Ownership Concentration and Board Gender Diversity on Environmental Disclosure of Listed Manufacturing Firms in Nigeria

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ABSTRACT

In contemporary times the environment is more threatened now than ever before as evidenced by increased pollution, emission, degradation, deforestation, and other climate change effects heading to high mortality rate as a relation to deadly diseases across the globe. Therefore, the study examined effect ownership concentration and board gender diversity on environmental disclosure of listed manufacturing firm in Nigeria covering the period of ten (10) years 2013-2022. The study adopted ex-post facto research design and secondary data was used for analysis which was obtained from Nigerian Exchange Group. Panel regression analysis technique was used to analyse the research data. The result revealed that ownership concentration has a positive and significant effect on environmental disclosure of manufacturing firm in Nigeria while board gender diversity has a negative significant effect on environmental disclosure of manufacturing firm in Nigeria. The study therefore concludes that ownership concentration and board gender diversity has significant influence on environmental disclosure of manufacturing firm in Nigeria. The study recommend that Management of manufacturing firm should maintain ownership concentration in the firm because it enhance the environmental disclosure of manufacturing firms in Nigeria

Keywords: Ownership Concentration, Board Gender Diversity, Environmental Disclosure, Firm Age, Manufacturing Firms.

INTRODUCTION

One of the key resources of a nation is the quality of its environment. However, due to the negative operations of organizations there has been a major concern on the climatic conditions, ozone layers and human lives. Khadijat *et al* (2022), asserts that environmental issues have become major topics because of how it negatively affects the stability of the ecosystem. The world is adversely affected as a result of careless management by business organizations of what the earth is blessed with (Onyali et al 2015). Accounting and management concerns related to environmental and social impacts, legislation and controls, protection, environmentally sustainable, and commercially viable energy production and supply are all covered by environmental reporting (Nobance & Ellili, 2016). Despite the increased focus on environmental disclosure in general, environmental disclosure continues to be voluntary on a global scale, with substantial variations in the quality and quantity of environmental data reported by businesses from different sectors and countries (Mohamed et al, 2021). The investing community wants to know which firms they can trust and, more importantly, which they should avoid based on their environmental responsiveness (Emeka-Nwokeji & Osisioma, 2019). In this century of global financial and economic crunch, increased sharp business practices, global warming, ozone depletion, and water scarcity, reporting to provide users with broad data about all firms' activities and uncertainties that they need to make correct judgments about a

company is in the public interest. Thus, apparent resurging pandemics, economic recession and corporate scandals have led to the call for firms to focus not only on long term relationships which deal with checks and balances, incentives for managers and communications between management and investors but also on the transactional relationship, which involves dealing with disclosure and authority (Orazalin, 2019). Emphasis is on providing a sustainable conducive environment for the human and corporate organisation to operate efficiently. The harsh economic situation in the country and uncertainty that followed the recent pandemic emphasized the need to regain the confidence of users of financial information.

Consequently, firms across the globe have been providing information on social performance. This is in response to the calls for firms to supplement regulatory efforts to lessen information asymmetry between company management and outside investors by disclosing relevant information in order to improve stakeholders' reporting (Bananuka *et al* 2019; Kaptein & Van Tulder, 2017). Thus, criticism of traditional reporting framework created opportunities for new reporting models and institutional innovations, causing growing numbers of organizations to disclose information on how their entities interact with local communities, employee and other stakeholders' (Emeka-Nwokeji *et al,* 2021). Most firms in developed economies and in some developing economies like South Africa, United Kingdom now integrate these nonfinancial disclosures fully, rather than just including a small section containing additional information.

Corporate governance practices are essential ingredients in achieving and maintaining public trust and confidence in the corporate firm. Corporate governance has attracted a good deal of public interest in recent years because of its apparent importance to the economic health of corporations and the society in general. Good corporate governance ensures accountability, transparency and fairness in reporting and it is not only concerned with corporate efficiency, it relates to a much wider range of company strategies and life cycle development. Sound corporate governance practices lead the economy towards the achievement of higher returns to the owners of the business and provide sources for capital increased investment by shareholders. The economic environmental challenges confronting the world at large and Nigeria in particular are enormous. Our environment is more threatened now than ever before as evidenced increased pollution, emission, degradation, deforestation and other climate change effect heading to high mortality rate as a relation of deadly diseases across globe (Abosede & Oluwatosin, 2021). Nigeria as a developing nation, blessed with natural resources and good climatic atmosphere, has strongly been affected negatively by the operations of manufacturing companies over the years (Uwuigbe & Jimoh, 2012).

H_{o1}: Ownership concentration has no significant effect on environmental disclosure of listed manufacturing firms in Nigeria

H_{o2}: Board gender diversity has no significant effect on environmental disclosure of listed manufacturing firms in Nigeria

LITERATURE REVIEW

Conceptual Framework

Ownership Concentration

Ownership concentration is a measure of the existence of large shareholders in a firm. Zhang (2006) defined Ownership concentration as stockholders ownership proportion. It can also represent the concentration degree of ownership in firms, which means large shareholders proportion in a firm. Zhang (2006) further reiterated that there are three types of ownership structure. First, absolute concentration of ownership, that is, there is only one stockholder who has the absolute power to control the firm and usually keep 50% ownership; Second, absolutely dispersed ownership, implying that there are numerous stockholders; there is complete separation of ownership and control when the share ownership is highly concentrated than

individual ownership as they keeps share below 10%. Third, where there coexists relative concentration of ownership and some large shareholders in a firm. However, in the firm, which has relative concentration of ownership and some large shareholders, ownership structure can almost decide the composition of board. It is always assumed that only shareholders who hold large share may closely monitor the management of board. Dispersed shareholders have little or no incentive to monitor the management and may have no power to decide for the board.

Ownership concentration refers to an ownership fraction or stake in a firm that is held by shareholders with the controlling interest or with large stake. Ownership concentration affords the shareholders the motivation and ability to monitor and control management decisions. Therefore, concentrated shareholders use their large stake in reducing conflicts between managers and the organization by being more proactive in monitoring and protecting their investments

Board Gender Diversity

Gender diversity is always used to explain the proportion of men and women who occupy board member position. To measure gender diversity on corporate boards, studies often use the percentage of women holding corporate board seats and the percentage of companies with at least one woman on their board (Amahalu, Okoye, Obi & Iliemena, 2019). One benefit of having female directors on the board is a greater diversity of viewpoints, which is purported to improve the quality of board deliberations, especially when complex issues are involved, because different perspectives can increase the amount of information available. Board Gender Diversity is used to describe the proportion of board members that are female. Tapver *et al* (2020) opined that the presence of women on the board contribute to greater orientation towards transparency as women tend to cater for the concern of all stakeholders

Environmental Disclosure

Environmental disclosure is disclosure made by the company to the stakeholders in form of reports on environmental activities undertaken by the company (Setyawan & Kamilla, 2015). A company that seeks continuity into perpetuity and good performance must consider its stakeholder by being legitimate company. This can be achieved through proper care and disclosure of that environmental information to the stakeholders. Environmental disclosure is the strategic way taken by the management of an organization in order to capture community perception towards their operations by making environmental data available on company's annual report. It is strategic because environmental disclosure in most countries is on voluntary basis, it is the decision of a company to disclose information that relate to environment. Any company that seeks to achieve good performance and sustainability should not ignore the benefits to engage in social approach (Alkhili & Ansi, 2012). Oba and Fodio (2012) posit disclosure on environmental issues can be considered as element of good corporate governance.

Environmental Reporting Index

Environmental reporting index is a concept that refers to the measurement and evaluation of the quality and comprehensiveness of environmental reporting by organizations, it aims to assess and rank the level of transparency and disclosure of environmental information in corporate sustainability reports, annual reports, and other relevant publications (GRI, 2021). According to Sustainability Accounting Standards Board (2021), the purpose of an environmental reporting index is to promote accountability, transparency, and sustainable practices by encouraging organizations to disclose their environmental impacts, risks, and performance. By providing a standardized framework for evaluating and comparing environmental reporting practices, it enables stakeholders such as investors, regulators, and the public to make informed decisions

and assessments about an organization's environmental practices and commitments.

Firm Age

Firm age is defined as the number of years of incorporation of the company (Shumway, 2001). In line with legitimacy theory, for a company to carry out business activities in a community depends on the acceptance of the society where they operate. As is obvious, businesses can be impacted by society and also have an impact on society. Hence, legitimacy theory is deemed to be an important resource determining organizational survival (Deegan, 2002). Based on this, aged firms with longer societal existence may have taken relatively more legitimacy and may have gained more goodwill and involvement of societal responsibility than newly incorporated firms. Generally, aged firms disclose more information than new ones. In other words, companies quoted on the stock exchange have enough experiences to disclose vital information considering the reaction of market for appropriate disclosure. Some studies have reported that level of disclosure of quoted companies significantly influence their capital market listing status. In addition, previous research works support the significant relationship between age of firm and environmental information disclosure (Roberts, 1992; Alsaeed, 2006; Yang, 2009). In line with the above discussion, it is expected that the age of a firm on the stock exchange may influence the disclosure of environmental information. In this study, firm age will be considered as company listing age at the Nigerian Exchange Group (NGX).

Empirical Review

Aderemi *et al* (2021), examine effect of corporate governance mechanism on sustainable growth of manufacturing firms in Nigeria. The population of the study consists of listed manufacturing companies, and a sample size of 30 manufacturing firms was selected using a purposive sampling technique based on convenience, covering a time period of five financial years (2011 to 2020). A regression method was used to analyse the data collected through the secondary sources. The result showed that board size, board composition, ownership concentration, board independence, and firm size had a positive relationship with corporate sustainable growth, while leverage had a negative relationship with corporate sustainable growth. Thus, the study showed that corporate governance exercises a positive influence on corporate sustainable growth. The study recommended that listed manufacturing firms put in place a larger board structure that encompasses people of different backgrounds, skills, and experience in order to help the companies move forward during difficult times and a good board structure that makes provision for the presence of independent directors needs to be maintained to checkmate the management so that all the decisions taken by the management will be the ones to achieve the company's ultimate goal. The period of this study is not too current and the results may not be applicable to the Nigerian environment

ThankGod *et al* (2021), investigated the relationship between board characteristics and environmental disclosure of quoted oil and gas firms in Nigeria: The moderating role of firm size with its specific objectives such as to determine the relationship between board independence and environmental disclosure. The research design adopted was ex-post facto design while, the population and the sample size for the study is the 12 quoted oil and gas companies in the Nigeria. Secondary data were used in this study and data were analyzed using both descriptive, inferential statistics and Pearson Correlation Coefficient Statistical tool. The findings of the study reveal that board independence has a negative relationship with environmental disclosure. The findings of the study further indicate that firm size significantly moderates the relationship between board characteristics and environmental disclosure. The study recommended that independence should be assessed by weighing all the relevant factors that may compromise independence while the classification of directors as independent or otherwise in the integrated report should be done on the basis of assessment. The study result cannot be generalize for ownership structure of manufacturing firm in Nigeria because it focuses on oil and gas firm in Nigeria.

Paul *et al* (2019), evaluates the relationship between environmental sustainability disclosures and board characteristics (board independence and qualifications) at the Nairobi Securities Exchange listed firms, guided by trinity theory. It employed a correlational survey research design covering the period of five (5) years (2013 – 2017). The population was 65 firms listed, with a sample size of 56 firms. The study utilised firms' annual reports, stand-alone reports, and website for secondary data. Pearson's correlation, Ordinary Least Square regression model and Environmental Disclosure Index were used in analysis. The findings indicated that board independence and board qualifications had a positive and significant effect on environmental sustainability disclosure. In conclusion, the study established that high degree of non-executive directors led to more disclosure of ecological activities similarly, financially equipped directors led to disclosure of ecological information, though not to a great extent compared with board independence. It recommends environmental management skills to be part of board qualifications, more non-executive directors on board, and establishment of corporate environmental committee to spearhead ecological issues. Future studies need to focus more on directors qualifications such as directors' experience, age, nationality and environmental knowledge. The scope and methodology are limited to 5 years and the data are obtained were too old to have meaningful bearing to current reality

Ofe and Ashinedu (2019), examine the relationship between corporate governance and social sustainability reporting in quoted firms in Nigeria. The ex-post facto research design was used for this study. The data set was sourced from the annual reports of selected quoted companies on the Nigerian stock exchange. The balanced panel data regression technique was used in this study. The corporate governance attributes which are the independent variables were CEO tenure, executive compensation, Board gender diversity, Board size and firm size (as control variable). Correlation results show that there is a positive association between the dependent variable of social sustainability reporting and all the independent variables of interest except for the variable of executive compensation. It was discovered that executive compensation and CEO tenure has no significant relationship with corporate social sustainability reporting. While Board gender diversity and board size had a significant relationship with corporate social responsibility reporting. It was recommended that the representation and participation of women on boards should be sustained and improved to promote social sustainability reporting for the firms and that quoted companies should keep up with the recommended board size in order to maintain a sizeable performance in terms of social sustainability reporting.

Sanusi and Sanusi (2019), examine environmental sustainability reporting practices among quoted manufacturing firms in Nigeria and its effects on their financial performances. The study employs survey research using panel data (data of different firms from 2010 to 2015). This study adopts content analysis, descriptive, and inferential statistics as methods of analysis. The evidence provided in this study, based on the empirical findings, shows a fair representation of the popularity of environmental sustainability reporting among manufacturing firms in Nigeria, though majority of the manufacturing firms reported very low levels of environmental disclosures. Environmental sustainability reporting indices have positive effects on the measures of financial performance (earning per share, revenue growth, and return on assets). The study concludes that management of companies should understand that improving environmental sustainability practices is as important as improving financial performance. Management should, therefore, build environmental sustainability practices and reporting into their policies. Also, shareholders should know that environmental issues affecting local communities can affect the social contract between the community and organizations, thereby affecting survival. This study recommends that shareholders should compel the management of their companies to have well-structured environmental practices. The scope and methodology are limited to 6 years and the data are obtained were too old to have meaningful bearing to current reality

Ohiani *et al* (2018) examined effect of ownership structure on financial performance of listed insurance

firms in Nigeria. Data was collected from the annual reports of 28 insurance firms listed in the Nigerian Stock Exchange for the periods of 2011 to 2016. The ex-post facto was employed by the study to examine the effect of ownership structure on financial performance of listed insurance firms in Nigeria. In addition to the descriptive statistics and correlation, multiple regression technique through panel data methodology was applied for model estimation. Data were subjected to pooled General Least Square, Fixed Effects, and Random Effects regression model to test the hypotheses of the study. Ownership structure proxied by managerial ownership, institutional ownership, and ownership concentration were adopted as independent variables. Firm financial performance as the dependent variables was proxied by Book value per Share. This study found ownership structure having significant positive effect on financial performance of the listed insurance firms except concentrated ownership with negative effect. However, in respect of size and growth of the firms, which form the control variables of the study, there were mixed evidence of their effects on financial performance. The study recommends that in order to enhance the financial performance, insurance firms in Nigeria should increase management equity holding in the firms as this can stimulate the managers to maximize their efficiency and create more wealth for stakeholders. The firm used is insurance companies which cannot be generalize for manufacturing firm in Nigeria.

Ozordi *et al* (2018), examine impact of corporate diversity on corporate social environmental disclosure of registered manufacturing firms in Nigeria. The study considered both industrial and consumer goods firms, respectively, consisting a total of 37 firms. A total of 17 firms was selected for this study using purposive random sampling spanning the period 2012–2016. While the content analysis technique was engaged to ascertain the extent of corporate social environmental disclosure, the study adopted the following variables (board size, foreign directors, and gender) as measures for corporate diversity. Findings from the study revealed that board size, foreign directors and gender had a significant positive influence on the extent of corporate social environmental disclosure of the selected firms. On the other hand, the presence of an independent director and non-executive director had an insignificant positive influence on corporate social environmental disclosure. Thus, the study recommends that a large and diverse board with experience, expertise and women involvement would enhance mandatory environmental audit and environmental grievance mechanism report, and if necessary, an ecological committee would be established, and also community leader on the board would contribute enormously to the going concern of the business. The study are limited to industrial goods and consumer firm and the finding cannot be generalize for all manufacturing firm.

Nera (2018), examine the effect of corporate governance on the company's performance with sustainability reporting as an intervening variable in Indonesia. The population of this study is a manufacturing company listed on the Indonesian Stock Exchange for the period 2010-2015. The sample selection used purposive sampling method and resulted in 102 manufacturing firms listed on the Indonesia Stock Exchange. The results show that: (1) Corporate governance with audit committee as a proxy affects sustainability reporting of economic and environmental dimensions, and does not affect sustainability reporting of the social dimension. Furthermore, institutional ownership, managerial ownership and independent board of commissioners do not affect sustainability reporting of economic, environmental, and social dimensions. (2) Corporate governance with audit committee as a proxy affects the company's performance, while institutional ownership, managerial ownership and independent board of commissioners do not affect the company's performance (3) Sustainability reporting of economic, environmental and social dimensions do not affect the company's performance. The contribution of this study provides the theoretical addition of knowledge as well as a completion the previous studies. The findings are expected to help regulators formulate government policy decisions that promote corporate governance and sustainability reporting on the company's performance, thereby making the entity more responsive to changes in sustainability activities. Similarly, the results of research provide input for stakeholders as a consideration in decision making. The study is based on Indonesia data and Nigeria data can provide evidence that can make one generalize findings across countries.

Theoretical Framework

Agency Theory

Agency theory is defined by (Jensen and Meckling 1976) as the theory that addresses the relationship where in a contract the principal engages another person called the agent to perform some service on their behalf which involves delegating some decision making authority to the agent. Agency problem occurs when the objectives of the principal and agent contradict and it is difficult and costly for the principal to detect what the agent is actually doing. Also, due to this separation of ownership, managers usually focus on their own personal gains and interests and forget about the shareholder's interest which ultimately leads to the agency problem as well as incurring costs that the owners bare at the end, and this is referred to the agency cost. It is added by (Jensen & Meckling 1976) that these contradictions are because of the inability of the shareholders to monitor the actions and the performance of the management.

Stakeholders Theory

Stakeholder theory was developed by Freeman (1984) who argued that organizations are accountable to the shareholders as well as other stakeholders which in contrary to the traditional view that shareholders were the only stakeholders of the firm. Stakeholders are groups of individuals who may benefit or be harmed by activities of the firm. These stakeholders have contracting interest which have to be taken into account when releasing the audit reports. This is important because their varying interests can affect the firm's ability to achieve its objectives (Freeman, 1984). The stakeholder theory is defined by (Freeman 1984) as any group or individual who can influence or is influenced by the achievement of the organization's objectives. So (Carroll 1993) add that the term stakeholder may, therefore, include a large group of participants, in fact anyone who has a direct or indirect stake in the business. Examples for direct stakeholders are the shareholders, employees, investors, customers and suppliers, all whose interests are aligned with the interests of the firm, on the other side, the indirect stakeholders are those who are indirectly affected by the functions of the firm and an example for the is the government (Kiel & Nicholson 2003). Another definition for the stakeholder theory is that "the Stakeholder theory defines organizations as multilateral agreements between the enterprise and its multiple stakeholders". The stakeholders can be divided into two groups, the internal group consists of the employees, managers and the owners while the external group includes customers, suppliers and the community, the relation between the firm and those stakeholders group is controlled by different types of rules (Clarke 2004)

METHODOLOGY

This study adopted the ex post facto research design and secondary data for the study. Population of the study consists of fifty five (55) listed manufacturing firms operating on the Nigeria, Nigeria Exchange Group (NGX) as at 31st December 2022. The sample size is forty (40) and Judgemental sampling techniques was adopted. Data required for this study were obtained from audited financial statements and annual reports of the listed manufacturing firms in Nigeria 10 years (2013-2022). The inferential analyses also involve the application of the appropriate statistical technique of Panel Regression Analysis: this is due to the nature of the data. The study adapting the model of Ozordi *et al* (2018).

The Panel regression model

$$ER = \beta_0 + \beta_1 OC_{it} + \beta_2 BGD_{it} + \beta_3 FA_{it} + \epsilon_{it} \quad \text{.......... (1)}$$

Where:

β_0 = The autonomous parameter estimate (Intercept or constant term)

$\beta_1 - \beta_3$ = Parameter coefficient of Corporate Governance

ER = Environmental Reportings

OC = Ownership Concentration

BGD = Board Gender Diversity

FA = Firm Age

ϵ_{it} = Stochastic Error term

Study Variables and their Measurement

Variable Acronym	**Variable Name**	**Variable types**	**Measurement**	**Source**
ER	Environmental Reporting	Dependent	GRI 300 (Actual environmental disclosure/Expected environmental disclosure)	Global Reporting Initiative (2021)
OC	Ownership Concentration	Independent	The proportion of shares owned by the largest shareholders to total number of shares issued.	Aderemi *et al* (2021)
BGD	Board Gender Diversity	Independent	Proportion of female directors to the total number of directors on board	Abazu & Pius (2021)
FA	Firm Age	Control	Company listing age at the Nigerian Exchange Group	Uyagu *et al* (2017)

Source: Author's Compilation, (2024)

RESULT AND DISCUSSION

Descriptive Statistics

Descriptive statistics gives a presentation of the mean, maximum and minimum values of variables applied together with their standard deviations obtainable.

Table 4.1: Descriptive Statistics Result

	ER	OC	BGD	FA
Mean	0.384318	0.026825	0.021525	36.27000
Median	0.333333	0.030000	0.020000	37.00000
Maximum	1.000000	0.050000	0.050000	80.00000
Minimum	0.083333	0.010000	0.010000	2.000000
Std. Dev.	0.211401	0.011067	0.005875	18.73552
Skewness	0.772469	0.183783	0.848923	0.125286

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Kurtosis	2.764074	2.323956	5.859160	2.162435
Jarque-Bera	40.70823	9.868999	184.2913	12.73837
Probability	0.000000	0.007194	0.000000	0.001714
Sum	153.7270	10.73000	8.610000	14508.00
Sum Sq. Dev.	17.83153	0.048868	0.013770	140056.8
Observations	400	400	400	400

Source: E-View 12 Output, (2024)

Table 4.1 presents the descriptive statistics effect of ownership concentration and board gender diversity on environmental reporting of listed manufacturing firms in Nigeria during the period of 2013 to 2022. The table shows that environmental reporting (ER) as a measure of environmental disclosure has a mean of 0.3843, with a standard deviation of 0.21140 as well as a minimum value of 0.08333 and maximum value of 1.0000 respectively. Given that the range between the minimum and maximum is not quite wide, it implies a stable environmental disclosure as the standard deviation indicated that there is no much slightly wide dispersion of the data from the mean value. For the other measure of ownership concentration and board gender diversity shows a mean of value of 0.02682 and 0.02152 with standard deviation of 0.01106, 0.00587 and a minimum and maximum value of 0.0100, 0.01000, 0.05000 and 0.05000 respectively. This implies ownership concentration and board gender diversity witnessed a marginal increase during the study period, as the standard deviation is not so large compared to the mean, together with the low range between the minimum and maximum values. Firm age as control variable has a mean of 36.2700 with minimum value of 2.0000 and maximum value of 80.000.

Table 4.2: Correlation Matrix

The correlation matrix table presents correlation relationship between dependent and independent variables and the correlation among the independent variables themselves.

Covariance Analysis: Ordinary				
Date: 01/03/24 Time: 13:48				
Sample: 2013 2022				
Included observations: 400				
Correlation				
Probability	ER	OC	BGD	FA
ER	1.000000			
	—–			
OC	-0.069682	1.000000		
	0.1642	—–		
BGD	0.068776	-0.048698	1.000000	
	0.1698	0.3313	—–	
FA	-0.021202	0.170952	-0.022650	1.000000
	0.6725	0.0006	0.6515	—–

Source: E-View 12 Output, (2024)

In table 4.2 correlation analysis, which is used to quantify the association between two continuous variables. In correlation analysis, we estimate a sample correlation coefficient, more specifically the Pearson Product

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Moment correlation coefficient. The result presented above confirms that ownership concentration and board gender diversity has a negative and positive correlation which are -0.06968 and 0.06877 with environmental reporting while firm age as control variable has a negative correlation with environmental reporting at value of -0.02120.

Multicollinearity Test (VIF)

The Multicollinearity test was carried out to check if there is strong correlation among the independent variables that may produce misleading result.

Table 4.3: Multicollinearity Test (VIF)

Variance Inflation Factors			
Date: 01/03/24 Time: 13:49			
Sample: 2013 2022			
Included observations: 400			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.002658	23.82946	NA
OC	0.942396	7.112174	1.032242
BGD	3.248413	14.49668	1.002590
FA	3.28E-07	4.901331	1.030323

Source: E-View 12 Output (2024)

***Decision rule**: Centred VIF of less than 10 is an indication of absence of multi-collinearity, while the centred VIF of more than 10 is an indication of presence of multi-collinearity. As stated above, the decision rule for the multicollinearity test using the variance inflation factor is that Centred VIF of less than 10 shows the absence of multi-collinearity, while the centred VIF of more than 10 is an indication of presence of multi-collinearity. Table above clearly shows that there is absence of multicollinearity among the independent variables, given that all the independent variable (OC, BGD and FA) have a center VIF that is less than 10.

Heteroskedasticity Test

In order to validate the robustness of the estimates, the Heteroskedasticity test was conducted as a diagnostic check. Heteroskedasticity happens when the standard errors of a variable, monitored over a specific amount of time, are non-constant.

Table 4.4: Heteroskedasticity Test

Panel Cross-section Heteroskedasticity LR Test				
Null hypothesis: Residuals are homoscedastic				
Equation: UNTITLED				
Specification: ER C OC BGD FA				
	Value	df	Probability	
Likelihood ratio	130.9308	40	0.0000	
LR test summary:				

	Value	df		
Restricted LogL	56.37485	396		
Unrestricted LogL	121.8403	396		

Source: E-View 12 Output, (2024).

Table 4.4 shows the results of the panel cross-section Heteroskedasticity regression test. The decision rule for the panel cross-section Heteroskedasticity test is stated thus:

***Decision Rule: At 5% level of Significance**

H_0: No conditional Heteroskedasticity (Residuals are homoskedastic)

H_1: There is conditional Heteroskedasticity

The null hypothesis of the test states that there is no Heteroskedasticity, while the alternate hypothesis states that there is Heteroskedasticity. The null hypothesis is to be accepted if the P value is greater than 5% level of significance. From the result in table 4.4 above with a ratio value of 130.9308 and a corresponding probability value of 0.0000 which is less than 5%, the study therefore posits that, there is reason to reject the null hypothesis, while the alternative hypothesis that states there is conditional Heteroskedasticity problem is accepted. Consequently, based on the diagnostic probability 0.0000 the null hypothesis is rejected, thus there is conditional heteroskedasticity, indicating that residuals are not homoskedastic and as such the samples does not give a true reflection of the population. This is corrected by logging dependent variable as independent variable to correct the present of heteroscedasticity

Hausman Test

The Hausman test is a test for model specification in panel data analysis and this test is employed to choose between fixed effects model and the random effects model. Due to the panel nature of the data set utilized in this study, both fixed effect and random effect regressions were run. Hausman specification test was then conducted to choose the preferred model between the fixed effect and the random effect regression models. The test basically checked if the error terms were correlated with the regressors. Thus, the decision rule for the Hausman specification test is stated thus; at 5% Level of significance.

Table 4.5: Hausman Test

Correlated Random Effects – Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.842048	3	0.1837

Source: E-View 12 Output, (2024)

The Result of Hausman test shows that chi-square statistics value is 4.84204 while the probability values of it is 0.1837. This implies that there is enough evidence to accept the null hypothesis which states that random effect is most appropriate for the Panel Regression analysis. It thus stands that error component model (Fixed effect) estimator is not most appropriate because the fixed effects are not well correlated with the regressors. Thus, the most consistent and efficient estimation for the study is the random effect cross-sectional model. Consequently, the result suggests that the random effect regression model is most

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appropriate for the sampled data because the Hausman test statistics as represented by corresponding probability value is greater than 5%.

Langranger Multiplier Test

The langranger multiplier test is a test for model specification in panel data analysis and this test is employed to choose between pooled effect model and the random effects model.

Table 4.6: Breusch-Pagan Langranger Multiplier Tests

Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in residuals			
Equation: Untitled			
Periods included: 10			
Cross-sections included: 40			
Total panel observations: 400			
Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations			
Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	1013.110	780	0.0000

Source: E-View 12 Output, (2023)

***Decision Rule: At 5% level of Significance**

H_0: Pooled Effect is more appropriate

H_1: Random Effect is more appropriate

Based on the probability value of the Breusch-Pagan Langranger Multiplier Test at 0.0000, the null hypothesis is rejected, thus random effect is most appropriate when compared to pooled effect.

Table 4.7: Panel Regression Result (Random Effect)

Dependent Variable: ER				
Method: Panel EGLS (Cross-section random effects)				
Date: 01/03/24 Time: 13:57				
Sample: 2013 2022				
Periods included: 10				
Cross-sections included: 40				
Total panel (balanced) observations: 400				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.786127	0.018880	41.63839	0.0000
OC	-0.299851	0.293004	-1.023366	0.0368
BGD	0.101016	0.547522	0.184497	0.8537
FA	-0.000399	0.000292	-1.367065	0.1724

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LOGER	0.342190	0.005820	58.79237	0.0000
	Effects Specification			
			S.D.	Rho
Cross-section random			0.030306	0.2181
Idiosyncratic random			0.057382	0.7819
	Weighted Statistics			
R-squared	0.894651	Mean dependent var		0.197425
Adjusted R-squared	0.893584	S.D. dependent var		0.179054
S.E. of regression	0.058410	Sum squared resid		1.347634
F-statistic	838.6062	Durbin-Watson stat		1.691275
Prob(F-statistic)	0.000000			

Source: E-View 12 Output, (2024)

This study examined effect of ownership concentration and board gender diversity on environmental disclosure of listed manufacturing firms in Nigeria. From table 4.7 above, the coefficient of multiple determinations (R^2) is 0.89 and in line with the panel nature of the data used in this study, the regression model shows that the range of values between adjusted R^2 and R^2 falls between 89%, and 89% respectively. This indicates that about 89% of the total variations in environmental reporting (ER) is explained by the variations in the independent variables (OC, BGD and FA), while the remaining 11% of the variation in the model is captured by the error term, which further indicates that the line of best fit is highly fitted. The panel regression result for the sampled manufacturing firm showed that there is a positive relationship between ownership concentration and environmental reporting with a corresponding positive probability value of 0.0368 which is less than 5%. There is negative relationship between board gender diversity with probability value of 0.8537 which is greater than 5%. However, when taken collectively, the regressors (OC and BGD) against the regressed (ER), the value of F-statistic is 838.6062 and the value of the probability of F-statistic is 0.00000. This result implies that the overall regression is both positive and statistically significant at 5%.

Discussion of Findings

This study examines effect of ownership concentration and board gender diversity on environmental disclosure of listed manufacturing firms in Nigeria. The findings of this study is on the basis of formulated hypotheses, models and analysis carried out. This study found that generally, ownership concentration positive significant effect on environmental reporting of listed manufacturing firm in Nigeria while board gender diversity have a negative effect on environmental reporting and the findings from this study are compared with that of previous studies.

Firstly, assess effect of ownership concentration on environmental disclosure of listed manufacturing firm in Nigeria revealed that a positive have significant on environmental reporting of listed manufacturing firm in Nigeria, The findings do agree with the findings of Olayinka (2021) who documented evidence of a positive relationship between ownership concentration and environmental disclosure but contradict the work of Ohiani *et al* (2019) which find negative effect of board size on environmental disclosure in Nigeria. Secondly, examine on effect of board gender diversity on environmental disclosure of listed manufacturing firm in Nigeria revealed that board gender diversity has a negative significant effect on environmental reporting of listed manufacturing firm in Nigeria. The result agrees to the findings of Ofe & Ashinedu (2019), who found a positive effect between board gender diversity and environmental disclosure of firms in Nigeria but the study disagree with work of Paul *et al* (2019) which has a negative relationship with environmental disclosure of firm in Nigeria.

CONCLUSION AND RECOMMENDATIONS

The study was undertaken to examine effect of ownership concentration and board gender diversity on environmental disclosure of listed manufacturing firms in Nigeria from 2013-2022 in Nigeria. The study conclude that ownership concentration and board gender diversity has significant influence on environmental disclosure of manufacturing firm in Nigeria. Based on the findings of this study and the conclusion made, the following recommendations are made to the management of manufacturing firm in Nigeria:

1. Management of manufacturing firm should maintain ownership concentration in the firm because it enhance the environmental disclosure of manufacturing firms in Nigeria
2. Management of manufacturing firms should maintain or not increase board gender diversity in the firm as a result is insignificant on the environmental disclosure of the firm in Nigeria.

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