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Firm Monitoring Attributes and Environmental Sustainability Reporting: Evidence from Listed Non-Financial Companies in Nigeria

Lambe, Isaac Ph.D, Arumona, O. Jonah Ph.D, Okoli Theresa

Department of Accounting, Faculty of Administration,Bingham University, Karu, Nasarawa State, Nigeria
Department of Accounting,Faculty of Administration,Bingham University, Karu, Nasarawa State, Nigeria
Department of Accounting,Bingham University,Faculty of Administration,Karu, Nasarawa State. Nigeria

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ABSTRACT
The achievement of sustainable development remains the greatest challenge facing the human race. This study investigated the effect of firm monitoring attributeson environmental sustainability reporting of listed non-financial companies in Nigeria from 2011 to 2020. Monitoring attributes used are board size, board independence and board gender diversity while environmental sustainability reporting is measured by the environmental disclosure content of the item required in the annual report which is basically non-financial information of the companies. Ex-post facto research design was adopted and panel multiple regressions were employed to test the hypotheses. The study found that board size have positive significant effect on Environmental Disclosure Index (EDI), board independence have negative significant effect (EDI) while board gender diversity has negative insignificant effect on EDI of listed non-financial companies in Nigeria. The study recommends that Non-financial companies should be discouraged from having smaller boards since larger boards have better management skills and are better able to make strategic decisions that lead to high environmental disclosure. Also, non-financial companies should encourage independent board members to a maximum that can guarantee environmental disclosuresince high board independence will discourage environmental disclosure. Furthermore, women directors should be allowed to handle some certain strategic responsibility but to a minimum in the organization, since they stand a chance of negatively influencing environmentaldisclosure. The study concludes that firm monitoring attributes have significant effect on environmental sustainability reporting.

KEYWORDS: Firm Monitoring Attributes, Sustainability Reporting, Environmental Sustainability reporting, Non-financial firms and Global Reporting Initiative Index.

I. INTRODUCTION

The disclosure of information in relation to sustainability reporting in companies annual reports is primarily the heart of the modern organizations. Firms are confronted with serious issues of trust hence they need to consider the efficiency of their financial communication. Consequently, transparency and a better disclosure make the stakeholders of the firm better informed. This will lead to a better capital allocation in the securities market. The information asymmetry and agency conflicts that exist between investors and management are the factors that have increased the demand for information disclosure in the modern capital market. Additionally, the board's ability to oversee management will determine whether management and the board of directors decide to consciously minimize the asymmetric information between the interested parties and the company by providing high-quality sustainability reporting. This will significantly decrease the goal incompatibility between management and the company's stakeholders. Therefore, the way out of agency skirmishes lies in the duty of the board of managements.Currently, Firms are under increasing pressure to act responsibly toward the general public. Consequently this pressure has motivated them to work in an environmentally responsible manner. Organisations are currently making a lot of effort to satisfy investors and other stakeholders by signaling their environmental consciousness and practices. Firms are making efforts to showcase their performance in the form

of information signals to gain legitimacy from stakeholders.

The past decades have witnessed the undesirable ecological consequences of industrialisation, which have come to be an issue of public interest in diverse parts of the world. Also, the 2018 world economic global risk report shows that nearly half of all major business risks are environmental. Consequently, there is a shift in societal focus toward environmental longevity, and businesses are advised to look at the bigger picture with the view to reducing or mitigating negative impacts, maximizing on positive ones, and also foreseeing the bright future and the impact of their activities on the environment. The demand for Sustainability Reporting (SR) is as a result of the damages that have affected the environment due to increasing development. Therefore, sustainability reporting as a tool provides information to stakeholders and to reflect companies' compatibility with the environment and concerns about a number of environmental matters. Additionally, adopting effective policies in line with societal expectations and consumer demands for environmentally friendly products helps to increase stakeholder confidence in the information provided to them, achieve the desired environmental consensus, and strengthen the competitive position of businesses. Consequently, companies harmonise with the society in addressing these environmental issues [1]. Nevertheless, despite a rise in interest, corporations globally still view SR as an optional exercise. Where there are notable disparities between the quantity and quality of SR produced by businesses from different industries and nations [2].

As encapsulated by signaling theory, the choice to release environmental information as signal to stakeholders rests with the company's management. The information serve as signal to the market, so the market is expected to differentiate good and bad quality companies. The Information serves as a signal to the market, and as a result, the market is expected to distinguish between companies of excellence and non-performing ones. This theory addresses information asymmetry, which can happen when one party has a signal of information that is more comprehensive than the other party. [3]contends that these reports typically do not meet the needs of the user because managers frequently consider their personal interests when making administrative decisions. This causes the disclosure gap, or the discrepancy between expected and actual disclosure, to widen. As a result, whether or not particular information is provided will likely rely on a number of variables, such as corporate governance traits [2].Studies have found that strong corporate governance mechanism generally drive corporate disclosure [3]; [4)].The board of directors in a company plays a highly important function and is in charge of making decisions. They depict the major business policies, such as environmental policies; for this reason, determining the ideal board of directors' makeup is crucial.

As suggested in study of [5]; [6];[7], the board serves as an efficient internal governance system, overseeing management to protect shareholders' interests. The board's monitoring role encompasses financial reporting, and since sustainability reporting to some extent comes under the discretion of the board of directors. It is anticipated that a more efficient board should lead to greater level of managerial disclosure. While Prior research on the relationship between firm monitoring attributes and environmentalsustainability reporting has been done in the developed countries such as [8],[9], [10], [11] and [12],a few studies have been made to examined this relationship in the emerging countries particularly in Nigeria vis a vis non-financial companies. Also, considering global warming and the recent development in global reporting initiatives in respect to company's environmental activities, most of the previous literatures cannot be said to reflect the current position of the environmental activities due to passage of time. As such, there is a need for further research that will portray this position with current data from the companies. A closer inspection of previous literature in Nigeria shows that the twin concept of Environmental Sustainability Reporting (ESR) and monitoring attributes of the firm were conducted in other sectors and the study of [13] focused on SR and financial performance. This study investigates ESR through the lens of signaling theory; as a result, this work differs greatly from other work done previously. The motivation of this study therefore is to acquire an understanding of whether the Firm Monitoring Attributes (FMA), namely board independence, board size and board gender diversity are effective on the extent of ESR amongst Nigerian non-financial companies listed on Nigeria Exchange Group (NGX). The purpose of this study is to assess if the results of previous research in developed nations can be adapted to the Nigerian market and to provide further data to support or refute those conclusions. The following hypotheses were tested:

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HO1: Board size has no significant effect on environmental disclosure index of listed non-financial companies in Nigeria.
HO2: Board independence has no significant effect on environmental disclosure index of listed non-financial companies in Nigeria.
HO3: Board gender diversity has no significant effect on environmental disclosure index of listed non-financial companies in Nigeria.

II. LITERATURE REVIEW

2.1. Conceptual Framework

2.1.1 Firm Monitoring Attributes

Firm attributes vary from one business entity to another and it is defined as the operating behaviors of a corporation that allow it to fulfill its goals during the course of its operations [14]in[15]. Firm characteristics include corporate governance and business characteristics [16]. Within an organisation, the board of directors plays a highly important role and is in charge of making decisions. The board depicts the major business policies as well as environmental and ecological policies. For this reason, the determination of the ideal board of directors' makeup is crucial. The board of directors is saddled with the responsibility to monitor the firm's management. In other words, the board of directors' role is to oversee management and offer expert advice [17]. FMA are those boardroom traits which enable an organisation's management to efficiently carry out its duties for organisational effectiveness. According to [18] firm monitoring attributes include board size, board diversity, board diligence and board independence. However, the following monitoring attributes of the firm are conceptualise based on the objective of the study.

2.1.2 Board size

Board size plays a pivotal role in keeping under surveillance the performance of a firm and it is defined according to [19] as the total number of directors on the board of a company, including the Chief Executive Officer, the Chairman, outside directors, executive directors, and non-executive directors. Board size is crucial for monitoring a company's success. The literature that is now available on-board size can be divided into larger board and smaller board. However, there is ongoing discussion regarding the ideal size of the board [20]; [21]; [22]; [23]. The advocates of larger boards believed that large boards are inefficient as they are week in control of management and increase the agency cost. However, this notion is defying by stating that larger boards may be less influenced by management. Conversely, small boards are deemed efficient but they may be easily influenced by managers [24]. Moreover, it is observed that large boards are diverse with reference to the education, expertise and gender of directors [25]. According to [26] the board's size significantly assists in controlling, overseeing, and influencing information disclosure. This could lead to a conclusion that the size of the board is important to the company. According to the agency hypothesis, larger corporations require larger boards to oversee and control managerial decisions [27]. This implies that one important element affecting the size of the board of directors is the firm's size. A larger board is made up of members who are more skilled and knowledgeable and has a reporting process that is more effective and influences the degree of voluntary disclosure, including ESR [28].

2.1.3 Board Independence

The board of directors' independence is one of the important aspects of board effectiveness [29]. [30]defined board independence as "a virtue based on practical wisdom, implying autonomy, sovereignty, and autarky, and enabling one to act with morality, justice, and sincerity." Independence is related to an honest desire to serve in the framework of corporate governance. It is believed that board independence will be more helpful from an agency standpoint because of their skills to check, supervise, and monitor managers, thereby reducing agency issues [31]. Several studies have found evidence that independent boards and strong governance enhance business performance. [32]. Also, the influence of non-executive directors (with reference to numbers) could provide them with more power to compel management to enhance the degree and level of firm disclosure [33]. According to research by [27],as the percentage of independent directors on the board increases, so does the amount of environmental reporting in company annual reports. [34] also discovered a favorable correlation between the degree of voluntary disclosure and the level of independent director selection on the board. On the other hand [35] noted that the level of information sharing is not significantly impacted by the number of independent directors. According to [36], board independence is not a reliable indicator of sustainability communication. More proof was presented by [37] showing companies with a higher proportion of external directors report on sustainability at much higher levels than companies

with balanced boards. As a result, prior empirical studies tend to indicate that companies are more likely to report on sustainability as the proportion of independent directors increases.

2.1.4 Board gender diversity

Board diversity according to [38] can be defined by observable characteristics like nationality, age, and gender, as well as less visible criteria such as board members' educational, functional, and occupational backgrounds. Women are becoming significantly more involved in all aspects of life around the world. Consequently, women's presence in the boardroom cannot be disregarded. As encapsulated by agency theory, a diverse board is more independent [39], and prior research have included board gender as a diversity variable. Therefore, women on the board can enhance opportunities for obtaining competitive advantage and can help to entrench diversity [40] and[41]. In addition, [42] discovered a favorable correlation between environmental disclosures and the number of women on the board of directors. Yet again, businesses in the US with female directors are more socially responsible, according to [43] research. Furthermore, [44] discovered proof that the company social performance was improved by having more female directors on the board. Better corporations, according to [45] have more female directors in their boardrooms. Therefore, the presence of women in the board room can be seen as an indication that businesses are aware of issues affecting minorities and women, which supports the legitimacy of firms.

2.1.4 Sustainability Reporting

Sustainability Report is a process that evaluates and discloses corporate governance as a commitment to internal and external stakeholders on organizational performance in achieving sustainable development goals, according to [46] disclosure guidelines for sustainability reports. Additionally, according to [46], sustainability reporting is the activity of assessing, outlining, and holding organizations accounting for their performance concerning sustainable development goals. Sustainability reporting was first described by [47] as a subcategory of accounting and reporting that deals with activities, strategies, and mechanisms to capture, analyze, and report both the financial impacts on the environment and society as well as the ecological and social effects of a particular economic system (example, a company, production site, and nation). Thirdly, sustainability reporting focuses on the measurement, evaluation, and disclosure of relationships and interactions between the social, environmental, and economic problems that make up the three aspects of sustainability. For businesses and organizations to demonstrate their corporate responsibility, according to [48], they must measure and make conclusions on their economic, social, and environmental performance and impacts.

Sustainability reporting was described by [49] as development that satisfies current demands without jeopardizing the ability of future generations to satiate their own needs. Companies publish their sustainability performance by intentionally providing sustainability reports. These reports strive to eliminate informational disparities between the company and its interested parties by informing stakeholders on the environmental, governance, and social aspects of their activities[50] Due to the voluntary nature of SR, businesses tend to only share positive news and conceal negative sustainability practices, making it difficult for stakeholders to evaluate the company's current sustainability performance.

2.1.6 Environmental Sustainability Reporting

The approach of corporate environmental sustainability reporting has attracted a lot of attention due to the growing concern regarding the longevity of natural environment [49]. The integrity of the ecosystem, capacity, and biodiversity are all aspects of environmental stewardship. It necessitates the preservation of natural capital as a means of resources for the economy and as a repository for trash [51] Natural deposits should be depleted only as quickly as they can be replenished. Additionally, wastes must not be released into the environment more quickly than they can be absorbed by it [52]. To meet future economic and social needs, environmental sustainability focuses on preserving the long-term productivity and health of resources, such as food supplies, cropland, and fisheries. A further need for environmental sustainability is to mitigate the effects of anthropogenic global warming. It also concerns policies to prevent the environment from deteriorating to the point where future generations will have to deal with water shortages, extreme weather events, excessive heat, and other conditions that could make living in some areas of the world extremely challenging, if not impossible. Environmental sustainability reporting is measured according to GRI disclosure index as actual environmental disclosure (material, water, energy, biodiversity, emission, effluent and waste, environmental compliance, and environmental

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impact assessment) by the company divided by the expected disclosure.

2.2 Empirical Review

[42]studied Women on Board and Environmental Sustainability Reporting using alternative different estimation techniques and dynamic GMM estimator. The analysis comprises two alternative measurements for board gender diversity—the presence of women on the board and the percentage of women on the board—were examined in a sample of 85 companies with 833 observations from the French stock exchange corporations between the years 2010 and 2019. According to the study's findings, there is a strong correlation between environmental sustainability reporting and the number of women on a board and their representation. As a result, ESR is likely to be enhanced by the expertise and social resources that women directors bring to the boardroom. ESG disclosures were also found to increase with the presence and percentage of women on boards. The study recommends that legislators should encourage the appointment of women on the boards of French companies as this will enhance environmental reporting practices. The results of this study may not be applicable to the Nigerian environment.

[5]examined the link between the attributes of the board of directors and environmental disclosure in the Jordan stock exchange for a period of four years (2014 - 2017. A population of sixty-three industrial companies was investigated and 47 samples were analyzed. The proxies for the study include board size, board independence, board ownership, and firm size as control variable. Panel Linear Regression analysis was used to test the hypotheses of the study. According to the investigation, less advanced countries disclosure is still relatively low when compared with advanced countries environmental transparency. The study also found a positive relationship between board size, board ownership, firm size, and the level of environmental disclosure. Whereas, board independence has no statistical significant relationship with environmental disclosure in Jordanian industrial companies. The study recommends that future research should expand the sample size and apply it to other sectors. The study is considered not too robust because only four years period was considered.

[6]studied the relationship between Pakistani company environmental reporting and corporate governance traits. Multiple Regression Analysis was used to examine a sample of 50 non-financial companies listed on the Pakistan Stock Exchange (PSX) between the years of 2014 and 2015. The findings showed that institutional ownership, a larger board size, a higher percentage of independent non-executive directors on the board, a division of the dual function of chairman and CEO, and increased environmental reporting are all related. The study suggests that corporations should be required to periodically produce environmental and climate change policy reports as a way to show their dedication to sustainable growth. The study only took into account one year, but a longitudinal study with large sample size and comparative analysis would provide additional information about the function of corporate governance practices and how it influences sustainability reporting.

Bandaraet al. (2018) examined the relationship between corporate governance and the volume of sustainability reporting of Sri Lankan listed firms for the year 2017 using a sample size of 52 companies. Board independence, board size, dual leadership, female directorship, the existence of a CSR committee, and cross-directorship were all used as indicators of corporate governance. The degree of sustainability reporting was evaluated following GRI G4 recommendations. The study used multiple regression analysis to look at the relationship between the two. It was found that the proportion of independent directors, the fact that they serve in dual capacities, and the existence of a CSR committee all significantly correlate with the voluntary sustainability reporting disclosures. The study also found that younger organizations are more likely to disclose more sustainability disclosures and that firm size and growth have a favorable impact on sustainability reporting. It was recommended that incentives be put in place to motivate and encourage voluntary disclosure by firms. The SPSS statistical package used in this study is considered not encompassing and the outcome of one-year analysis (2017) may not produce a robust finding. Also, no theory was used to underpin the study.

[54]investigated the determinants of sustainability disclosure practice in Nigeria for the period of 2010 to 2015. The factors that were taken into consideration as determinants of sustainability disclosure include, board meeting frequency, board independence, board diversity, and board size. In order to estimate the regression analysis, sustainability disclosure index and board governance metrics were generated. A multiple regression analysis was used to test the relationships specified in the study. According to the regression study, board diversity,

independence, and size all improve and enhance the release of sustainability information. However, it was discovered that the frequency of board meeting insignificant effect on the disclosure of sustainability information. This study is considered not too current and therefore cannot reflect the current reality on environmental disclosure and reporting.

[55]using Multivariate Ordinary Least Squares (OLS), multiple regression, and GRI, 2002, it was possible to determine the magnitude of Social and Environmental Reporting in Australia as well as the relationship between firm characteristics and Levels of Social and Environmental Reporting (SER) in Australia. the extent of social and environmental reporting by Australian companies is fairly low, and the degree of complete reporting is significantly greater for large businesses in the industrial and transportation sector. the sample size is 47 small and medium-sized organizations drawn from five various industries. Additionally, businesses with negative total asset returns disclosed much more social information. The size of the external auditor or the age of the organization had no significant effect on the entire disclosure. The paper recommended that greater social and environmental accounting research be encouraged and GRI indicators can also be exploited by preparers in determining the extent of compliance by corporations. Despite the fact that the objective of the study was achieved, the study does not meet the current realities based on passage of time because the most current GRI's reporting frameworks are the GRI standards launched in 2016.

[56]examined the nexus between corporate governance and financial characteristics and the extent of sustainability disclosure among the US firms. The corporate governance variables are board meeting, board size, board age and CEO duality. While financial attributes variables are leverage, profitability firm size on sustainability disclosure. Out of the 500 Furtune listed companies, a samples consist of 100 firms for the year 2011 was analyzed. The Multiple Linear Regression analysis revealed among other that board meeting and board age has a positive effect on sustainability disclosure. The study's weakness is that it employed data from a one-year period, which weakened the strength of the result; also, the findings cannot be generalized.

[4] examined the connection between environmental reporting and Australian company corporate governance characteristics. The study, which used a quantitative analytic technique, looked at 100 companies that were listed on the Australian Stock Exchange (ASX) in 2008. According to the OLS regression study, there is a substantial correlation between the amount of environmental reporting and the percentage of female and independent executives on a board. The data also showed a link between institutional stakeholders, the board size, and the scope of environmental reporting was favorable. The study recommended that ASX should think about including environmental matters in its Corporate Governance Council standards because it is increasingly recognized as a crucial component of CSR. The consideration of only a year (2008) analysis may not produce an encompassing finding.

[57]examined the relationships between principles of good governance, marketing practices and sustainability reporting of companies in Turkey. The authors investigated the linkage between board composition characteristics, sustainability reporting and financial performance. The population consists of all firms listed in Turkish's Istanbul Stock Exchange (ISE) for the period 2007. The authors discovered using logistic regression and content analyses that smaller board size leads to improved financial performance, whereas inside directors and CEO duality lead to unfavourable financial performance. Contrastingly, independent directors led to increased sustainability reporting. The study recommends that smaller board sizes be encouraged in order to enhance performance. The sampling technique is not detailed and the period of the study is not wide enough, thus, reducing the robustness of the result.

2.3 Theoretical Framework

2.3.1 Institutional Theory

The Institutional theory (IT) was developed by John Meyer and Brain Rowan in the late 1970s to better investigate how organizations interact with and are formed by their societal, state, national, and international surroundings. "The rules and conventions of particular systems in a community, nation, and the entire world" are referred to as institutions [58] IT offers a method by which an organization can navigate the rules and regulations of a system to establish its legitimacy and, as a result, ensure its survival [59]. The involvement with external institutional environments, aiming to be consistent with societal expectations of the environment and its impacts, as well as the integration of these expectations, and demonstrating it as a practice in the system, are the main areas of focus of this theory [60] According to [61], the obsessive behavior of seeking legitimacy influences organizational operations due to the established social norms. To ensure their

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continued existence, organizations must interact with their environment in a way that is acceptable to all its stakeholders.

Considering that it provides a more in-depth comprehension of how organizations react to shifting institutional, social, and environmental pressures and expectations, [62] claims that institutional theory is connected to voluntary disclosure. It also explains why businesses operating in the same industry frequently act and communicate similarly [63]By adhering to organizational principles like corporate and environmental reporting of their operations, businesses hope to preserve the legitimacy of their organizations. Institutional homogeneity is what organizations strive for when they attempt to align their behaviors with the requirements of the institutional context [58]. The methods by which such reporting develops and adapts within the organization are isomorphic since voluntary disclosure is a behavior that is institutionalized inside an organization. One of the key elements of institutional theory is isomorphism, which describes how organizations accommodate an institutional practice. According to [64], one of the similarity practices is normative isomorphism. This kind of isomorphism ties stakeholder demand to the approval of particular institutional practices. Since institutional isomorphism will offer the organization credibility and approval, organizations must adhere by the laws and values of the environment, claims [65]. Companies are releasing more sustainability-related data in the form of sustainability reports in response to the Sustainable Development Goals (SDG). However, these accounts diverge significantly as a result of multiple institutional and stakeholder pressures [66]. The Institutional Theory (IT) emphasizes the demand and constraints of the institutional environment in particular and shows how organizations can avoid exercising strategic choice when they take the institutional procedures, they follow for granted [67]. It restricts organizational options and concentrates on how the social and cultural context affects organizations [68].

IT is mostly driven by the fact that businesses operate in social networks where behavior is governed by specific social norms and standards about what is appropriate or acceptable in the context in which they function [60] As a result, the rules for social behavior are determined by the social reality [65]. IT is fundamentally motivated by the fact that organizations function within a social grid where behavior is defined by particular social norms and standards regarding what is suitable or acceptable in the society they operate in [60]. As a result, the social reality serves as the foundation for the laws governing social and societal behavior [65]. Companies yield to institutional pressures for change since they will be rewarded with an increase acceptability and survival capacity [69]and [60].

2.3.2 Signaling Theory

Michael Spence first established the signaling hypothesis in 1973 as a result of observed gaps in knowledge between organizations and potential employees. The signaling hypothesis states that successful firms use financial information disclosure to communicate with the market. According to [70] businesses will strive to accept the same level of disclosure as other businesses in the same industry because failing to do so could lead to suspicions from stakeholders that the business is concealing bad news or unfavorable information. Understanding why some signals are trustworthy and others are not in terms of decision-making is the focus of signaling theory. The theory examines the accuracy and dependability of accounting data that a business sends to others who may use it to help potential investors make investment decisions. According to [71] theory, a successful firm sets itself apart from a failing one by communicating with capital markets and potential investors about how well it is functioning. The outcomes of a company's operational actions that might alert investors to the company's prospects for the future are known as signals.

According to the signaling theory, corporate management acts in a certain way when directing investors towards management tactics and perspectives on the future [72]. Information (signals) about a company's success or failure serve as the disclosure of signaling theory. According to the signaling hypothesis, a good quality business will purposefully communicate to the market, and as a result, the market should be able to distinguish between good and bad quality businesses [72]. This theory addresses information asymmetry, which can happen when one party has a fuller information signal than the other. If accounting data provided by management contains information on the characteristics of unmonitored business choices, it can be interpreted as a signal. [73] opined that uncertainty, opportunism, and bounded rationality when present in a multi-stakeholder context are bound to create an unequal information status where data is spread asymmetrically between the parties (managers of the firms as providers of financial reporting) and multiple stakeholders groups (as consumers and users of corporate

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reports). Therefore, corporate financial actions, such as financial information and their disclosed contents, are indicators communicated to shareholders and other stakeholders by business management with the goal of shattering the asymmetry. Contextually, morally astute managers who have access to inside knowledge would be inclined for using sustainability reports to inform stakeholders about their companies' environmental performance, so improving the reputation of the companies. Such precise declarations can be utilized as a valued-statement signal to communicate the firm's environmental friendliness or to distinguish between businesses that value sustainability and those that do not.

Because the signaling theory suggests that managers utilize sustainability reports to communicate stakeholders about their companies' long-term sustainability management policy in the area of corporate sustainability, this study is anchored to that theory [74] These Sustainable Disclosure Practices provide information on openness, financial security, and issues related to the environment and society [75]. The hypothesis that supports voluntary disclosure is the signaling theory, claim [76] Management makes every effort to make confidential information public when it feels that it will be of substantial interest to shareholders and potential investors, especially if the information is favorable. Furthermore, even if it is not necessary, management is eager to share information that can enhance its credibility and help the company succeed [72]. Management will continue to offer unnecessary information in order to boost the company's credibility and performance. In order to achieve the goals of the investors, which is to maximize shareholder value, the company, according to the signaling theory, transmits a signal in the form of knowledge regarding leadership's operations [77]. Numerous studies have demonstrated how voluntary report disclosure can reduce conflicts of interest between shareholders, debt holders, and management. Environmental disclosure procedures send a message to people and stakeholders about board independence, an active environmental strategy, a dedication to dealing with climate change, integrity, and stakeholder involvement in total [78].

III. METHODOLOGY

The study adopted ex-post facto research designs to evaluate the effect of firm monitoring attributes on environmental sustainability reporting of non-financial companies in Nigeria. The design is considered appropriate for the study since it is an after the fact design that explains the relationship between the variables after their occurrence. The population of the study consists of all the 112 companies listed on the Nigerian Exchange Group from 2011 to 2020. While the sample size is 82 firms. Panel regression technique was used to establish the relationship between firm monitoring attributes and Environmental Disclosure Index (EDI). The model used to empirically test the hypotheses is adopted from [12] and the functional relationship between the variables is represented below:

$$\mathbf{EDI_{it} = \beta 0_{it} + \beta_1 BS_{it} + \beta_2 BI_{it} + \beta_3 BGD_{it} + e_{it}}$$

Where:
EDI= EnvironmentalDisclosure Index
BS= Board size
BI= Board independence
BGD = Board gender diversity
B0 = Constant
β_1 -β_3 = Coefficient
e = Error Terms
I = firm
T= time

Table: 1 Variables Definition and Measurement

Variables	Measurement	Source
EnvironmentalDisclosure	Material use, energy use, water use, waste management and recycling, carbon dioxide emission, other atmospheric emissions, and environmental compliance are among the GRI G4 Index's score factors. As a result, if a corporation discloses any of the criteria, a score of 1 is given, and if not, a score of 0. Therefore, the projected environmental disclosure divided by the actual environmental disclosure yields the average of the aggregate disclosure.	[3]and [79]

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Board independence	Board independence is characterized by the ratio of independent non-executive directors to the size of the board.	[80]
Board size	The number of directors on the board as a whole	[53]
Board gender diversity	percentage of female directors relative to all of the board's directors.	54 and[11]

IV. RESULT AND DISCUSSION

Table 2 Descriptive Statistics

	EDI	BS	BI	BGD
Mean	0.350968	9.159756	0.613301	0.184320
Median	0.333000	9.000000	0.625000	0.142857
Maximum	1.000000	23.00000	1.166667	1.000000
Minimum	0.083000	4.000000	0.000000	0.000000
Std. Dev.	0.191178	2.593330	0.175300	0.191401
Skewness	0.792431	0.892423	-0.324989	0.706235
Kurtosis	3.161867	4.750232	2.732516	2.576979
Jarque-Bera	86.71451	213.5069	16.87898	74.27900
Probability	0.000000	0.000000	0.000216	0.000000
Sum	287.7940	7511.000	502.9071	151.1422
Sum Sq. Dev.	29.93351	5508.072	25.16796	30.00347
Observations	820	820	820	820

Source: E-View 10 Output (2022)

The result above shows that EnvironmentalDisclosure Index (EDI) has a mean of 0.350968, with standard deviation of 0.191178 Mean of EDI indicates that the companies in this research on the average have a disclosure index of 35%. Standard deviation is 0.191178 is lower than mean, so it can be said that the data has some level of variation. The minimum and maximum values of EDI are 0.083000 and 1.000000 respectively. The maximum value implies that non-financial firms disclose their environmental activities while the minimum shows that at least 8% of the items are disclosed by the companies. The result shows that it is relatively skewed to the right by 0.792431 and the kurtosis is 3.161867. The probability of Jarque-Bera is less than 87 which signifies non-normality of environmental disclosure.

The descriptive statistics further indicates that the number of the board of directors ranges between 4 and 23 with a mean value of 0.613301which is in line with the 2009 Securities and Exchange Commission (SEC) Code of Corporate Governance which recommends that the board should be of a size that is appropriate for the proportions and complexity of the business' operations. The mean signifies that on the average, there are 9 members on the board. The standard deviation of 2.593330implies that the data is widely dispersed. The skewness is 0.89242 and the kurtosis is 4.750232. The probability of Jarque-Bera is less than 5% which signifies non-normality of board size.

Also, the result indicates that board independence has an average of 0.613301 with standard deviation of 0.175300, suggesting that the deviation from mean is 17%. The minimum and maximum independent board members are 0.00000 and 1.66667 respectively. The minimum of 0.00000 indicates that there is no independent board member on the board. In addition, the variable is relatively skewed to the left by -0.324989 and the kurtosis is 2.732516. The probability of Jarque-Bera is less than 5% which signifies non-normality of board independence.

Additionally, the data shows that, while the mean is 0.184320, the percentage of women on boards ranges from 0.0000 to 1.00000. This demonstrates how poorly represented women are on the boards of the examined corporations. This is as a result of the representation being only 18% on average. The minimum of 0.0000 demonstrates that some businesses did not include women in their team of board members throughout the study period, while the maximum representation of

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women in those that did is just 78%. The results are slightly variable, according to the standard deviation of 0.191401. The skewness and kurtosis are also 0.706235 and 2.576979, respectively. Less than 5% of Jarque-Beraare likely, which means non-normality of board gender diversity.

Correlation Test

Bivariate analysis that assesses the path and degree of the link between two variables is called correlation. To determine or show that two variables are related to one another, a correlation test is utilized. Below is a presentation of the correlation matrix.

Table 3Correlation Matrix

Correlation Probability	EDI	BS	BI	BGD
EDI	1.000000			

BS	-0.103068	1.000000		
	0.0031	-----		
BI	0.136788	-0.393488	1.000000	
	0.0001	0.0000	-----	
BGD	-0.031680	0.085048	-0.028164	1.000000
	0.3649	0.0148	0.4206	-----

Source: E-View 10 Output (2022)

The result above shows that EDI is 3.1% inversely associated with board size. This signifies that the larger the size of the board members the lower the level of environmentaldisclosure by the firms. Also, the result shows that there is a positive relationship between EDI and board independence, from the correlation coefficient of 13.7%. This implies that an increase in independent board members, will lead to an increase in environmentaldisclosure of the listed non-financial companies in Nigeria. Furthermore, the table also shows the correlation coefficient between board gender diversity and EDI of -0.03168. This negative correlation indicates that some firms with high female members are likely not to disclose their information voluntarily.

Test for Multicollinearity

Whenever the predictor variables in a regression model have a correlation with one another, multicollinearity typically results. In a multiple regression model, the variance inflation factor is required to measure multicollinearity. It evaluates the level of multicollinearity or intercorrelation between predictor variables.

Table 4 Variance Inflation Factor

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.001846	42.20208	NA
BS	7.76E-06	16.06609	1.190913
BI	0.001686	15.68383	1.183238
BGD	0.001204	1.942625	1.007320

Source:E-View 10 Output (2022)

All of the VIF values are below 10 according to the multicollinearity test from the table above, and the reliability coefficients are greater than or equal to 0.1. The outcome showed that the explaining factors do not exhibit any signs of multicollinearity.

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Table: 5 Heteroskedasticity Test

	Value	df	Probability
Likelihood ratio	247.7553	82	0.0000
LR test summary:			
	Value	df	
Restricted LogL	202.8822	816	
Unrestricted LogL	326.7599	816	

Source: E-View 10 Output (2022)

The outcomes of the panel cross-section Heteroskedasticity regression test are displayed in Table 5. The following is the decision rule for the panel cross-section heteroskedasticity test:

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

H_0: No conditional Heteroskedasticity (Residuals are homoskedastic)

H_1: There is conditional Heteroskedasticity

Heteroskedasticity is not present, according to the test's null hypothesis, whereas heteroskedasticity is present, according to the alternate hypothesis. If the P value is larger than 5% level of significance, the null hypothesis should be accepted. The research consequently suggests the existence of cause to reject the null hypothesis, while the alternative hypothesis that there is a conditional heteroscedastic problem is accepted. This is based on the outcome in the table above, which has a ratio value of 247.7553 and a corresponding probability value of 0.0000, which is less than 5%. Due to conditional heteroskedasticity, which shows that residuals are homoscedastic and, as a result, the samples do not accurately represent the population, the null hypothesis is therefore rejected based on the diagnostic probability of 0.0000.

Fixed Effect Likelihood Ratio Test

A testing for model estimation in panel data analysis, the Fixed Effect Likelihood Ratio test is used to determine whether to use a pooled effect model or a fixed effects model. The decision rule for the fixed effect likelihood ratio specification is therefore given as follows: at 5% Level of importance

H0: Panel Regression analysis should use pooled effect instead.

H1: Panel Regression Analysis Should Not Use Fixed Effect

As stated above, if the p-value is higher than 0.05, the choice criterion is to reject the null hypothesis, according to which pooling effect is the most suitable for the Panel Regression analysis (meaning that the preferred model is fixed effects). Similar to this, if the p-value is less than 0.05, the choice criterion is to adopt the null hypothesis, according to which pooling effect is the most suitable for the Panel Regression analysis (meaning that the fixed effect model is to be rejected).

Table 6: Fixed Effect Likelihood Ratio Table

Effects Test	Statistic	d.f.	Prob.
Cross-section F	6.661436	(81,735)	0.0000
Cross-section Chi-square	451.408874	81	0.0000

Source: E-View 10 Output (2022)

The results of the fixed effect likelihood ratio test indicate that the probability value is 0.0000 and the chi-square statistic is 451.40887. This suggests that there is sufficient data to disprove the null hypothesis, according to which pooled effect is the best choice for Panel Regression analysis. The pooled effects are therefore likely linked with one or more regressors, making the error component model (pooled effect) estimator inappropriate. When deciding between a pooled effect analysis and a fixed effect analysis, the fixed effect model of regression analysis is the most reliable and effective estimate for the research. Considering the two possibilities mentioned above, the results show that the fixed effect regression model is the most suitable one for the collected data because the likelihood ratio test statistics, as indicated by the related probability

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value, is larger than 5%. Therefore, it makes the most sense to move on to the Hausman test, that will demonstrate whether or not adopting the fixed effect model or the random effect model is acceptable in other situations.

Hausman Specification

In a regression model, the Hausman test finds endogenous regressors (predictor variables). The values of endogenous variables are influenced by other variables in the system. As one of the assumptions of Ordinary Least Square (OLS) is that there is no connection between the predictors and the error term, the presence of endogenous regressors in a model will lead to the failure of OLS estimators. In order to distinguish between models with fixed effects and those with random effects, the Hausman test is used.

Decision Rule: The fixed-effect model is applicable for the study if the P-value is 5%; else, the Random model is more suitable.

Table 7: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.259916	3	0.0165

Source: E-View 10 Output (2022)

To determine which fixed or random effect model is more suitable for the interpretation, the Hausman specification was used. The Hausman Test's outcome showed that the fixed effect hypothesis is supported by the value of the chi-square prob., which is 10.259916 and significant at the 5% level. The fixed effect model is utilized as a result.

Table: 8Panel Regression Result (Fixed Effect)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.682922	0.022034	30.99440	0.0000
BS	0.002848	0.001585	1.797300	0.0327
BI	0.008496	0.016388	0.518434	0.6043
BGD	0.015698	0.029394	0.534065	0.5935
LOGEDI	0.303563	0.004291	70.73648	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.927862	Mean dependent var		0.350968
Adjusted R-squared	0.919509	S.D. dependent var		0.191178
S.E. of regression	0.054239	Akaike info criterion		-2.891873
Sum squared resid	2.159330	Schwarz criterion		-2.397970
Log likelihood	1271.668	Hannan-Quinn criter.		-2.702360
F-statistic	111.0706	Durbin-Watson stat		1.654688
Prob(F-statistic)	0.000000			

Source:E-View 10 Output (2022)

The coefficient of coefficient of determination (R2) is 0.92786 from table 9 above, and the regression model demonstrates that the range of values between adjusted R2 and R2 falls between 92% and 91%, respectively. This is consistent with the panel type of the data utilized in this study. This shows that the variations in the independent variables (BS, BI, and BGD) account for around 92% of the overall variations in the Environmental Disclosure Index (EDI), whereas the error term accounts for the residual 8% of the variance in the model.

The coefficient of the intercept (for the fixed effect result) is also positive, as seen in the

table above. Accordingly, the EDI of the enterprises increases by 0.682922 at every given period when these explanatory variables are held constant. The standard error test is used to quantify the error and ascertain the level of confidence in the accuracy of the estimations.

Amongst study's explanatory variables, BS, BI, and BGD were determined to be statistically significant and negligible, respectively, with probability values of 0.0327, 0.6043, and 0.5935, which are less and larger than 5%, according to the results shown in the above table. The value of the F-statistic is 111.0706 while the probability of the F-statistic is 0.0000 when the regressors (BS, BI, and BGD) are compared to the regressed (EDI). This finding suggests that the overall regression is both statistically significant at 5% and positive.

4.1 Discussion of Findings

This study examined firm monitoring attributes and environmental sustainability reporting; evidence from listed non-financial companies in Nigeria, using panel series data and regression analysis approach. Firm monitoring attributes as the independent variable was proxied by board size (BS), Board independence (BI) and board gender diversity (BGD) while environmental sustainability reporting for the eighty two (82) listed non-financial companies in Nigeria, for a period of 10 years ranging from 2011 to 2020.

The regression result revealed that board size has a positive significant effect on environmentaldisclosure of listed non-financial companies in Nigeria. The result shows a beta coefficient of 0.001585with p-value of 0.0327 indicating that the p-value is statistically significant. This implies that board size as one of the proxies of firm monitoring attributes significantly affect the environmentaldisclosure of listed non-financial companies in Nigeria. The results serve as a basis for failing to reject the null hypothesis, which states that board size has no significant effect on environmentaldisclosure of listed non-financial companies in Nigeria. The study's finding is in alignment with that of [5] and [26] which revealed positive significant relationship.

Also, the result exhibits evidence that board independence has a negative significant effect on EDI of listed non-financial companies in Nigeria. Implying that board independence insignificantly affects EDI of listed non-financial companies in Nigeria. This provides a basis for rejecting the null hypothesis which stated that board independence has no significant effect on EDI of listed non-financial companies in Nigeria. The finding does not aligns with that of[53] which has positive significant effect on EDI. But aligns with that of [5], [6], and [36].

Furthermore, the table also revealed that board gender diversity has a negative and insignificant effect on EDI of listed non-financial companies in Nigeria. This indicates that board gender diversity has negative insignificant effect on EDI. The study therefore, accepts the null hypothesis which states that board gender diversity has no significant effect on EDI of listed non-financial companies in Nigeria. The study is not consistent with that of [52], [54], [44] and [4].

V. CONCLUSION AND RECOMMENDATION

The objective of this study is to examine the effect of firm monitoring attributes (board size, independent, board gender diversity) on environmental sustainability reporting of listed non-financial companies in Nigeria. The study found that board size and board independence have significant effect on EDI. While board gender diversity have insignificant negative effect on EDI of listed non-financial companies in Nigeria.The study concludes that firm monitoring attributes have significant effect on environmental sustainability reporting. Based on the finding, recommendations were proffer thus:

Non-financial corporations should be discouraged from having smaller boards since larger boards have better management skills and are better able to make strategic decisions that lead to high environmental disclosure.

Non-financial companies should encourage independent board members to a maximum that can guarantee environmental disclosure since high board independence does not encourage environmentaldisclosure.

Furthermore, women directors should be allowed to handle some certain strategic responsibility but to a minimum in the organization, since they stand a chance of negatively influencing environmentaldisclosure.

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