Effect of Board Size and Board Meeting Frequency 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 leading to high mortality rate as a relation of deadly diseases across the globe. Therefore the study examined effect of board size and board meeting frequency on environmental disclosure of listed manufacturing firms in Nigeria covering the period of ten (10) year 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 showed that board size has a positive and significant effect on environmental disclosure of manufacturing firms in Nigeria while board meeting frequency has a negative significant effect on environmental disclosure of manufacturing firm in Nigeria. The study therefore concludes that board size and board meeting frequency has significant effect on environmental disclosure of manufacturing firm in Nigeria. The study recommend that management of manufacturing firm maintain the maximum number of directors that a company can have on its board which will not decline the extent of voluntary and transparent environmental disclosure. These bodies should equally ensure that the maximum number to establish should capture the necessary expertise needed for the effective and efficient running of the business because of the positive effect.

Keywords: Board Size, Board Meeting Frequency, Environmental Disclosure, Firm Size, 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 non financial 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}: Board Size has no significant effect on environmental disclosure of listed manufacturing firms in Nigeria

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

LITERATURE REVIEW

Conceptual Framework

Board Size

It is the sum total of non-executive and executive directors on a company's board that ensure decisions reached by the management are to the advantage of the firm and minimizes the costs. This usually includes outside directors, executive and non-executive directors of a company. The board of directors with more than seven members is unlikely to be ineffective (Khadijat *et al*, 2022). This is owing to the reality that a larger number of people with expertise and experience will tend to add more value to crucial decisions reached by companies than a board with a small number of persons on it. The optimum number of board members should be appropriately determined by the whole board to ensure that there are enough members to discharge responsibilities and perform various functions. Heninger (2001) argued that smaller boards, between four to six members might be more effective since they are able to make timely strategic decisions, while larger boards are capable of monitoring the actions of top management. Large board members with varied expertise could increase the synergetic monitoring of the board in reducing the incidence of earnings management.

A reasonable size of the board is expected to be effective in monitoring the activities of firm's management (Olayinka, 2021). A large size of board of directors can improve monitoring mechanism effectively and prevent managers to engage in earnings restatements (Feng & Shiao 2009). Larger boards with competent directors having diverse educational and technical know how, have multiple perspectives to improve the quality of firm's value and more likely to represent the interests of shareholders thereby preventing managers from earnings management. Jian and Ken (2004).

According to the SEC, CCG, 2003-2011 all listed companies in the NSE should have a sufficient board the size relative to the scale and complexity of the company's operation and be composed in such a way to ensure diversity of experience without compromising independence, compatibility, integrity and availability of members to attend meeting, also the size should not be less than five (5) comprising executives and non-executives members. According to agency theory, board size of a firm is organized depending on the scope and complexity of the firms' production process, that is to say larger complex processes lead to the larger firms (Fama & Jensen, 1983). But some studies suggested that smaller board that ranges from four to six may have more effective decision (Pearce & Zahra, 1992)

Board Meeting Frequency

This is the number of board meetings done per annum. A board meeting is a formal periodic gathering of a Board of Directors. Most of the organizations, being public or private, profit or non-profit, are ultimately governed by a body commonly known as Board of Directors (Abazu & Pius, 2021). The members of this body cyclically meet to discuss strategic matters. The Board of directors is the supreme authority in a company and they have the powers to take all major actions and decisions for the company. The board is also responsible for managing the affairs of the whole company. In the case of a Public Limited Company, the first board meeting has to be held within the first 30 days, since the incorporation date. Additionally, a minimum of 4 board meetings must be held in a span of one year. Also, there cannot be a gap of more than 120 days between two meetings. It is at such meeting that key issues including that of sustainability are being discussed and decision on disclosures reached (Amahalu & Obi, 2020).

The Nigerian Code of Corporate Governance (Code of Corporate Governance for Public Companies in Nigeria 2011 issued by the Securities and Exchange Commission (replaced 2003 SEC Code); stipulates the required number of times members of the audit committee are expected to meet in a year. It states that the members of the board must meet at least once in a quarter, which means they are expected to meet at least 4 times in a year for the board to be effective in the discharge of its duties. Frequency of Board Meeting is presumed to be a good proxy for the corporate governance to control managers' behaviour. Board that meets frequently are expected to solve the problem effectively

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 Size

In the present world's trend, due to economies of scale, size of a firm plays very important role in competing with competitors through the cost reduction and, take and hold more opportunities. Further based on this concept the firm size is a factor in determining the firm's profitability and reveals a positive association between size and firm's profitability by several experts. Arani (2016) states as "Firm size has been recognized as an essential variable in explaining organizational profitability and a number of studies have tried to explore the effect of firm size on profitability". Okpala, (2019) also supportively said to this as big firms have the opportunity to have more profit since they have a bigger market share. So based on these situations, the big size firms work in more profitable with less competition.

Empirical Review

Khadijat *et al* (2022), examine how corporate governance affects environmental disclosures listed Nigerian consumer goods firms. The ex-post facto research design was used and regression analysis was used to analyzed data derived from seventeen consumer goods firms. The findings revealed that the presence of environmental sustainability committee, number of meetings held by the board of directors, and firm size have significant positive impact on the quantity of environmental information disclosure (EDI). However, the size of the board of directors (BSIZE) and board independence have an insignificant inverse influence on the Environmental Disclosure Index (EDI of the sampled companies. It was concluded that corporate governance affects environment disclosure. Based on the findings it was recommended that companies should constitute environmental committee on the board of directors to improve environmental disclosure

Nita and Wiwik (2022), examine the effects of disclosure of sustainability, corporate governance mechanisms, and intellectual capital on the return on assets. The population of this study is banking companies listed on the IDX in 2016-2019. The samples were selected based on the criteria of 27 companies over a 4-year period, so that 108 samples were obtained. Regression analysis method on panel data. The results of this study indicate that sustainability disclosure has no significant effect on ROA, frequency of board of Commissioners meetings has a positive and significant effect on ROA, institutional ownership has no significant effect on ROA, and intellectual capital has a positive and significant effect on ROA. It is recommended for further research using samples in different sectors, research periods with a longer period of time, and adding different variables outside of the variables in this study. The scope and methodology are limited to 4 years and the data are obtained were too old to have meaningful bearing to current reality

Onuora *et al* (2022), examine corporate governance mechanism and sustainability of health care firms in

Nigeria. The study is vital as it portrays the extent to which corporate governance mechanism ensures organizational sustainability. The study anchored on the Stewardship Theory adopted an Ex Post Facto Approach. Hence, data were collected from the annual reports and accounts of listed health care firms in Nigeria for the period 2016-2020. The empirical analysis of the research indicates that there is a significant and positive relationship between board independence, board diligence and sustainability of listed health care firms in Nigeria at 1% significant level. Thus, the study concludes that corporate governance mechanism ensures sustainability of quoted health care firms in Nigeria. The study recommended that companies should re-examine the frequency of meetings of the Board. The researcher believe that if a robust data analysis was used and sample size is increase, finding could have given a good result and conclusion.

Modozie and Amahalu (2022), examine effect of Board Structure on Sustainability Reporting of listed Industrial Goods firms in Nigeria for a period of nineteen years (19) spanning from 2002-2020. The panel data sets used in this study were obtained from annual reports and accounts and Nigerian Exchange Group (NGX) fact books for the study period. Ex-post facto research design was employed. Inferential statistics using Pearson Coefficient Correlation, Multicollinearity test, Panel Least Square Regression analysis and Hausman test were applied to test the hypotheses of the study. The findings showed that Board Members Shareholding has a significant but negative effect on Environmental Sustainability Reporting, Board Independence has a significant and positive effect on Environmental Sustainability Reporting; Female Board Representation has a significant and positive effect on Environmental Sustainability Reporting; Number of Board Meetings has a significant and positive effect on Environmental Sustainability Reporting. The study recommended inter alia that large boards should be prevented which can lead to a lack of coordination and communication and to slowness in decision-making, thereby prejudicing business development. The study is limited by industrial goods firm which cannot be generalized for manufacturing firm in Nigeria.

Obiora *et al* (2022), investigated the impact of board quality on sustainability disclosure of quoted firms in Nigeria. The study is vital as it portrays the extent to which board quality ensures organizational sustainability in Nigeria. Ex Post Facto Design was adopted and data for the study were obtained from the published annual financial reports and accounts of the entire consumer goods and industrial goods firms quoted on Nigerian Exchange Group (NGX) spanning from 2016-2020. The findings of the study generally indicate that board independence, female directorship presence and board diligence have significant and positive impact on sustainability disclosures of quoted firms in Nigeria. Thus, the study concludes that board quality have significant impact on sustainability disclosures of firms in Nigeria. The study recommended that firm should increase the number of independent directors, female directors in the board and board of directors' level of expertness, expertise, intelligence and proficiency as it ensure sustainability among the quoted firms in Nigeria. The researcher believe that if a robust data analysis was used and sample size is increase, finding could have given a good result and conclusion.

Saheed *et al* (2021) examined impact of board mechanism on environmental disclosure quality in Nigeria. Content analysis was employed on annual reports of seven listed oil and gas companies on Nigerian Stock Exchange over an eight-year period (2012-2019). Panel corrected standard error (PCSE) regression analysis was used to examine the results. The findings indicate that board independence, board gender diversity and board expertise have a significant positive impact on environmental disclosure quality. However, board size and board nationality has an insignificant relationship with environmental disclosure quality. In conclusion, the findings support the study's general claim that effectiveness in board monitoring positively influences the quality of environmental information disclose to stakeholders. The study recommended that Governance codes regulators in Nigeria should emphasize or increase specific minimum characteristics for independence, gender diversity and expertise of the board member as they aid effective monitoring of the board and improves the credibility of information reported to the stakeholders. The researcher believe that if a robust data analysis was used and sample size is increase, finding could have given a good result and conclusion.

Abazu and Pius (2021) examine effect of corporate governance on environmental disclosure of listed construction firms in Nigeria. The broad objective is to evaluate how corporate governance affected environmental disclosure on listed construction firms in Nigeria between the periods of 2010-2018. Panel Least Squared (PLS) method of data analysis was used. Secondary sources of data were employed; the interested variables were sourced from the annual report of the quoted construction firms. The following variables were employed: environmental disclosure as the dependent variable, while board meeting, board gender diversity, board size, and board independence were the independent variables. The study employs regression analysis in the analysis. From the analysis result the study found that Board size was positively and significantly related to environmental disclosure. Board meeting was found to have a positive and statistically significant on environmental disclosure. Board gender diversity (BGD) has a positive effect and significant relationship with environmental disclosure. The study recommended that Board size should be increased to up to seven members for improved quality and quick decision making in relation to environmental disclosure. The study is limited by construction firms which cannot be generalized for manufacturing firm in Nigeria.

Olayinka (2021), examine effect of corporate governance on economic sustainability reporting in quoted companies on Nigerian Stock Exchange. This study adopted *ex-post facto* research design. The population of the study comprised 169 quoted companies on the Nigerian Stock Exchange (NSE) as at December 31, 2019. A sample of 42 quoted companies for the period of 10 years (2010-2019) was selected. Data were extracted from published audited annual reports and accounts of the companies. Data were analyzed using descriptive and inferential statistics. The findings revealed that board size, female director and board ownership have positive and significant effect on economic sustainability reporting of selected quoted companies in Nigeria while CEO duality has negative effect on economic sustainability reporting and independent director has insignificant effect. The study concluded that corporate governance promotes economic sustainability reporting. It was recommended that the shareholders of companies should appoint experienced board members that will enhance sustainability reporting appoint more directors with shareholding interest and include more female on the board, as they boost economic sustainability reporting

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.

2.3.3 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

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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 stake holders 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 Olayinka (2021)

The Panel regression model

$$ER = \beta_0 + \beta_1 BS_{it} + \beta_2 BMF_{it} + \beta_3 FS_{it} + \epsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.1)$$

Where:

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

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

ER = Environmental Reportings

BS = Board Size

BMF = Board Meeting Frequency

FS = Firm Size

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)

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BS	Board Size	Independent	The total number of directors on the board	Khadijat *et al* (2022)
BMF	Board Meeting Frequency	Independent	Number of meetings held by the board of directors	Onuora *et al* (2022)
FS	Firm Size	Control	Natural logarithm of total assets	Aderemi *et al* (2021)

Source: Author's Compilation, (2023)

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	BS	BMF	FS
Mean	0.384318	7.142500	4.020000	7.290175
Median	0.333333	7.000000	4.000000	7.650000
Maximum	1.000000	8.000000	5.000000	8.680000
Minimum	0.083333	6.000000	4.000000	5.020000
Std. Dev.	0.211401	0.680700	0.140175	0.987743
Skewness	0.772469	-0.184524	6.857143	-0.917980
Kurtosis	2.764074	2.147823	48.02041	2.643324
Jarque-Bera	40.70823	14.37337	36915.31	58.29942
Probability	0.000000	0.000757	0.000000	0.000000
Sum	153.7270	2857.000	1608.000	2916.070
Sum Sq. Dev.	17.83153	184.8775	7.840000	389.2791
Observations	400	400	400	400

Source: E-View 12 Output, (2023)

Table 4.1 presents the descriptive statistics effect of board size, board meeting and 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 board size and board meeting frequency shows a mean of value of 7.1425 and 4.02000 with standard deviation of 0.68070, 0.14017 and a minimum and maximum value of 6.0000, 0.40000, 8.0000 and 5.0000 respectively. This implies board size and board meeting frequency 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 size as control variable has a mean of 7.29017 with minimum value of 5.02000 and maximum value of 8.68000.

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

Table 4.2: Correlation Matrix

Covariance Analysis: Ordinary				
Date: 09/23/23 Time: 10:57				
Sample: 2013 2022				
Included observations: 400				
Correlation				
Probability	ER	BS	BMF	FS
ER	1.000000			
	——			
BS	0.106414	1.000000		
	0.0334	——		
BMF	0.043116	-0.029944	1.000000	
	0.3898	0.5504	——	
FS	0.020234	-0.042867	0.015904	1.000000
	0.6866	0.3925	0.7512	——

Source: E-View 12 Output, (2023)

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 Moment correlation coefficient. The result presented above confirms that board size and board meeting frequency has a positive correlation which are 0.0334 and 0.3898 with environmental reporting while firm size as control variable has a positive correlation with environmental reporting at value of 0.6866.

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: 09/23/23 Time: 10:59			
Sample: 2013 2022			
Included observations: 400			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.112091	1009.910	NA
BS	0.000241	111.6773	1.002701
BMF	0.005669	826.4282	1.001112
FS	0.000114	55.72465	1.002056

Source: E-View 12 Output (2023)

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***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 (BS, BMF and FS) 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 homos kedastic			
Equation: UNTITLED			
Specification: ER C BS BMF FS			
	Value	df	Probability
Likelihood ratio	133.3667	40	0.0000
LR test summary:			
	Value	df	
Restricted LogL	57.35428	396	
Unrestricted LogL	124.0377	396	

Source: E-View 12 Output, (2023).

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 133.3667 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 problemis accepted. Consequently, based on the diagnostic probability 0.0000 the null hypothesis is rejected, thusthere is conditional heteroskedasticity, indicating that residuals are not homoskedastic and as such thesamples 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

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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	3.719080	3	0.2934

Source: E-View 12 Output, (2023)

The Result of Hausman test shows that chi-square statistics value is 3.71908 while the probability values of it is 0.2934. 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 appropriate for the sampled data because the Hausman test statistics as represented by corresponding probability value is greater than 5%.

Lang ranger Multiplier Test

The lang ranger 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 Lang ranger 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	1029.812	780	0.0000

Source: E-View 12 Output, (2023)

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***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 Lang ranger 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: 09/23/23 Time: 11:16				
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	0.636982	0.100984	6.307767	0.0000
BS	0.005291	0.004764	1.110753	0.0274
BMF	0.005425	0.021749	0.249452	0.8031
FS	0.009601	0.004122	2.328992	0.0204
LOGER	0.342906	0.005874	58.37769	0.0000
	Effects Specification			
			S.D.	Rho
Cross-section random			0.027780	0.1844
Idiosyncratic random			0.058425	0.8156
	Weighted Statistics			
R-squared	0.896310	Mean dependent var		0.212827
Adjusted R-squared	0.895260	S.D. dependent var		0.181092
S.E. of regression	0.058608	Sum squared resid		1.356775
F-statistic	853.6080	Durbin-Watson stat		1.674899
Prob(F-statistic)	0.000000			

Source: E-View 12 Output, (2023)

This study examined effect of board size and board meeting frequency 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 (BS, BMF and FS), 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 board size and

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environmental reporting with a corresponding positive probability value of 0.0274 which is less than 5%.

There is negative relationship between board meeting frequency with probability value of 0.8031 which is greater than 5%. However, when taken collectively, the regressors (BS and BMF) against the regressed (ER), the value of F-statistic is 853.6080 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 board size, board meeting frequency 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, board size has positive significant effect on environmental reporting of listed manufacturing firms in Nigeria while board meeting frequency has a negative effect on environmental reporting and the findings from this study are compared with those of previous studies.

Firstly, the effect of board size and environmental disclosure of listed manufacturing firms in Nigeria revealed that board size has a positive significant effect on environmental reporting of listed manufacturing firms in Nigeria, The findings do agree with the findings of Olayinka (2021) who documented evidence of a positive relationship between board size and environmental disclosure but contradict the work of Saheed *et al* (2021) which find negative effect of board size on environmental disclosure in Nigeria. Secondly, investigation on effect of board meeting frequency and environmental disclosure of listed manufacturing firm in Nigeria revealed that board meeting frequency has a negative significant effect on environmental reporting of listed manufacturing firm in Nigeria. The result disagrees to the findings of Abazu & Pius (2021), who found a positive effect between board meeting frequency and environmental disclosure of firms in Nigeria.

CONCLUSION AND RECOMMENDATIONS

The study was undertaken to examine the board size, board meeting frequency and environmental disclosure of listed manufacturing firms in Nigeria from 2013-2022 in Nigeria. The study conclude that board size and board meeting frequency has significant effect 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 management of manufacturing firm in Nigeria:

1. Management of manufacturing firm maintain the maximum number of directors that a company can have on its board which will not decline the extent of voluntary and transparent environmental disclosure. These bodies should equally ensure that the maximum number to establish should capture the necessary expertise needed for the effective and efficient running of the business because of the positive effect.
2. Management of manufacturing firms should maintain or not increase board meeting frequency in the firm as a result is insignificant on the environmental disclosure of the firm in Nigeria.

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