

Research Paper

Corporate Governance Mechanisms and Sustainability Reporting Quality of Listed Manufacturing Companies in Nigeria

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ABSTRACT

Purpose: The study examined the influence of corporate governance mechanisms on the sustainability reporting quality of Nigerian quoted manufacturing companies.

Methodology: The study's population consists of forty-three (43) oil and gas, industrial goods, and consumer goods companies quoted on the Nigerian Exchange Group as of 20th May 2024. The study utilized a purposive sampling technique to select a sample of twenty-nine (29) companies. The study employed the ex-post facto research design, adopting secondary data from the sampled companies' corporate annual and sustainability reports from 2018 to 2022. The study also adopted descriptive and multiple regression analysis to analyze the data using the EViews 12 statistical package.

Results: The study discovered that only gender diversity significantly and positively influences the sustainability reporting quality of Nigerian quoted manufacturing firms.

Practical Implications: The study identified gender diversity as a critical factor in driving sustainability practices of firms.

Originality: There is an apparent dearth of empirical studies on the relationship between corporate governance variables and sustainability practices in Nigeria, and this is the focus of the current study.

Keywords: *Sustainability Reporting, Sustainability Reporting Quality, Corporate Governance, Corporate Governance Mechanisms, Board characteristics, Exchange Regulator*

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1. Introduction

The global business landscape is undergoing a significant transformation with an increasing focus on sustainability and ethical business practices (NGX, 2020). The convergence of economic, social, and environmental considerations has catalyzed this paradigm shift. Hence, in addition to maximizing the shareholder's wealth, the expectations from corporate organizations now include being socially and environmentally responsible (Oluwatoyin, Agbi, & Mustapha, 2021). This is particularly significant for manufacturing companies because of the impacts of their activities on the environment and society, (PwC Nigeria, 2023). There is increasing pressure on firms with high environmental footprints to align their operations with sustainable business practices and provide accurate and transparent sustainability disclosures in their reports (PwC Nigeria, 2023).

Furthermore, there are concerns about the sufficiency of conventional financial reports in evaluating a company's performance due to the collapses of top companies such as Parmalat and Enron, among others (Nwobu, 2017). The inadequacy of traditional financial reporting to meet non-financial disclosure requirements results in asymmetric information between the management and stakeholders (Razaq, Alhassan & Ame, 2023). As a result, stakeholders are now interested in non-financial reports (Bloomberg, 2023).

This interest in non-financial information is growing because of corporate missteps that could result in substantial losses for everyone involved. For instance, failure to comply with legal requirements may lead to fines, sales reduction, long-term reputational damage and a drop in share price. (Bloomberg, 2023). For example, in 2022, the Nigerian government charged Shell Nigeria fifteen (15) million dollars to compensate affected farmers and fishermen because the company's operations caused oil spillage (Reuters, 2022).

The push towards sustainable finance and responsible investing has also amplified the significance of sustainability reporting (Bloomberg, 2023). Sustainability reporting helps companies improve reputations and comply with regulatory requirements, focusing on the economy, society, and environment beyond profit-making (PwC Nigeria, 2023). The inability of companies to effectively incorporate sustainability into their reporting practices may lead to a diminished ability to attract socially responsible investors (Bloomberg, 2023). Reporting

sustainability performance enhances the capacity of stakeholders to make informed decisions and advocate for responsible corporate behaviour.

Recently, the International Sustainability Standards Board (ISSB) published two sustainability standards, IFRS S1 and S2, that will take effect from 1st January 2024 to enhance universality and trust in sustainability reporting (PwC Nigeria, 2023). The Nigerian Financial Reporting Council (FRC) would adopt these Sustainability Disclosure Standards to promote sustainability reporting in Nigeria (KPMG Nigeria, 2023). With new disclosure requirements in Nigeria and the increasing demand for responsible investments, companies must increase their sustainability reporting efforts to demonstrate their environmental and social responsibility (PwC Nigeria, 2023).

The role of the board of directors in corporate governance mechanisms is crucial in addressing sustainable business operations and its reporting. Effective corporate governance enables prudent management and fosters long-term company success (ICAEW, 2023). Effective governance in terms of monitoring is also necessary to ensure the credibility and transparency of corporate reporting (Moses, Che-Ahmad, & Abdulmalik, 2020). Hence, effective control mechanisms are crucial for companies to function without causing societal or environmental problems (Tasnim & Khan, 2022).

Hence, corporate governance, overseen by the board of directors, safeguards stakeholder rights and ensures management actions align with the diverse interests of stakeholders (Tasnim & Khan, 2022). The board possesses some attributes, such as gender diversity, independence, size, and financial expertise that may influence the extent of sustainable business practices and sustainability reporting. Board composition in terms of these attributes will likely ensure effective board functioning and compliance with sustainable business practices. Specifically, this study will examine the effect of corporate governance variables (board size, board independence, board financial expertise, board gender diversity) on sustainability reporting of Nigerian publicly traded manufacturing companies

The study also hypothesises that:

H₀₁: Board size has no significant influence on the quality of sustainability reporting of Nigerian quoted manufacturing companies.

H₀₂: Board independence has no significant influence on the quality of sustainability reporting of Nigerian quoted manufacturing companies.

H₀₃: Board financial expertise has no significant influence on the quality of sustainability reporting of Nigerian quoted manufacturing companies.

H₀₄: Board gender diversity has no significant influence on the quality of sustainability reporting of Nigerian quoted manufacturing companies.

2. Literature Review

2.1. Concept of Corporate Governance

Corporate governance, as described by the Chartered Governance Institute (2024), refers to the set of processes, practices, or rules that direct and govern a company. It encompasses the institutions, laws, customs, and policies that guide how corporations act, manage and control their operations (Khan, 2011). This enables the company to maximize shareholder wealth, subject to various legal and ethical requirements, while considering its impact on other affected groups (Chartered Governance Institute, 2024).

The corporate governance structure establishes the policies and guidelines for making decisions on corporate matters and allocating the rights and duties of various stakeholders (OECD, 2015). The division of ownership and management made corporate governance imperative for modern businesses (Khan, 2011). The managers' interests are conflicting with those of shareholders. While owners (shareholders) are interested in maximizing the firm's value to maximize their returns, managers might be concerned with enhancing their prestige and wealth.

Therefore, corporate governance is the framework by which firms operate when the owners are not the managers. It establishes trust, openness and accountability in corporations, promoting financial stability, business integrity and long-term investment (OECD, 2015). It ensures that businesses have suitable processes and controls for making decisions and balancing the interests of various stakeholders (The Chartered Governance Institute, 2024).

In this literature, corporate governance mechanisms refer to board characteristics, emphasizing the responsibility of boards of directors in implementing these mechanisms. The board is also responsible for integrating sustainability reporting principles and guidelines into the management of organizations (NGX, 2020). The board of directors is a company's most influential decision-making body, representing the shareholders' interests. The board of

directors helps the organization set broad goals by ensuring that it has adequate resources and supports the responsibilities of the executive team. The primary issues under a board's remit are the options policies, dividend policies, appointment and dismissal of senior executives, and executive remuneration (Corporate Governance Institute, 2021).

Therefore, the board of directors is essential to companies' existence and success. Without sacrificing integrity, competence or independence, the board needs a diverse set of individuals with the appropriate combination of skills to perform their responsibilities effectively. These characteristics or attributes are significant in evaluating the association between board performance and company performance (Akpokerere & Obonofiemro, 2022). Thus, board characteristics refer to features essential in measuring the effectiveness and efficiency of corporate boards responsible for a company's overall governance (Fakile & Adigbole, 2019). Board characteristics include size, independence, gender diversity, directors' ages, experience, and racial diversity (Fakile & Adigbole, 2019).

These characteristics are widely known as crucial corporate governance mechanisms for ensuring the alignment of the managers' interests with other stakeholders (Fakile & Adigbole, 2019). Hence, they will enable an effective management system for successful sustainability performance. This study considers board attributes such as independence, size, financial expertise, and gender diversity.

2.2. Concept of Sustainability Reporting

Corporate decision-making usually relies on financial information, which may not provide a comprehensive view of an organization and its operating environment (INTOSAI, 2013). An organization's ability to succeed might depend not just on its financial results but also on its environmental impacts (such as its reduction in greenhouse gas emissions and efficient use of resources) or its social impacts (such as its ability to preserve customer and employee satisfaction). In addition to being a moral concern, environmental and sustainability issues are increasingly becoming more financially significant (INTOSAI, 2013).

As a result, sustainability reporting is becoming rampant due to stakeholder demands for transparency and the increasing recognition of the probable effect of sustainability-related matters on a company's performance (The Institute of Company Secretaries of India, 2023). Sustainability reporting involves publishing sustainability disclosures alongside existing

reporting practices of companies (UNEP, 2022). Such reporting assesses sustainability data and uses the analysis to promote a firm's dedication to sustainable development in a manner demonstrable to internal and external stakeholders (UNEP, 2022).

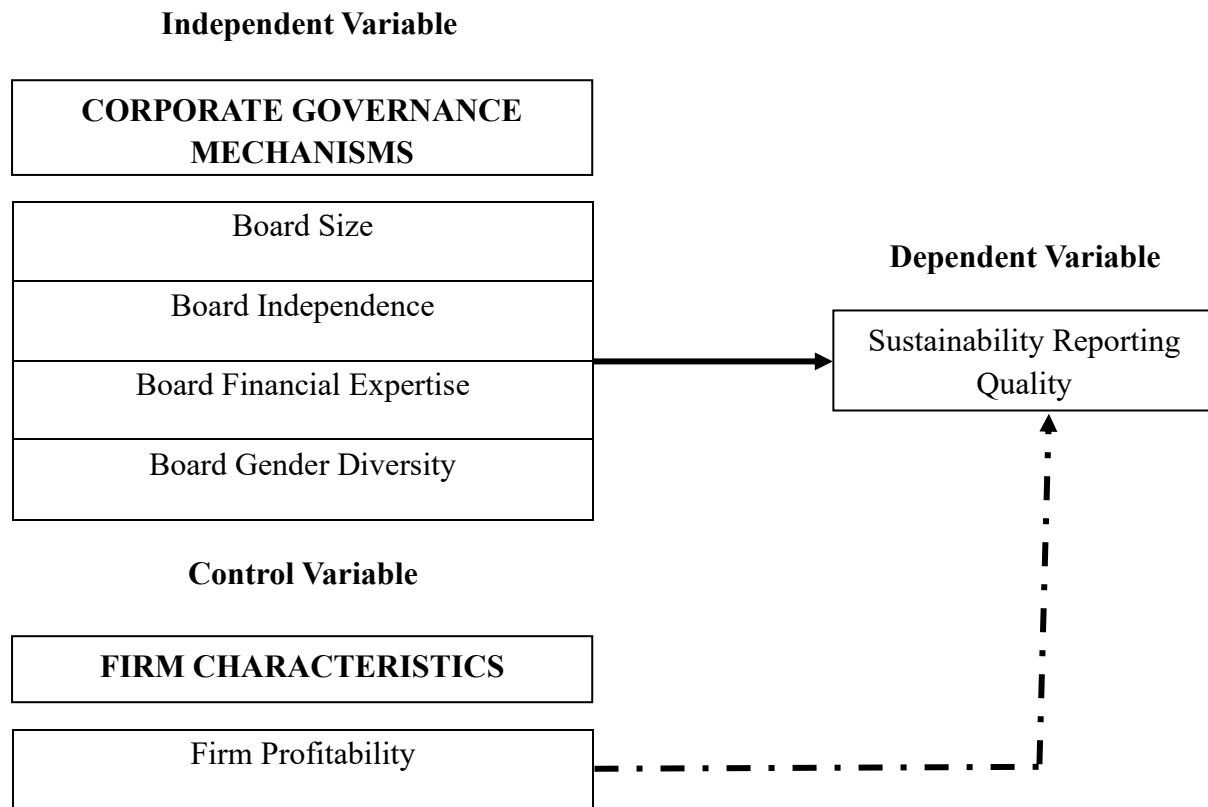
A sustainability report examines how non-financial concerns, from climate change to customer service, affect or add to the creation of value (ACCA, 2023). This helps users evaluate the risks and opportunities that companies encounter and evaluate the impacts of their operations on society and the environment. It is an essential communication tool in persuading doubtful observers that the company is acting sincerely. Corporations' responses to these non-financial considerations progressively shape their reputation, capacity for innovation, and financial performance. The Global Reporting Initiative (2023) states that sustainability reporting involves publicly revealing the contributions of an organization to sustainable development and its most significant economic, social, and environmental impacts. This helps identify and manage risks, motivates accountability, and enables organizations to take advantage of new opportunities. It facilitates more informed communication and decision-making for all stakeholders by ensuring they understand an organization's sustainability performance and impacts.

This study considers the environmental, social, economic, and governance dimensions of sustainability reporting, as adopted by the Nigerian Stock Exchange (NGX, 2020). The economic aspect relates to the financial performance of an organization in its financial accounts (NGX, 2020). The environmental dimension requires a firm to present information on environmental metrics, such as water use, waste management and energy consumption (Bloomberg, 2023).

The social aspect of sustainability reporting requires an organization to present information on social indicators, such as occupational health and safety management, labour and employment practices, product quality and safety, and stakeholder engagement (Bloomberg, 2023). The governance aspect of sustainability reporting requires an organization to present information on corporate governance indicators, like board composition, appointment, diversity, independence and evaluation (Bloomberg, 2023). Proper disclosure of these aspects of sustainability reporting will ensure better decision-making, enhanced reputation and improved stakeholder relations in an organization (Bloomberg, 2023).

In line with this view, the study developed a conceptual model. Figure 1 below represents this study's conceptual framework

Figure 1: Conceptual Model of the Study



Source: Author (2024)

2.3. Theoretical Framework

The study utilized the stakeholder theory (Edward Freeman, 1984) and legitimacy theory (Dowling & Pfeffer, 1975) as they provide a better explanation of the significance of sustainability disclosures in corporations.

2.3.1. Stakeholder Theory

The Stakeholder theory, developed by R. Edward Freeman in 1984, is a widely accepted framework that encourages sustainability reporting practices (Stakeholder Theory Org, 2024). The stakeholder theory emphasizes the interwoven relationship between an organization and its stakeholders (Stakeholder Theory, 2024). The framework acknowledges the rights of these stakeholders and holds that everyone can gain without causing harm to one another (Razaq et

al., 2023). Hence, the theory suggests that firms must prioritize value creation for all parties involved as they can significantly influence an organization's success or failure. The theory argues that businesses must protect all stakeholders' interests regardless of the stakeholders' power to influence business activity. Companies are to remain attentive to what will fulfil the interests of their stakeholders due to the increasing pressure from various stakeholder groups for non-financial information (Erin, Adegbeye, & Bamigboye, 2021).

2.3.2. Legitimacy Theory

The legitimacy theory, developed by Dowling and Pfeffer in 1975, also encourages sustainability disclosures practices (Razaq et al., 2023). Burlea and Popa (2013) described the theory as a framework established on the presence of exchangeable and social relationships between a firm and society. The theory indicates that companies have no innate rights to exist, and any business operation depends on its level of acceptability by society. Therefore, a company's legitimacy can be threatened by society if it is not acceptably conducting its operations (Hahn & Kuhnen, 2013).

The organization is harshly sanctioned by society when its actions violate moral values. These sanctions may even result in the collapse of the organization. The organization must demonstrate its legitimacy through social and economic activities that do not imperil the existence of its society (Burlea & Popa, 2013). Furthermore, companies can only preserve or regain public legitimacy by disclosing their social and environmental performance (Burlea & Popa, 2013). Hence, organizations must uphold social norms and values and willingly disclose environmental and social information to legitimate their legitimacy.

2.4. Empirical Review of Literature

2.4.1 Board Size and Sustainability Reporting

Abdulwahab, Bala, Yahaya, and Abdullahi (2023) evaluated the association between sustainability reporting and corporate governance committees in Nigerian consumer goods firms. The study analyzed data from twenty (20) quoted consumer goods companies from 2011 to 2022, employing correlational research design. The study discovered a statistically

significant relationship between the presence of finance, risk, and audit committees and the sustainability reporting of quoted consumer goods companies. However, the study was restricted to consumer goods companies and failed to consider other board attributes such as financial expertise, independence, and size.

Razaq, Alhassan, and Ame (2023) evaluated the relationship between corporate attributes and sustainability reporting in Nigerian quoted non-financial firms from 2011 to 2020. The study proxied corporate characteristics with ownership attributes (institutional, managerial, foreign, and ownership concentration), board attributes (financial expertise, gender diversity, independence, and size), and firms' attributes (firm profitability, liquidity, leverage, and size). The study used GRI guidelines to measure sustainability reporting, relying on an ex-post facto research design and data from corporate reports of 51 sampled firms. The study adopted a multiple regression model to explore the data and discovered that board financial expertise, board size, foreign ownership, firm size, institutional ownership, leverage, liquidity, and profitability positively and significantly affect sustainability reporting.

Similarly, Razaq, Omole, and Alhassan (2023) examined the association between sustainability reporting and corporate governance mechanisms in Nigerian quoted non-financial firms from 2011 to 2020. Board financial expertise, gender diversity, size, and independence were used as variables of corporate governance, while GRI guidelines were used to measure sustainability reporting. The study revealed that board financial expertise and size positively and significantly affect sustainability reports. Tasnim and Khan (2022), employing a cross-sectional regression model, found that corporate governance positively impacts sustainability disclosures while board size had negative impact on sustainability reporting. It corroborates Shamil, Krishnan, Ho, and Shaikh (2014) with respect to the effect of board size and sustainability.

2.4.2 Board Independence and Sustainability Reporting

Chouaibi, Chouaibi, and Zouari (2022) analyzed the relationship between integrated reporting quality and the board characteristics of European firms. The results showed that that board diversity, size, and independence significantly and positively affect integrated reporting. The finding is corroborated by Sani, Abdulsalam-Ka'oje, and Babangida (2022) which investigated the determinants of sustainability practice (SP) in Nigeria. They were, however contradicted by Tiamiyu, Adeyemo, and Oyedokun (2021) which established negative relationship but board

independence negatively and sustainability reporting of quoted manufacturing companies in Nigeria. However, the scope of the study was limited to consumer goods firms.

2.4.3. Board Financial Expertise and Sustainability Reporting

Prior studies on the influence of Board financial expertise on sustainability reporting is mixed. For instance, Erin, Bamigboye, and Adegboye (2021) found that board expertise, (along with board gender diversity, board size, audit meeting, audit expertise, and audit committee size) is significantly related to sustainability reporting. Also, Gold et al. (2021) established positive relationship between board expertise board expertise measured with board members' education level and the sustainability reports of Nigerian consumer goods companies. However, the study revealed no relationship between sustainability reporting and board members' educational level.

Other studies such as Saidu, Gold, and Aifuwa (2020) found no association between sustainability disclosures and board expertise. Umukoro et al. (2019) investigated the connection between sustainability reporting and board expertise in Nigerian quoted banks from 2014 to 2016. The study proxied board expertise using environmentally educated or certified board members. The study used ten Deposit Money Banks in Nigeria, employing a regression model. The study also revealed board expertise does not significantly impact the sustainability disclosures of banks.

2.4.4. Board Gender Diversity and Sustainability Reporting

The preponderance of previous study on the subject suggest a positive trelationship between gender diversity and sustainability reporting. Savitri and Suhari (2023) using data from insurance firms registered on the IDX, Indonesia, from 2015 to 2021 found that female independent commissioners are positively related to enhanced sustainability reporting. However, the study did not assess sustainability reporting with Global Reporting Initiative guidelines. Similarly, Oluwatoyin, Mustapha, and Agbi (2021) examined the association between sustainability reporting and board characteristics in Nigerian quoted non-financial companies from 2010 to 2018.

The study measured sustainability reporting following GRI guidelines. The study used a population of 47 firms in the oil and gas, consumer goods, and industrial goods industries. The study utilized 30 sampled firms, employing robust fixed effect regression and data from the corporate reports. The study discovered that board gender positively and significantly impacts the sustainability disclosures of the sampled companies. However, the study failed to consider the board's expertise.

Moses, Abdulmalik, and Che-Ahmad (2020) examined the connection between sustainability reporting and board governance mechanisms in Malaysia's Public Limited Companies (PLCs) by exploring existing literature on sustainability practices. After reviewing the findings of past investigations, this study concluded that board gender diversity along with other examined elements of board governance (external assurance, politically connected firms, board integrity, board communication, and) positively correlate with sustainability reports.

On the other hand, Adeniyi and Fadipe (2018) investigated the association between sustainability reporting and board diversity in Nigerian beverage manufacturing firms between 2015 and 2016. The study used a sample of four (4) firms, employing an ex-post facto research design and a regression model. The study discovered that female directors do not significantly affect sustainability disclosures. However, a sample size of only four (4) firms over two years is insufficient for generalization.

3. Methodology

The study adopted the ex-post facto research design to carry out the objectives, as it aims to establish causal associations among variables after an event has already occurred (Razaq et al., 2023). The study also employed a longitudinal research design, which entails observing the same subjects (in this case, companies) over a period (Sani et al., 2022; Nwobu, 2017). The population consists of forty-three (43) manufacturing firms quoted on the Nigerian Exchange Group (NGX), encompassing oil and gas, industrial goods, and consumer goods industries. As of 20th May 2024, the Nigerian Exchange Group lists thirteen (13) industrial goods companies, twenty-one (21) consumer goods companies, and nine (9) oil and gas companies (NGX, 2024). The study focuses on these sectors because of the significant environmental impact of their operations (PwC Nigeria, 2023) and their high expenditures on sustainability activities, which may substantially affect business value and investor returns (Sani et al., 2022). The study

employed the purposive sampling technique to choose twenty-nine (29) firms from the listed manufacturing firms. In line with the purposive sampling, the study's sample comprises eight (8) industrial goods, seven (7) oil and gas, and fourteen (14) consumer goods companies.

Table I: Measurement of Variables and sources

Type	Description	Measurement	Supporting Authors
Independent	Board Size (BS)	Number of directors on the board of a company	Nguyen & Huynh (2023); Razaq et al. (2023); Akpokerere & Obonofiemro (2022); Nwankwo & Uguru (2022); Adeniyi & Fadipe (2018)
Independent	Board Independence (BI)	The ratio of independent non-executive directors to the board size	Nguyen & Huynh (2023); Razaq et al. (2023); Akpokerere & Obonofiemro (2022); Adeniyi & Fadipe (2018); Shamil et al. (2014)
Independent	Board Financial Expertise (BFE)	The ratio of directors with finance or accounting background to the board size	Razaq et al. (2023); Güner, Malmendier, & Tate, (2008)
Independent	Board Gender Diversity (BGD)	The ratio of female directors to the board size	Nguyen & Huynh (2023); Razaq et al. (2023); Akpokerere & Obonofiemro (2022); Adeniyi & Fadipe (2018)
Control	Firm Profitability (ROA)	Net income after tax to total assets ratio	Akpokerere & Obonofiemro (2022); Tasnim & Khan (2022); Gold et al. (2021)

Source: Author's Compilation (2024)

3.1 Measurement of Sustainability Reporting Quality (SRQ)

The study employed the content analysis technique to measure sustainability reporting quality following the 2021 Global Reporting Initiative (GRI) G4 general framework (Saidu et al., 2020; Oluwatoyin et al., 2021). The study developed an unweighted sustainability reporting index (SRI) using forty (40) core indicators for governance, environmental, social, and economic performances following the GRI standards as adopted by the previous studies (Nwobu, 2017; Saidu et al., 2020). For example, a sampled firm will score "1" for each disclosure of governance, social, environmental and economic information and "0" for non-disclosure (Gold et al., 2021; Nwobu, 2017). Therefore, below is the formula for the sustainability reporting index of a firm (Saidu et al., 2020):

$$SRQ = \frac{TD}{MAX}$$

Where:

SRQ = Sustainability Reporting Quality

TD = Total number of sustainability disclosures (Governance Indicators + Social Indicators + Environmental Indicators + Economic Indicators)

MAX = Maximum possible sustainability disclosures (40)

Model Specification

The study adopted the Ordinary Least Squares regression model. The study's model is as follows:

$$SQR = f(BS; BI; BFE; BGD; \text{Control variable})$$

In econometric form:

$$SQR_{it} = \beta_0 + \beta_1 BS_{it} + \beta_2 BI_{it} + \beta_3 BFE_{it} + \beta_4 BGD_{it} + \beta_5 ROA_{it} + \xi_{it}$$

Where:

SQR = Sustainability Reporting Quality

BS = Board Size

BI = Board Independence

BFE = Board Financial Expertise

BGD = Board Gender Diversity

ROA = Firm Profitability (control variable)

β_0 = is the intercept

β_1 - β_4 = coefficients of independent variables

ξ = Error term

i = Cross Sections

t = Time Series (2018 to 2022)

4. Results and Discussion

4.1. Descriptive Statistics

Table II below shows the mean, maximum, minimum, and standard deviation values of the explanatory and dependent variables (board financial expertise, gender diversity, size, independence, firm profitability, and sustainability reporting quality).

Table II: Descriptive Statistics

	SRQ	BS	BI	BFE	BGD	ROA
Mean	0.657	9.586	0.222	0.409	0.250	0.049
Maximum	1.000	16.000	0.750	0.750	0.667	0.366
Minimum	0.450	5.000	0.000	0.071	0.000	-0.274
Std. Deviation	0.165	2.394	0.146	0.173	0.141	0.090
Observations	145	145	145	145	145	145

Source: Author's Computation (EViews 12 Output, 2024)

As shown in Table II, sustainability reporting quality (SRQ) has a mean value of 0.657 and a standard deviation value of 0.165. The mean value shows that the average quality of sustainability reporting based on GRI guidelines during the study period for Nigerian quoted manufacturing firms is 65.7%. The standard deviation suggests that the variable is 16.5% from the average, showing a low dispersion of the variable from the mean. The minimum and maximum values of sustainability reporting quality are 45% and 100%, respectively, indicating that some companies disclosed 100% of the GRI indicators, and the minimum disclosure was 45% of the GRI indicators.

The board size (BS) has a mean value of 9.586 and a standard deviation value of 2.394. The mean value shows that the average board size of listed oil and gas, consumer goods, and industrial goods firms in Nigeria is approximately 10. The standard deviation reveals that the variable is 2.394 from the average, showing a low dispersion of the variable from the average. The maximum number of board members in these Nigerian quoted manufacturing firms is 16, while the minimum board size is 5.

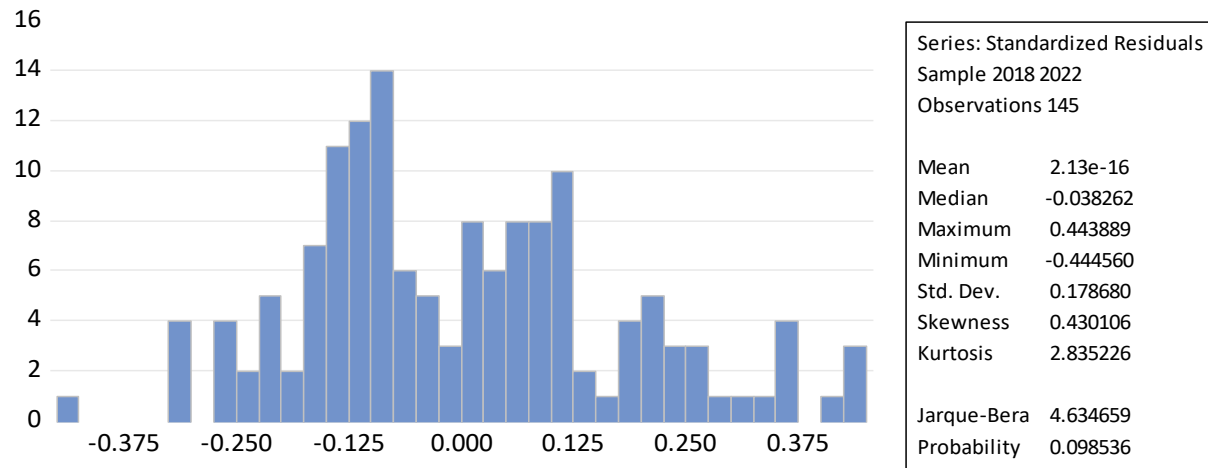
The board independence (BI) has a mean value of 0.222 and a standard deviation value of 0.146. The mean value indicates that, on average, 22.2% of the board members of the Nigerian quoted manufacturing firms are independent non-executive directors. The standard deviation reveals that the variable is 14.6% from the average, showing a low dispersion of the variable from the average. The maximum number of independent non-executive directors in these

Nigerian quoted manufacturing companies is 75% of the board members, while the lowest number of these independent directors is 0.

The board financial expertise (BFE) has a mean value of 0.409 and a standard deviation value of 0.173. The mean value indicates that, on average, 40.9% of the board members of Nigerian quoted manufacturing companies have a background in accounting or finance. The standard deviation reveals that the variable is 17.3% from the average, showing a low dispersion of the variable from the mean. The minimum and maximum values of the board financial expertise are 7.1% and 75%, respectively. These values indicate that the highest number of board members with financial expertise is 75% of the board size, while the lowest number with an accounting and finance background is 7.1%.

The board gender diversity (BGD) has a mean value of 0.250 and a standard deviation value of 0.141. The mean value shows that, on average, 25% of the members of the board of quoted oil and gas, consumer goods, and industrial goods firms in Nigeria are female directors. The standard deviation indicates that the variable is 14.1% from the average, showing a low dispersion of the variable from the mean. The maximum and minimum values of board gender diversity are 66.7% and 0%, respectively. These values indicate the highest number of females on the board of these companies is 66.7% of the board size, while some companies have 0 female directors.

Lastly, the control variable, firm profitability (ROA), has a mean value of 0.049 and a standard deviation value of 0.090. The mean value indicates that, on average, the annual returns on total assets of quoted consumer goods, oil and gas, and industrial goods firms in Nigeria is 4.9%. The standard deviation value reveals that the variable is 9% from the average, revealing a low dispersion of the variable from the mean value. The maximum and minimum annual returns on total assets of these Nigerian quoted manufacturing companies are 36.6% and -27.4%, respectively.

Figure 2: Test of Normality

Source: Author's Computation (EViews 12 Output, 2024)

Figure 2 presents the normality test's result. The Jarque-Bera test statistic is 4.6347 with an insignificant probability value of approximately 0.0985 (9.85%), greater than the 5% level of significance, suggesting that the residuals exhibit a normal distribution. As also shown in the histogram, the standardized residuals distribution resembles a bell-shaped curve, with most residuals clustered around the center/mean. Therefore, the data and residuals satisfy the normal distribution assumption.

4.2. Multicollinearity Test

Another assumption of the Ordinary Least Squares model is the absence of strong association between the explanatory variables (Oluwatoyin et al., 2021). The multicollinearity test was conducted on the data using the Variance Inflation Factor (VIF) and Pearson correlation coefficient. The correlation coefficient reveals the strength of the association between the explanatory variables, while the VIF assesses if the variables are multi-correlated.

Table III: Pearson's Correlation Matrix

	SRQ	BS	BI	BGD	BFE	ROA
SRQ	1.000					
BS	0.475	1.000				
BI	0.396	0.071	1.000			
BGD	0.166	-0.315	0.294	1.000		
BFE	0.156	-0.182	0.248	0.307	1.000	

ROA	0.169	-0.110	0.177	0.223	0.200	1.000
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Source: Author's Computation (EViews 12 Output, 2024)

Table III reveals that the greatest correlation coefficient between the explanatory variables is 0.307, indicating a weak positive relationship between board financial expertise (BFE) and board gender diversity (BGD). On the other hand, the lowest coefficient is -0.315, signifying a weak negative association between board size (BS) and board gender diversity (BGD). Thus, the correlation coefficients between the explanatory variables are all less than the acceptable value of 0.80, signifying the absence of multicollinearity in the data used for this study (Razaq et al., 2023; Saidu et al., 2020).

Table IV: Variance Inflation Factor (VIF)

Variable	Variance Inflation Factor (VIF)
BS	1.170
BI	1.189
BFE	1.174
BGD	1.320
ROA	1.087

Source: Author's Computation (EViews 12 Output, 2024)

Furthermore, as shown in Table IV above, the VIF is lower than the acceptable value of ten (10) for each explanatory variable, indicating the absence of multicollinearity in the explanatory variables (Razaq et al., 2023; Oyekale, Olaoye, & Nwaobia, 2022; Oluwatoyin et al., 2021). The finding further affirmed the result of the Pearson correlation coefficient.

Hausman Specification Test

Table V: Hausman Specification Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	21.781345	5	0.0006

Source: Author's Computation (EViews 12 Output, 2024)

As shown in Table V above, the result displays a significant probability value of 0.0006 (0.06%) at a 5% significance level. This suggests that the fixed effect model is more appropriate. Thus, the study adopted a fixed effect regression model

4.3. Test of Hypotheses

Table VI provides the fixed effect panel regression results to provide evidence to test the hypotheses of whether each variable of corporate governance mechanisms significantly influences the sustainability reporting quality (SRQ) of Nigerian quoted manufacturing companies.

Table VI: Fixed Effect Panel Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c	-0.542106	0.194696	-2.784378	0.0063
LBS	0.033116	0.081887	0.404413	0.6867
BI	-0.144167	0.117147	-1.230652	0.2211
LBFE	0.029439	0.042434	0.693765	0.4893
BGD	0.332208	0.122820	2.704830	0.0079
ROA	-0.063089	0.148963	-0.423524	0.6727
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.894163	Mean dependent var	-0.450348	
Adjusted R-squared	0.862698	S.D. dependent var	0.240938	
S.E. of regression	0.089278	Alaike info criterion	-1.792362	
Sum squared resid	0.884731	Schwarz criterion	-1.094370	
Log likelihood	163.9463	Hannan-Quinn criterion	-1.508744	
F-statistic	28.41768	Durbin-Watson stat	1.413331	
Prob(F-statistic)	0.000000			

Source: Author's Computation (EViews 12 Output, 2024)

4.4. Board Size and Sustainability Reporting Quality

The study discovered no statistically significant association between board size and sustainability reporting quality of quoted manufacturing firms in oil and gas, consumer goods, and industrial goods industries in Nigeria, as indicated by the p-value of 0.6867. The implication is that the number of members on the board may not necessarily correlate with high-quality sustainability reporting in these firms. The finding is consistent with the study of Adeniyi and Fadipe (2018), which found that board size has no significant association with the level of sustainability reporting in Nigerian quoted beverage manufacturing firms. However, the finding is contradicts Razaq et al. (2023), which asserts that board size has a significant and positive effect on the sustainability reporting of Nigerian quoted non-financial companies. Similarly, Oluwatoyin et al. (2021) discovered board size significantly and positively affects the sustainability reporting of Nigerian quoted non-financial companies.

4.5. Board Independence and Sustainability Reporting Quality

The study found no statistically significant relationship between board independence and sustainability reporting quality of quoted manufacturing firms in oil and gas, consumer goods, and industrial goods sectors in Nigeria, as indicated by the p-value of 0.2211. The implication is that the number of independent non-executive directors on the board of these companies may not necessarily translate into quality sustainability reporting. The finding supports the works of Razaq et al. (2023), which discovered that board independence does not significantly influence the sustainability reporting of Nigerian quoted non-financial firms. However, the finding disagrees with the study of Oluwatoyin et al. (2021), which discovered that board independence significantly and positively impacts the sustainability reporting of quoted non-financial companies in Nigeria. Adeniyi and Fadipe (2018) also found that board independence significantly influences the sustainability reporting level of quoted beverage manufacturing firms in Nigeria.

4.6. Board Financial Expertise and Sustainability Reporting Quality

The study discovered no statistically significant relationship between board financial expertise and sustainability reporting quality of Nigerian manufacturing companies in oil and gas, consumer goods, and industrial goods industries, as indicated by the p-value of 0.4893. The implication is that the accounting or finance background of the board members may not necessarily translate into quality sustainability reporting in these companies. The finding supports the study of Saidu et al. (2020), which found that the educational level diversity of directors has no significant influence on the sustainability reporting of industrial goods companies in Nigeria. Similarly, Umukoro et al. (2019) demonstrated that board expertise does not significantly impact sustainability disclosures of Nigerian banks. However, the finding contrasts the study of Razaq et al. (2023), which found evidence that board financial expertise has a significant positive effect on the sustainability reporting of Nigerian quoted non-financial companies. Erin et al. (2021) also discovered that board expertise is significantly associated with sustainability reporting of Nigerian quoted firms.

4.7. Board Gender Diversity and Sustainability Reporting Quality

The study discovered a significant positive relationship between board gender diversity and sustainability reporting quality of Nigerian quoted manufacturing companies in oil and gas, consumer goods, and industrial goods industries. With a coefficient of 0.332208 and a p-value of 0.0079, the study supports the hypothesis that the presence of females on the board of these quoted manufacturing companies enhances sustainability reporting quality. The finding agrees with the study of Oluwatoyin et al. (2021), which discovered that board gender diversity significantly and positively influences the sustainability reporting of Nigerian quoted non-financial companies, as women are more selfless and ethical in their duties.

However, the finding contrasts the study by Razaq et al. (2023), which found evidence that board gender diversity has no significant impact on the sustainability reporting of Nigerian quoted non-financial companies. Similarly, Adeniyi and Fadipe (2018) found that board gender diversity does not significantly impact the level of sustainability reporting of quoted beverage manufacturing companies in Nigeria.

Furthermore, the adjusted R-squared value of 0.862698 reveals that the board characteristics and the control variable explain 86.3% of the variation in sustainability reporting quality of these firms. It suggests that other factors not captured in the model account for 13.7% of the variation but are adequately captured by the error term. The F-Statistic is 28.41768 with a p-value of 0.0000, which is less than the 5% significance level, signifying that the model is fit. It shows that the explanatory variables have a combined influence on the sustainability reporting quality of Nigerian quoted manufacturing companies. The Durbin-Watson statistic of 1.413331, which is close to the acceptance range of 1.5% to 2.5%, indicates that the model is not significantly suffering from the serial correlation problem.

5. Conclusion and Recommendations

The study evaluated the impact of corporate governance mechanisms (proxied with board attributes) on the sustainability reporting quality of Nigerian quoted oil and gas, consumer goods, and industrial goods companies. Only the existence of female directors in these manufacturing companies significantly affects the sustainability reporting quality. In contrast,

other board attributes have no significant influence on the sustainability disclosures of these companies. Nonetheless, the reports of these companies are descriptive. They mostly contain qualitative factors and not quantitative measures/metrics. Hence, there were low disclosures of environmental aspects of sustainability disclosures, especially in the oil & gas and industrial goods industries. Hence, the study concludes that board gender diversity will lead to higher quality of sustainability reporting.

The study therefore recommends that Nigerian oil and gas, consumer goods, and industrial goods companies should increase the number of female directors to enhance the quality of their sustainability disclosures. Also, these companies should also form a sustainability committee to implement measures to increase the board's knowledge of sustainable development and ensure that management makes sustainable business decisions. In addition, The Security and Exchange Commission (SEC) should monitor these companies to ensure they implement the Nigerian Stock Exchange's new sustainability reporting guidelines. Finally, institutions, such as professional accounting firms, should enhance their support for sustainability development by guiding firms in implementing the standards and guidelines on sustainability reporting.

The study is based on 43 manufacturing firms listed on Nigeria Exchange Group (NGX). Future studies may need to extend the scope to other industries, which activities impacts the environment.

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