



Effect of Hexagon Fraud Model in Detecting Fraudulent Financial Reporting of Listed Consumer and Industrial Goods Companies in Nigeria

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ABSTRACT

This study examined the effect of the Hexagon Fraud Model in detecting fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria. Specifically, the study investigated the effect of opportunity (receivables), rationalisation (accruals), and ego (directors' remuneration) on fraudulent financial reporting. An ex-post facto research design was adopted using secondary data obtained from the published audited annual reports and accounts of 20 sampled consumer and industrial goods companies listed on the Nigerian Exchange Group (NGX) over a 13-year period spanning 2012-2024. The data were subjected to relevant diagnostic tests to ensure their validity and reliability before analysis. Logistic regression analysis was employed with the aid of STATA version 12 to test the formulated hypotheses. The findings revealed that opportunity, proxied by receivables, has a positive and statistically significant effect on fraudulent financial reporting. Similarly, rationalisation, measured by accruals, exerted a positive and significant effect on fraudulent financial reporting, while ego, proxied by directors' remuneration, also has a positive and significant effect on the likelihood of fraudulent financial reporting. The study concluded that firms characterised by abnormal growth in receivables, higher discretionary accruals, and increased directors' remuneration are more likely to engage in fraudulent financial reporting. The study therefore recommended that consumer and industrial goods companies should strengthen controls over trade receivables and revenue recognition processes, regulatory authorities should enhance monitoring of accrual-based accounting practices through effective audit oversight, and Board of Directors should establish transparent and performance-based directors' remuneration policies to minimise incentives for financial statement manipulation.

Keywords: Ego; Fraudulent Financial Reporting; Hexagon Fraud Model; Opportunity; Rationalisation

1. Introduction

Financial reporting is an important mechanism through which management renders an account of its stewardship to shareholders and other stakeholders. The separation of ownership from control in modern corporations creates an agency relationship that often results in information asymmetry, whereby managers possess more information about the firm's activities than shareholders (Jensen & Meckling, 1976). To reduce this information gap, managers are required to prepare financial reports that provide useful information for investment and other economic decisions. According to the International Accounting Standards Board (IASB, 2018), financial information should possess qualitative characteristics such as relevance and faithful representation to enhance its usefulness to users. Despite these requirements, financial reports are sometimes manipulated by management to present a misleading picture of a firm's financial performance and position. Fraudulent financial reporting denotes the intentional misstatement or omission of material information in financial statements with the aim of deceiving users of such reports (Dechow & Skinner, 2000). Managers may engage in fraudulent financial reporting to conceal poor performance, meet earnings expectations, secure compensation incentives, maintain investor confidence, or avoid regulatory scrutiny (Bhattacharya et al., 2003).

The prevalence of fraudulent financial reporting has been demonstrated by several corporate scandals across the world. Notable examples include Enron and WorldCom in the United States, Satyam Computer Services in India, Toshiba Corporation in Japan, and Steinhoff International in South Africa (Bhasin, 2017; Caplan et al., 2019; Rossouw & Styan, 2019). In Nigeria, accounting irregularities reported in Cadbury Nigeria Plc, Afribank Plc, Stanbic IBTC Holdings Plc, and Unilever Nigeria Plc have raised concerns regarding the credibility and reliability of corporate financial reports (Amao & Amaeshi, 2008; Okaro et al., 2013). These scandals have resulted in significant losses to investors, reputational damage to firms, regulatory sanctions, and reduced confidence in financial reporting.

The increasing occurrence of financial statement fraud has generated substantial academic and professional interest in identifying factors that motivate fraudulent behavior and developing mechanisms for detecting such practices. Consequently, Vousinas (2019) developed the Hexagon Fraud Theory, which expanded previous fraud models by introducing collusion as an additional fraud element. The theory identifies six major factors associated with fraud, namely pressure, opportunity, rationalisation, capability, ego, and collusion. Among these elements, opportunity, rationalisation, and ego have been widely recognised as important indicators of fraudulent financial reporting. Opportunity arises when weaknesses in internal controls, ineffective monitoring mechanisms, or poor corporate governance create conditions that enable management to manipulate financial statements. Rationalisation refers to the process through which perpetrators justify unethical actions as acceptable or necessary. Ego, often referred to as arrogance, reflects excessive self-confidence and a belief that internal controls and regulations can be overridden without consequences (Vousinas, 2019; Marks, 2012).

The Nigerian consumer and industrial goods companies contribute significantly to economic growth, industrial development, employment generation, and capital market activities. However, concerns regarding earnings manipulation, weak governance structures, and financial reporting irregularities continue to threaten the credibility of financial information produced by some companies within the sub-sector. Given the importance of reliable financial reporting to investors and regulators, there is a need to examine whether the hexagon fraud model components of opportunity, rationalisation, and ego can effectively detect fraudulent financial reporting among listed consumer and industrial goods companies in Nigeria. Therefore, this study investigates the effect of hexagon fraud model in detecting fraudulent financial reporting in listed consumer and industrial goods companies in Nigeria.

1.1 Objectives of the Study

The study mainly examined the effect of hexagon model in detecting fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria. The study specifically investigated the following objectives: (i) determine the effect of opportunity on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria; (ii) evaluate the effect of rationalisation on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria; and (iii) analyse the effect of ego on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria.

1.2 Research Hypotheses

In order to carry out empirical analysis on the objectives of this study, the following null hypotheses were formulated:

H_{01} : Opportunity has no significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria.

H_{02} : Rationalisation has no significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria.

H_{03} : Ego has no significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria.

2. Literature Review

2.1 Fraudulent Financial Reporting

Fraudulent financial reporting represents the intentional preparation or presentation of materially misleading financial statements with the objective of deceiving investors, creditors, regulators, and other stakeholders. The American Institute of Certified Public Accountants defines fraudulent financial reporting as deliberate misstatements or omissions of amounts or disclosures in financial statements intended to mislead users (AICPA, 2002). Similarly, Rezaee (2005) described it as the intentional manipulation of accounting records or disclosures to present a false picture of an entity's financial position and performance, while Wells (1997) viewed it as management's deliberate distortion of financial information to influence users' economic decisions.

Unlike asset misappropriation, which is typically perpetrated by employees against an organisation, fraudulent financial reporting is commonly committed by senior management to conceal poor performance, meet earnings targets, secure financing, or maintain investor confidence (Rezaee, 2005; Association of Certified Fraud Examiners, 2024). Common techniques include premature or fictitious revenue recognition, understatement of liabilities and expenses, overstatement of assets, improper application of accounting standards, and omission of material disclosures (ACFE, 2024; Beneish, 1999). Several high profile corporate failures, including Enron Corporation and Cadbury Nigeria Plc, demonstrated the severe consequences of fraudulent financial reporting, including regulatory sanctions, loss of investor confidence, reputational damage, financial losses, and, in some cases, corporate collapse (Rezaee, 2005; ACFE, 2024). These incidents underscored the need for effective corporate governance, strong internal controls, and robust audit mechanisms to deter financial statement fraud.

Empirical studies have employed several measures of fraudulent financial reporting, including the Beneish M-Score (Beneish, 1999), financial statement restatements, accounting enforcement actions, and discretionary accrual-based earnings management models. Among these measures, the Beneish M-Score remains the most widely adopted because of its strong predictive ability in identifying firms with a high likelihood of financial statement manipulation. For the purpose of this study, fraudulent financial reporting is defined as the deliberate manipulation, misstatement, or omission of financial information by management to present a misleading representation of a firm's financial performance or position with the intention of influencing stakeholders' decisions.

2.2 Hexagon Fraud Model

The Hexagon Fraud Model, also known as the Fraud Hexagon Theory, represents one of the most recent developments in fraud detection theory. It was proposed by Vousinas in 2017 as an extension of earlier fraud frameworks. The model evolved from the Donald R. Cressey Fraud Triangle Theory (1953), which identified pressure, opportunity, and rationalisation as the principal drivers of fraudulent behavior. It was subsequently expanded into the Fraud Diamond Theory by Wolfe and Hermanson in 2004 through the addition of capability, and later refined by Crowe (2011) with the inclusion of arrogance. Vousinas further advanced these earlier models by introducing collusion, resulting in a six-dimensional framework comprising stimulus (pressure), capability, collusion, opportunity, rationalisation, and ego (arrogance), collectively referred to by the acronym S.C.C.O.R.E. (Vousinas, 2019).

Although the Hexagon Fraud Model consists of six interrelated elements, the present study concentrates on opportunity, rationalisation, and ego (arrogance) because these dimensions are more directly associated with fraudulent financial reporting within organisational settings. Opportunity refers to weaknesses in internal controls, ineffective corporate governance, or inadequate oversight that create conditions enabling individuals to commit fraud without immediate detection. Rationalisation reflects the cognitive process through which perpetrators justify unethical actions as acceptable or necessary under prevailing circumstances. Ego or arrogance captures an individual's excessive confidence, sense of superiority, or belief that organisational rules and control mechanisms do not apply to them, thereby increasing the likelihood of intentional financial misrepresentation.

The restriction of the Hexagon Fraud Model to these three dimensions is based on the fact that they represent organisational and behavioral conditions that management can influence through stronger governance structures, effective internal controls, ethical leadership, and enhanced monitoring mechanisms. Furthermore, prior empirical studies have consistently identified opportunity, rationalisation, and arrogance as significant predictors of fraudulent financial reporting, making them particularly relevant for examining financial statement fraud in corporate organisations. Consequently, these three constructs provide an appropriate theoretical lens for explaining variations in fraudulent financial reporting in the context of this study.

2.3 Theoretical Review

The effect of opportunity, rationalisation and ego in detecting fraudulent financial reporting is grounded in agency theory developed by Jensen and Meckling in 1976, which posited that managers are employed by shareholders to manage a company's resources in the best interest of the shareholders. However, because managers often possess more information than shareholders, which results in information asymmetry, and may pursue personal objectives such as bonuses, promotions, job security or prestige, they may engage in opportunistic behavior, including fraudulent financial reporting. Within the context of this study, agency theory provides a strong theoretical foundation for explaining the three independent variables:

Opportunity: agency theory argued that fraud becomes possible when internal controls are weak, corporate governance mechanisms are ineffective, or managerial oversight inadequate (Al-Faryan, 2024). These weaknesses create opportunities for managers to manipulate accounting records or conceal financial misstatements without immediate detection (Demetriades & Owusu-Agyei, 2022).

Rationalisation: managers may justify fraudulent reporting by believing that their actions are temporary, intended to protect the company, satisfy investors' expectations, or preserve their employment. Agency theory explains this self-justification as a consequence of managers prioritizing their own interests over those of shareholders (Demetriades & Owusu-Agyei, 2022).

Ego: agency theory suggested that powerful executives who believe they are indispensable or beyond organisational controls may override established internal control systems and corporate governance procedures. Such overconfidence or arrogance increases the likelihood of financial statement manipulation because these individuals assume they will not be challenged or detected (Nduokafor & Egbunike, 2025).

The relevance of agency theory to this study cannot be overemphasised because it further suggested that effective monitoring mechanisms including independent board of directors, external audits, strong internal controls, and regulatory oversight, would help reduce agency conflicts and limit opportunities for fraudulent financial reporting. Consequently, understanding how opportunity, rationalisation and ego influence fraudulent financial reporting enhanced the ability of auditors, regulators, and corporate governance structures to detect and prevent financial statement fraud among listed consumer and industrial goods companies in Nigeria.

2.4 Empirical Review

Azizah (2024) examined the effect of opportunity, rationalisation, capability, pressure, arrogance, and collusion from Fraud Hexagon theory component on fraudulent financial statements between 2019 to 2020. The study employed purposive sampling method. Panel data logistic regression analysis was employed to analyse the collated data via EVIEWS 10. The results showed that opportunity, rationalisation, and capability did not affect financial statement fraud. The other three components of the fraud hexagon, namely pressure, arrogance, and conspiracy, recorded a significant effect on financial statement fraud.

Achmad et al. (2022) studied the effect of fraud pentagon theory consisting of external pressure, effective monitoring, rationalisation, capability, and arrogance on fraudulent financial reporting of state-owned companies listed on the IDX (Indonesia Stock Exchange) during 2015-2019. Purposive sampling was used and 36 out of 180 firms were selected. The data used were secondary data from the annual reports of the firms sampled and were analysed using logistic regression analysis with SPSS version 20.0. Findings demonstrated that external pressure and rationalisation have a significant effect on fraudulent financial reporting. However, effective monitoring, capability, and arrogance have no considerable impact on fraudulent financial reporting.

3. Methodology

The study on effect of hexagon fraud model, proxied by opportunity, rationalisation and ego in detecting fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria employed ex-post facto research design, and has a population of 31 consumer and industrial goods companies listed on the Nigerian Exchange Group (NGX) as at 31 December 2024, out of which the study sampled 20 companies using a filtering method. Secondary data for the sampled companies were extracted from the Nigerian Exchange Group Facts Books and audited annual reports and accounts of the sampled companies. The study employed a period of 13 years covering 2012-2024.

3.1 Variables and Measurement

Table 1: Measurement of Variables

Variables	Measurement	Source
Fraudulent financial reporting (dependent variable)	Beneish M-Score	Beneish (1999)
Opportunity (independent variable)	Receivables Index = (Receivables/Sales) _t ÷ (Receivables/Sales) _{t-1}	Beneish (1999); Oktavia & Rinaldo (2024)
Rationalisation (independent variable)	Total Accruals = (Net Income - Cash Flow from Operations)/Total Assets	Beneish (1999); Achmad et al. (2022)
Ego (independent variable)	Natural logarithm of total directors' remuneration	Harjanto & Mulya (2024); Nugroho & Diyanty (2022)

Source: Researcher's compilation (2026).

3.2 Model Specification

The study modeled fraudulent financial reporting as a function of the selected dimensions of the fraud hexagon theory.

$$FFR = f(OPP, RAT, EGO)$$

The econometric model is specified as:

$$\text{M-Score}_{it} = \beta_0 + \beta_1 \text{OPP}_{it} + \beta_2 \text{RAT}_{it} + \beta_3 \text{EGO}_{it} + \beta_4 \text{FSZ}_{it} + \varepsilon_{it} \quad (1)$$

This econometric model is re-stated to reflect their respective proxies:

$$\text{M-SCORE}_{it} = \beta_0 + \beta_1 \text{REC}_{it} + \beta_2 \text{ACC}_{it} + \beta_3 \text{DRM}_{it} + \beta_4 \text{FSZ}_{it} + \varepsilon_{it} \quad (2)$$

Where: M-Score = Beneish M-Score (fraudulent financial reporting); OPP = Opportunity (Receivables Index); RAT = Rationalisation (Total Accruals); EGO = Directors' Remuneration (proxy for Ego/Arrogance); β_0 = Constant term; β_1 - β_4 = Regression coefficients; ε = Error term; i = Company; t = Year.

3.3 Decision Rule

The decision rule is set at the 5% level of significance, which states that if the p-value is less than 0.05, the null hypothesis is rejected, implying that a significant effect exists between the two variables; but if the p-value is greater than 0.05, the null hypothesis is accepted, implying that no significant effect exists between the variables.

4. Results and Discussion

4.1 Descriptive Statistics

This section displays the descriptive statistics of the data for the study. It shows the mean, median, standard deviation, minimum and maximum of the data variables. The result of the descriptive statistics is displayed in Table 2.

Table 2: Result of the Descriptive Statistics

Variable	Obs.	Mean	Median	Std. Dev.	Min.	Max.
M-Score	260	0.5577	1.0000	0.4976	0.0000	1.0000
Opportunity (REC)	260	-0.0002	-0.0009	0.0609	-0.4107	0.3688
Rationalisation (ACC)	260	-0.0530	-0.0537	0.1594	-0.8863	1.1336
Ego (DRM)	260	11.6364	11.7218	1.4319	8.0986	15.2589
Firm size (FSZ)	260	17.7358	17.9762	1.9347	13.7554	22.5801

Source: Researcher's computation (2026).

Table 2 presented the descriptive statistics for the variables employed in this study based on 260 firm-year observations obtained from listed consumer and industrial goods companies in Nigeria. The descriptive measures, comprising the mean, median, standard deviation, minimum and maximum values, provided an overview of the characteristics and distribution of the variables used in the analysis. Fraudulent financial reporting, measured using the Beneish M-Score, has a mean value of 0.5577, indicating that approximately 55.8% of the sampled observations were classified as firms with a high likelihood of fraudulent financial reporting. The median value of 1.0000 further suggested that more than half of the observations fall within the category of firms exhibiting possible financial statement manipulation. The standard deviation of 0.4976 indicated moderate variability in the classification of firms, while the minimum and maximum values of 0 and 1, respectively, confirm the binary nature of the dependent variable. The first explanatory variable, Opportunity (REC), measured by the ratio of change in receivables to sales, records a mean value of -0.0002 with a median of -0.0009. The standard deviation of 0.0609 indicated considerably larger variation among the sampled companies. The values range from -0.4107 to 0.3688, implying considerable differences in the movement of receivables across companies. Such variations suggest that some companies experienced substantial increases in receivables, which might create opportunities for earnings manipulation and fraudulent financial reporting. Rationalisation (ACC), measured by the ratio of total accruals to total assets, has a mean value of -0.0530 and a median of -0.0537. The standard deviation of 0.1594 indicated noticeably larger dispersion in accrual practices among the companies. The variable ranged between -0.8863 and 1.1336, demonstrating considerable differences in companies' accounting choices and accrual management practices. These

variations are consistent with the proposition that managers might rationalise fraudulent reporting through discretionary accounting policies.

The Ego (DRM) variable, represented by the natural logarithm of directors' remuneration, recorded an average value of 11.6364 with a median of 11.7218. Its standard deviation of 1.4319 suggested relatively low variability across the sampled companies. The minimum and maximum values of 8.0986 and 15.2589, respectively, indicated differences in directors' remuneration levels among the consumer and industrial goods companies. Higher executive remuneration might reflect managerial influence and overconfidence, which have been associated with fraudulent reporting behavior. Firm size (FSZ), included as a control variable and measured by the natural logarithm of total assets, has a mean value of 17.7358 and a median of 17.9762. The standard deviation of 1.9347 indicated considerably low variation in company size, while the observed values ranged from 13.7554 to 22.5801. This suggested that the sampled companies vary considerably in their scale of operations, thereby justifying the inclusion of firm size as a control variable in the empirical model.

Table 3: Hausman Specification Test

Chi2(19)	Prob>chi2	Decision
0.33	1.0000	RE model favoured

Source: STATA 12 output.

Table 3 revealed a chi-squared statistic of 0.33 with an associated p-value of 1.0000. Since the p-value of 1.0000 exceeds the 5% level, the null hypothesis that the random-effects estimator is consistent cannot be rejected, indicating that RE is the preferred specification for this data.

4.2 Regression Result

Table 4: Result of Logistic Regression Based on REM

M-Score	Coef.	Std. Err.	Z	p-value
Opportunity (REC)	1.3024	0.4635	2.81	0.005
Rationalisation (ACC)	2.7074	1.1686	2.32	0.021
Ego (DRM)	0.8154	0.2496	3.27	0.001
Firm size (FSZ)	-0.7930	0.1918	-4.13	0.000
Year effect	Included	Included	Included	Included
Constant	8.3486	3.2550	2.56	0.010

Model Summary (Table 4)

Statistic	Value
Number of obs.	260
Number of groups	20
Obs. per group: min / avg / max	13 / 13.0 / 13
Wald Chi ² (19)	46.13
Prob > Chi ²	0.0005
Log likelihood	-126.80932
Likelihood ratio test of rho = 0: chibar ² (01) / Prob ≥ chibar ²	5.50 / 0.010

Source: STATA 12 output.

Table 5: Random Effects Logistic Regression Results (Odds Ratios)

M-Score	Odds ratio	Std. Err.	Z	p-value
Opportunity (REC)	3.6781	1.3089	2.81	0.005
Rationalisation (ACC)	14.99021	17.51767	2.32	0.021
Ego (DRM)	2.26019	0.5640534	3.27	0.001
Firm size (FSZ)	0.452498	0.0868107	-4.13	0.000
Year effect	Included	Included	Included	Included
Constant	4224.076	13749.41	2.56	0.010

Model Summary (Table 5)

Statistic	Value
Number of obs.	260
Number of groups	20
Obs. per group: min / avg / max	13 / 13.0 / 13
Wald Chi ² (19)	46.13
Prob > Chi ²	0.0005
Log likelihood	-126.80932
Likelihood ratio test of rho = 0: chibar ² (01) / Prob ≥ chibar ²	5.50 / 0.010

Source: Researcher's computation (2026).

The regression results obtained from the Random Effect Logistic Regression model are presented in Tables 4 and 5. Table 4 reported the estimated coefficients, while Table 5 presented the corresponding odds ratios to facilitate interpretation of the magnitude of the effects. The estimation was based on 260 firm-year observations covering a 13-year period (2012-2024) drawn from 20 listed consumer and industrial goods companies listed on the Nigerian Exchange Group (NGX).

The overall performance of the model is statistically significant. The Wald Chi-square statistic of 46.13 with a corresponding probability value of 0.0005 indicated that the explanatory variables jointly explained variations in the likelihood of fraudulent financial reporting measured by the Beneish M-Score. Furthermore, the Likelihood Ratio test of $\rho = 0$ produced a χ^2 value of 5.50 with a probability value of 0.010, confirming that the random-effects specification is appropriate and that unobserved firm-specific effects are significant. These results further supported the adequacy of the estimated model for examining the influence of the selected hexagon fraud model dimensions on fraudulent financial reporting.

The coefficient estimates revealed that Opportunity (REC) exerted a positive and statistically significant effect on fraudulent financial reporting ($\beta = 1.3024$, $p = 0.005$). Similarly, Rationalisation (ACC) has a positive and significant effect on the likelihood of fraudulent financial reporting ($\beta = 2.7074$, $p = 0.021$). The result also showed that Ego (DRM) significantly and positively affected fraudulent financial reporting ($\beta = 0.8154$, $p = 0.001$), suggesting that increases in directors' remuneration are associated with a greater likelihood of financial statement manipulation. Regarding the control variable, Firm Size (FSZ) exhibited a negative and statistically significant effect with coefficient ($\beta = -0.7930$, $p < 0.001$), indicating that larger companies are less likely to engage in fraudulent financial reporting than relatively smaller companies.

The odds ratio estimates provided further insight into the magnitude of these relationships. Specifically, a unit increase in Opportunity (REC) increased the odds of fraudulent financial reporting by approximately 3.68 times,

while a unit increase in Rationalisation (ACC) increased the odds by approximately 14.99 times. Likewise, a one-unit increase in Ego (DRM) increased the likelihood of fraudulent financial reporting by about 2.26 times. Conversely, the odds ratio of 0.4525 for firm size indicated that larger firms have lower odds of being associated with fraudulent financial reporting, holding other variables constant. Overall, the empirical findings demonstrated that opportunity, rationalisation and ego are significant determinants of fraudulent financial reporting among listed consumer and industrial goods companies in Nigeria, thereby providing empirical support for the selected dimensions of the hexagon fraud model. The inclusion of year effects further controlled for time-specific influences that might affect fraudulent financial reporting over the study period.

4.3 Test of Hypotheses and Discussion of Results

Employing logistic regression analysis in testing the hypotheses formulated for the study, results revealed the following:

H₀₁: Opportunity has no significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria.

In Table 4, REC has a positive coefficient ($\beta_1 = 1.3024$) and z statistics of 2.81 and a p value of 0.005. Since the p-value of the test statistic is less than 0.05, the null hypothesis is rejected. Therefore, the finding is that opportunity has a significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria. The regression results revealed that Opportunity (REC) has a positive and statistically significant effect on fraudulent financial reporting ($\beta = 1.3024$; $z = 2.81$; $p = 0.005$). This indicated that an increase in changes in receivables significantly increased the likelihood that a firm would engage in fraudulent financial reporting. The corresponding odds ratio of 3.6781 implied that a one-unit increase in opportunity increased the odds of fraudulent financial reporting by approximately 3.68 times, holding other variables constant. Expressed in percentage terms, this represented an increase of approximately 267.81% [$(3.6781 - 1) \times 100$] in the likelihood of fraudulent financial reporting. This finding suggested that companies experiencing abnormal growth in receivables are more susceptible to financial statement manipulation because receivables provide management with greater discretion over revenue recognition and earnings management.

The present finding is consistent with Dechow et al. (2011), who found that abnormal changes in receivables are among the strongest indicators of earnings manipulation and financial statement fraud. Similarly, Beneish (1999) identified disproportionate growth in receivables relative to sales as a significant signal of possible earnings manipulation through the Days' Sales in Receivables Index (DSRI). Likewise, Skousen et al. (2009) reported that companies with greater opportunities arising from weak internal controls and abnormal receivable growth are more likely to commit financial statement fraud, lending empirical support to the opportunity element of the fraud triangle and subsequently the hexagon fraud model.

H₀₂: Rationalisation has no significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria.

The result in Table 4 indicated that ACC has a positive coefficient ($\beta_2 = 2.7074$) and z statistics of 2.32 and a p-value of 0.021. Since the p-value is less than 0.05, the null hypothesis is rejected. The finding therefore showed that rationalisation has a significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria. The coefficient of Rationalisation (ACC) is also positive and statistically significant ($\beta = 2.7074$; $z = 2.32$; $p = 0.021$). The odds ratio of 14.9902 indicated that a one-unit increase in accruals increased the odds of fraudulent financial reporting by approximately 14.99 times, equivalent to an increase of about 1,399.02% in the likelihood of fraudulent financial reporting, all other factors remaining constant. This result implied that companies with higher discretionary accruals are more likely to manipulate financial statements, supporting the argument that managers might justify fraudulent reporting through aggressive accounting estimates and accrual-based earnings management.

This finding agreed with Dechow et al. (2011), who established that abnormal accruals are reliable predictors of accounting manipulation and financial reporting fraud. Similarly, Jones (1991) demonstrated that discretionary accruals provide managers with opportunities to influence reported earnings, while Dechow et al. (1995) showed

that abnormal accrual models effectively detected earnings management associated with fraudulent reporting. The finding is also consistent with Summers and Sweeney (1998), who found that firms involved in enforcement actions reported unusually high discretionary accruals before fraud detection. Furthermore, Sasongko and Wijayantika (2019) reported that rationalisation, measured through total accruals, significantly influences fraudulent financial reporting in listed firms. In contrast, Rahayu and Sopian (2017) found that rationalisation, proxied by total accruals to total assets, had no significant effect on fraudulent financial reporting, suggesting that accrual-based proxies might not fully capture managers' psychological justification for fraud in every context.

H₀₃: Ego has no significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria.

It is observed in Table 4 that the coefficient on DRM is positive ($\beta_3 = 0.8154$) and z statistics of 3.27 and a p-value of 0.001. Since the p-value is less than 0.05, the null hypothesis is rejected. Therefore, the study found that ego has a significant effect on fraudulent financial reporting of listed consumer and industrial goods companies in Nigeria. Similarly, Ego (DRM) exhibited a positive and highly significant relationship with fraudulent financial reporting ($\beta = 0.8154$; $z = 3.27$; $p = 0.001$). The estimated odds ratio of 2.2602 showed that a one-unit increase in directors' remuneration increased the odds of fraudulent financial reporting by approximately 2.26 times. In percentage terms, this translated to an increase of approximately 126.02% [$(2.26019 - 1) \times 100$] in the likelihood of fraudulent financial reporting. The finding suggested that higher directors' remuneration, which reflected managerial influence and self-interest, might encourage behavior consistent with the ego dimension of the hexagon fraud model, thereby increasing the propensity for financial statement manipulation.

The result supported the theoretical proposition of Voutsinas (2019), who introduced ego (arrogance) as one of the dimensions of the hexagon fraud model and argued that executives with excessive power, self-confidence and personal influence are more likely to override internal controls and engage in fraudulent reporting. The finding is also consistent with Marks (2012), who emphasised that arrogance and executive superiority often motivate managers to manipulate financial reports because they believe internal controls do not apply to them. Empirically, Tessa and Harto (2016) found that executive arrogance significantly influenced fraudulent financial reporting among Indonesian listed companies. Likewise, Septriani and Handayani (2018) documented that managerial arrogance increased the probability of financial statement fraud. However, the finding contradicted Hidayah and Saptarini (2020), who reported that arrogance-related variables were not statistically associated with fraudulent financial reporting, implying that executive remuneration alone might not always capture the ego dimension of fraud.

5. Conclusion and Recommendations

This study examined the effect of selected dimensions of the Hexagon Fraud Model, namely opportunity, rationalisation, and ego, on the detection of fraudulent financial reporting among listed consumer and industrial goods companies in Nigeria. Fraudulent financial reporting was measured using the Beneish M-Score, while opportunity was proxied by changes in receivables (REC), rationalisation by total accruals to total assets (ACC), and ego by directors' remuneration (DRM). Firm size was included as a control variable.

The findings revealed that opportunity has a positive and statistically significant effect on fraudulent financial reporting, indicating that increases in receivables relative to sales significantly increase the likelihood of financial statement manipulation. This suggests that firms with higher levels of receivables provide management with greater discretion in revenue recognition and accounting estimates, thereby creating opportunities for fraudulent reporting. The study also established that rationalisation exerts a positive and significant effect on fraudulent financial reporting. This finding implies that firms with higher discretionary accruals are more likely to engage in financial statement manipulation, as managers may justify or rationalise fraudulent reporting through aggressive accounting policies and accrual-based earnings management practices.

Similarly, the results showed that ego has a positive and statistically significant effect on fraudulent financial reporting. This indicates that higher directors' remuneration, which may reflect managerial dominance, overconfidence or a sense of entitlement, increases the likelihood of fraudulent financial reporting. The finding

supports the proposition of the Hexagon Fraud Model that managerial ego constitutes an important behavioral driver of corporate financial fraud. Furthermore, the study found that firm size has a negative and statistically significant effect on fraudulent financial reporting, suggesting that larger firms are less likely to engage in financial statement manipulation. This may be attributed to stronger internal control systems, more effective corporate governance mechanisms, greater regulatory oversight and increased public scrutiny associated with larger organisations.

Based on the findings of this study, the following recommendations are made. First, management of listed consumer and industrial goods companies should strengthen internal controls over receivables and revenue recognition processes. Since opportunity was found to have a positive and significant effect on fraudulent financial reporting, companies should implement robust credit management policies, periodic reconciliation of trade receivables, automated revenue monitoring systems, and regular internal audits to minimise opportunities for financial statement manipulation. Second, regulatory authorities should enhance oversight of accrual-based accounting practices. Given that rationalisation significantly increases the likelihood of fraudulent financial reporting, the Financial Reporting Council of Nigeria (FRCN), the Nigerian Exchange Group (NGX), and external auditors should intensify the review of discretionary accruals, accounting estimates, and judgment-based transactions during financial statement examinations, which would discourage the use of aggressive accounting practices to justify fraudulent reporting. Third, boards of directors should establish transparent and performance-based executive remuneration policies. As ego, proxied by directors' remuneration, was found to have a positive and significant effect on fraudulent financial reporting, remuneration committees should ensure that executive compensation is aligned with long-term organisational performance rather than short-term accounting results, and independent periodic reviews of directors' compensation should also be encouraged to reduce excessive managerial influence and self-serving behavior.

6. Limitations and Direction for Future Research

Despite the contributions of this study, certain limitations are acknowledged. First, the study is restricted to listed consumer and industrial goods companies in Nigeria; hence, the findings might not be generalisable to companies in other sectors with different operating, regulatory and governance environments. Second, the study relied mainly on secondary data obtained from published annual reports and other publicly available sources; the quality and completeness of such disclosures might therefore affect the measurement of the variables. Third, some components of the hexagon fraud model, particularly rationalisation and ego, are behavioural constructs that are difficult to observe directly from archival corporate data, so the proxies employed might not completely capture the underlying characteristics of these constructs. Fourth, the study concentrated on the three factors of the hexagon fraud model and might not fully account for other institutional, organisational, governance and economic factors that could influence fraudulent financial reporting. Finally, the period covered by the study might limit the applicability of the findings to future periods characterised by changes in economic conditions, regulation, corporate governance practices and financial reporting requirements.

Future research could address these limitations in several ways. First, subsequent studies could extend the investigation to other sectors of the Nigerian economy, including financial services, oil and gas, telecommunications and healthcare, to determine whether the findings are sector-specific. Second, comparative cross-country studies involving Nigeria and other emerging economies could provide evidence on the influence of institutional and regulatory differences on fraudulent financial reporting. Third, future researchers could employ multiple measures of fraudulent financial reporting, including confirmed fraud cases, financial statement restatements, enforcement actions, and the Dechow F-Score, to improve the robustness of the findings. Fourth, future studies could incorporate corporate governance mechanisms, audit quality, internal control effectiveness, institutional ownership and regulatory enforcement as moderating or mediating variables. Finally, primary data obtained through questionnaires and interviews with auditors, accountants, regulators and corporate executives could complement archival data and provide better measurement of difficult-to-observe factors such as rationalisation and ego.

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