

## Board characteristics, audit firm choice and Environmental, Social and Governance Reporting in Environmentally Sensitive Listed Firms in Nigeria

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**Abstract :** The study examined the role of board characteristics and audit firm choice in the Environmental, Social, and Governance (ESG) disclosure in the Nigerian companies. The variables included in the analysis included ESG disclosure which was measured by Global Reporting Initiative (GRI) framework; audit firm choice; and board characteristics, including independence, gender diversity, meeting frequency, and board size, and the control variables, including firm size, profitability and leverage. The secondary data were obtained using annual reports of 26 companies on the Nigerian Stock Exchange in six years of 2018-2023. The dataset was analyzed using panel corrected standard errors. Findings revealed that board independence had statistically significant positive impact on ESG disclosure at the 1 percent level of significance, hence, highlighting the critical role of independent directors in promoting ESG reporting. Furthermore, this relationship was moderated by audit firm choice, which implies that the effect of independent directors on ESG disclosure is strengthened by the presence of a specific audit firm as well at the 1% level of significance. The study found out that board attributes and audit firm selection jointly determine ESG disclosure practices in Nigerian companies. Therefore, the authors recommend that organisations should strengthen their board characteristics i.e. by focusing on appointment of independent directors who provide independent oversight and provide balance in corporate decisions and interests of stakeholders.

**Keywords :** Board characteristics, audit, Environmental, Governance, Listed Firms, Nigeria

**Résumé :** Cette étude examine le rôle des caractéristiques du conseil d'administration et du choix du cabinet d'audit dans la publication d'informations environnementales, sociales et de gouvernance (ESG) au sein des entreprises nigérianes. Les variables analysées comprennent la publication d'informations ESG, mesurée selon le référentiel de la Global Reporting Initiative (GRI) ; le choix du cabinet d'audit ; et les caractéristiques du conseil d'administration, notamment l'indépendance, la mixité des genres, la fréquence des réunions et la taille du conseil, ainsi que les variables de contrôle, telles que la taille de l'entreprise, sa rentabilité et son niveau d'endettement. Les données secondaires proviennent des rapports annuels de 26 entreprises cotées à la Bourse du Nigeria sur la période 2018-2023. L'analyse des données a été réalisée à l'aide d'erreurs-types corrigées pour les données de panel. Les résultats révèlent que l'indépendance du conseil d'administration a un impact positif et statistiquement significatif sur la publication d'informations ESG (seuil de signification de 1 %), soulignant ainsi le rôle crucial des administrateurs indépendants dans la promotion du reporting ESG. De plus, cette relation est modulée par le choix du cabinet d'audit, ce qui signifie que l'effet des administrateurs indépendants sur la publication d'informations ESG est renforcé par la présence d'un cabinet d'audit spécifique (seuil de signification de 1 %). L'étude

conclut que les attributs du conseil d'administration et le choix du cabinet d'audit déterminent conjointement les pratiques de publication d'informations ESG au sein des entreprises nigérianes. Par conséquent, les auteurs recommandent aux organisations de renforcer les caractéristiques de leur conseil d'administration, notamment en privilégiant la nomination d'administrateurs indépendants qui assurent une surveillance impartiale et un équilibre entre les décisions de l'entreprise et les intérêts des parties prenantes.

**Mots-clés :** Caractéristiques du conseil d'administration, audit, environnement, gouvernance, sociétés cotées, Nigéria

## Introduction

Over the past years, Environmental, Social and Governance (ESG) disclosure has become one of the key issues in the corporate practice as an increasing number of people understand that the performance of business cannot be isolated of the broader environmental and social implications (Khamisu and Paluri, 2024). ESG considerations no longer focus on conventional financial reporting alone, but incorporate aspects like climate change mitigation, labor standards, human rights protection, diversity and inclusion, ethical conduct, and quality of corporate governance arrangements (Hwang, 2024). ESG disclosure has, therefore, become a significant tool of enhancing corporate transparency, accountability, and stakeholder engagement (Strouhal et al., 2025). Efforts of regulatory institutions are also slowly changing the ESG reporting structures in Nigeria. The Central Bank of Nigeria (CBN) promotes sustainability in the financial sector by the application of the Nigerian Sustainable Banking Principles, which focus on ensuring that ESGs are incorporated in the risk management and sustainable finance. Equally, the Securities and Exchange Commission (SEC) promotes ESG reporting by using the Nigerian Sustainable Finance Principles, which promote the capital market operators to make use of ESG factors and enhance disclosure transparency. The Nigerian Exchange Group (NGX) also enhances voluntary sustainability reporting by way of its 2019 Sustainability Disclosure Guidelines, and the Financial Reporting Council of Nigeria (FRC) keeps in line with the international reporting trends by adopting the International Sustainability Standards Board (ISSB) IFRS sustainability disclosure standards. The concept of ESG disclosure can thus be described as the systematic reporting of the environmental, social, and governance performance of a company, as well as the risks and opportunities linked to the sustainability practices (Pratiwi and Edeh, 2024). It is becoming evident that such reporting is one of the essential signs of corporate responsibility and ethical business practices and contributes to decision-making based on trust and responsible investment (Sari and Muslim, 2024).

Even though it has been becoming increasingly relevant, ESG disclosure has been marked by significant practical issues. Organizations all over the world also struggle with constant issues such as disparities in reporting standards, poor quality of data, and insufficient implementation of ESG indicators in the major corporate reporting systems (Du Toit, 2024). Such inadequacies diminish the comparability among firms and restrict the stakeholders in the assessment of the ESG performance effectively, establishing gaps in transparency and accountability that cannot be completely solved by the existing research. These problems are compounded in Nigeria especially in industries that are environmentally sensitive like industrial goods, agriculture, oil and gas, and natural resources where the risks of sustainability are the greatest. The lack of expertise and resources to execute ESG strategies is a challenge to many companies in these industries, and poor stakeholder awareness and engagement are also factors that reinforce the lack of disclosure practices.

Consequently, the unhealthy practices like oil spills, deforestation, and overproduction of carbon can continue with minimal responsibility fueling environmental destruction. Moreover, the lack of proper ESG integration can exacerbate social impact by overlooking labor rights, host-community relations, and governance practices and raising the conflict risks and labor unrest. In the long run, these vices compromise the sustainability of natural resources, jeopardize the long-term sustainability of industries, and slow down the process of achieving national development goals, such as the United Nations Sustainable Development Goals (SDGs). These facts highlight the necessity to find out more about the reasons behind ESG disclosure in the environmentally sensitive industries in Nigeria.

Some previous studies have investigated the drivers of ESG disclosure and have analyzed such factors as the governance structure, the regulatory pressure, and the influence of the stakeholders (Sulemana et al., 2025; Bolognesi et al., 2025; Yavuz et al., 2024; Anifowose, 2025). Although these studies emphasise the significance of good governance and favourable regulatory frameworks, disclosure practices are inconsistent and ineffective in Nigeria in the environmentally sensitive industries (Sulemana et al., 2025). This perseverance can be attributed to the limitation of previous works, such as variable measurement problems (Bolognesi et al., 2025), methodological limitations (Yavuz et al., 2024), small sample sizes (Anifowose, 2025), and the lack of focus on important board traits. According to recent scholarship, the aspects of independence, gender diversity, frequency of meetings, and size of the board are the board attributes that are crucial in determining the ESG disclosure outcomes (Almaqtari et al., 2023; Hida and Bassidi, 2024; Lippi and Galavotti, 2024), as the board is directly involved in the corporate control and disclosure governance (Hermalin and Weisbach, 2019).

Nonetheless, empirical evidence is still contradictory: it has been found that board independence is significant in certain settings (Yavuz et al., 2024; Anifowose, 2025) but not in others (Schmuck et al., 2022), and board gender diversity, board meetings, and board size also have inconsistent findings. These inconsistencies could be related to regulatory strength differences (Almaqtari et al., 2023), corporate culture and internal governance direction (Adeniyi et al., 2024), contextual differences across industries and regions (Almaqtari et al., 2023; Schmuck et al., 2022), and methodological differences in ESG measurement, i.e., Bloomberg ESG scores and Global Reporting Initiative (GRI)-based indices (Adeniyi et al., 2024). It is against this background that this study is relevant as the research will explore the relationship between board attributes and ESG disclosure and how the audit firm choice mediates this relationship. The relevance of audit firm choice is that auditors can increase the credibility of ESG disclosure by verifying it independently (Hazaea et al., 2025), contribute to adherence to reporting frameworks, including GRI, SASB, or TCFD, (Almaqtari et al., 2023), help in identifying and managing ESG risks (Anifowose, 2025), and create a stronger trust of stakeholders with more reliable reporting. Through this, the study will give more insight on how the internal governance mechanisms interact with the external assurance processes in the determination of ESG reporting outcomes.

## 1. Theoretical Review and Empirical Review

### 1.1 Agency Theory

The agency theory was mainly formulated by economists Michael C. Jensen and William H. Meckling, and it is commonly considered to be the basis of the modern concept of agency relationships. Their study offered an elaborate model of examining the conflicts of interests that exist between agents and principals and gave rise to the agency costs. The theory deals with the association between the agents (managers or executives) and principals (owners or shareholders). In the principal agent relationship, the principals put in place agents who administer the firm on their behalf. The key problem is that, as the owners are interested in maximising their returns on their investment, the managers can be interested in personal goals which are not necessarily according to the interests of the owners. Such a difference may create a possible conflict of interest, where managers may focus on personal gains, including increased pay or increased job security, rather than on the best performance of the company (Gwala & Mashau, 2023; Bendickson et al., 2016).

One of the major problems that arise in the principal-agent relationship is information asymmetry. Managers usually have greater information on the operations and the financial status of a firm than the shareholders. Such an imbalance may also allow managers to make decisions that are favorable to them at the expense of the shareholders. As an illustration, a manager can be undertaking projects that will safeguard his/her own job but not necessarily increase the shareholder value. Such an imbalance requires mechanisms in order to keep a check and bring the interests of both parties into harmony.

Independent board members can be seen as one of the effective mechanisms of mitigating such conflicts. Uninvolved directors that are not part of the daily running of a firm are able to offer objective monitoring of a management. They provide a control over the managerial decision-making process so that the managerial decisions do not violate the interests of shareholders (Bendickson et al., 2016). In the case of ESG disclosure, independent boards will tend to suggest more openness and regular reporting. The reason is that sound ESG practices are increasingly seen to be key to long-term shareholder value, and may mitigate the problem of managerial opportunism.

Board meetings are also regular and are important in the agency theory. These meetings are a systematic way of the board to examine and analyze management actions and measures. Constant communication and monitoring are guaranteed by regular communication. With regards to ESG matters, regular board meetings ensure that such issues are given the necessary consideration and control. Such continued interaction can bring improved governance and comprehensive ESG reporting, because the board is able to respond to arising concerns in real-time and can make sure that the practices of the firm are in line with the expectations of the shareholders (Gwala 2023).

Resource dependency theory dwells on the relationship between organisations and the external resources upon which they depend in their operations, as well as how they manage the dependencies in order to gain a competitive advantage. Jeffrey Pfeffer and Gerald Salancik are the main sociologists who developed this theory. It also highlights the effect of external resources and environment on organisational behaviour and strategy indicating that boards of directors can be instrumental in availing access to important resources

including expertise, knowledge, gender difference and network, thus improving performance and sustainability of firms (Hillman et al., 2009; Celtekligil, 2020).

Board gender diversity is one of the major aspects of this theory. As an example, a diverse board may present different views and experiences that are likely to be of great benefit to the firm. A diverse board has the ability to increase the knowledge and reaction to the requirements of various stakeholders such as customers, employees and community. Such a larger picture can result in more successful ESG disclosure, because gender-inclusive boards have higher chances of focusing on a broad spectrum of issues holistically, especially those impacting the community (Celtekligil, 2020).

The size of the board is also very important in resource dependency theory. The bigger boards are able to offer a broader range of experience and resources and this may be beneficial in complicated decision-making processes. A bigger board has access to a bigger pool of knowledge and skills which improves the capabilities of the firm to manage its dependencies and to overcome challenges. Such wide experience can enhance quality of ESG disclosure in that a more informed board will be in a better position to understand and report the ESG performance of the firm.

## **1.2 Board Characteristics and ESG disclosure**

Several empirical studies have been conducted on this relationship and have used different theoretical approaches like the stakeholder theory, dependency theory and the legitimacy theory. Some studies have exhibited that there is a positive relationship between board independence and ESG disclosure, indicating that independent boards enhance disclosure, however, others have revealed that the association between board independence and ESG disclosure is either negative or insignificant, implying that the effect of board independence on ESG disclosure might be industry and region specific. As an example, Pozzoli et al. (2022) evaluated the impact of board independence on the ESG disclosure of Chinese companies. Based on panel data of 703 firms collected between 14 years (2006-2019) and the application of the OLS regression analysis, the results showed a statistically significant positive relationship, which implies that an increase in board independence levels will positively contribute to ESG disclosure. The research was based on the concept of stakeholder theory to justify how independent boards may serve the stakeholder expectations in a better way based on transparent ESG reporting. Nevertheless, the sample used, though large, might not be representative of the whole population of 4,600 firms and as such, generalisability is restricted. A larger and more varied sample would be beneficial to the future study.

Based on the conception of board independence, Rahman (2020) examined how board independence affects the ESG disclosure of listed firms in India. The study of the panel data of 386 companies during 10 years (2007-2016) on the basis of the fixed-effects regression demonstrated that the impact of the board independence on ESG disclosure is significant and positive. The analysis used dependency theory to bring out the fact that the more firms are dependent on sound governance structures, the more they tend to deliver complete ESG disclosure. Nevertheless, the data use until 2016 makes the results less applicable to the present-day ESG disclosure practices. A more recent data would have offered a more precise representation of the current practices.

Similarly, MODOZIE et al. (2022) examined the impact of board independence on sustainability reporting by listed industrial goods companies in Nigeria. The results with the help of panel data of 15 companies during the time frame 2002-2022 and multiple regression analysis have shown that there is a positive and significant relationship between the board independence and ESG disclosure, with independent boards contributing to better ESG reporting. The legitimacy theory was utilized to describe how in the process of gaining legitimacy, firms with independent boards seek legitimacy by means of full ESG disclosure. However, the sample used is small and this limits the generalisability of the results to other sectors. It would be better to further the sample by incorporating more companies in different industries so as to get a clearer picture of the relationship.

Razaq et al. (2023) investigated the influence of gender in the board on sustainability reporting in Nigeria. The authors analysed the data over a decade (2011-2020) and studied the impact of the board gender diversity on the sustainability reporting of the quoted non-financial companies in Nigeria, based on random-effects regression of panel data of 51 companies. They established a positive although non-significant effect of board gender diversity on the disclosure of ESG in terms of Global Reporting Initiative (GRI) scores. The research was supported by the stakeholder theory and indicated the lack of measurement of independent variables, which is a potential area of future research.

On another regional level, Menicucci and Paolucci (2022) studied the board diversity and ESG performance in the Italian banking industry (2017-2021). This paper examined the connection between the board gender diversity and ESG performance through ordinary least squares (OLS) regression applied to information in 105 banks. Their results showed that there is a positive and significant effect of board gender diversity on ESG disclosure. This proves that improving female representation in boards can improve ESG reporting. The paper combined the agency, stakeholder and legitimacy theories to give a holistic picture of the relationship between board composition and ESG disclosure performance. Nevertheless, it had a significant limitation in that it only studied the banking industry and may not be generalisable to other sectors. The authors indicate that in future studies, this limitation can be solved by incorporating a more varied set of industries and researching more variables in order to support and elaborate on their findings.

Unlike the above results, Cucari et al. (2018) investigated the issue of board gender diversity and ESG disclosure in Italy. The authors utilized multiple regression analysis and a sample of 54 samples of companies across a ten-year span (2011-2014) to establish the existence of a negative and significant association between board gender diversity and ESG disclosure. They indicated that the greater the female representation on board, the lower the ESG disclosure rating. This implies that in the Italian setting, the gender diversity of boards may not result in enhanced disclosure and in fact, may be detrimental, which is contrary to the widely accepted notion that gender diversity enhances transparency. To further support the complexity of the relationship, Fahad and Rahman (2020) examined the role of corporate governance on ESG disclosure in India and analyzed the effect of corporate governance on the disclosure in listed companies within a decade (2007-2016). The research found that there was a negative relation between gender diversity in boards and ESG disclosure, which means that the greater the number of women in boards, the lower the level of ESG reporting. This result is contrary to the expectation that the gender

diversity will increase the transparency and indicates that the relationship could be affected by other factors.

### **1.3 Audit Firm Choice and ESG disclosure**

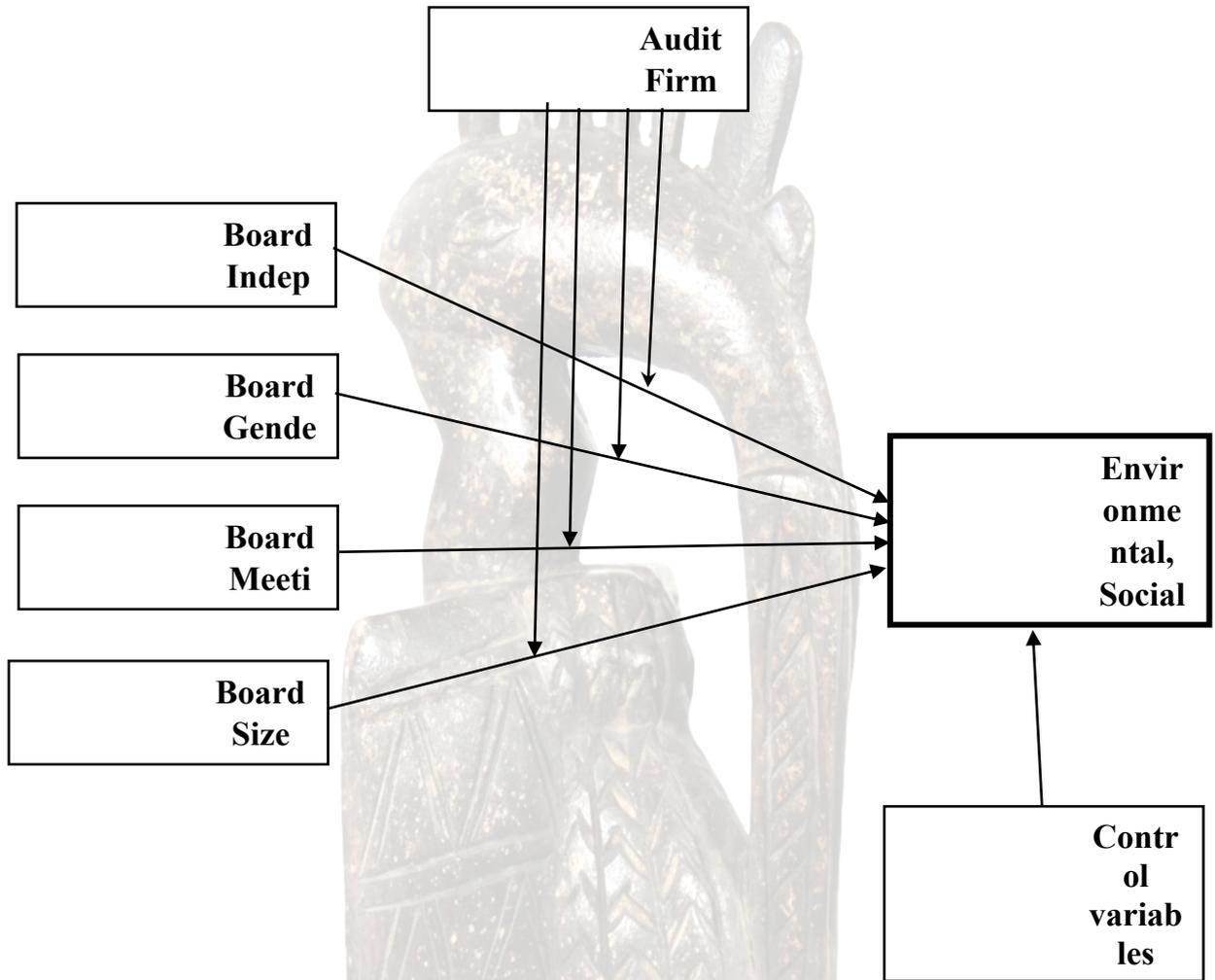
A number of studies have confirmed that there is a positive relationship between audit firm choice and the level of ESG disclosure. Based on this knowledge, Buallay and AIDhaen (2019) investigated ESG disclosure in the banking industry of the Gulf Cooperation Council. They analyzed panel data between 2013 and 2017 on the basis of a Bloomberg ESG index and discovered that audit quality and ESG disclosure had a positive and significant correlation. They used dependency theory to formulate the argument that firms that are dependent on high-quality audits have a higher chance of giving a full ESG reporting. Their findings were further confirmed using simple regression techniques and this further confirms the relevance of audit firm choice in promoting ESG disclosure.

The same study by Del Giudice & Rigamonti (2020) also focused on the effect of third-party auditing on the quality of the ESG disclosure especially in corporate misconduct. The researchers used a dataset consisting of ESG scores of 2007-2017 (Thomson-Eikon) and corporate scandal data (Lexis-Nexis) to discover that audited ESG disclosures showed stronger disclosure reliability than unaudited reports. According to their findings, the disclosure of ESG did not have any significant changes, once a scandal was disclosed to the company with an audited report, but the unaudited reports had a considerable declining trend. This is supported by multivariate analysis, which indicates that audits assurance effect on reliability of ESG disclosures is significant, and the benefits of audit practices on firms, investors and policymakers. The research proposes increased standardisation and control of non-financial reporting to improve the market transparency and reliability.

Also, Zahid et al. (2022) investigated the question of audit quality in ESG factors and corporate financial performance relationship by Western European companies. The analysis of 620 companies in 2010-2019 found that on the one hand, ESG investments usually decrease the short-term profitability in terms of Return on Assets (ROA) whereas, on the other hand, it increases the revenue, probably because of the improved customer attraction. This means that quality audits can build on the trust of stakeholders and corporate transparency. These results highlight the duality of ESG activities and audit quality in forming corporate financial performance, and support the idea that more methods should be implemented to capture sustainability into business strategies.

### **1.4 Conceptual Framework on Environmental, Social and Governance Disclosure (ESG disclosure)**

The current research design examines the effects of board characteristics on ESG disclosure as shown in Figure 2.1 where audit firm choice (AFC) serves as a moderating factor. The independent variables that influence ESG disclosure are board independence (BI), board gender diversity (BGD), board meeting frequency (BM), and board size (BS). Environmental, Social, and Governance Disclosure (ESGD) is the dependent variable presented in the framework. Moreover, the paper includes three control variables, namely firm size (FS), profitability (Prof), and leverage (LEV). These controls can consider the external variables that can modify the disclosure of ESG, thus, making sure that the observed implications of the board traits and audit firm selection are accurately estimated.



**Fig 2.1 Conceptual Framework on Environmental, Social and Governance Disclosure**

**2. Methodology**

The research design that was selected in this study was a correlational research design which aimed to examine the moderating role of audit firm choice on the relationship between board characteristics and ESG reporting on a sample of Nigeria listed companies in the environmentally sensitive industries. The correlational design was chosen due to its ability to test the relationships between variables without manipulating them through the use of an experiment. The target population will be environmentally sensitive companies listed on the Nigerian Stock Exchange in 2018-23. The initial population that was used was 30 firms in these sectors, which was narrowed down to 26 firms after removing firms with unavailable or incomplete data. The industrial goods industry is the highest category (consisting of 13 companies) which have been narrowed down to 11 companies after refining. Eight and seven companies respectively are the oil and gas and natural resources industries respectively. The figures of the agriculture sector had not changed and had five companies. This filtered population will make the data more reliable and accurate and it will also be a complete picture of ESG disclosure practices in these vital sectors as represented in Table 3.1. The choice of environmentally sensitive industry is important because companies in

such industries usually have a huge environmental effect on their production process, emissions and consumption of resources. They, therefore, draw increased attention of regulators, investors, and the community to their environmental policies. Consequently, such companies are likely to be more willing to be involved in the thick of ESG reporting and are likely to become champions of strong sustainability practices. The study of these areas thus simplifies a more in-depth comprehension of the connection between the board characteristics and the audit company choices on the clarity of ESG reporting in sectors that are faced with high environmental risk.

**Table 3.1 Population of the Study**

S/No	Sectors	Population	Adjusted population
1	Industrial goods	13	11
2	Oil and gas	8	7
3	Natural resources	4	3
4	Agriculture	5	5
	<b>Total</b>	<b>30</b>	<b>26</b>

Source: Nigerian Exchange Group website (2023)

The data collection started in 2018 and lasted six years, i.e., between 2018 and 2023, to align with the introduction of the Nigerian Code of Corporate Governance in 2018 and the revisions of the Global Reporting Initiative (GRI) framework, which started its introduction in 2018, as well. The 2023 observation window will help to capture the latest trends in the study, hence offering a holistic analysis of the trends on board characteristics, audit firm selection, and ESG disclosure, as it is within the scope of the study. The hypotheses were tested using panel data regression analysis, as well as to test the moderating effect of audit-firm choice on the relationship between board attributes and ESG disclosure.

**2.1 Model Specification**

$$ESGD_{it} = \beta_0 + \beta_1 BI_{it} + \beta_2 BG_{it} + \beta_3 BM_{it} + \beta_4 BS_{it} + \beta_5 AFC_{it} + \beta_6 BI_{it} * AFC_{it} + \beta_7 BG_{it} * AFC_{it} + \beta_8 BM_{it} * AFC_{it} + \beta_9 BS_{it} * AFC_{it} + \beta_{10} FS_{it} + \beta_{11} PROF_{it} + \beta_{12} LEV_{it} + \varepsilon_{it} \dots \dots \dots (1)$$

Where:

- ESGD = Environmental Social and Governance Disclosure;
- it = Longitudinal data indicator;
- β<sub>0</sub> = Intercept;
- β<sub>1</sub> to β<sub>5</sub> = Coefficient of independent variables;
- β<sub>6</sub> to β<sub>9</sub> = Coefficient of moderated variables;
- β<sub>10</sub> to β<sub>12</sub> = Coefficient of control variables;

$\varepsilon$	= Error terms;
BI	= Board Independence;
BG	= Board Gender Diversity;
BM	= Board Meetings;
BS	= Board Size;
AFC	= Audit Firm Choice;
FS	= Firm Size;
PROF	= Profitability;
LEV	= Firm Leverage

### 3. Data Presentation and Analysis

**Table 4.1: Descriptive Statistics**

Variables	Observations	Mean	Std. Dev	Min.	Max
ESGD	156	0.4008	0.1538	0.16	0.69
BI	156	0.3819	0.1786	0	0.83
BG	156	0.1869	0.1439	0	0.67
BM	156	4.9103	2.1683	1	13
BS	156	8.9680	3.1447	3	17
AFC	156	0.6730	0.4706	0	1
FS	156	17.8521	2.4520	13.84	23.32
PROF	156	0.0424	0.1848	-1	1.52
LEV	156	0.6443	0.4217	0.03	2.22

Source: author computation using stata

The dependent variable of the current study is the Environmental Social and Governance disclosure, which is the ratio of environmental, social, and governance disclosed by firms. The results of the mean of 0.4008 point to the fact that, on average, the firms report about 40 percent of the measured ESG items, which is a moderate value that indicates that there is a lot that can be done to attain greater levels of transparency and accountability. This amount of disclosure is less than 50, which is not the level that can be regarded as a good standard of disclosure (Refinitiv, 2021). The standard deviation of 0.1538 indicates that the disclosure level of most firms do not vary much with the mean but to some extent, there is some consistency in the sample. The lowest figure of 0.16 and the highest figure of 0.69 however show that there are firms which disclose as low as 16% and the most transparent firms disclose up to 69%. This distribution shows that there is a large disparity in the dedication of firms to reporting on ESG, which could be a difference in the compliance with regulation or a difference in the expectation of stakeholders, or could be a difference in priorities of the management.

As regards the independent variables, one of the variables, Board independence, shows the percentage of independent directors in the board. The mean value of 0.3815 is an indication that, the independent directors make up about 38.15 percent of the total number of board members. The standard deviation of 0.1794 shows that there is moderate variation in the percentage of independent directors in firms. The number of independent directors in boards ranges between 0, with some boards having no independent directors, in this case, the annual report of FTN cocoa processor 2018, to 83, the maximum. It means that some companies do not comply with the Principle 7 of the Nigerian Code of Corporate Governance that states that the independent non-executive directors must express a robust independent voice in the Board (FRCN Code, 2018). Such a broad spectrum highlights the fact that there is a high level of diversity in governance, and the board is likely to be ineffective in managing ESG practices.

Board gender diversity (BGD) is a metric that is calculated to determine the number of female directors in corporate boards. Having a mean of 0.1869, the results show that women represent only 18.69 percent of the average board members. Such a low gender diversity indicates the possibility of insufficient progress in the quest to create gender balance in the leadership position, thus, impeding the board to introduce different perspectives in decision-making, especially on ESG matters. The standard deviation of 0.1439 indicates moderate range of variability in gender representation with a range of 0, namely, Industrial and Medical Gases Nigeria Plc (Formerly BOC Gases Nigeria Plc) 2020 to 67. The lack of female directors in certain boards is an indication of barriers that have long existed against inclusion and companies that have more female directors show the dedication to foster gender equity. Bringing more gender diversity to the boards may make corporations more sensitive to social and sustainability issues.

Also, Board meetings are a sign of board activity and participation. The average of 4.9103 indicates that boards convene about five times per year on average, which is in line with the best practice of governance. The standard deviation of 2.1683 shows a variation in the frequency of meetings, so that there are boards that are more actively engaged in supervising corporate affairs compared to others. The maximum and minimum of 13 and 1 respectively highlight the variation in the level of activity of the boards. Infrequent boards can face difficulties in dealing with complicated governance issues, such as ESG ones, whereas more frequent meetings can help to offer effective oversight and adjust to new needs.

Board size (BS) is the maximum number of directors in the board of a firm. The average 8.9680 means that the boards usually have an average of nine members, which is in line with the governance guidelines on diversity and decision-making effectiveness. The value of standard deviation of 3.1447 indicates that there is an average variability in the board size and the value range of 3 to 17 illustrates that there is a considerable variation amongst firms. Smaller boards can have inadequate diversity of skills and views, which can hamper their performance whereas large boards may have coordination problems that may slow down the decision making process. Board size is the most important to enhance strong governance and encourage ESG reporting.

Another binary variable is audit firm choice (AFC), which is used to state whether a firm hires one of the Big Four audit firms. The average of 0.6731 indicates that 67.31 percent of

the companies use the services of these world renowned auditors who are rigorous and have a reputation of quality assurance. The standard deviation 0.4706 indicates variability in the choice of the audit firm, and the range is used to verify the fact that the choice of smaller audit firms is made by some companies. Companies that are audited by the Big Four will have a higher chance of producing a more credible and transparent ESG disclosure, which is an indicator of concern about high governance standards.

The Firm size (FS) is computed as a natural logarithm of total assets with a mean of 17.8521. This implies that the sampled companies are relatively big, which is agreeable with their operations in environmentally sensitive sectors that need a lot of capital investment. The big companies tend to be more scrutinized by the stakeholders and regulators and this may lead to increased ESG disclosure. The value of the standard deviation (2.4520) shows that the sample size is very diverse with a range of 13.84 to 23.32 showing that these are both medium and very large companies.

The profitability (PROF) (net profit margin) has a mean of 0.0424, which shows an average profit margin of 4.24%. The standard deviation of 0.1848 shows that there is a high level of variability in financial performance as some firms are incurring losses (minimum of -1) and others are making good profitability (maximum of 1.52). The profitability is a critical issue that impacts the ESG practices since more profitable companies are in a better position to invest in sustainability activities and disclosure projects. On the other hand, less profitable or loss making companies can focus on short-term financial objectives at the expense of long-term ESG objectives.

Leverage (LEV) is a ratio that indicates the ratio of assets that a firm has been funded with debts. The average of 0.6444 represents that firms are using on average 64.44 percent of their assets through debt financing. This implies moderate dependence on external funding, which may have a bearing on corporate policies, such as ESGs. The standard deviation of 0.4217 shows that the leverage levels are highly varied with the range being between 0.03 and 2.22. The leverage of a firm can also become a constraint to its financial ability to engage ESG activities, as highly leveraged firms might not be able to undertake such activities, but the less leveraged firms may have the financial flexibility to undertake the same.

### **3.1 Correlation Analysis**

The correlation table in table 4.2 indicates that there are positive significant correlations between ESG disclosure and board attributes variables. Among them, the audit firm choice (AFC) is most strongly correlated with ESG disclosure (0.671), which demonstrates the paramount importance of the audit firm in the improvement of the ESG disclosure through the provision of the structured control and responsibility regarding the sustainability practices.

Table 4.2: Correlation Result

	ESG D	BI	BGD	BM	BS	AFC	FS	PROF	LEV
ESG D	1.000 0								
BI	0.570 6	1.0000							
BGD	0.171 0	0.1596	1.0000						
BM	0.545 1	0.2758	0.1734	1.0000					
BS	0.647 4	0.0211	0.0078	0.4651	1.0000				
AFC	0.671 0	0.3978	0.1070	0.3820	0.6206	1.0000			
FS	0.591 1	0.2729	0.2363	0.3681	0.4652	0.3984	1.000 0		
PRO F	0.113 8	0.0587	0.1297	0.1690	0.1839	0.0849	0.224 3	1.0000	
LEV	0.009 9	0.0228	-0.2334	- 0.1360	- 0.2566	-0.1947	0.107 5	-0.2541	1.000 0

Source: Author computation using stata

The positive relationship between audit firm choice (AFC) and reputed audit firms is strong (0.6710) and serves to support the fact that the firms that are audited by reputable firms provide more exhaustive information on ESG, thus indicating the effect of external assurance on the quality of reporting. The board size (BS) shows a strong positive relationship with ESG disclosure (0.6474) indicating that bigger boards with various expertise and wider views are in a better position to guide ESG-related decisions and enhance transparency. Board independence (BI) has a positive relationship with ESG disclosure (0.5706), which is moderately strong indicating the role of independent directors in enhancing accountability and promoting sustainability practices. Board meetings (BM) are moderately positively related to ESG disclosure (0.5451), which indicates the relevance of intense and regular governance debate on ESG concerns. Lastly, board gender diversity (BG) is weakly positively correlated with ESG disclosure (0.1710) and thus, although gender diversity on boards is beneficial, it has a relatively weak effect on ESG disclosure compared to other board characteristics.

The independent variables show significant interdependence with each other, which provides information on the dynamics of board characteristics. As an illustration, the Board size (BS) has positive correlation with audit firm choice (AFC) (0.6206) which shows that bigger boards tend to hire reputable auditors, which is assumed to support the governance structures. Board size is also positively related to board meetings (BM) (0.4651), which implies that bigger organizations and boards are more involved in governance. Board independence (BI) has a moderate correlation with BM (0.2758).

### 3.2 Multicollinearity Result

The Variance Inflation Factor (VIF) test helps to determine the existence of multicollinearity between the explanatory variables in the regression model as shown in Table 4.3. Multicollinearity occurs when the independent variables are strongly intercorrelated and this may jeopardize the accuracy of coefficient estimates.

Table 4.3: Multicollinearity Result

Variable	VIF	1/VIF
<b>BS</b>	<b>2.58</b>	<b>0.386929</b>
<b>AFC</b>	<b>2.18</b>	<b>0.458176</b>
<b>FS</b>	<b>1.77</b>	<b>0.565851</b>
<b>BI</b>	<b>1.50</b>	<b>0.668273</b>
<b>BM</b>	<b>1.45</b>	<b>0.689001</b>
<b>LEV</b>	<b>1.40</b>	<b>0.715181</b>
<b>BGD</b>	<b>1.23</b>	<b>0.810985</b>
<b>PROF</b>	<b>1.16</b>	<b>0.859811</b>
<b>Mean VIF</b>	<b>1.66</b>	

Source: author computation using stata

A VIF of more than ten is traditionally an indication of undesirable multicollinearity, whereas smaller values are acceptable. In the current analysis, all VIFs are significantly lower than this value, and the mean VIF is 1.66, which means that the regression model is stable. The VIFs of board size (BS; 2.58) and audit firm choice (AFC; 2.18) are the largest, but they are acceptable since they are not too high. The small height of these VIFs implies that it is not highly correlated with other covariates, including firm size, which is in line with the correlation table. This is expected to be found in the governance literature as the presence of larger boards and reputed auditors are normally accompanied by larger firms.

The size of firms (FS; 1.77), the independence of boards (BI; 1.50) and the frequency of board meetings (BM; 1.45) portray moderate VIFs. These variables complement the governance framework without creating a significant overlap, which represents their different but interrelated contributions to ESG disclosure. The moderate level of VIF of FS is consistent with its high correlations with other measures of governance reported above.

The lowest VIFs are recorded by leverage (LEV; 1.40), board gender diversity (BG; 1.23), and profitability (PRF; 1.16), which highlights the fact that there are not high levels of multicollinearity. These findings support the low interrelationships observed in the correlation table especially the insignificant relationship between LEV and ESG disclosure.

The fact that the VIFs of all the explanatory variables are uniformly low is a confirmation that there is no excessive collinearity, which preserves reliable coefficient estimates and strong interpretation of the regression results. Although moderate VIFs of BS and AFC

indicate the interdependency of board characteristics in determining the ESG disclosure, they do not present significant analytical difficulties. Therefore, the model is stable and it is easy to evaluate the role of board characteristics in determining ESG disclosure in environmentally sensitive sectors.

**Table 4.4: PANEL CORRECTED STANDARD ERRORS (PCSEs)**

ESGD	Coef.	Std. Err	z	p> z
BI	0.20745	0.06209	3.34	0.001
BG	0.06419	0.04289	1.50	0.135
BM	-0.01585	0.00661	-2.40	0.017
BS	0.06727	0.00711	6.58	0.000
AFC	0.08417	0.02211	3.81	0.000
AFCBI	0.21818	0.05313	4.11	0.000
AFCBG	0.17206	0.03915	4.39	0.000
AFCBM	0.01575	0.00428	3.68	0.000
AFCBS	0.07555	0.01828	4.13	0.000
FS	0.00064	0.00311	0.21	0.837
PROF	-0.05241	0.04481	-1.17	0.242
LEV	-0.02269	0.00447	-5.07	0.000
Cons	-0.12924	0.05787	-2.23	0.026
R-Square	= 0.8061			
Prob > F	= 0.000			
Number of obs	= 156			
Number of groups	= 26			
Obs per group	= 6			

**Source:** author computation using stata

One of the major results of the analysis is that the audit firm choice (AFC) has a strong moderating role in the relationship between board characteristics and environmental, social, and governance (ESG) disclosure. The AFC has a positive and significant impact on ESG disclosure with a coefficient of 0.0842 and p-value of 0.000 implying a positive contribution of an audit firm to ESG disclosure. In addition, the interaction terms indicate that AFC enhances the effect of other board characteristics on ESG disclosure.

The correlation between board independence (BI) and AFC is also statistically significant with a coefficient of 0.2182 and p-value of 0.000 indicating that the positive effect of board independence on ESG disclosure is augmented in the presence of an audit firm. In the same vein, the relationship between board gender diversity (BG) and AFC has a strong and positive impact with a coefficient of 0.1721 and a p-value of 0.000, which means that those boards that are gender-diverse when working with the audit firms are more effective in fostering ESG disclosure.

BG in itself is not significant with a coefficient of 0.064 and a p-value of 0.135. Nevertheless, the interaction term AFCBG has a positive strong value at the 1 percent level of significance having a coefficient of 0.172 and a p-value of 0.000. This implies that gender diversity itself

on the board may not be a significant ESG disclosure driver unless it is coupled with a highly experienced auditor, the effect is significant. An explanation is that different boards can have a more extensive view or ethical sensibility that can suit the audit of the highest-ranking audit firms, hence more ESG disclosure.

Board meetings (BM) have a negative coefficient of  $-.015$  and a p-value of  $0.017$ , meaning that greater frequency of board meetings can actually be associated with reduced ESG disclosure, perhaps as a result of greater emphasis on crisis management or operational issues that preempt ESG attention. However, the interaction term AFCBM has a coefficient of  $0.016$  and a p-value of  $0.000$  which is the opposite impact and this is positive. This suggests that in case of regular gatherings between the context of a robust audit partner, they can be more systemized and strategic, which could be the forums of ESG deliberations, thereby boosting ESG disclosure. The level of interaction between board size (BS) and AFC is also of great significance with a p-value of  $0.000$  indicating a strong interaction between board size and audit firm selection. This observation highlights the importance of audit firms in improving the effectiveness of boards and promoting ESG disclosure.

The interaction between BG and AFC in the Model 3 shows another level of influence. The direct impact of BG is not significant but positive, but its combination with AFC (AFCBG) enhances its effect on ESG disclosure with a positive coefficient of  $0.17206$  and a significant p-value of  $0.000$ . The outcome of this study underscores the supportive functions of board gender diversity and external oversight systems in the promotion of holistic ESG reporting. Audit firms are another layer of scrutiny and confirmation of corporate disclosures to make sure that the opinions of gender-diverse boards have been converted into viable and plausible ESG disclosures, in line with the results of Saeed and Saeed (2018). Having female directors is even more effective in generating ESG results therefore with the support of high-quality audit firms. This causes the rejection of hypothesis H 0 7: audit firm choice is not a significant factor in the relationship between board gender diversity and ESG disclosure of environmentally sensitive listed companies in Nigeria.

These findings underscore the twofold role of BG and AFC in the pursuit of solid ESG disclosure. Companies operating in sectors that are sensitive to the environment must focus on the gender diversity in their boards not because it is valuable in itself but because it complements the audit firm in ensuring sustainability and transparency. This helps in increasing the popularity of the strategic significance of diversity in the governance structures and its contribution to the development of ESG objectives.

### **Conclusion (and recommendations)**

This paper empirically demonstrates that board characteristics, especially independence, gender diversity, the frequency of meetings, and board size, are critical in promoting ESG disclosure in environmentally sensitive firms in Nigeria, particularly in combination with AFC. The results highlight the moderating effect of audit firm choice that enhances the effects of these board qualities on ESG disclosure. This proves that effective board qualities and external audit control can largely enhance transparency and accountability in the reporting of ESG.

The study proves that board characteristics interacting with AFC improve the ESG disclosure by providing higher accountability, transparency, and adherence to the sustainability standards. Independent and large boards are more effective in ESG initiative driving. Nevertheless, these disclosures are greatly enhanced in terms of credibility when the firms employ well-known audit firms especially those that offer stringent control and verification.

The findings highlight the complementary importance of the internal governance mechanisms and the external assurance procedures in promoting extensive disclosures of ESG. Having a strong board composition coupled with quality audits, companies are able not only to comply with the regulatory and stakeholder requirements but also to become a leader in the sustainable business practices.

This paper confirms that board characteristics and audit committee selection are the most important elements of improving ESG disclosure, which are part of corporate responsibility and sustainable growth in the industries that are environmentally sensitive. The results also underscore the role of diversity, size, frequency of meetings and independence of the composition of the board. Also, the importance of the audit firm choice as a moderating factor shows the importance of external assurance as an incentive to promote ESG disclosure.

According to the results of this research, organisations should concentrate on enhancing their board qualities. In particular, companies must engage independent directors whose interests should be unbiased and thus, corporate decisions should be in line with the interests of the stakeholders. In addition, companies ought to make boards more gender-diverse which is equally important as this would bring different views and perspectives which would result in more holistic and innovative solutions to sustainability issues.

Moreover, organisations ought to maximize quality and frequency of board meetings, so that ESG matters are considered part and parcel of board meetings. The culture of responsibility and the need to proactively tackle sustainability issues are developed through regular involvement of ESG issues in board meetings. Board meetings are a very important platform to achieve influential governance changes and match corporate strategies to long term sustainability objectives.

Audit firms selection is a critical aspect in determining credibility of ESG disclosures. Business organisations ought to take the initiative of contracting audit firms that are reputable and those that have been sued to international standards of auditing. These companies introduce expertise in validating ESG reports, mitigating the risk of misinformation, and enhancing the credibility of the information disclosed to the stakeholders. The regulators and policymakers must establish incentives to encourage firms to hire such auditors, and also strive to increase the ability of the local audit firms to deliver high-quality ESG assurance services.

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