

# Direct and Indirect Relationships between Corporate Environmental Disclosure and Financial Performance\_ A Test of SDG 12 in a Less-Developed Context

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## Abstract

This study investigates the impact of board size and industry sensitivity on the correlation between environmental disclosure measures and the financial performance of listed companies in Nigeria's non-financial sector. The paper relies on DICTION software to compute the environmental disclosure proxies, descriptive statistics and regression analysis using robust panel corrected standard errors to find out the link between corporate environmental disclosure and return on assets using board size and industry sensitivity as the intervening variables. We analysed 42 Nigerian-listed firms from 2011 to 2022. Our investigation focused on how environmental disclosure, as measured by volume environmental disclosure (VED), general environmental disclosure tone (GED), and specific environmental disclosure tone (SED), impacts firm financial performance, which is measured by return on assets (ROA). We also looked at how board size and industry sensitivity influence this relationship. The empirical results reveal that the general environmental disclosure has a significant direct positive effect on ROA. Additionally, both the specific and volume of environmental disclosure have a direct negative effect on return on assets. We document that board size positively moderates the relationships between specific and volume of environmental disclosure on

ROA. We also find that industry sensitivity positively mediates the relationship between general environmental disclosure and ROA. We recommend that firms focus on environmental responsibility reporting as a driver for better performance and transparency. Future research could extend this analysis to other emerging markets, conduct cross-country comparisons, and explore other components of board diversity for more insights.

**Keywords:** Environmental Disclosure, Roa, Board Size, Industry Sensitivity, Diction Software & Stakeholder Theory.

### Introduction

Prior evidence shows that larger boards and environmentally sensitive industries, especially in less-developed countries, are characterized by difficulties in designing and implementing policies that target improved non-financial performance disclosure while trying to achieve increased financial performance (Albertini, 2013). The difficulty becomes intensified as boards are now expected to design and oversee the implementation of policies that manage stakeholder groups with conflicting needs, including environmental stakeholders (Kabir & Thai, 2017). In doing so, companies are crucially required by most governments to pursue the attainment of sustainable development goals (SDGs). SDG 12 is considered an important goal that targets the attainment of minimal environmental degradation (through ensuring responsible consumption and production) as well as the transparent reporting of environmental impacts and performance (Jibril, 2024).

From the industrial revolution in Europe through to the present time, the world has experienced a tremendous population expansion, accompanied by huge increases in production of goods and services to meet the ever-increasing consumption needs of the growing global populace. These geometrically increasing scenarios are occurring within a long-term phenomenon known as economic development (Haapanen and Tapio, 2016), with the rapid population expansion driving the global consumption and production aspects (Akinbode, 1997; Azam et al., 2020). Economic development may be generally described as a process that brings about more wealth and an improved living standard for the ever-growing population (Schumpeter and Swedberg, 2021). However, it has since become evident that the processes being implemented to attain economic development require a massive utilization of non-renewable natural resources and are inflicting harmful environmental impacts on the planet (Waziri et al., 2018; Hassan et al., 2023; Rehmen et al., 2022). Additionally, it has become unambiguous that the environmental degradations being caused are not limited to affecting the present generation, but also the ability of the future generation to live a healthy, fulfilling and comfortable life (Pearce, 1988; van Geldrop and Withagen, 2000; United Nations, 2015; Fenichel et al., 2019).

Realizing the long-run dangers of this unsustainable consumption and production pattern, concerned stakeholders have over the years developed strategies through the United Nations' 17 Sustainable Development Goals (SDGs) to achieve sustainable consumption, production, and utilization of natural resources without compromising the ability of future generations to meet their needs (Gasper et al., 2019). In so doing, therefore, at the microeconomic level, corporate firms in both advanced and developing countries are to embrace sustainable development and to particularly align their strategic objectives, operations, and activities to the sustainable SDG 12 (responsible consumption and production). One of the key subobjectives of SDG 12 is to ensure the restoration and

maintenance of Earth's environmental health. On Earth's environmental well-being, the United Nations (2015, p. 2) declares that "We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources, and taking urgent action on climate change, so that it can support the needs of the present and future generations." To operationalize the achievement of SDG 12, UN (2015) provides that countries are to ensure the attainment of efficient environmental management of chemicals and corporate firms in conformance to agreed international frameworks and tremendously bring down their air, water, and land pollutions. This must show evidence of significantly reduced adverse impacts on humans and the planet's health (UN, 2015; Gasper et al., 2019). A careful look at this provision demonstrates the intension to motivate and/or compel corporate firms to, through their home nations, ensure improved environmental performance. Furthermore, UN (2015, p. 22) then provides guidance on accountability and transparency of environmental responsibility and performance by corporations, directing signatory countries to "encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle." Obviously, this provision promotes and requires corporations to demonstrate environmental accountability and transparency regarding their environmental responsibility on resource utilization and emissions of pollution to air, water, and land.

Even though many studies have been conducted to investigate the link between corporate environmental disclosure and financial performance, there is dearth of literature focussing on the evaluation of environmental disclosure in relation to the progress in attaining SDG 12. Therefore, based on the above findings from different studies including Nigerian context revealed that the results are inconclusive, and this motivate us to revisit the relationship between environmental information disclosure and firm performance with intervening effects of board size and industry sensitivity.

The paper is structured as follows. The next section is devoted to review of relevant literature, sustainable development goals 12 and development of the research hypotheses and revisiting theoretical underpinnings. Such methods as Diction software and regression with panel corrected standard errors, fixed effect model with Driscoll & Kraay standard errors and empirical results are discussed and conclusion and recommendations were drawn.

## **Literature Review**

### *Corporate Environmental Reporting, Financial Performance and the SDG 12*

A large body of research has been investigating the relationship between environmental disclosure and financial performance for a couple of decades, and pieces of evidence documented are mixed. Those who documented a positive relationship contend that an improved environmental disclosure in terms of volume and quality enhances corporate financial performance (Cai et al., 2023; Pulino et al., 2022; Wang et al., 2020a; Wu & Li, 2023; Gao et al., 2023). On this note, Cai et al. (2023) explain that the positive relationship between the variables denotes the use of environmental disclosure as a strategy for firms to gain a competitive advantage and enhance their financial performance. Giving further insight into the positive relation, Porter and Vander (1995) conclude that environmental management can enhance a firm's competitive advantage through protecting the environment and

developing a positive social image, which would help to increase product sales and expand market opportunities.

However, studies such as (Albertini 2013; Song et al. 2017; Wang et al. 2021; Wang et al. 2021b; Kingsley, and Uche 2021) have reported a negative relation between the two variables. According to Friedman (1972), companies that disclose environmental information tend to incur higher costs on environmental protection and production equipment that ensure less environmental pollution, potentially leading to higher pollution levels. On this note, Albertini (2013), argues increased costs on environmental protection and improved environmentally friendly productive activities, accompanied by increased environmental disclosures, can reduce profit margins and negatively affect a firm's financial performance (Song et al., 2017). For instance, studies conducted by Wang et al (2021), and Wang et al (2020b), document that market-based financial performance reacts negatively to corporate environmental information disclosure.

Recently, there has been a rising wave of research evaluating corporate environmental reporting based on the pursuit of SDGs (Di Vaio et al., 2020; Hummel & Szekely; Hatayama, 2022; Vallet-Bellmunt, 2022; Erin et al., 2022; Lodhia et al., 2022; Partzsch, 2023; Toukabri and Mohamed Youssef, 2023; Erin and Olajede, 2024). However, these studies have not taken any defined directions; suffice it to say that they implicitly share an evaluation of progress in attaining the SDGs through environmental reporting as a common interest. For instance, Erin and Asiriawa (2019), report mixed results on the effect of accountability and transparency performance on sustainable development goal performance. Hatayama (2022), found that the implementation of sustainability reporting based on SDGs, including the reporting of environmental information, focuses more on some SDGs and less on others. Vallet-Bellmunt et al (2022), evaluate the extent to which retail companies perform in supporting and progressing SDG 12 through environmental disclosure. Erin et al (2022), evaluates the extent to which the top 50 corporations in Nigeria have performed in reporting ESG information based on SDGs. Hummel and Szekely (2022, p. 152) stated that they “assess both firms’ explicit reference to the SDGs in their annual reports as well as the implicit prevalence of SDG topics.” Toukabri and Yousef (2023) use the level carbon disclosure score (CDP) to assess the extent to which SDG 7 and SDG 13 are achieved by sampled US companies. Di Vaio et al. (2021), examined the nature and orientation of sustainability disclosures crafted to achieve the 17 SDGs. Erin and Olajede (2024), evaluate whether and non-financial reporting contribute to the attainment of SDGs by African companies. Similarly, Lodhia et al (2022), explored the nature and substantiveness of SDGs reporting with a view to establishing the extent to which SDGs are being achieved. A careful evaluation of these studies shows that they are mainly standing alone, are far between and the area as whole is trying to chart out research paths to define and guide studies. Nonetheless, our careful review shows that some studies focus on specific SDGs (see, for example, Gasper et al., 2019; Hatayama, 2022; Toukabri and Yousef, 2023; Vallet-Bellmunt, 2022). However, as our study is specifically concerned with SDG 12, we especially focus on the studies that evaluate ESG reporting vis-à-vis the pursuit of the achievement of SDG 12.

The debate on whether it pays to be green, now to be sustainable, or not has been on-going for several decades (Ulmann, 1985; Porter and Linde, 1995; Hart and Ahuja, 1996; Waddock and Graves, 1997; Orlitzky et al., 2003; Ambec and Lanoie, 2008; Dixon-Fowler, 2013; Zhou et

al., 2023; Azeem et al., 2024). Evidence documented by studies within this large body of research is still mixed and inconclusive. As a specific strand of research within the CSR performance and financial performance relationship, studies that explore whether it pays to pursue SDGs or not have begun to emerge. These studies explore whether doing well in attaining SDGs improves or worsens firm financial performance. Certainly, this research strand is an extension of the main body of knowledge that is concerned with the relationship between CSR performance and financial performance. Therefore, like the larger body of research, empirical evidence being documented on the link between the SDG attainment performance and financial performance is mixed, ranging from positive (Muhmad and Muhamad, 2020), neutral (Lassala et al., 2021), to negative (Lassala et al., 2021; Ahmad and Buniamin, 2021). Some studies have even reported multiple relationships (Lassala et al., 2021; Khan et al., 2021; Martí-Ballester, 2021). Therefore, the nascency and the inconclusiveness of findings within this research, which, at least in part, constitute an aspect of our study, substantiate/justify the conduct of the current research. Consequently, an investigation into the transparent reporting of the environmental information aspect of SDG 12, including its relation to financial performance, is justifiable and worth conducting. We hypothesize as follows:

H1: Measures of environmental disclosure significantly affect the financial performance of firms operating in the nonfinancial sector of a less-developed economy.

H1a: the volume of environmental disclosure significantly affects the financial performance of firms operating in the nonfinancial sector of a less-developed economy.

H1b: the general environmental disclosure tone significantly affects the financial performance of firms operating in the nonfinancial sector of a less-developed economy.

H1c: Specific environmental disclosure tone significantly affects the financial performance of firms operating in the nonfinancial sector of a less-developed economy.

### **The Role of Board Size**

The board size, as a key corporate governance mechanism, refers to the total number of directors who participate in formulating and overseeing the implementation of corporate strategies and policies. On this note Kabir and Thai (2017), stress that board members play a crucial role in corporations' strategic decision-making by providing access to resources that managers can rely on (Kabir & Thai, 2017). Commenting on the importance of board size, Said et al (2009), remark that the size a board plays a crucial role in determining its efficiency and effectiveness for the better or worse. From the agency theory viewpoint (Eisenberg, Sundgren, & Wells, 1998; Yermack, 1996) boards with effective coordination and communication enhance decision-making, efficiency, and performance by monitoring managerial actions and mitigating agency problems.

Empirical evidence from the literature confirms that Board size has a positive impact on the corporate environmental disclosure of a firms (Nuskiya et al., 2021; Gurol and Lagasio, 2021; Raimo et al., 2022; Kumari et al., 2022; Kilincarslan et al., 2020; Kiliç et al., 2014) For example, Kumari et al., 2022 show that there is a significant positive effect of board size on the corporate social responsibility disclosure. On the other hand, other studies establish a negative impact (Lippi and Galavotti 2024; Githaiga and Kosgei, 2022) and general conclude that board size has a negative effect on sustainability reporting. Furthermore, there are

studies that confirmed no effect (AbdurRouf and Hossan 2020), and concluded that board size was found to have no significant relationship with corporate social responsibility disclosure. Several studies have examined the moderating role of board size in the relationship between environmental disclosure and financial performance effect, Albitar et al (2019), suggested a moderation effect of corporate governance mechanisms including board size on the environmental, social and governance disclosure and financial performance nexus. Similarly, (Toukabri et al., 2022), confirmed the influential role of board size, director independence, the presence of women on the board and the presence of an environmental committee on Climate change disclosure and sustainable development goals (SDGs) nexus. While other justify no effect (Hamrouni et al., 2021) and concludes that there is no moderating effect of board size on the association between corporate social responsibility disclosure and information asymmetry.

Therefore, as established by Baron and Kenny (1986) that, the moderating variable can strength, modify or change the direction of the relationship. This study introduces board size as a moderator on the relationship between corporate environmental disclosure and firm's financial performance.

Our broad hypothesis on board size moderation is stated as follows:

H2: Board size moderates the relationships between corporate environmental disclosure and financial performance in the non-financial sector of a less-developed country.

H2 is further broken down into the following specific moderation hypotheses.

H2a: Board size moderates the relationship between the environmental disclosure volume and financial performance in the non-financial sector of a less-developed country.

H2b: Board size moderates the relationship between the general environmental disclosure and financial performance in the non-financial sector of a less-developed country.

H2c: Board size moderates the relationship between the specific environmental disclosure and financial performance in the non-financial sector of a less-developed country.

### **The Role of Industry Sensitivity**

This relates to environmental industry sensitivity and involves activities that has high adverse effects on the host community. According to Buniamin, S., Alrazi, B et al (2011) environmentally sensitive companies engage in hazardous product production processes, causing direct waste disposal to the environment, highlighting their business activities' significant environmental impact. Business activities by nature of their operations tend to have more effects on the environment, are termed as environmental sensitive (Al-Tuwaijri, 2004).

The lack of clear results has highlighted the need to intervene the relationship between environmental disclosure and a company's financial performance using industry sensitivity. According to Baron and Kenny (1986), a moderator is introduced where the influence of the predictor and the outcomes variable are either weak or inconsistent in nature. The moderator is expected to strengthen, modify, or changes the direction of the relationship between the predictor and criterion variables (Wu & Zumbo, 2008). This study introduced an industry sensitivity as an intervener in the relationship between environmental information disclosure and financial performance because it was confirmed from the literature that sensitive

industries affect the financial performance of the listed Nigerian firms negatively (Adabenege & Yahaya, 2018).

Several studies indicated that industry sensitivity is positively associated with corporate environmental disclosure Nuskiya et al (2021), as the study concludes that board size, board independence, board meetings, industry type, profitability and firm size are positively associated with corporate environmental disclosure level. On the other hand, the industry sensitivity has negative impact on the firm's financial performance (Adabenege & Yahaya, 2018).

Similarly, industry sensitivity as a mediating role play a vital function in the relationship between corporate environmental disclosure and corporate financial performance (Appiagyei et al 2023; Gopal Maji and Lohia 2024). In the study of Appiagyei K. et al., (2023) concludes a positive association between integrated reporting quality and sustainability performance but however, the strength of the relationship is found to be weaker among environmentally sensitive firms, thereby raising concerns that those companies in the environmentally sensitive may be reporting less sustainability information required. Furthermore, Gopal Maji and Lohia (2024), reported that, on the three ESG components, only governance(G) factor affects firm performance significantly. The interaction effect model suggests that the link between environmental, social and governance (ESG) disclosure and financial performance is mediated by industry sensitivity. However, the effect is greater for less or non-sensitive industries.

In the same vein, Emma et al (2021), conducted research on a tittle" Is sustainable development goals (SDG) reporting substantial or symbolic? An examination of controversial and environmentally sensitive industries and concludes that, our evidence shows lack of an effect of sustainable development goals on firm performance, confirming the information's symbolic importance to stakeholders. However, their findings confirmed an effect of the reporting on performance in environmentally sensitive industries.

Therefore, as established by Baron and Kenny (1986), that, the moderating variable can strength, modify or change the direction of the relationship. This study introduces industry sensitivity as a moderator on the relationship between corporate environmental disclosure and firm's financial performance.

Our broad hypothesis on industry sensitivity mediation is stated as follows.

H3: Industry sensitivity mediates the relationships between dimensions of corporate environmental disclosure and financial performance in the non-financial sector of a less-developed country.

H3 is further broken down into the following specific mediation hypotheses.

H3a: Industry sensitivity mediates the relationship between the environmental disclosure volume and financial performance in the non-financial sector of a less-developed country.

H3b: Industry sensitivity mediates the relationship between the general environmental disclosure and financial performance in the non-financial sector of a less-developed country.

H3c: Industry sensitivity mediates the relationship between the specific environmental disclosure and financial performance in the non-financial sector of a less-developed country.

### **Theoretical Underpinning: The Stakeholder Theory**

Stakeholder theory begins when corporations shift from solely focusing on shareholder value to fostering shared value (Ghelli, 2013). Freeman et al (2010), defines a stakeholder as “any group or individual who can affect or is affected by the achievement of an organisation’s objectives”. In defining stakeholder, Freeman et al (2010), considers both internal and external parties that affect and are affected by the firm. External parties often create pressures on firms to minimise corporate impacts and improve positive outcomes (Sarkis et al., 2010). The theory suggests that firms must effectively manage their relationships with their stakeholders to ensure their survival. On this note, Deegan and Blomquist (2006), explain that according to stakeholder theory, reporting on specific information can be utilized to attract or maintain specific stakeholder groups. For instance, to attract or retain influential individuals or groups interested in a firm's social or environmental activities, it is crucial to provide information about its performance. Thus, a company is based not only on profit maximisation but also on sustainable development and value maximisation (Buallay, 2021).

Stakeholder theory has been employed by many studies in the environmental accountability and reporting research to underpin the link between several variables of interest (Ullmann, 1985; Roberts, 1992; Altuwaijri et al., 2004; magness, 2006; Liao et al., 2015; Lu and Taylor, 2018; Theodoulidis et al., 2017; Haninun et al, 2018). For instance, the theory has been employed to explain the strategic posture view of the link between environmental performance and disclosure relationship (Ullmann, 1985; Roberts, 1992; Liao et al., 2015). In a different context, it has also been applied to underpin the link between environmental performance and financial performance (Altuwaijri et al., 2004, Endrikat et al., 2014; Lu and Taylor, 2018). There are also those who applied the theory to support and explain the link between environmental disclosure and financial performance based on the notion that an efficient management of divergent (diversified) stakeholder groups (including the environmental stakeholder group) will lead to an improvement of corporate financial performance (Altuwaijri et al., 2004, magness, 2006; Theodoulidis et al., 2017; Haninun et al, 2018).

Concerning the notion of the last group of studies, the requirement on pursuing the achievement of SDG 12 has added a layer of intensity and complexity to the management of the environmental stakeholder group. And this may affect the nature of the relationship between environmental disclosure and financial performance depending on, firstly how corporate board, based on their sizes, modify and implement policies; and, secondly, the intensity of negative environmental impact of the company. In this regard, and consistent with the last cohort, the current study employs the theory to underpin the relationship between volume, specificity, and general measures of environmental disclosure and financial performance in a less-developed country’s setting as companies operating therein pursue the achievement of SDG 12. The relation will be investigated through the intervening roles of board size and industry sensitivity.

### **Material and Methods**

#### *Research Design*

We use quantitative research techniques which enable statistical testing of the hypotheses generated above. This involves measuring and collecting data on the quantitative variables shown in figure 1. Below were collected for many non-financial companies listed in the



Nigerian exchange group limited for twelve-year-period. We employ Panel data regression analysis and other relevant estimation and tests of hypotheses.

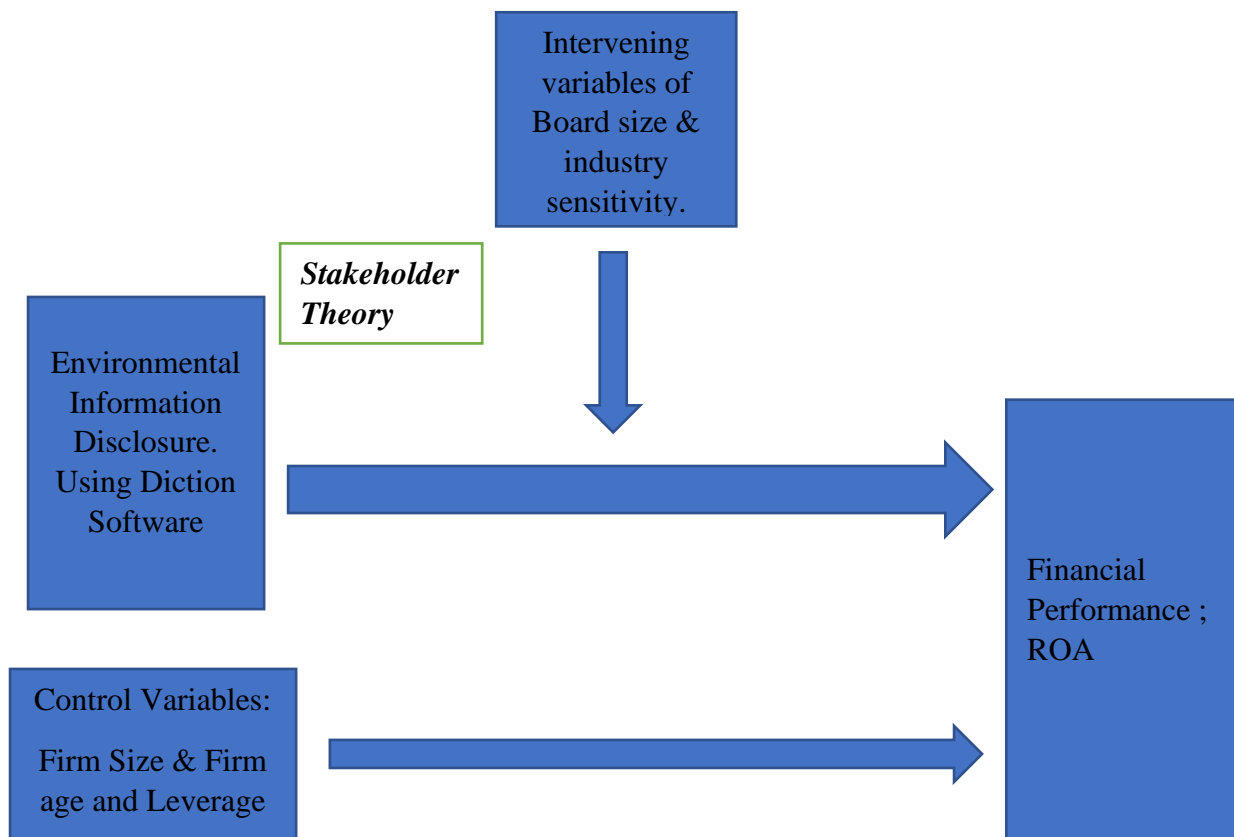


Figure 1: Research Framework

The population for this study is made up of 105 companies derived from 10 Nigerian non-financial listed industries. Sustainability reports, or stand-alone reports, or environmental report or annual reports in a few cases of the firms from 2011 to 2022 were carefully examined to identify those firms that provide environmental information disclosure and those that did not. The output of the examination revealed that out of 105 companies, only 42 companies provide the complete information for the said period (2011-2022), whereas 63 did not. The author adopted the 42 companies out of 105 as the tentative sample of the study. The sample industries include the ten industries listed in the Table 1 below. Environmental information disclosure extracted were imported into DICTION 7.1 as Microsoft Word documents. Eighteen environmental information disclosure (EID) reports were extracted as pictures and because DICTION does not support pictures files, these reports was converted to texts using optical character recognition software. By so doing, EID reports converted to editable Word files were edited based on the original picture files. All the 504 files entered DICTION 7.1 were carefully extracted the output in form of volume of environmental disclosure, general environmental disclosure tone and specific environmental disclosure tone, while other variables (ROA, board size, industry sensitivity, firm size, firm age and leverage) were extracted purely from annuals accounts of the selected companies from the 10 industries identified.

Table 4.1

*Summary of number of firms in each industry with number of observations*

S/N	INDUSTRIES	NO. OF FIRMS	PERIOD COVERED	NO. OF OBSERVATIONS
1.	Agriculture	2	12	24
2.	Construction/real estate	3	12	36
3.	Healthcare	3	12	36
4.	Industrial goods	5	12	60
5.	Natural resources	2	12	24
6.	Oil and gas	3	12	36
7.	Conglomerate	3	12	36
8.	Consumer goods	12	12	144
9.	ICT	2	12	24
10.	Services	7	12	84
	Total	42		504

Author's compilation: 2024

### **Variable's Measurement**

In this section, we defined our dependent, independent, intervening and control variables with their measurement.

#### *Dependent Variable*

Return on assets (ROA) is an indicator of how profitable a company is relative to its assets. It gives a manager/investor an idea as to how efficient a company's management in using its assets to generate earnings (Buallay, 2020). ROA will be used as a proxy for a company's financial performance.

ROA has been used by many studies in strategy, accounting & finance, and sustainability in the literature to measure a company's financial performance (Nor et al., 2016; Smith et al., 2007; Victor Chiedu Oba, Musa Inuwa Fodio, 2012).

ROA is calculated as the ratio of Net income to total assets.

#### *Independent Variable*

DICTION is a powerful computer-based software used to content-analyse texts in documents and it facilitates meaning-oriented interpretive content analysis (Beck et al., 2010) through a sophisticated word frequency analysis underpinned by communication theories (Cho et al., 2010). A unique characteristic of the programme is its ability to enable robust analysis of verbal tones used in communicating text messages based on five (5) master variables, namely, certainty, optimism, activity, realism, and commonality (DICTION 7.1, Hart, 1984). The software was created by Roderick P. Hart, a professor of communication and government and was designed to enable a scientific analysis of rhetoric used in communication via text documents.

In this research work, DICTION 7.1 will be used to generate three important variables from the information communicated by sustainability reports regarding environmental aspects of the non-financial firms listed in the Nigerian exchange group plc. These variables include optimistic score (General environmental disclosure tone), certainty score (Specific

environmental disclosure tone) and total words analysed (Volume environmental disclosure). Optimistic tone describes optimism as “language endorsing some person, group, concept, or event or highlighting their positive entailments”. This implies a deliberate language style that paints a favourable picture of a communicator (Goel et al., 2010), and the certainty score describes certainty as “language indicating resoluteness, inflexibility and completeness and tendency to speak ex cathedra”. As such verbal certainty represents a language style used by professional individuals who speak confidently and authoritatively due to objectivity, independence, and high technical proficiency, while total words analysed are volume related to environmental information that was critically analysed by the DICTION software.

#### *Intervening Variable*

The two intervening variables would be adopted in this current study, board size and industry sensitivity.

#### *Board Size*

The board size refers to the total number of directors who assist managers in formulating and implementing strategies. Board members play a crucial role in strategic decision-making by providing access to resources that companies rely on. (Kabir & Thai, 2017). The size of a board plays a crucial role in determining its efficiency and effectiveness. (Said et al., 2009).

Board Size = number of directors on the board (Kabir & Thai, 2017).

#### *Industry Sensitivity*

Sensitive industries are businesses that significantly impact the environment through their operations, causing degradation through effluents and emissions. (Enahoro, 2009). Non-sensitive industries are businesses that have minimal or no negative impact on the environment through their operations and emissions. The propensity of pollution from them is either nil or minimal.

#### *Industry Sensitivity:*

This will be computed as 1 if the industry is sensitive and 0 if the industry is not sensitive one (Loprevite et al., 2020; Welbeck et al., 2017).

#### *Control Variables*

The following variables would be use as a control for the study, namely, Firm size, Firm age, and Leverage.

Table 4.2

*Variable Measurement*

Variables	Measurements	REFERENCES
Dependent; ROA	Net income divided by total assets	(Buallay, 2021)
Independents: Environmental disclosure using diction software		
Volume Environmental Disclosure tone. General Environmental Disclosure tone Specific Environmental Disclosure tone.	Using Diction software analysis	Hassan A (2019)
Intervening variable; Board size	Total number of board directors	(Nur Utomo et al., 2020)
Intervening variable: Industry sensitivity	1 for Sensitive Industry and 0 for Non-sensitive industry.	(Loprevite et al., 2020; Welbeck et al., 2017)
Control: Firm size	Log of total assets	(Partalidou et al., 2020)
Firm age	Number of years firms listed.	(Kabir Tahir Hamid and Mohammed Ibrahim, 2020)
Leverage	Total Liability/Total Equity.	(Al-Tally, 2014; Ibrahim, Hashim, & Ariff, 2020).

Source: Compiled by the Author:2024

### Method of Data Analysis

The current study focus on the impact of direct and indirect effects, intervene through board size and industry sensitivity of the Nigerian non-financial listed firms. We employ the traditional panel data analysis using both static and dynamic models. The models are designed to take into cognisance the unobserved heterogeneity in the cross-sectional part of the panel dataset when estimating the link between variables under-review (Baltagi, 2005).

For testing the intervening effect of board size and industry sensitivity we adopt Baron and Kenny's (1986) hierarchical regression approach which was well documented in the literature (Githaiga,2022; Tariq et al.,2019; Shao, 2018; Woods et al., 2018). Therefore, in line with the past literature, at the initial stage, we regress the dependent variable of (ROA) on the control variables (firm size, firm age & leverage) and observe the model utilities (R-square, F-statistics, and/or Wald chi-square). In the second stage, we introduce the main independent variables to ascertain the direct link between the dependent and independent variables while considering the differences between the first and second stages utilities and observing progress in their performance.

In the third stage, the intervening variables were introduced to find out the impacts of such variable on the link between environmental disclosure and return on assets and finally, the interaction variables are also introduced to find out their impacts on the relationship between environmental disclosure and return on assets. Moreover, moderation exist if and only if, the interaction terms are significant over the direct effects of the independent variables in the third stage of the hierarchy (Githaiga,2022).

### Model Specification

Under this section, we first specify the general static and dynamic panel data models. Secondly, based on the outcomes of pre-estimation diagnostic tests presented in section below, we then specify our models at each of the four stages mentioned in section 4.

A general fixed effects (FE) model is specified as:

$$y_{it} = \beta_i X_{it} + a_i + u_{it} \quad 1$$

Where  $X_{it}$  denotes a vector of regressors,  $a_i$  is the unobserved heterogeneity and  $u_{it}$  is the idiosyncratic error with the sum of  $a_i + u_{it}$  being the composite error. However, if pre-estimation diagnostic tests suggest an estimation using a dynamic panel data model in any stage of the hierarchical moderation procedure, the following general dynamic specification will guide the estimation.

$$y_{it} = \beta_i X_{it} + \lambda_i W_{it} + a_i + u_{it} \quad 2$$

Where  $X_{it}$  is the vector of strictly exogenous variables;  $W_{it}$  is the vector of predetermined regressors including lags of  $y_{it}$  ( $y_{it-n}$ ), which define the dynamism of the model, and other endogenous variables.

The first step is specified as:

$$ROA_{it} = \beta_0 + \beta_1 FSZ_{it} + \beta_2 FAGE_{it} + \beta_3 LEV_{it} + a_i + \mu_{it1} \quad 3$$

In the second stage, we introduce all the independent variables of (TWA<sub>it</sub>, OPT<sub>it</sub> and CTT<sub>it</sub>) established as strictly exogenous.

$$ROA_{it} = \beta_0 + \beta_1 VED_{it} + \beta_2 GED_{it} + \beta_3 SED_{it} + \beta_4 FSZ_{it} + \beta_5 FAGE_{it} + \beta_6 LEV_{it} + a_i + \mu_{it1} \quad 4$$

The pre-estimation test in table 3 indicate that our model is characterised by cross-sectional dependence, heteroskedasticity and panel serial correlation, we specify a fixed effects model with Driscoll & Kraay standard error to estimate the model.

In stage 3, we introduce the board size and industry sensitivity as an intervening variable (BSZ<sub>it</sub> & IS<sub>it</sub>) established as strictly exogenous. The pre-estimation diagnostic results in table 4,5 & 6 revealed that the main three independent variables are endogenous and subsequently we identify a fixed effects model with Driscoll & Kraay standard error to estimate the model. in estimating the models.

$$ROA_{it} = \beta_0 + \beta_1 VED_{it} + \beta_2 GED_{it} + \beta_3 SED_{it} + \beta_4 BSZ_{it} + \beta_5 IS_{it} + \beta_6 FSZ_{it} + \beta_7 FAGE_{it} + \beta_8 LEV_{it} + \alpha_i + \mu_{it1} \quad 5$$

In the final stage (stage four), we introduce the interaction variables established as endogenous variables, which are the results of multiplying each main independent variable by the intervening variable. The pre-estimation diagnostic results in table 7, revealed that the main independent and interaction variables are endogenous as shown by the Wu-Hausman and Wooldridge robust endogeneity tests. Subsequently, we rely on fixed effects with Driscoll & Kraay standard errors to estimate our model:

$$ROA_{it} = \beta_0 + \beta_1 VED_{it} + \beta_2 GED_{it} + \beta_3 SED_{it} + \beta_4 BSZ_{it} + \beta_5 IS_{it} + \beta_6 VED_{it} * BSZ_{it} + \beta_7 GED_{it} * BSZ_{it} + \beta_8 SED_{it} * BSZ_{it} + \beta_9 VED_{it} * IS_{it} + \beta_{10} GED_{it} * IS_{it} + \beta_{11} SED_{it} * IS_{it} + \beta_{12} FSZ_{it} + \beta_{13} FAGE_{it} + \beta_{14} LEV_{it} + \alpha_i + \mu_{it1} \quad 6$$

### Results and Discussion

We use Stata 14 to estimate all the specific models presented in section 4. Descriptive statistics was carried out. These estimations and the presentation of the results therefrom in Tables 2,3,4, 5,6 & 7 are guided by the four-step procedure developed and used in the current paper.

Table 1  
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	504	.0720609	.1464864	-.9281139	.7926756
TWA	504	169.8234	272.9936	32	3827
OPT	504	53.18012	3.769891	36.77	62.28
CCT	504	49.24708	9.51958	33.1	126.92
FSIZE	504	10.4125	.7316624	8.599265	12.42463
FAGE	504	28.40476	13.39427	1	57
LEV	504	.1576727	.1813841	0	.7991317

As shown in the table 4.1 above, the results of the descriptive analysis show that the mean of environmental disclosure proxy by volume environmental disclosure with minimum of 32 and maximum of 3827 and general environmental disclosure with minimum of 36.77 and maximum of 62.28 and specific environmental disclosure with minimum of 33.1 and maximum of 126.92.

Table 2

*Static panel data results with control variables as the only regressors*

MODLE	ESTIMATION
PRE-ESTIMATION DIAGNOSTIC:	
Unobserved heterogeneity (FE): F-Stat	12.44
Cross sectional dependency: Pesaran test stat	5.115
Wald test for group-wise Heteroskedasticity	24033
Panel Serial correlation	297.71
DV: ROA <sub>it</sub>	Fixed effects with D & K Std. error

Regressors:	co-eff	p-value
FSZ <sub>it</sub>	0.1142	0.059*
FAGE <sub>it</sub>	-0.0106	0.01**
LEV <sub>it</sub>	0.0168	0.534*
CONSTANT <sub>it</sub>	-0.8162	0.116*

Model fit and post-estimation diagnostic tests:

R-Square within	0.0833
Model- F-stat	8.16

\*\*\*, \*\*, \* significant at 0.01, 0.05 and 0.1 respectively.

The table 2 above present the results estimated in step 1. It shows that (FSZ<sub>it</sub>) is positive and statistically significant at 10% while, (FAGE<sub>it</sub>) is negative and statistically significant at 5% and (LEV<sub>it</sub>) is positive and statistically insignificant at 10%. This implies that the control variables identified are appropriate. Moreover, the F-statistics in the above model is significant at 10% and it depicts that the model is fit and appropriate.

Similar with our approach and concluded by the results of pre-estimation diagnostic tests presented in table 2 above, we present specific models based on the hierarchical regression steps suggested by Baron and Kenny (1986). In the first step, as shown in Table 2, pre-estimation diagnostic tests through an exploratory fixed effects model show that the models are characterised by a significant unobserved heterogeneity, cross-sectionally dependent, heteroskedastic in nature, and serially correlated. Note that all the models estimated exhibit these four estimation issues. We, therefore, propose to regress the dependent variable ( $ROA_{it}$ ) on three control variables ( $FS_{it}$ ,  $FAGE_{it}$ , LEV<sub>it</sub>) that are strictly exogenous through a special FE model, with (Driscoll & Kraay, 1998) standard errors which corrects for all four issues listed (Driscoll & Kraay, 1998; Hoechle, 2007).

Table 3

*Static and dynamic panel data results with control and main independent variables as regressors.*

MODLE	ESTIMATION	
PRE-ESTIMATION DIAGNOSTIC:		
Unobserved heterogeneity (FE): F-Stat	12.44	
Cross sectional dependency: Pesaran test stat	5.115	
Wald test for group-wise Heteroskedasticity	24033	
Panel Serial correlation	297.71	
Waldridge test for Autocorrelation	0.378	
Test for Endogeneity:		
Durbin score	7.931	
Wu-Hausman	3.9649	
DV: ROA	Fixed effects with D & K Std. error	
Regressors:	co-eff	p-value
VEDit	-9.09	0.186*
GEDit	0.0014	0.059*
SEdit	-0.0016	0.128*
FSIZEit	0.1208	0.042**
FAGEit	-0.0109	0.006***
LEVit	0.0217	0.478*
CONSTANTit	-0.8725	0.101*
Model fit and post-estimation diagnostic tests:		
R-Square within	0.0924	
Model- F-stat	23.39	

\*\*\*, \*\*, \* significant at 0.01, 0.05 and 0.1 respectively.

From the above table 3, the independent variables were all introduced (VEDit, GEDit and SEDit). The direct relation between environmental disclosure proxy by volume environmental disclosure (VED) and operational performance proxy by return on assets (ROA) was negatively and statistically insignificant at 10%. This implies that the VED from environmental disclosure report do not impact on the return on assets. General environmental disclosure displays a positive and statistically significant at 10% which signifies that there is direct relationship with significant impact on the operational performance proxy by ROA and this may be as a result of favourable and good information related to environmental issues which may convince stakeholders to relate to firms positively and subsequently improve the firm's financial performance. Specific environmental disclosure (SEdit) has negative and insignificant impact on return on assets which testify that it has no impact on the operational performance proxy by return on asset (ROA), possibly due to unclear information regarding environment or uncertainty of such information. other control variables of FSZit shows a positive and significant impact at 5%, FAGE display a negative and significant impact at 1% and LEVit shows positive and insignificant relationship at 10%.



Table 4

*Static and dynamic panel data results with control, main independent and moderator variables as regressors.*

MODEL	ESTIMATION	
PRE-ESTIMATION DIAGNOSTIC:		
Unobserved heterogeneity (FE): F-Stat	5.16	
Cross sectional dependency: Pesaran test	19.285	
Wald test for group-wise Heteroskedasticity	2	
Panel Serial correlation	113.86	
Waldridge test for Autocorrelation	0.378	
Test for Endogeneity:		
Durbin score	7.931	
Wu-Hausman	3.9649	
IV: VED	Panel Corrected Stand error	
Regressors:	co-eff	p-value
Isit	85.5981	0.000***
BSZit	12.3574	0.37*
FSIZEit	103.323	0.000***
FAGEit	-0.0753	0.904*
LEVit	34.4628	0.403*
CONSTANTit	-1054.96	0.000***
Model fit and post-estimation diagnostic tests:		
R-Square within	0.1512	
Model- F-stat	278.27	

\*\*\*, \*\*, \* significant at 0.01, 0.05 and 0.1 respectively.

From the table 4 above, the relationship between explanatory variable and intervening variable was displayed. The VEDit shows a positive and statistically significant at 1% with industry sensitivity (ISit which justify the mediating role between VEDit and ROAit, On the other hand, board size plays a moderating role between VEDit and ROAit and display a positive and insignificant relationship at 10% level of significance with r-square of 15.12% and a fit model of 278.27.

Table 5

*IV and Intervening variable*

IV: GED	Panel Corrected Stand error	
Regressors:	co-eff	p-value
Isit	-1.4741	0.000***
BSZit	-0.0613	0.239*
FSIZEit	-0.7095	0.000***
FAGEit	-0.0753	0.091*
LEVit	0.9044	0.199*
CONSTANTit	61.3535	0.000***

Model fit and post-estimation diagnostic tests:

R-Square within	0.1512
Model- F-stat	278.27

\*\*\*, \*\*, \* significant at 0.01, 0.05 and 0.1 respectively.

From the table 5 above, the relationship between explanatory variable and intervening variable was displayed. The GEDit shows a statistically significant at 1% with industry sensitivity ISit which justify the mediating role between GEDit and ROAit, On the other hand, board size plays a moderating role between GEDit and ROAit and display a positive and insignificant relationship at 10% level of significance with r-square of 15.12% and a fit model of 278.27.

Table 6

IV and Intervening variable:

IV: SED	Panel Corrected Stand error	
Regressors:	co-eff	p-value
Isit	3.7719	0.000***
BSZit	-0.7179	0.100*
FSIZEit	0.5390	0.136*
FAGEit	0.1295	0.000***
LEVit	4.6328	0.004***
CONSTANTit	44.3597	0.000***

Model fit and post-estimation diagnostic tests:

R-Square within	0.1512
Model- F-stat	278.27

\*\*\*, \*\*, \* significant at 0.01, 0.05 and 0.1 respectively.

From the table 6 above, the relationship between explanatory variable and intervening variable was displayed. The SEDit shows a positive and statistically significant at 1% with industry sensitivity ISit which justify the mediating role between SEDit and ROAit. In the same vein, board size plays a moderating role between SEDit and ROAit and display an insignificant relationship at 10% level of significance with r-square of 15.12% and a fit model of 278.27.

Table 7

*Static and dynamic panel data results with control, main independent and moderator variables and interaction*

MODLE	ESTIMATION	
PRE-ESTIMATION DIAGNOSTIC:		
Unobserved heterogeneity (FE): F-Stat	6.49	
Cross sectional dependency: Pesaran test stat	3.837	
Wald test for group-wise Heteroskedasticity	13186	
Panel Serial correlation	21.62	
Waldridge test for Autocorrelation	0.338	
Test for Endogeneity:		
Durbin score	7.931	
Wu-Hausman	3.9649	
DV: ROAit	Panel Corrected Stand error	
Regressors:	co-eff	p-value

VEDit	-0.0000	0.427
GEDit	-0.0122	0.091
SEDit	-0.0115	0.002
Isit	-0.3167	0.166
BSZit	-0.1000	0.001
VEDit*Isit	-0.0001	0.148
GEDit*Isit	0.0065	0.049
SEDit*Isit	0.0003	0.892
VEDit*BSZit	0.0000	0.000
GEDit*BSZit	0.0007	0.224
SEDit*BSZit	0.0011	0.000
FSIZEit	0.0218	0.001
FAGEit	-0.0001	0.768
LEVit	0.0741	0.012
CONS_	1.0575	0.009
Model fit and post-estimation diagnostics:		
r-square within	9.59%	
Model fit F-stat	113.32	

\*\*\*, \*\*, \* significant at 0.01, 0.05 and 0.1 respectively.

At stage four, we estimated the results of equation 6 presented in the above table 7. In this stage, we ascertain whether the measures of board size (BSZit) moderate the environmental disclosure proxies by volume environmental disclosure (VED), general environmental disclosure (GED) & specific environmental disclosure (SED) and firm's financial performance proxy by return on assets (ROA) relationship. Based on the above results, there is positive and statistically significant impact at 1% between (VEDit) and (ROAit) via moderating role of board size which support for H2a, which states that board size intervenes the relationship between volume environmental disclosure and return on assets. We conclude that board size moderates the relationship between volume environmental disclosure and return on assets with significant impact. However, there is positive and insignificant indirect relationship between general environmental disclosure (GEDit) and return on assets (ROAit) via the moderating effects of board size. This means that board size has no impacts on the relationship and hence does not support the H2b, which says that board size intervene the relationship between general environmental disclosure and return on assets and lastly there is a positive but statistically significant relationship between specific environmental disclosure (SEDit) and return on assets (ROAit) and we conclude that there is a significant impact on the relationship and this signifies that the environmental information provided are certain and relevant which could motivate the stakeholders to have positive thought on the company and hence will improve the financial performance, with r-square of 9.56% that explains the impact of explanatory variables.

Furthermore, regarding the mediating effect of industry sensitivity, we ascertain whether the measures of industry sensitivity (IS) mediate the environmental disclosure proxy by volume environmental disclosure (VED), general environmental disclosure (GED) & Specific environmental disclosure (SED) and firm's financial performance proxy by return on assets (ROA). Based on the above results, there is negative and statistically insignificant impact of industry sensitivity between (VEDit) and (ROAit) which does not support for H3a, that states

industry sensitivity intervenes the relationship between volume environmental disclosure (VEDit) and return on assets (ROAit) and concludes that industry sensitivity does not mediate the link at all. Moreover, there is a positive and statistically significant impact of industry sensitivity in the relationship between general environmental disclosure and return on assets which support the H3b, that states that industry sensitivity positively intervene the link between general environmental disclosure and return on assets and concludes that the industry sensitivity highly mediate the relationship nexus, and signifies that environmental information provide a favourable and sensitive adverse free which could help the firm to improve the financial performance. Lastly there is a positive but statistically insignificant relationship between specific environmental disclosure and return on assets via mediating role of industry sensitivity which justify that there is no impact of mediating role.

Some studies conducted investigating the impact of environmental disclosure on firm performance documented a mixed results (Johari & Komathy, 2019; Rehman et al., 2020), ranging from positive and significant impact (Cai et al., 2023; Gao et al., 2023; Shi et al., 2021), negative impact (D. Wang et al., 2021; S. Wang et al., 2020), and no effects Shinta Dewi et al., (2021). Our studies contribute to this debate by documenting 3 key results.

Firstly, in our direct relationship we conclude that environmental disclosure proxy by general environmental disclosure directly impact positively on operational performance proxy by return on assets, while volume environmental disclosure and specific environmental disclosure had no impact on return on assets. Secondly, in the case of moderating effects of board size, there is positive and statistically significant effects of board size on the relationship between VED and ROA and hence had a significant impact and similarly, there is positive and significant link between specific environmental disclosure and return on assets via a moderating role of board size, while general environmental disclosure and return on assets has no impact.

Thirdly, on the mediating effect of industry sensitive variables, result documented a negative and insignificant impact of industry sensitivity on the relationship between volume environmental disclosure (VED) and return on assets (ROA) and a positive but insignificant link between specific environmental disclosure and return on assets via industry sensitivity, while, general environmental disclosure and return on assets indicates a positive and statistically significant impact of industry sensitivity on the link and justify a strong impact of mediating role of industry sensitivity and such results may be as a results of good and favourable information provided in the environmental report and this will enhance the firm performance.

The results documented a direct positive and statistically significant relationship between environmental disclosure proxy by general environmental disclosure and return on assets and this emerged from the test of H1a. The findings align with the results of prior studies (Cai et al., 2023; Gao et al., 2023; Shi et al., 2021), and suggest that firms that disclose a positive information regarding environmental activities tend to improve its performance. The results are consistent with stakeholder theory which propagate that stakeholders both internal and external should be considered while taking decision to protect their interest, while other variables (Volume and specific environmental disclosure) documented no impact of such variables on the firm performance proxy by return on assets and this emerged from the test

of H1b & H1c. The results align with the prior studies (Wang et al., 2021; S. Wang et al., 2020), and concludes that disclosing environmental information has nothing to do with firms' financial performance and hence no effect at all (Okpala, & Iredele, 2019).

On the moderating role of board size, our results documented a mixed finding. An indirect positive and statistically significant relationship between volume environmental disclosure and operational performance of return on assets (ROA) in the Nigerian non-financial listed firms. This implies that the listed firms in the Nigerian Group exchange plc significantly disclose the environmental related, relevant and less adverse information, and this will convince the existing and potential stakeholders to patronise the goods and/or services provided and hence improve the firm's performance, and this is aligned with the prior studies (Albitar et al., 2020; Mohammad & Wasiuzzaman, 2021). Furthermore, board size also, play an indirect positive and statistically insignificant relationship between general environmental disclosure and return on assets of the listed firms via the moderating variable of board size. This indicate that the board size has no impact on the relationship and this support prior studies (Buallay, 2020; Pawar & Munuswamy, 2024) and lastly board size played an indirect positive but statistically significant relationship between specific environmental disclosure and return on assets via moderating variable of board size and implies that there is full impact of board size on the relationship and such environmental information needed are present without doubts and this will undoubtedly improve the firm's financial performance and supported by prior studies (Chung et al., 2024).

On the mediation effect, there is a negative and insignificant relationship between volume environmental disclosure and return on assets via a mediating role of industry sensitivity and this implies that the sensitivity of the firm's does not mediate the relationship, and this is supported by previous researchers (Appiagyei et al (2023), and there is a positive and statistically significant relationship between general environmental disclosure and return on assets via industry sensitivity role and this implies that the sensitive firms provide a good and sound environmental information which could convince the stakeholders including shareholders and customers to patronise the company's activities and hence improve the financial performance of the firms and this is supported by (Maji and Lohia 2024). Lastly, there is a positive but insignificant impact of industry sensitivity between specific environmental disclosure and return on assets and this indicates that there is no impact on the firm performance (Benlemlih et al., 2018; Qiu et al., 2016).

### **Conclusion, Recommendation and Future Research**

This study investigates the relationship between environmental disclosure and firm's financial performance in the non-financial firms listed in the Nigerian exchange group plc. The research is quantitative in nature and based on time-series & cross-sectional analysis of 42 firms listed for twelve (12) years (2011-2022) for a total of 504 observations. The data generated was analysed using Panel Corrected Standard errors (PCSE) and fixed effect model with Driscoll & Kraay standard errors. Given the structure of the dataset, we conclude that fixed effect model with Driscoll & Kraay standard errors are the most appropriate and robust for our analysis.

The findings deduced from the empirical results demonstrate that environmental disclosure proxy by volume environmental disclosure and specific environmental disclosure has an insignificant relationship with return on assets which justify no impact at all and may be as a

result of inadequacy or irrelevant words related to environmental issues and uncertainty of such information provided while general environmental disclosure has a direct positive and statistically significant impact on the operational performance proxy by return on assets and this signifies that information provided with regards to environmental issues are encouraging and favourable in nature and this will convince the stakeholders to engage with the firms and hence will improve the firm's financial performance.

While, for the moderating role, it revealed that board size is positive and significantly moderates the volume environmental disclosure and return on asset relationship and implies that board size plays a vital role in moderating the link and this is because the volume analysed are favourable and encouraging with regards to environmental information provided by the companies and will manifest in the firm performance positively. Secondly, board size does not moderate link between general environmental disclosure and return on asset relationship. This implies that the board size has no impact in the environmental disclosure and firm's performance link. Thirdly, specific environmental disclosure and return on assets was moderated by board size positively and significantly, and this implies that board size impacted on the link and justify the impact because of undoubted relevant environmental information provided which is favourable and good in nature.

In the case of mediating effects of industry sensitivity, there is a negative and insignificant link between volume environmental disclosure and return on assets via industry sensitivity and this confirmed that industry sensitivity does not mediate the link. Furthermore, general environmental disclosure and return on assets was positively and significantly mediated by industry sensitivity and this signifies that the environmental information provided was favourable enough and minimises the adverse effect on the host community and environment, which could help in boosting the firm's financial performance and lastly, there is positive and insignificant relationship between specific environmental disclosure and return on assets via the mediated role of industry sensitivity and report no impact of such mediating role on the link.

The overall results have important management implications. Firstly, the management should give more emphasis to the disclosure of environmental information as it has positive impact on the firm's performance and subsequently will increase the return on assets. Secondly, the management of the corporations should strength board size by forming a strong and diversified experts board members to check met the management activities effectively and efficiently. Thirdly, the management of the company should put strict measures to ensure that the firm maintain environmental management system especially to those environmental sensitive companies for better performance and sustainable development.

The following recommendations was proposed:

We recommend that firms must focus more on environmental responsibility reporting as a driver for better performance and transparency.

We suggest that stakeholders such as investors, creditors, debtors & financial institutions to increase their knowledge about the terms of environmental activities and its important in helping the business to make better decision-making analysis and investment opportunities.

We also advice the Nigerian authorities such as Security & Exchange Commission (SEC), Federal Ministry of Environment, Stock Exchange Group plc and other relevant authorities to

ensure that firms provide reliable and relevant environmental information in their annual reports of accounts or stand-alone report or environmental report for external users.

Finally, we suggest future research on environmental disclosure to focus on other factors that can moderate and/or mediate the relationship such as board independent, board gender diversity, CEO duality, ownership concentration. Furthermore, the pollutant industry such as oil & gas, natural resources, energy, steel and coal need to be studied alone.

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