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BOARD OF DIRECTORS CHARACTERISTICS AND ENVIRONMENTAL SUSTAINABILITY REPORTING IN SUB-SAHARAN AFRICA

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ABSTRACT

Purpose: This study examines the relationship between institutional ownership structure, board of director credentials, and environmental sustainability reporting among non-financial publicly traded Sub-Saharan Africa (SSA) firms.

Design/Methodology/Approach: The research employs a dynamic panel data estimation methodology, analysing 1,969 firm-year datasets from non-financial firms in SSA from 2012 to 2021. The Arellano-Bond dynamic panel data strategy, using the two-step generalised method of moments (GMM) technique, was applied for hypothesis testing.

Findings: The findings indicate a relatively unfavourable relationship between the frequency of audit committee meetings, environmental sustainability reporting, and institutional ownership. No evidence suggests that institutional ownership moderates the relationship between environmental sustainability and other board attributes, such as committee size and independence.

Research Limitation: The research is limited to publicly traded non-financial firms in SSA and the period from 2012 to 2021, which may affect the generalizability of the findings to other regions and time frames.

Practical Implication: The significant impact of gender diversity in sustainability committees on environmental sustainability reporting highlights the need for firms to prioritise diversity in board composition.

Social Implication: The study suggests that policymakers and regulators in SSA should focus on specific board committee attributes, such as gender diversity and institutional ownership's role in improving environmental sustainability reporting.

Originality/Value: The study's new insight is that the results challenge the conventional perspective on the role of institutional ownership by demonstrating that institutional ownership does not moderate the relationship between board characteristics and sustainability reporting.

Keywords: *Board committee. environmental sustainability. institutional ownership. reporting. Sub-Saharan Africa*

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INTRODUCTION

Sustainability, defined by social equality, economic performance, and environmental performance, is progressively taking center stage in the accounting industry when conversations about corporate governance are mentioned (Blay et al., 2024; Rogers & Hudson, 2011). Due to climate change, shifting consumer tastes, and environmental mishaps, stakeholders worldwide call for more sustainability reporting (Coffie et al., 2018; Dienes et al., 2016). Consequently, according to Haanaes (2016), 22% of business executives think a sustainability strategy will be important in the future, and 62% of executives think it is essential for competitiveness now.

McKinsey's (2010) survey found that most organisations do not enjoy greater shared value compared to those that assume ownership of environmental sustainability (Musah et al., 2022; Krechovská & Prochazková, 2014). Simply put, sustainability is a business approach that looks at how an organisation may behave in the social, environmental, and economic spheres to provide value in the long run. The idea behind sustainability is that by implementing these initiatives, businesses can live longer. In terms of the governance of corporations, external assurance further raises the bar for sustainability reporting (Lewa et al., 2024; Erin et al., 2021).

While sustainability reporting is growing in popularity in wealthy nations, adoption and practice are still very low in poor nations, particularly for enterprises in sub-Saharan Africa (Blay et al., 2024; Coffie et al., 2018; Marquis & Qian, 2014). Businesses in sub-Saharan Africa (SSA) typically prioritise short-term financial results over long-term sustainability when developing their corporate strategies.

Due to this, a substantial portion of prior research on environmental sustainability and corporate governance has concentrated on businesses in developed Western nations like the US, UK, Australia, Canada, and Germany (Tkachenko et al., 2020; Ong & Djajadikerta, 2020; Camilleri, 2018; Dienes et al., 2016; Thijssens et al., 2016). It is not unexpected that this research focuses on developed countries since environmental sustainability reporting is becoming mandatory in many European and North American countries, at least for specific types and sizes of businesses.

Most Asian research on sustainability reporting comes from developed or developing countries, such as China Li, 2013; Marquis & Qian (2014), Pakistan (Rashid & Shariff, 2014); and Japan (Fukukawa & Moon, 2004). Moreover, South Asian nations have produced the majority of the significant research on corporate governance and environmental responsibility reporting in emerging nations (Mahmood et al., 2018; Masud et al., 2020; Setyahadi & Narsa, 2020; Wahyuni, 2020). Nevertheless, a significant portion of this research has focused on how corporate governance encourages environmental sustainability reporting, sometimes neglecting to consider

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ownership structure in this connection. It is important to emphasise that board committees are essential to guarantee compliance and disclosure since they oversee thorough oversight at the committee level. Therefore, these committees' characteristics are essential for board effectiveness. Nonetheless, the findings of previous studies have been inconsistent, inconclusive, and ambiguous. Studies that distinctively investigate mixed findings are limited.

In theory, institutional ownership is widely acknowledged as a powerful internal and external corporate governance control mechanism (Blay et al., 2024; Munisi, 2023; Aggarwal et al., 2015; Haider & Fang, 2016). It exercises its voting ability to participate in forming the governing body and supervising administration actively. (Chen & Keung, 2018; Al-Sartawi & Sanad, 2019). Environmental and social issues have recently become the emphasis of institutional ownership. Debatable topics include institutional investors' participation in corporate governance and sustainability disclosure when they hold a portion of a company (Gillan & Starks, 2003; Rafique et al., 2017). Nonetheless, corporate governance and sustainability reporting norms are heavily influenced by institutional investors, especially in SSA nations. Based on theoretical and conceptual issues, institutional ownership will affect the connection between environmental sustainability and board attributes.

From a conceptual standpoint, institutional investors often hold a larger percentage of the shares than other types of ownership. As a result, they care about the company's long-term viability. Since corporate sustainability depends on environmental sustainability, institutional ownership may influence the board of directors environmental sustainability. The agency hypothesis states that institutional investors are more inclined to monitor management because of their regular investments and accountability. According to Elyasiani and Jia (2010), this favours financial and non-financial results, like environmental sustainability.

Notwithstanding these conceptual and theoretical prepositions, empirical studies examining how firms with institutional ownership influence board characteristics and environmental sustainability relationships are limited (Chen & Keung, 2018; Al-Sartawi & Sanad, 2019; Malik, Waheed, & Khan, 2017). These studies have proved that institutional ownership impact on financial and non-financial outcomes. To our knowledge, no research has examined how institutional ownership might moderate the impact on environmental sustainability. This study fills these gaps and gets above the aforementioned constraints by evaluating the moderating impact of institutional right of ownership on the connection between boards of directors and sustainability reporting in SSA, addressing the shortcomings of earlier empirical studies. This study contributes to the body of knowledge previously accessible on-board committees, ownership within institutions, and sustainability reporting by building on previous research in these areas. While various ownership structures exist, institutional ownership is the predominant model in Sub-Saharan Africa (SSA).

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Therefore, investigating the dynamics of institutional ownership in SSA provides a unique opportunity to enhance the global understanding of sustainability reporting. Adopting an agency theory perspective, the research explores the roles of different board committees in sustainability reporting within emerging markets, characterised by nascent companies, limited investor protection, and low market capitalisation (Musah et al., 2022; Saeed et al., 2022; Moats et al., 2022). Consequently, by showing how institutional ownership alters the relationship between sustainability reporting in SSA and board committees. This research adds to the expanding collection of empirical studies on corporate governance. To our knowledge, it is the first to explore the link between key elements of environmental sustainability, board committee structure, and different institutional ownership types.

The study's conclusions indicate that institutional ownership reduces the negative effects of audit committee meetings on environmental sustainability reporting. The results of this study, which demonstrate a high positive correlation between gender parity on sustainability committees and enhanced environmental sustainability reporting in publicly traded non-financial enterprises in Sub-Saharan Africa, are not surprising. However, there is no evidence in the data to support the hypothesis that institutional ownership alters the relationship between environmental sustainability and board attributes (size, independence, and composition).

THEORETICAL UNDERPINNING OF THE STUDY

To understand corporate governance, Meckling and Jensen (1976) developed the agency theory, highlighting the competing interests of loan lenders, managers, and shareholders (owners). This theory holds that businesses represent their shareholders, who entrust the company's management with their assets. In the quest for short-term earnings and the unequal distribution of information, managers often possess more knowledge than shareholders, causing a notable gap between the shareholders and management's short- and long-term goals in large companies. Given the division of ownership and power, this divergence in the agency dilemma may result in choices that do not benefit shareholders.

Agency theory suggests that by reducing the principal-agent conflict, corporate governance can enhance company performance (Jensen & Meckling, 2019). Corporate governance frameworks try to replicate the agent-principal relationship within a legal framework (Chen et al., 2019; Dal Maso et al., 2018). These frameworks develop policies and procedures to prevent the unfavourable effects of competing corporate objectives, intending to align managers' and directors' interests with shareholders' (Elmagrhi et al., 2019). Agency theory also emphasises the officers' and directors' obligations to the corporation. The degree of ownership separation from control, or the principal-agent problem, is crucial to consider when choosing corporate governance approaches. This

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highlights the crucial part that an organisation's ownership structure plays in its governance strategy, according to Homayoun & Homayoun (2015). Agency theory also sheds light on how institutional ownership affects the connection between environmental sustainability reporting and board committees.

Board of Directors Characteristics and Reporting on Sustainability

The role of board committees on corporate boards is evolving; according to Boone et al. (2007), they are becoming more formal and managed. Khan (2011); Pande and Ansari (2014); Alhossini et al. (2021). The board of directors supervises and evaluates management choices in light of shareholder interests. However, many tasks, like risk management, audits, and compensation, need specific knowledge. As a result, boards have formed committees to assess various aspects of their companies. Major stock exchanges, such as NYSE and NASDAQ, mandated that companies set up various committees after the 2002 Sarbanes-Oxley Act (SOX). These committees included the audit, remuneration, nomination/governance, environmental, and finance committees (Bansal & Singh, 2022). Studies have shown that the number and composition of these committees impact sustainability reports (Subramaniam et al., 2017; Amran et al., 2014). Agyemang (2020) recommends that these committees consist of no more than four members for optimal outcomes. To guarantee their impartiality, the auditing panels must include a minimum of fifty per cent independent directors (Al-Hadrami et al., 2020; Saeed and colleagues, 2022; Moats and colleagues, 2022). Several studies have shown a connection between the board committee's qualities and sustainability (Ame et al., 2017; Haji & Anifowose, 2016; Sharma et al., 2009). Furthermore, board governance characteristics influence the reporting of sustainability quality, particularly regarding the audit committee (Erin et al., 2021). This study examines the size, independence, frequency of meetings, gender diversity, and other attributes of CSR/ESG committees and auditors.

Board Committee Size and Sustainability Reporting

For successful sustainability reporting, a board committee of four people is usually adequate (Anyigbah et al., 2023). Committee reports' sustainability is highly influenced by the total number of members on its board (Okere et al., 2021; Nguyen et al., 2021; Alta'any et al., 2024; Almaqtari et al., 2024). Agyemang et al. (2020) state that larger board committees improve environmental sustainability reporting. Similarly, Rabi (2021) and Kumari et al. (2022) contend that higher committee sizes improve sustainability reports. A larger committee frequently allows for better job allocation, greater variety, and lower individual workloads, improving stakeholder representation (Jizi et al., 2014). Due to their more diverse membership and dedication to environmental responsibility, broader committees on the board typically report at higher levels of environmental sustainability. Environmental sustainability reports should be closely tied with larger board committees. In light of this, we proposed that:

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H_{1a}: Audit committee size is positively and significantly associated with ESR
H_{1b}: The size of the Environmental Sustainability Committee has a significant positive correlation with ESR.

Sustainability Reporting and the Independence of Board Committees

According to Liao et al. (2015), most respondents believe that having more independent directors enhances sustainability reporting through improved management supervision. With an increasing number of independent on-board committee directors, management is increasingly obligated to report on sustainability (Shamil et al., 2014). Most people regard these directors as capable individuals who can effectively manage operations and provide intelligent recommendations on environmental disclosures (Masud et al., 2019). Khaireddine et al. (2020). As a result, research shows that board committee independence improves sustainability reporting Khan et al. (2021), Farza et al. (2022), Almaqtari et al. (2022), and Lewa et al. (2024). Aliyu (2019) also discovered a strong, beneficial relationship between board independence and environmental reporting. According to research, environmental performance and board independence are strongly associated, which improves environmental sustainability (Ortiz-De-Mandojana et al., 2016). Furthermore, research indicates that an organisation's sustainability and environmental performance are enhanced when more independent directors serve on committees (Husted & Sousa-Filho, 2017; Kumari et al., 2022). Independent directors are more likely to impose stringent sustainability reporting requirements, per Ammer et al. (2020). Consequently, the research proposes the following notion:

H_{2a}: The audit committee's independence is positively and significantly correlated with ESR.
H_{2b}: Sustainability committee independence has a favourable and significant relationship with ESR.

Board Meetings and Sustainability Reports

A productive governing committee convenes at least four times annually, per Kolk and Perego (2012). Proponents of agency theory argue that more frequent board meetings are connected with more vigilant scrutiny, which could help corporations disclose their sustainable practices (Shamil et al., 2014). A key metric of board activity and management oversight is the frequency of board meetings (Ioana & Mariana, 2014; Aly et al., 2024). Regular board meetings are believed to increase the board's involvement in business matters and encourage management to consider the interests of all parties involved, not only shareholders (Liu & Zang, 2017). According to some (DeZoort et al., 2002; Karamanou & Vafeas, 2005), regular board meetings enhance the oversight function, which could affect the calibre of corporate reporting. Most participants concur that

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holding regular board meetings reduces costs for the organisation while enhancing collaboration and communication (Jizi et al., 2014). Despite the widespread belief that board committee meetings are essential to the overall performance of an organisation, there is a paucity of empirical study on the subject, especially in sub-Saharan Africa. Research on how board committee meetings enhance environmental sustainability reporting is scant. (Haji, 2013; Alshbili et al., 2020; Bansal & Singh, 2022; Jizi et al., 2014). According to Bansal and Singh (2022), board meetings improved the quality of environmental sustainability reports for ninety-two Indian software enterprises between 2011 and 2018. This study puts up the following theories in light of the reviewed literature:

H_{3a}: Audit committee meetings positively and significant effect.
H_{3b}: Sustainability committee meetings positively and significant impact.

2.1.4 Gender Diversity and Sustainable Reporting.

More people realise that having a diverse mix of genders on boards is essential to improving board effectiveness, encouraging good governance, and drawing attention from academics and business executives alike. Research has continuously shown a link between gender diversity and sustainability reporting (Magambo & Nyamwesa, 2022; Hoang et al., 2018; Nekhili et al., 2018; Katmon et al., 2017; Mohammed et al., 2024). According to Tilt et al. (2021), these results show how important it is for female directors to have a voice in formulating sustainability disclosures. Gender diversity encourages more balanced decision-making since women frequently bring distinct viewpoints to the table relative to their male colleagues (Baker et al., 2019). Women also contribute to sustainability efforts by helping with sustainability reporting through their decision-making (Al-Shaer & Zaman, 2016; Bakar et al., 2019).

Additionally, research indicates that female directors prioritize environmental and community concerns and are more cognisant of sustainability issues (Grubnic, 2014; Al-Shaer & Zaman, 2016). Numerous studies conducted in the US (Harjoto et al., 2015), Malaysia (Abdullah & Ismail, 2013), Jordan (Ibrahim & Hanefah, 2016), the UK (Al-Shaer & Zaman, 2016), and other countries have demonstrated a favourable relationship between environmental reporting on sustainability and gender diversity on boards. This study backs up its claim about the importance of female directors with legitimacy theory.

H_4: Board gender diversity in committees positively and significantly affects ESR.
H_{4a}: Gender diversity in audit committees has a positive and significant effect on ESR.
H_{4b}: Gender diversity within the sustainability committee has a positive and significant effect on ESR.

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Institutional Ownership as a Moderator

According to Ismail et al. (2020), institutional ownership refers to the percentage of a company's shares held by big organisations that control the financial affairs of other persons. These organisations could be investment firms, insurance providers, endowments, mutual and pension funds, private foundations, etc.

Scholars have examined institutional investors' role as corporate behaviour watchdogs because monitoring is expensive. According to Grossman and Hart (1980), only substantial owners, such as institutional investors, can offer sufficient profits to persuade them to participate in monitoring. These major shareholders are often more motivated to watch managers than board members, who may not have significant personal investments in the company. Furthermore, institutional investors have the ability and resources to monitor, regulate, and influence management decisions (Schleifer & Vishny, 1986).

The research of McConnell and Servaes (1990), Del Guercio and Hawkins (1999), Smith (1996), and Nesbitt (1994), institutional monitoring forces managers to prioritise improving business performance over personal aspirations. Ntim et al. (2013) assert that agency theory suggests institutional owners, even in environmental problems, have the authority to supervise management and encourage openness.

Institutional ownership has the power to influence board decisions regarding environmental matters because the 1989 Exxon Valdez and the 2010 BP Gulf of Mexico oil spills have shown that ignoring these issues could result in missed opportunities for investment and increased operating costs (DeVilliers et al., 2011). Appoint capable directors who prioritise the company's environmental policy-related strategic decisions. Institutional investors can also influence board choices. Oh et al. (2011); Faller & Zu Knyphausen-Aufseß, (2018). Thus, the theory contends that a corporation's institutional ownership level influences how the governance committee's makeup affects environmental sustainability reporting (ESR). Thus, the current investigation suggests the following theory:

> *H_5: Institutional ownership moderates a relationship between the board of directors' characteristics and ESR.*

METHODOLOGY

Source and Dataset

Panel data from businesses registered on Sub-Saharan African stock exchanges between 2012 and 2021 were used in this study. SSA nations that have stock markets include Ghana, Nigeria, as well as Kenya, South Africa, Botswana, Zambia, and Zimbabwe, among others the African nations of

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Tanzania, Malawi, Rwanda, Mozambique, and Namibia (Ntim, 2012). This study, however, focuses on data from six significant nations: Zimbabwe, Mauritius, Nigeria, Ghana, Kenya, and South Africa. These countries were chosen due to their active stock exchanges, significant market capitalisation, many listed firms, and similar reporting standards. Notably, these six stock exchanges represent approximately 70% of all firms listed in the SSA region (Ntim, 2015). By the end of the financial year 2021, there were 667 listed non-financial firms in these six selected countries, distributed as follows: 120 in Nigeria, 26 in Ghana, 45 in Kenya, 311 in South Africa, 47 in Zimbabwe, and 119 in Mauritius. The study period of 2012 to 2021 was established by the availability of the necessary data up to that year. The study's data sources were the hand-selected yearly reports of the chosen companies.

Model Specification

The study uses panel data for analysis because it spans numerous periods and different firms. This type of data allows one to analyse how various firms' behaviours have changed over time. Equation 1 establishes the link between the dependent variable, control variables (aspects unique to the firm), the independent variables, and the suggested moderator. It also displays the broader regression model.

$$Y_{it} = \beta_0 + \sum_{n=1}^{k} \beta X_{it} + \sum_{n=1}^{k} \beta \nu_{it} + \sum_{n=1}^{k} \beta \psi_{it} + \mu_{it} \qquad \text{Equation (1)}$$

Where;

Y_{it}	=	Environmental sustainability reporting by the *i*th firm for the period t.
β_0	=	Intercept
X_{it}	=	Firm-specific characteristics of the ith firm at the period t
ν_{it}	=	Board committee characteristics of the *i*th firm at the period t.
Ψ_{it}	=	Institutional ownership of *i*th firm during the period t
B	=	coefficients for the independent variables
μ_{it}	=	Error or disturbance term
n =1……k	=	From the first to the *k*th variable.
i = 1, 2, 3,.., N	=	Cross-sectional dimensions or firm indexes
t = 1, 2, 3,..N	=	Dimensions of the time series

Measurement of Variables

Sustainability reporting in the environment is the dependent variable in this study. As per the Global Reporting Initiative (GRI, 2017), an environmental sustainability report is a corporate document illustrating the environmental consequences of an organisation's routine operations.

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Businesses are more likely to overlook non-financial environmental performance indicators than financial performance indicators, which is why this study largely focused on them. It is crucial to understand how firms in sub-Saharan Africa account for and manage the societal spill-over effects of their operations. The study used data based on the most recent guidelines for environmental sustainability report disclosures, specifically the fourth version (GRI-G4), released in 2013. There are 34 items related to environmental aspects (Caesaria & Basuki, 2017). A dummy variable was used for scoring, with a score of 1 going to items that were disclosed and 0 to those that were not. After assessing each item in the sustainability report, the total scores were added to calculate an overall score for each firm.

The makeup of the board is one of the study's independent variables, including the audit, remuneration, CSR, and environmental committees. This study examined the structural components by dummying the variables, just like many other existing studies (Tan et al., 2018; Maharani et al., 2019; Pang, Binti & Hamid, 2017). The study also covers control and moderating variables. The dependent variable and any sub-dependent variables are defined, measured, and appended.

Estimation Technique

This research used the generalised moment method (GMM) to estimate. Our estimating method is suitable for our investigation for several reasons. Initially, panel data with a "small period and large firms" are appropriate for this strategy (Phillips, 2019). There are 667 listed non-financial enterprises in the ten-year research. Secondly, the independent variables in the study are not exogenous, as they correlate with past and possibly even present errors. Consequently, using estimating techniques like random or fixed effects will lead to conflicting findings. The provided data must also consider a substantial diversity of individual-specific characteristics to solve fixed individual effect issues. Fourth, there is heteroscedasticity and autocorrelation within individuals in panel data but not between them. Therefore, the GMM estimation approach can tackle the endogeneity, heteroscedasticity, and autocorrelation problems. (Bover & Arellano, 1995). The GMM is based on two sets of equations. The original (2) and the modified (3) are these two sets of equations. The GMM system uses two techniques, the level equation and the first-differencing transformed equation, to process complex data.

$$ESR_{it} = \delta ESR_{it-1} + \beta_1 MBV_{it} + \beta_2 DTA_{it} + \beta_3 \text{AUDSize}_{it} + \beta_4 \text{AUCIndep}_{it} + \beta_5 \text{AUDMeet}_{it}$$
$$+\beta_6 \text{Csrsize}_{it} + \beta_7 \text{Scind}_{it} + \beta_8 \text{Csrbmt}_{it} + \beta_9 \text{Scgd}_{it} + \beta_{10} \text{INST}_{it} + \sigma_i + \mu_{it} \qquad \text{Equation (2)}$$

A random-walk model with a continuous dependent variable is often the level or initial equation (2). Thus, by using first differences (FDs) as tools, equation (2) can be expressed in level form.

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The correlation between the inserted lag dependence (SURit-1) in this equation and the error term (μi), fixed effect (σi), or unobserved unique individual features is believed to exist. Heteroskedasticity and serial correlation may exhibit individual-specific patterns in idiosyncratic disturbances (those unrelated to fixed effects) (Roodman, 2009). First, differencing GMM solves the correlation between lag dependency and the fixed effect. Equations 3, 4, 5, and 6 were, nevertheless, produced following the initial differentiation, considering the moderation idea's evaluation.

$$ESR_{it} - ESR_{it-1} = ESR_{it-1} - ESR_{it-2} + \beta_1 MBV_{it} - MBV_{it-1} + \beta_2 DTA_{it} - DTA_{it-1}$$
$$+\beta_3 \text{AUDSize}_{it} - \text{AUDSize}_{it-1} + \beta_4 \text{AUCIndep}_{it} - \text{AUCIndep}_{it-1} + \qquad \text{Equation (3)}$$
$$\beta_5 \text{AUDMeet}_{it} - \text{AUDMeet}_{it-1} + \beta_6 \text{Csrsize}_{it} - \text{Csrsize}_{it-1} + \beta_7 \text{Scind}_{it} - \text{Scind}_{it-1}$$
$$+\beta_8 \text{Csrbmt}_{it} - \text{Csrbmt}_{it-1} + \beta_9 \text{Scgd}_{it} - \text{Scgd}_{it-1} + \beta_{10} \text{INST}_{it} - \text{INST}_{it-1} + \sigma_i - \sigma_{i-1} + Interactions + \mu_{it} - \mu_{it-1}$$

A modification to the original equation (2) yielded the first difference. Consequently, we can now state equation (3) in first-difference (FD) form using levels as instruments. This improvement has resulted in more instrumentation on the system GMM than the FD GMM. Effective differentiation removes the constant fixed effect (σi) over time. The system GMM uses both level and differenced equations for estimation, in contrast to the FD GMM. Windmeijer (2005) developed the Windmeijer standard error option to overcome the problems associated with heteroscedasticity and serial autocorrelation.

Interestingly, the standard system GMM estimator uses both level and differenced data. Moreover, forward orthogonal deviations and level data can be used in system GMM calculations. The theorem's instrument requirements are met (Phillips, 2019). Since the lagged variable (ESRit-1) in equation (3) may correlate with μit in the formula Δ μit = μit - μit-1, even with the fixed effect eliminated, the lagged dependent variable still poses a potential endogeneity risk. On the other hand, because equation (3)'s predefined variables are related to μit-1, they might theoretically be endogenous even if they are not entirely exogenous. Therefore, the regressors' longer lags are orthogonal to the error term and can be employed as tools in contrast to the mean-deviation transformation (Arellano & Bover, 1995).

This method takes all future data for a variable and subtracts its means instead of subtracting the past observations from the present. Since this modification applies to all of the individual's observations save the final one, it minimises data loss regardless of the number of gaps. Lagged observations serve as instruments in forward orthogonal transformation rather than being a part of

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the equation. We tested multiple GMMs in dynamic data models to verify the precision and reliability of the estimators utilised in the system generalised moment method (GMM).

Roodman (2009) lists these tests as the Arellano-Bond test for serial correlation, the Sargan-Hansen test with over-identification constraints, and the Sargan-Hansen test for exogeneity. The initial serial correlation test determines whether the data aligns with the dynamic model, and the subsequent test looks at the instrument's dependability concerning lag dependency. Whereas the Sargan-Hansen test for exogeneity determines if the subsets of instruments employed in the level equations are exogenous, the Sargan-Hansen test for over-identification restrictions verifies the validity of the instruments. It takes a few steps to make the GMM system easier to use.

RESULTS AND DISCUSSION

Board Committee Characteristics

Table 1 demonstrates that the audit committees of Sub-Saharan Africa (SSA) public firms usually consist of 4.6 members. With an average of 5.5 members, the committees of listed companies in Nigeria were the largest, whereas those in Ghana were the lowest with only 3.7 participants. Surprisingly, Nigeria was the only country where corporations did not comply with the four-member audit committee proposal. Nigeria had the lowest average audit committee independence (Acind), at 52.2%, while Mauritius recorded the highest, at 95.1%. The audit committee had a fairly independent structure, with independent directors making up about 81% of its members. On average, SSA businesses held four audit committee meetings annually, with Mauritian firms leading at 4.8, compared to Ghana's lowest average of 3.5 meetings.

Table: 1 Board Committee Characteristics of Sub-Saharan Africa

Country	and size	Aucindep	Audmeet	size	Scind	Scgd	Csrbmt
Ghana	3.7(1.1)	90.7(14.4)	3.5(.7)	0	0	0	0
Kenya	4.3(1.3)	95.6(12.4)	4.4(1.8)	0.0(0.5)	0.6(7.3)	0.3(2.9)	0.0(0.4)
Mauritius	3.8(1.2)	95.1(14.4)	4.8(1.4)	0.1(4.0)	0.5(4.0)	0.0	0.0(0.2)
Nigeria	5.5(1.0)	52.2(19.2)	3.9(0.9)	0.0	0.0	0.0	0.0
South Africa	4.4(1.7)	90.6(19.0)	3.9(1.5)	3.5(2.1)	46.5(34.6)	18.8(22.3)	2.0(1.5)
Zimbabwe	3.9(1.2)	88.8(17.9)	3.6(1.2)	0.3(1.1)	1.8(9.1)	5.8(22.9)	0.1(0.5)
Total	4. 6(1.5)	81.2(24.9)	4.0(1.3)	1.6(2.2)	20.8(32.6)	8.9(18.8)	0.9(1.3)

Table 1 shows that listed firms in Ghana and Nigeria do not have corporate social responsibility or environmental sustainability governance committees. In South Africa, many listed companies have committees dedicated to sustainable development and corporate social responsibility (CSR).

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Environmental Sustainability Reporting for Sub-Saharan African Businesses

As shown in Table 2, publicly listed non-financial firms in Sub-Saharan Africa have poor levels of environmental sustainability reporting, with a reporting share of only 24.3%. Mauritius and South Africa were compelled to report since their environmental sustainability rates were higher than the regional norm, at 26.1% and 39.1%, respectively. While listed corporations in sub-Saharan Africa tend to report or disclose less about their environmental practices, South Africa and Mauritius have the highest percentage of environmental sustainability disclosure. The lowest rates of environmental sustainability were reported by publicly traded companies in Ghana and Nigeria, which were 3.8% and 6.8%, respectively.

Table 2: Environmental Sustainability Reporting Level

Country	Environmental Sustainability
Ghana	3.0(10.5)
Kenya	18.9(21.5)
Mauritius	26.0(27.7)
Nigeria	6.8(16.9)
South Africa	39.1(23.7)
Zimbabwe	17.6(25.7)
Total	24.3(26.2)

Board of Directors' Characteristics and Environmental Sustainability Reporting

The Generalised Method of Moments (GMM) model evaluated hypotheses about board of director characteristics, institutional ownership, and sustainable environmental disclosures in sub-Saharan African listed enterprises. The dependent variable in this study was environmental sustainability disclosure, with the board of directors and institutional ownership characteristics serving as independent and moderating variables. Using the xtabond2 function in STATA 14.1, a two-step GMM system was implemented to evaluate the hypotheses. The Arellano-Bond dynamic panel data estimate method evaluated a well-balanced panel dataset of 1,969 observations from 275 groups spanning 2012–2021. The instrumental variables were market-to-book value (Mbv) and debt-to-assets ratio (Dta). The GMM estimation conditions were non-leveled, non-Diffsargan, two-step, robust, and modest. Table 3 shows the results of the Arellano-Bond dynamic panel data estimation using the GMM two-step technique. The moderating influence was investigated using three models and a hierarchical regression modelling technique.

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Table 3: Dynamic panel-data estimation, two-step difference GMM

Envdisclos	Model 1	Mode 2	Model 3
Controls			
Envdisclos (L1.)	.862(.087)***	.836(.090)***	.851(.094)***
Mbv	.001(.002)	-.001(.002)	-.001(.003)
Dta	-.008(.022)	-.009(.024)	-.007(.021)
Independent			
AUDSize	-.188(.444)	-.093(.439)	.620(1.72)
AUCIndep	.051(.039)	.059(.039)	.029(.121)
AUDMeet	-.542(.297)*	-.485(.464)	3.588(1.97)*
Csrsize	.374(.807)	.553(.854)	.269(2.04)
Scind	-.004(.052)	-.001(.054)	-.080(.123)
Scgd	.144(.084)*	.146(.085)*	.540(.193)***
Csrbmt	-.619(.910)	-.662(.930)	-1.431(2.453)
Moderator			
INST		.065(.064)	.258(.347)
Interactions			
AUD size × INST			-.011(.032)
AUCIndep × INST			.001(.002)
AUDMeet × INST			-.076(.035) **
Scind × INST			.002(.002)
scgd × INST			-.008(.003) **
Number of obs	2004	1956	1956
Number of instruments	370	370	370
F-Statistics	15.12	11.55	7.63
Prob > F	0.000	0.000	0.000
AR(2) in first difference	z =-0.91, P=0.360	z =-0.98, P=0.326	z =-0.46, P=0.644
Sargan test	χ^2= 1013, P=.000	χ^2= 1008, P=.000	χ^2= 940, P=.000

Annual audit committee meetings (AUD Meet) had a substantial beneficial influence on environmental sustainability reporting for non-financial enterprises in Sub-Saharan Africa (SSA) (β=3.588, P<.10), as shown in Model 3 in Table 3. More audit committee meetings on the board of directors are associated with improved environmental sustainability reporting. Gender diversity in sustainability committees (Scgd) has a significant positive impact on environmental

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sustainability reporting (β=.540, P<.01), indicating a correlation between a notable increase in gender diversity and a 0.540 sustainability reporting unit increase.

Furthermore, Model 3 demonstrates how institutional ownership influences the relationship between environmental sustainability and board composition. When institutional ownership was present, there was a negative connection (β = -.076, P<0.05) between environmental sustainability reporting and audit committee meetings. Gender diversity in Sub-Saharan Africa negatively impacts non-financial firms' environmental sustainability (β=-.008, P<.05.). This suggests that institutional ownership influences the impact of gender diversity on sustainability reporting. However, because these findings were statistically insignificant, there is little evidence to support the theory that institutional ownership alters the relationship between audit committee independence and size regarding environmental sustainability. The research also found no proof that institutional ownership alters the relationship between sustainability committee independence and reporting. Table 4 provides measurements and definitions for the study variables.

Table 4: Notation, Name, and Measurement of Study Variables

Notation	Name of Variables	Measurement/Definition of variables
	Dependent Variables	
ESR	Environmental	The number of indicators reported by each company in the environmental indicator category according to GRI guidelines
	Independent Variables	
BCP	Board Composition	
BODI	Board Independence	The proportion of the number of independent directors represented on the board to the total number of directors (in %)
BOGD	Board Gender Diversity	The proportion of females and males on the boards of companies
BODS	Board Size	The number of directors on the board
BST	Board Structure	
AUDI	Audit Committee	If a firm has an audit committee (1), otherwise (0)
BRC	Board Remuneration Committee	If a firm has a board remuneration committee (1), otherwise (0)
CSR	CSR and Env. Committee	This is measured as a dummy variable; if a firm has CSR or an environmental committee (1), otherwise (0)
BMET	Board Meetings	Number of meetings held in a year by the board
BGDV	Board Gender Diversity	The total number of women on the board in the financial year
	Moderator	
BLOW	Block Ownership	The fraction of shares held by outside owners who have more than 5% of a firm's stock, plus the fraction of shares held by managers, company pension funds, and other insiders
INSO	Institutional	The total percentage of shares held by a company's domestic institutional investors

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GOVO	Government	The total percentage of majority shares held by the government or the state.
FR	Foreign	The total percentage of shares held by a company's foreign institutional investors
	Firm-Specific X'tics	
CTRY	Country	The specific country of location of firms
IND	Industry Type	A dummy variable takes (1) if a firm is working in environmentally sensitive industries, and (0) otherwise.
FIRA	Firm Listing Age	Number of years the firm is listed on the stock market
FSZ	Firm Size	The natural logarithm of total assets
PTBV	Market-to-Book	The natural log of (the market capitalization dollar value divided by the equity dollar value)
LEV	Leverage	The natural log (the total liability divided by total assets)

DISCUSSION

In sub-Saharan Africa, publicly listed non-financial firms attach a low level of importance to environmental sustainability, as evidenced by the low reporting rate of 24.3 per cent. Mauritius and South Africa have the highest percentage of environmental sustainability disclosure despite listed corporations in sub-Saharan Africa generally having low environmental disclosure or reporting levels. These nations' obligatory policies may be the reason for their high reporting standards for environmental sustainability. If South African listed companies and the nation's implementation of B-BEE regulations had access to King Reports on Corporate Governance, for instance, they might have provided more comprehensive disclosures of sustainability information (Wachira & Berndt, 2019). Even though all of the Sub-Saharan African countries in this analysis have laws that both expressly and implicitly support the reporting of sustainability disclosures, how these regulations are enforced varies by area (Wachira & Mathuva, 2022). According to studies, South Africa and Mauritius have some of the most stringent regulations for sustainability reporting.

It was found that the established audit committees of sub-Saharan African publicly traded non-financial firms satisfied the size, frequency of meetings, and independence requirements. Agyemang (2020) stated that listed corporations in Zimbabwe, South Africa, Kenya, Ghana, and Mauritius purportedly conformed to the four-member audit committee guideline. Nigeria was the only country with publicly traded firms that disregarded the four audit committee members' recommendations. Nigerian listed businesses' audit committees were likely less successful than those in Ghana, Kenya, Mauritius, South Africa, or Zimbabwe. Because independent directors constituted around 81% of the membership, audit committees demonstrated high independence. The findings on audit committee autonomy in Sub-Saharan Africa are consistent with prior study recommendations by Al-Hadrami et al. (2020), Saeed et al. (2022), and Moats et al. (2022). There

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should be at least 50% independent directors on an audit committee. Sub-Saharan African listed companies hold audit committee meetings four times a year, in compliance with global standards that demand at least three times a year (KPMG, 2017; Deloitte, 2023).

As stated earlier, this work aims to look into how institutional ownership modifies the association between environmental sustainability and board quality. According to the study, audit committee meetings had less impact on environmental sustainability reporting when there was institutional ownership. Although existing research suggests that institutional block holdings could promote increased environmental sustainability reporting (Oh et al., 2011; Harjoto & Jo, 2011), community concerns and a lack of statutory standards restrict environmental sustainability reporting in Sub-Saharan Africa (SSA) (De Villiers et al., 2011). Even though legitimacy is a key factor in encouraging environmental sustainability reporting worldwide, the SSA community has low expectations for businesses' environmental sustainability reports when making purchasing decisions (Oh et al., 2011; Faller & Zu Knyphausen-Aufseß, 2018). As a result, the importance of environmental sustainability reports to legitimacy is limited.

Due in large part to the strong sense of community that permeates many African nations, environmental sustainability reporting in the SSA is primarily focused on social sustainability. Consequently, compared to their counterparts in more developed nations, African businesses disclose community social investments at higher levels (Wachira & Berndt, 2017). It could be argued that socioeconomic problems such as inadequate healthcare, subpar educational systems, unemployment, poverty, etc., affect African economies more severely than ecological problems, which often seem to be of a different magnitude and urgency (Wachira & Berndt, 2019; Hosanoo et al., 2021).

According to Majeed et al. (2015) and Ganapathy & Kabra (2017), businesses in sub-Saharan Africa are under the impression that African communities are more engaged in social activities than in environmental issues. As a result, these businesses rarely have environmental strategies implemented through well-functioning environmental sustainability committees. It is, therefore, not surprising that publicly listed businesses in sub-Saharan Africa rarely have strongly established sustainability committees with appropriate characteristics to design policies to stimulate environmental sustainability reporting strategically.

However, research shows that having a diverse gender representation on sustainability committees improves environmental sustainability reporting in Sub-Saharan African publicly traded non-financial firms by a significant margin. This resulted in validating hypothesis (H4b), which argues that gender diversity has a positive and significant impact on sustainability committees' ability to maintain sustainable environmental reporting. Previous study on corporate governance (Hoang et

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al., 2018; Nekhili et al., 2018; Katmon et al., 2017; Tilt et al., 2021) confirms this finding. This study found that gender diversity significantly enhances sustainability committees in charge of environmental reporting.

Men and women think differently; hence having a diverse gender adds to better-balanced results (Bakar et al., 2019). According to Bakar et al. (2019) and Al-Shaer & Zaman (2016), women are also recognised for promoting well-informed judgements that improve an organisation's sustainability strategy and reporting. Furthermore, because of their greater environmental consciousness, female directors are typically more altruistic, stakeholder-focused, and aware of sustainability-related issues (Grubnic, 2014; Al-Shaer & Zaman, 2016). The results, however, indicate that institutional ownership is necessary before gender diversity may affect sustainability committees that report on environmental sustainability. These results indicate a connection between gender diversity on sustainability committees and institutional ownership. Because of their organisational design, institutional shareholders are more likely to abide by the law. The study's findings also support the theory that institutional ownership is widely regarded as an efficient internal and external corporate management mechanism that has a major influence on the governing body's composition and voting power.

CONCLUSION

Although reporting on environmental sustainability is becoming more widespread in affluent countries, poorer countries, especially those in sub-Saharan Africa (SSA) remain extremely slow to adopt the practice. Existing empirical research on environmental sustainability in SSA has primarily concentrated on short-term financial performance, often neglecting sustainability issues. The results from these studies have been inconsistent and unclear.

According to theory, institutional ownership can influence the composition of governing bodies through voting power, making it a valuable tool for internal and international corporate governance. When integrated into the ownership structure, institutional investors influence a company's sustainability reporting and board composition. However, it is unclear how much better oversight of this kind helps board committees encourage sustainability disclosures in SSA.

This study examines how institutional ownership affects the connection between environmental sustainability and board characteristics. The study demonstrates a negative correlation between audit committee meetings, environmental sustainability reporting, and institutional ownership by applying generalised moment approaches to non-financial listed firms in South Africa. Furthermore, it finds that improved sustainability reporting among publicly traded non-financial enterprises in SSA is facilitated by gender diversity on sustainability committees. There is,

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however, little proof that institutional ownership modifies the associations between environmental sustainability and other board attributes, like committee size, independence, or total board size.

The study's conclusions have a big impact on corporate governance literature, practitioners, regulators, and policymakers. They highlight how crucial it is for business professionals and regulators in sub-Saharan Africa (SSA) to support institutional ownership and gender diversity in environmental sustainability reporting, and they demonstrate how institutional ownership affects the gender diversity of environmental sustainability committees.

The Southern African Region (SSA) is considered to be the root cause of the low levels of environmental sustainability reports among publicly traded firms in the region because of the generally poor quality of rules and their ineffective execution. Promoting sustainability reporting in enterprises is something that policymakers, including different Ministries of Environment and regulatory agencies, should be very interested in doing.

To improve environmental sustainability reporting, developing effective regulatory frameworks and law enforcement mechanisms in SSA is crucial. Additionally, governments could implement tax exemption policies to incentivise sustainability reporting. Management teams in publicly listed companies in SSA should establish CSR/ESG sustainability board committees with standardised characteristics (size, independence, and meeting frequency) to ensure their effectiveness in promoting environmental sustainability. Institutional ownership may limit the relationship between environmental sustainability reporting and audit committee meetings since research indicates that institutional ownership does not improve environmental reporting in SSA firms that routinely host audit committee meetings. This demonstrates that institutional investors in SSA strongly emphasise environmental reporting.

Nevertheless, this study has limitations that may influence the direction of future research. The primary data source variables were the reason behind the absence of nomination committee features from the corporate governance indicators. The study is also restricted to SSA countries with publicly listed companies from 2012 to 2019, excluding those without stock markets or with stock markets established after 2019. Despite various countries in SSA, the focus on publicly listed firms defines the scope of this research. Future studies examining non-listed firms in SSA could contribute valuable to the global literature on sustainable reporting.

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