CORPORATE BOARD ATTRIBUTES AND ENVIRONMENTAL REPORTING QUALITY OF LISTED OIL AND GAS COMPANIES IN NIGERIA

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Abstract
This study investigates the effect of board attributes on environmental reporting quality in listed Nigerian oil and gas firms over the period of 2015–2024. The study used secondary data extracted from the audited annual reports and accounts of seven sampled companies from total population of eleven listed oil and gas firms on the Nigeria exchange group. The study employed explanatory research design and after running the OLS regression, a robustness test was conducted to test the validity of statistical inferences, a multiple regression was also employed. The study Uses Global Reporting Initiative (GRI) Standard 13 to measure environmental reporting quality. Board attribute is proxied by board independence, board size, board gender diversity and board meetings. The findings reveal that board independence, board size, and board gender diversity have statistically significant positive effects on environmental reporting quality. Conversely, board meeting frequency shows a positive but statistically insignificant relationship. These results demonstrate that board composition and diversity are more consequential for environmental transparency than the sheer number of board meetings. The study recommended that the management of the companies should strengthen board independence, promote gender diversity through a "comply-or-explain" framework, and shifting regulatory focus from meeting quantity to agenda quality.

Keywords: Environmental reporting, board attributes, GRI 13, corporate governance, Nigeria

1. Introduction

Environmental degradation in Nigeria's oil and gas sector characterised by oil spills, gas flaring, and toxic effluent discharge has escalated from a local ecological crisis into a critical corporate accountability challenge. In response, stakeholders increasingly demand transparent environmental disclosures. The Board of Directors is theoretically positioned to oversee these disclosures, yet the precise configuration of board attributes that drives effective environmental reporting in the Nigerian oil and gas industry remains poorly understood. Existing Nigerian studies have examined board attributes in a fragmented manner, selecting isolated variables such as board size or independence without simultaneously considering the quartet of board independence, board size, gender diversity, and board meetings (Okoye et al., 2023; Orumwense & Osa-Izeko, 2023; Issa et al., 2021). Moreover, measurement of environmental reporting has relied on generic indices or aggregated ESG scores, with no prior study anchoring the disclosure instrument in the GRI Standard 13, which provides sector-specific indicators for spills, flaring, decommissioning, and community impact (GRI, 2022). Finally, the majority of studies employ short panels of two to five years that end before recent Nigerian regulatory shifts such as the SEC Sustainability Reporting Guidelines (2018), NGX Sustainability Disclosure Guidelines (2021), and IFRS S1/S2 requirements (2023), thus missing the dynamic regulatory evolution (Tonye & Boubai, 2025; Jibril, 2025).

This study addresses these gaps by simultaneously examining how board independence, board size, board gender diversity, and board meetings influence environmental reporting quality in listed Nigerian oil and gas firms, using a GRI 13-aligned disclosure index and a ten-year panel (2015–2024). The research questions are: (i) What is the impact of board independence on environmental reporting? (ii) What is the impact of board size? (iii) How does board gender diversity affect reporting? (iv) What is the impact of board meetings? The remainder of the paper is structured as follows. Section 2 reviews the theoretical and empirical literature and develops the hypotheses. Section 3 describes the methodology. Section 4 presents and discusses the results. Section 5 concludes with implications, recommendations, and directions for future research.

2. Literature Review and Hypotheses Development

2.1 Hypotheses Development

Board Independence

Independent directors, free from managerial influence, are better positioned to demand verifiable environmental data and challenge greenwashing. Prior studies in Nigeria (Okoye et al., 2023; Ukolobi et al., 2023) and internationally (Alotaibi et al., 2024; Endo, 2025) find a positive association between board independence and environmental disclosure. We hypothesize:

***H_1*:** Board independence has a significant positive impact on environmental reporting quality in listed Nigerian oil and gas firms.

Board Size

Larger boards provide a wider pool of expertise and diverse perspectives necessary for complex environmental decisions. Empirical evidence from the energy sector (Nuhu & Alam, 2024; Ed-Dafali et al., 2025) supports a positive relationship, though some studies find non-linear effects (Biju, 2025). In the Nigerian oil and gas context, a larger board may serve as a "resource bank" for compliance. We hypothesize:

***H_2*:** Board size has a significant positive impact on environmental reporting quality.

Board Gender Diversity

Female directors are often associated with greater sensitivity to social and environmental responsibility. They broaden the board's cognitive resources and ensure community concerns are addressed (Gavana et al., 2025; García-Sánchez et al., 2025). In the Niger Delta, they may foster a more relational approach to transparency. We hypothesize:

***H*3: ** Board gender diversity has a significant positive impact on environmental reporting quality.

Board Meetings

Meeting frequency is a proxy for board diligence; more frequent meetings provide opportunities to scrutinize environmental performance. However, evidence is mixed—some studies find a positive effect (Bedi & Singh, 2025), while others report insignificant or negative effects (Ladini et al., 2024; Sirajo et al., 2025). In Nigeria's oil and gas sector, meeting quantity may not translate to robust environmental oversight if agendas are dominated by financial matters. We hypothesise:

***H*4: ** Board meeting frequency has a significant positive impact on environmental reporting quality.

2.2 Theoretical Framework

The study is anchored in three complementary theories. *Agency Theory* (Jensen & Meckling, 1976) posits that the separation of ownership and control creates information asymmetry; managers may conceal negative environmental data. The board acts as a monitoring mechanism, with independence, size, and meeting frequency serving as proxies for vigilance. *Stakeholder Theory* (Freeman, 1984) extends accountability beyond shareholders to include communities, regulators, and environmental groups, emphasizing the board's role in balancing diverse interests. *Legitimacy Theory* (Suchman, 1995) argues that firms must maintain a social license to operate; environmental reporting is a strategic tool to bridge "legitimacy gaps" caused by ecological harm, particularly relevant in the environmentally scarred Niger Delta.

3. Methodology

The population comprises the 11 oil and gas firms listed on the Nigerian Exchange Group (NGX) as of 31 December 2024. Applying a census approach and excluding four firms delisted during the study period, the final sample consists of seven firms, yielding 70 firm-year observations (2015–2024). Data were collected from audited annual reports and accounts.

Variable Measurement.

Environmental Reporting Quality (ENVD): An unweighted disclosure index based on 42 items from the GRI 13: Oil and Gas Sector Standard (2022). Each item is coded 1 if disclosed, 0 otherwise, with the score expressed as the ratio of disclosed items to total possible items as used by Terzungwe, et al. (2022), Shuaibu et al. (2023).

Board Independence (BOID): Proportion of independent non-executive directors to total board size (Adekunle et al., 2024; Jouirou & Chenguel, 2014).

Board Size (BOSI): Total number of directors on the bord (Eguavoen et al., 2023).

Board Gender Diversity (BOGD): Measured by the presence and the number of female directors in the boardroom (Adekunle et al., 2024; Ekadah & Kiweu, 2012).

Board Meetings (BOMT): Board meeting is the number or frequency of meetings by board members. It is the number of formal board meetings held in the financial year. (Barros & Sarmento, 2020)

Firm Size (FSIZE): The natural log of total assets of a sampled firm (Khan et al., 2022).

Firm Age (FAGE): The age of a firm from date of listing (Kajola et al., 2020).

Model Specification

The panel regression model adapted from Okoye et al. (2023) and Ukolobi et al. (2023) is:
$ENVD_{it} = \alpha + \beta_1 BOID_{it} + \beta_2 BOSI_{it} + \beta_3 BOGD_{it} + \beta_4 BOMT_{it} + \beta_5 FSIZE_{it} + \beta_6 FAGE_{it} + \varepsilon_{it}$
Diagnostic tests included Variance Inflation Factor (VIF) for multicollinearity, Breusch-Pagan/Cook-Weisberg test for heteroskedasticity, and Hausman test for model selection (failed to reject random effects, but LM test favored pooled OLS). Consequently, OLS with robust standard errors was employed.

4. Results and Discussion

Table 1 shows the mean environmental reporting score is 0.545 (54.5%), indicating moderate disclosure levels. Board independence averages 48.3%, close to the regulatory minimum; board size averages 9.4 directors; female directors average 1.23 per board (range 0–3); and meetings average 5.3 per year (range 3–10). The data evidence sufficient variation for regression analysis.

Table 1: Descriptive Statistics (N = 70)

Variable	Mean	Std. Dev.	Minimum	Maximum
ENVD	0.545	0.129	0.232	0.769
BOID	0.483	0.117	0.310	0.680
BOSI	9.429	1.528	7	13
BOGD	1.228	0.935	0	3
BOMT	5.271	1.752	3	10
FSIZE	19.534	1.733	17.22	23.00
FAGE	41.357	13.739	10	54

Soure: Stata output 2026

4.2 Regression Results

The model is jointly significant (Wald $\chi^2 = 54.29$, $p = 0.000$), and the R-squared of 0.454 indicates that the variables explain 45.4% of the variance in environmental reporting. This is comparable to prior Nigerian studies (Okoye et al., 2023: R^2=0.41; Ukolobi et al., 2023: R^2=0.39) and confirms the model's adequacy.

Table 2: Robust OLS Regression Results (Dependent Variable: ENVD)

Variable	Coefficient	Robust Std. Error	t-Statistic	p-Value
BOID	0.535	0.149	3.59	0.000
BOSI	0.102	0.044	2.33	0.020
BOGD	0.396	0.134	2.94	0.003
BOMT	0.090	0.052	1.73	0.083
FSIZE	-0.003	0.0016	-1.86	0.068
FAGE	0.348	0.182	1.91	0.061
Constant	-1.593	0.503	-3.16	0.002
R^2	0.4538			
Wald χ^2	54.29	($p = 0.000$)		

Soure: Stata output 2026

4.2.1 Board Independence (H1)

The coefficient of BOID is 0.535 ($p < 0.001$), supporting H1. This implies that a one-unit increase in the proportion of independent directors is associated with a 0.535-unit rise in environmental reporting score. Independent directors appear to constrain managerial opportunism and demand greater transparency, consistent with Agency Theory. The finding aligns with Okoye et al. (2023), Issa et al. (2021), and Alotaibi et al. (2024), but contrasts with Ikhu-omoregbe and Ugbogbo (2022).

4.2.2 Board Size (H2)

Board size exhibits a positive significant effect ($\beta = 0.102$, $p = 0.020$), supporting H2. Larger boards bring more expertise and variety of perspectives, which aids in navigating complex GRI 13 reporting requirements. This supports the Stakeholder Theory view of boards as resource banks. The result corroborates Nuhu and Alam (2024) and Ed-Dafali et al. (2025), but diverges from Biju (2025), where non-linear effects were noted.

4.2.3 Board Gender Diversity (H3)

Gender diversity is positively and significantly associated with environmental reporting ($\beta = 0.396$, $p = 0.003$). An increase of one female director is associated with a 0.396 improvement in the disclosure index. This finding is anchored in Legitimacy Theory: female directors enhance sensitivity to community and social contract concerns, especially in the Niger Delta context. The result supports the critical mass argument and aligns with Gavana et al. (2025), García-Sánchez et al. (2025), and Al-Shaer and Zaman (2024).

4.2.4 Board Meetings (H4)

Board meetings show a positive but insignificant coefficient ($\beta = 0.090$, $p = 0.083$); H4 is not supported. The result suggests that the sheer number of meetings does not automatically translate into improved environmental reporting. If environmental issues are not prioritised in board agendas, additional meetings will not enhance disclosure quality. This finding echoes the insignificance reported by Sirajo et al. (2025) and the mixed results in prior literature.

4.3 Discussion

Collectively, the findings suggest that board composition who sits on the board matters more than *how often* the board meets. Independence and gender diversity are particularly powerful drivers, reflecting both monitoring and stakeholder responsiveness mechanisms. Board meetings become effective only when paired with substantive environmental agenda items. The model's moderate explanatory power ($R^2 = 0.454$) indicates that other factors, such as regulatory enforcement, media attention, and ownership structure, also shape reporting, but board attributes are a significant component.

5. Conclusion and Recommendations

This study set out to clarify which board attributes drive environmental reporting quality in the Nigerian oil and gas sector. Using a GRI 13-based measurement and a 10-year panel, we find that board independence, board size, and board gender diversity significantly enhance reporting, while board meeting frequency does not. The study contributes to the literature by providing the first integrated examination of these four attributes within a single model in the Nigerian oil and gas context and by employing a sector-specific, internationally benchmarked disclosure index.

Recommendations

i. The Securities and Exchange Commission (SEC) and the Nigerian Exchange Group (NGX) should strengthen independence criteria, moving beyond numerical quotas to require environmental competence among independent directors.
ii. Listed oil and gas firms should maintain reasonably large boards with diverse expertise to navigate complex GRI 13 disclosures.
iii. The Financial Reporting Council of Nigeria (FRCN) should introduce a "comply-or-explain" requirement for female board representation in the extractive sector.
iv. Regulators should mandate "Environmental and Climate Risk" as a standing board agenda item, and shift oversight from counting meetings to evaluating the quality of environmental discussions.

Limitations and Future Research

The disclosure index captures the quantity of reporting, not its substantive depth; future studies could compare reported disclosures with actual environmental performance indicators. The sample is limited to the oil and gas sector, thus generalizability to other industries is constrained. Qualitative research is recommended to understand why meeting frequency fails to drive better reporting, possibly through interviews with board members. Additionally, investigating interaction effects between attributes (e.g., independence and gender diversity) could yield more nuanced governance prescriptions.

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