud with percentage correctness of 94.9%. Additionally, there were 26 false negatives and 5 true negatives for financial statements with likelihood of fraud with percentage correctness of 16.1% signifying that detected true negatives are below than half of the population identified as with likelihood of fraud. As the probability is above half, it can be noted that the overall utilization of the Beneish M-Score in identifying the likelihood of financial statement fraud is 72.7% reliable.

In comparison to Alfarago et al's study (2023), there were 325 true positives and 1 false positive on financial statements without likelihood of fraud with percentage correctness of 99.7%. Additionally, there were 48 false negatives and 6 true negatives for financial statements with likelihood of fraud with percentage correctness of 11.1%. Overall, the reliability was 72.7%.

The covered years of 2018 to 2022 have shown significant changes in financial statement ratios due to the COVID-19 pandemic in 2020 with recovery in the subsequent years, 2021 and 2022 which may have been a factor.

Table 6. Classification Matrix Test[a]

Observed			Predicted		
			Likelihood of Fraud		Percentage Correct
			Non-fraud	Fraud	
Step 1	Likelihood of Fraud	Non-fraud	75	4	94.9
		Fraud	26	5	16.1
	Overall Percentage				72.7

a. The cut value is .500

Binomial Logistic Regression Analyses

Through binomial logistic regression, with 95% level of confidence (p-value < 0.05), the fraud hexagon elements were tested for their significance on predicting the likelihood of financial statement fraud as presented on Table 8.

Capability, represented by director change, showed p-value of 0.048 and beta coefficient of -1.103. The coefficient provided that change in directors yielded an inverse relationship with the likelihood of fraud. With this, as the members of the board of directors are changed regularly, the less likely it is that the company will commit financial statement fraud. Supporting this were the descriptive statistics that showed that 26 out of the 31 annual reports with M-score greater than

-2.22, were found to have no changes in the board of directors. Only 5 changed some members of their board of directors while being found with the likelihood of fraud. Odds ratio presented that for every year a company does not replace a member of the board of directors, the likelihood of financial statements fraud is 3.012. This contradicted the claim of Supri et al (2018) which indicated that changing of the board of directors is an attempt to remove a person not in connivance to commit fraud. Governance Gurus (2021), on the other hand, suggested regular changing of the board of directors to achieve the benefits of promoting accountability, ensuring transparency, and mitigating risks.

Stimulus, proxied by asset change, a sign of financial stability, had a p-value of 0.066 and a beta coefficient of 3.564. As asset change increases, the likelihood of financial statement fraud also increases by 35.303 in odds ratio. This confirmed Alfarago et al (2023)'s claim that the more stable companies are, the more likely they are to commit financial statement fraud.

The independent variable represented by government projects, collusion, was excluded for there were no government projects for the companies for the periods 2018 to 2022 under manufacturing companies. Donations to the government during the COVID-19 pandemic, especially food items and other essentials, were presented in the annual report. These were not considered as government projects for donations were done out of gratuity and in solidarity with the Filipino people during the said times.

Opportunity, as proxied by related party transactions, presented a p-value of 0.703 and beta coefficient of 0.327, though not statistically significant, with the likelihood of fraud. Additionally, odds ratio provided that for every irregular change in related party transactions, the likelihood of fraud is at 1.387. Alfarago et al (2023) also provided that RPT has a direct effect on the likelihood of fraud. It is supported by Hasnan et al (2013) that provided that related party transactions are pathways to manipulate financial information. IAS 24.9 defined related party transactions as "transfer of resources, services, or obligations between related parties, regardless of whether a price is charged." As related party transactions increase, the likelihood of financial statement fraud increases also.

Auditor change represented rationalization. Recognized in this was the transfer of statutory financial statement audit engagements from one accounting firm to another and not including rotation of signing partners. This variable provided a beta coefficient of -0.225, p-value of 0.855, and odds ratio of 1.252. The odds ratio shown that the likelihood of fraud for every year is predicted when a company does not change auditors. Section 120 of the Code of Ethics for Professional Accountants by the International Ethics Standards Board for Accountants (2023) highlighted that a familiarity threat to compliance to the code might arise "due to a long or close relationship with a client, or employing organization, a professional accountant will be too sympathetic to their interests or too accepting of their work." In the study of Ahmad et al (2024) in industrial companies of Jordan, auditor change resulted in a direct relationship with the likelihood of fraud. The change in auditor for Jordanian industrial

companies was not motivated by fraud; rather, it was a result of other factors, such as the end of the legal period within which the auditor was legally permitted to assess the company's financial statements.

Finally, ego or arrogance as represented by the number of photos of the CEO in the annual reports provided a p-value of -0.159 and beta coefficient of -0.225. Odds ratio of 2.217 signified that when companies do not present photos of their CEOs, the likelihood of financial statements fraud occurs at 2.217. This opposed Yusof et al (2015) who claimed that a company is likely to commit fraud to save face for the CEO, setting a tone of preserving the ego. In the Philippine context, the photos of CEOs relate inversely to the commission of financial statement fraud. Somehow, the CEO's representation vouches for confidence in the annual reports. While RA 11232 (2019) provided that corporations are artificial beings separate and distinct from their stockholders and directors, the directors, especially the CEO or Chairman of the Board may be criminally liable in cases of fraud with the Doctrine of Piercing the Corporate Veil. According to Alburo Alburo and Associates (2022), piercing the corporate veil is warranted when "the separate personality of a corporation is used as a means to perpetrate fraud or an illegal act, or as a vehicle for the evasion of an existing obligation, the circumvention of statutes, or to confuse legitimate issues." It is also warranted in alter ego cases "where a corporation is merely a farce since it is a mere alter ego or business conduit of a person, or where the corporation is so organized and controlled and its affairs are so conducted as to make it merely an instrumentality, agency, conduit or adjunct of another corporation." "The corporation and persons who are normally treated as distinct from the corporation are treated as one person, such that when the corporation is adjudged liable, these persons, too, become liable as if they were the corporation." (Lanuza v. BF Corporation, G.R. No. 174938, 1 October 2014).

Individually, the independent variables, stimulus, collusion, opportunity, rationalization, and ego, are not statistically significant in predicting the likelihood of financial statement fraud as p-values are greater than 0.05. However, capability was found as a statistically significant predictor in the likelihood of financial statement fraud with p-value of 0.048. As a predictor, it was found that the independent and dependent variables, capability and the likelihood of fraud, respectively, have an inverse relationship.

The logistic regression model was statistically significant, $\chi 2(5) = 13.870$, $p < 0.05$. The model explained 17.0% (Nagelkerke R2) of the variance in the likelihood of exhibiting fraud and correctly classified 72.7% of cases.

Table 7. Binomial Logistic Regression

		B	S.E.	Wald	df	Sig.	Exp(B)/ Odds Ratio	Interpretation
Step 1[a]	Stimulus	3.564	1.926	3.423	1	0.064	35.303	Not significant
	Capability	-1.103	0.559	3.896	1	0.048	0.332	Significant
	Opportunity	0.327	0.857	0.146	1	0.703	1.387	Not significant
	Rationalization	-0.225	1.228	0.033	1	0.855	0.799	Not significant
	Ego	-0.503	0.357	1.983	1	0.159	0.604	Not significant
	Constant	-0.797	0.384	4.306	1	0.038	0.451	

Dependent Variable: Likelihood of Fraud
Nagelkerke R^2=0.17

Supporting the significance of the model, the fraud hexagon elements with their respective proxies as predictors of the likelihood of financial statement fraud, is the Hosmer and Lemeshow Test to evaluate its goodness-of-fit. With the Chi-square of 6.620 and

p-value of 0.578, the model is statistically significant and indicated as a good fit as p-value is greater than 0.05 as provided by Table 8. This provided that the hexagonal dimensions of fraud, as a whole, predict the likelihood of fraud.

Tablle 8. Hosmer and Lemeshow Test

Step	*Chi-square*	*df*	*Sig.*	*Interpretation*
1	*6.620*	*8*	*0.578*	*Significant*

RESULTS AND DISCUSSION

In response to the limited studies in the Philippines and to the investors' encounters of prevalent cases of investment scams in the country, as deceived by fraudulent financial statements, this study was conducted. The study aimed to describe the hexagonal dimensions of fraud and account for the likelihood of fraud on the financial statements of publicly listed corporations of the Philippines for the years 2018 to 2022. A total of 110 annual reports with audited financial statements were tested. A binomial logistic regression was performed to ascertain the predictive effect of stimulus, capability, collusion, opportunity, rationalization, and ego on the likelihood of financial statements fraud. This supported the null hypotheses (Ho1, Ho3, Ho4, Ho5, Ho6) that the said fraud hexagon elements stimulus, collusion, opportunity, rationalization, and ego do not predict the likelihood of financial statement fraud for Philippine PLCs. Capability (Ho3) was found statistically significant in predicting fraud and with an inverse relationship. As proxied by change of board of directors, as change of directors regularly occurs, the less likely it is that there was financial statement fraud for the company. This did not support the null hypothesis that capability does not predict the likelihood of financial statement fraud of Philippine PLCs. Regular change on the composition of the board is suggested as it was found to be significant in minimizing the likelihood of financial statements fraud. Governance Gurus (2021) emphasized that regular change in board of directors ensures transparency and mitigates risk at C-suite level. While some members of the board of directors are majority stockholders especially owned by the family members of those who founded the company, it is important to note the influence and competence of the other members in mitigating risks especially financial statement fraud to the company. These members are to be assessed if they possess the qualities needed to answer the businesses needs especially in governance. Diligent Corporation (2019) emphasized that a company's board of directors should aligned to the strategic goals to ensure independence, diversity, and pertinent experience to make informed decisions. A balanced board size, term restrictions for directors, and the participation of a range of viewpoints, including those based on gender, background, and thought, are all highlighted by best practices. Maintaining an objective, accountable, and dynamic board that can handle the changing demands of the company and its environment requires regular reviews and openness in the board selection process. Lastly, the operational framework was assessed using the Hosmer and Lemeshow test for model fit. It was found that the framework was statistically significant.

As the study was conducted, there may be other factors that significantly affect the likelihood of financial statement fraud. With this, it is recommended that future studies may utilize other proxies for the five

elements of the fraud hexagon. Also, as the study did not encounter government projects in the manufacturing companies, it is suggested to look into industries that may have government projects, especially those in the construction subsector. Future researchers may also expand the samples to the whole stock exchange to cover all industries.

Lastly, this study recommended the use of an infographic as aid to inform investors and companies on the predictive effect of capability, specifically director change, to the likelihood of fraud. Also included in the content are the recommended actions for companies and the benefits of regular change of some members of the board of directors. This answers the call of sustainable development goals by the United Nations to provide decent work and pave the way for economic growth through a project that could assist investors in choosing companies that are aligned to their preferences and values. Also, the infographic could also serve as guidance for companies to prevent or deter the likelihood of fraud in their companies so as to protect investors and other stakeholders' interest.

The project is expected to begin with the creation of the infographic and consultation on content and design. Once successful, the formal launching will commence and information dissemination will culminate the project's release. Table 9 presented the action plan for said project while Figure 3 presented the infographic's proposed layout.

Table 9. CAPSTONE Action Plan

Title of the Project:	**Infographic Guide on the Predictive Effect of Capability to the Likelihood of Fraud**				
Project Description:	As output of this study, the proponent seeks to inform readers of the predictive effect of Capability to the likelihood of financial statement fraud to companies.				
Goals/Objectives:	- To inform the public on the effect of capability, through director change, on the likelihood of fraud. - To provide guidance to investors in their selection of companies to invest at. - To provide guidance to companies in creation of policies to prevent or deter the likelihood of fraud				
Time Frame: May – June 2024	**Unit/Institution Responsible for the project:** Proponent		**Stakeholders:** Investors, Listed Companies		
Project Team:	Proponent, Graphics Consultant				
ACTION PLAN[1]					
Activities	**In-Charge**	**Timeline**	**Resources**	**Potential Risks**	**Communication Plan**
What will be done?	***Who will do it?***	***By when? (Month/Year)***	***A. Resources available B. Resources needed***	***A. What individuals or organizations might resist? B. How?***	***Who is involved? What methods? How often?***
Step 1: Creation of infographic	Proponent	May 2024	A. Internet B. None		Proponent
Step 2: Content and design consultation	Proponent	May 2024	A. Internet B. Graphics Consultant		Investors
Step 3: Launching of layout on social media	Proponent	June 2024	A. Social media platforms i.e. Facebook, Instagram B. None	A. Listed Companies B. Deviance to usual operations	General public General public
Step 4: Information dissemination	Proponent	June 2024	A. Social media platforms i.e. Facebook, Instagram B. None		

Evidence of Success: Percentage of views is 85% of page visits

Evaluation Process: Feedback page on posting

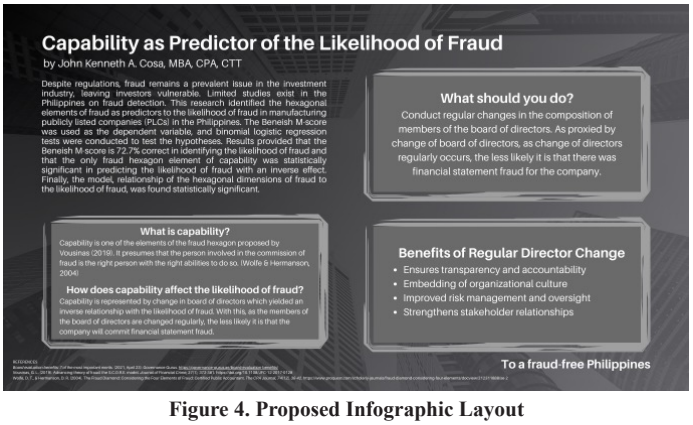

Figure 4. Proposed Infographic Layout

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