Audit committee attributes and financially material sustainability reporting: An emerging market evidence

Abstract

We examine the relationship between audit committee attributes and the materiality concept of sustainability reporting based on the sustainability reporting standards of the Sustainability Accounting Standards Board (SASB). The study uses a sample of 980 firm-year observations of firms listed on the Nigerian Exchange Group (NGX) for the period 2011-2020 and employs two proxies of sustainability reporting, disclosure of sustainability reporting and financially material sustainability information. We find that larger audit committees, more frequent audit committee meetings, and the presence of female members on the audit committee are positively associated with sustainability reporting. We also find that audit committee chaired by a shareholder representative is negatively associated with sustainability reporting. However, we do not find a significant association between audit committee financial expertise and sustainability reporting. Our study provides insights into the current state of disclosure of sustainability information and financially material sustainability reporting in Nigeria, highlighting the impact of recent regulatory reforms aimed at promoting such practices. Our findings offer guidance to regulators, standard-setters, and practitioners on leveraging audit committees to enhance the disclosure of financially material sustainability information.

Keywords: Audit committee attributes, financially material sustainability information, sustainability reporting, disclosure, SASB, Nigeria.

1. Introduction

In recent years, the corporate landscape is seeing a growing emphasis on sustainability reporting, reflecting a shift towards greater accountability and transparency in business practices. This shift is largely driven by increasing stakeholder demand for companies to disclose their environmental, social, and governance (ESG) impacts, which are now considered essential factors in assessing a company's long-term viability and ethical standing (Bravo & Reguera-Alvarado, 2019). As the global community increasingly prioritizes sustainable development, companies are under pressure to disclose how their operations impact society and the environment. This leads to the evolution of sustainability reporting from a voluntary practice to a critical component of corporate governance and investor relations (Khan et al., 2016; Grewal et al., 2021).

The rising importance of sustainability reporting is further underscored by recent data. According to KPMG's 2022 global survey on sustainability reporting, which includes 5,800 N100 companies and 250 G250 companies, 79% of N100 companies and 96% of G250 companies now issue sustainability reports (KPMG, 2022). This represents a significant increase from the 2017 survey, which reports that three-quarters of companies worldwide are issuing sustainability reports (KPMG, 2017). This shift is driven by growing stakeholder expectations and the recognition that sustainability practices can impact a company's longterm financial performance and risk profile (Dhaliwal et al., 2011; Grewal et al., 2021). In response, international organizations such as the Global Reporting Initiative (GRI) and Sustainability Accounting Standards Board (SASB) develop frameworks to guide companies in disclosing sustainability information (Carvajal & Nadeem, 2023).

As sustainability reporting evolves, the focus shifts towards identifying and reporting on financially material sustainability issues. This approach aims to provide investors with decision-useful information that directly impacts a company's financial performance (Eccles et al., 2014). In emerging markets like Nigeria, where sustainability reporting is still developing, the adoption of financially material sustainability reporting practices presents both challenges and opportunities for companies seeking to enhance their disclosure quality and attract global investors.

Given this context, the role of corporate governance mechanisms, particularly audit committees, in overseeing sustainability reporting is gaining increasing attention. Audit committees are considered an essential aspect of every good corporate governance framework (Cohen et al., 2002; Dwekat et al., 2020). They serve as a conduit for the board's oversight of management policies and practices (Chahine & Filatotchev, 2011; Mohammadi et al., 2021). In recent times, the remit of the audit committees extends beyond financial reporting to encompass monitoring and oversight of non-financial reporting, addressing the risk of firms misleading stakeholders (Al-Shaer & Zaman, 2018; Trotman & Trotman, 2015).

While the corporate governance and sustainability performance nexus is extensively studied, research on the influence of audit committees on sustainability disclosure remains scant (Dwekat et al., 2020; Pozzoli et al., 2022). Previous studies affirm that audit committees enhance firms' non-financial disclosures, including sustainability reporting (Al-Shaer & Zaman, 2018; Pozzoli et al., 2022). The effectiveness of the audit committees is significantly influenced by the unique individual attributes and competencies of its members (Yorke et al., 2023). This leads to increasing research interest in the role of audit committee attributes on sustainability disclosure (Al-Shaer & Zaman, 2018; Trotman & Trotman, 2015).

Despite the growing emphasis on sustainability reporting, research on the determinants of high-quality sustainability disclosure remains limited, especially in emerging markets. This study aims to address this gap by exploring the influence of audit committee attributes on the disclosure of financially material sustainability information in the context of Nigeria, a major economy and one of the largest markets in Africa. Nigerian firms listed on the Nigerian Exchange Group (NGX) are considered leaders in promoting sustainability reporting in Africa, making them an ideal sample for studying sustainability reporting practices in an emerging market setting (Nigerian Exchange Group, 2020). The period from 2011 to 2020 witnesses significant regulatory improvements in energy and environmental disclosure requirements in Nigeria, providing a unique opportunity to examine the impact of these reforms on sustainability reporting practices (Jibril et al., 2024).

Furthermore, recent regulatory developments, such as the Code of Corporate Governance 2018, the Companies and Allied Matters Act (CAMA) 2020, and the Climate Change Act 2021, heighten the importance of sustainability reporting for boards of directors in Nigeria. These reforms mandate sustainability reporting for large businesses and establish the National Council on Climate Change (NCCC) to implement the Act and set a net-zero emissions goal by 2060 (Federal Republic of Nigeria, 2020). The Code of Corporate Governance 2018 emphasizes the need for transparency and accountability in corporate disclosures, including sustainability reporting (Financial Reporting Council of Nigeria, 2018). The CAMA 2020 reinforces these standards, requiring companies to disclose their environmental and social impacts as part of their annual reporting (Federal Republic of Nigeria, 2020). While substantial literature exists on sustainability reporting in developed countries, limited research is conducted in the Nigerian context, particularly focusing on the attributes of the audit committee.

Therefore, this study examines two research questions: Do internal audit committee attributes influence the disclosure of sustainability reporting? and Do internal audit committee attributes influence financially material sustainability reporting? Understanding these influences is crucial for improving corporate governance practices and ensuring that companies provide accurate and meaningful sustainability information to stakeholders.

To address these questions, we analyse a sample of 980 firm-year observations for firms listed on the Nigerian Exchange Group (NGX) for the period 2011–2020. We obtain data on the disclosure of sustainability information and material sustainability information using the SASB industry guidelines from sources such as standalone sustainability reports, annual reports, and company websites. Additionally, we manually collect data on audit committee attributes from annual reports, NGX, and corporate governance reports, with financial data obtained from the Bloomberg database.

We employ two proxies for sustainability reporting: disclosure of sustainability information (DISCLOSE) and material sustainability information (SRINDEX). For

DISCLOSE, we find that having larger audit committees may provide more resources and oversight, leading to increased transparency and more likelihood of disclosing sustainability information. We also find that audit committees with more frequent meetings are associated with more likelihood of disclosing sustainability information. We also find that the presence of a female member on the audit committee may reflect a more inclusive and diverse perspective, which can contribute to a greater likelihood of disclosing sustainability information. However, we find that having the audit committee chaired by a shareholder is associated with less likelihood of disclosing sustainability information. Moreover, we do not find any significant association between audit committee financial accounting expertise and disclosure of sustainability information.

The findings for SRINDEX are consistent with those for DISCLOSE. Larger audit committees appear to enhance oversight, leading to increased transparency and material sustainability reporting. Similarly, audit committees that meet more frequently are associated with higher levels of material sustainability reporting. The inclusion of a female member on the committee also seems to foster a greater emphasis on disclosing material sustainability information. However, audit committees led by shareholders are associated with lower levels of material sustainability reporting. Interestingly, we fail to find any significant relationship between audit committee financial accounting expertise and material sustainability reporting.

Our robustness test results remain consistent after using alternative measurements for the dependent variable, such as lagged SRINDEX, to examine the robustness of our main findings and explore the time-lagged effects of audit committee attributes on sustainability reporting. By employing a one-year lag of the dependent variable l.SRINDEX, we investigate whether the influence of audit committee characteristics on sustainability reporting persists over time. Additionally, we use standalone sustainability reporting STANDSP, proxied by a binary variable where 1 indicates the company published a standalone sustainability report and 0 otherwise, and conducted other additional analyses.

Moreover, we consider the effect of audit committee co-option on material sustainability reporting by examining sub-samples of high and low co-option levels. Our analysis shows significant differences between high and low co-option groups, indicating that the presence of new audit committee members following a CEO's appointment can lead to more effective oversight of sustainability reporting practices, improving the quality of material disclosures. To address potential endogeneity bias, we employ the Generalized Method of Moments (GMM), and our findings remain robust, further reinforcing the consistency of our main results.

We contribute to the existing literature in four different ways. First, our study extends the existing literature on financially material sustainability reporting, which has primarily focused on firms in developed economies such as the United States and New Zealand. Specifically, we build upon the work of Khan et al. (2016), Rodriguez et al. (2017), Grewal et al. (2021), and Carvajal and Nadeem (2023), who explore the concept of materiality in sustainability reporting and its impact on firm performance and stock price informativeness. By focusing on Nigeria, an emerging economy with a unique cultural, institutional, and regulatory environment, our research contributes to the understanding of sustainability reporting practices in a context that has been largely unexplored in the existing literature.

Second, our study is the first of its kind to investigate the relationship between audit committee attributes and financially material sustainability reporting. Using a particular African context, Nigeria, we provide evidence that key audit committee attributes, such as size, frequency of meetings, gender diversity, chairperson and financial expertise affect the level of financially material sustainability information disclosure. In Nigeria, where corporate governance structures and regulatory environments are still evolving, these attributes play a crucial role in shaping the quality and transparency of sustainability reporting. By ensuring effective oversight and accountability, audit committees can enhance the credibility of financial disclosures related to sustainability, which is critical for meeting the growing expectations of investors and other stakeholders.

Third, we distinguish our study from prior research in terms of its methodological approach. While previous studies, such as those by Khan et al. (2016), Rodriguez et al. (2017), Grewal et al. (2021), and Carvajal and Nadeem (2023), employ the SASB guidelines, most are primarily descriptive. These earlier studies focus on introducing the SASB standards, explaining their functionality, and are often authored by affiliated researchers or SASB members. Additionally, the majority of these studies are based on U.S. data, limiting the scope of their findings. In contrast, our study moves beyond descriptive analysis by empirically investigating the relationship between audit committee attributes and financially material sustainability reporting. By applying the SASB standards in a Nigerian context, we provide a more comprehensive understanding of how audit committee characteristics impact the level of sustainability disclosures that are financially material and relevant to investors' decision-making processes, contributing valuable insights outside of the U.S.

Fourth, we contribute to the sustainability reporting literature by exploring the current trends in sustainability reporting practices in Nigeria using the SASB materiality map, thereby enhancing the understanding of materiality issues across industries. However, it is important to note that sustainability reporting remains a voluntary undertaking in Nigeria, and the market is still evolving. Our research assists in monitoring the progress of sustainability reporting advancements in Nigeria, particularly following the implementation of regulatory reforms. In 2011, the Corporate Governance Code was introduced to strengthen governance

practices, and in 2018, the code was revised to include more robust guidelines on sustainability.

Additionally, the Companies and Allied Matters Act of 2020 introduced new provisions aimed at promoting sustainability reporting among listed firms. Also, the Climate Change Act enacted in Nigeria in November 2021 mandates sustainability reporting for businesses with more than 50 employees. This regulatory reform heightens the importance of sustainability reporting for boards of directors in Nigeria. The Act establishes the National Council on Climate Change (NCCC) to implement the Act and set a net-zero emissions goal by 2060.

Lastly, we provide important insights for regulatory bodies, standard setters, and practitioners, who recognize the audit committee as a crucial mechanism for ensuring the quality of audits. We present novel evidence that the presence of an effective audit committee, characterized by a larger number of members, regular attendance at meetings by its members, and the inclusion of at least one female member, has the potential to mitigate resource-agency conflicts by enhancing sustainability reporting practices.

The remainder of the paper is structured as follows. In Section 2, we discuss the literature review, hypothesis, and the underlying theories that link the relationship between audit committee attributes and financially material sustainability reporting. Section 3 outlines the research design, sample selection, and model specification. Section 4 presents the empirical results and discusses the main findings. Finally, section 5 provides the conclusion.

3. Literature review and hypotheses development

3.1 Sustainability reporting and audit committee

Sustainability reporting emerges as a crucial aspect of corporate disclosure, reflecting a company's commitment to transparency and accountability regarding its environmental, social, and governance (ESG) impacts. Various scholars contribute to defining this concept. For instance, Gray (2006) describes sustainability reporting as the practice of measuring, disclosing, and being accountable to internal and external stakeholders for organizational performance towards the goal of sustainable development. Elkington and Rowlands (1999) introduce the "triple bottom line" concept, emphasizing that sustainability reporting should cover economic, environmental, and social dimensions. The Global Reporting Initiative (GRI, 2021) defines a sustainability report as "a report published by a company or organization about the economic, environmental and social impacts caused by its everyday activities."

Building on these definitions, the concept of financially material sustainability reporting gains traction in recent years. Khan et al. (2016) argues that not all sustainability information is equally relevant to investors, introducing the notion of materiality in sustainability disclosures. This perspective is further developed by the Sustainability Accounting Standards Board (SASB), which focuses on industry-specific, financially material sustainability topics that are reasonably likely to impact the financial condition or operating performance of a company (SASB, 2018). Grewal et al. (2021) emphasize that material sustainability information can significantly influence stock price informativeness, highlighting the financial relevance of such disclosures.

Audit committees play a critical role in overseeing both financial and nonfinancial disclosures, ensuring the quality and reliability of information released to the market (Al-Shaer & Zaman, 2018). Prior research indicates that audit committees are increasingly concerned with the accuracy of sustainability reporting, recognizing its importance in

reflecting a company's commitment to sustainable practices (Al-Shaer & Zaman, 2018; Trotman & Trotman, 2015). Research by Trotman and Trotman (2015) indicates that audit committees are particularly attentive to the accuracy of sustainability reporting, actively monitoring the reporting process. Furthermore, Carcello and Neal (2003) highlight that audit committees can influence the extent of voluntary disclosures by monitoring and guiding corporate governance practices.

However, little is known about the influence of internal audit committee attributes and sustainability reporting, and the few available studies on internal audit committee attributes and sustainability reporting remain inconclusive (Al-Shaer & Zaman, 2018, Ashfaq & Rui, 2019; Black & Kim, 2012; Jibril et al., 2024; Orazalin & Mahmood, 2018; Qaderi et al., 2023). For instance, Al-Shaer and Zaman (2018), Black and Kim (2012), Orazalin and Mahmood (2018), Qaderi et al. (2023), and Wang and Sun (2022) find that attributes such as audit committee size, frequency of meetings, gender diversity, chairperson, and financial accounting expertise improve sustainability reporting. These studies imply that larger audit committees with regular meetings, diverse gender representation, and members possessing financial expertise and effective chairperson leadership tend to enhance the transparency and quality of sustainability disclosures.

On the contrary, other studies present conflicting results. Hermawan and Gunardi (2019) argue that firms with larger audit committees may face difficulties in coordinating their activities and reaching consensus, which could lead to less effective oversight and reduced corporate social responsibility disclosure. Additionally, Ashfaq and Rui (2019) argue that audit committee gender diversity may not necessarily increase disclosure under different regulatory environments. Moreover, Jibril et al. (2024) find a negative association between the financial expertise of audit committee members and energy disclosure, suggesting that

financial experts might prioritize traditional financial metrics over sustainability issues. This inconsistency in results, coupled with the limited research in emerging markets like Nigeria, underscores the need for further investigation into how specific audit committee attributes impact the disclosure of sustainability information, particularly in emerging markets.

Furthermore, despite the growing importance of sustainability reporting and the role of audit committees in overseeing both financial and non-financial disclosures, there remains a significant gap in the literature regarding the relationship between audit committee attributes and financially material sustainability reporting. While the Sustainability Accounting Standards Board (SASB) provides a framework for identifying industry-specific, financially material sustainability topics, prior studies do not explore how audit committee attributes influence the disclosure of this material information. Our study explores the influence of audit committee attributes on the disclosure of financially material sustainability information as defined by SASB standards in Nigeria.

3.2 Hypothesis development

3.2.1 Audit committee size and sustainability reporting

The term audit committee size refers to the number of members that constitute the audit committee within an organization. It is a crucial aspect of corporate governance as the size of the audit committee can impact its effectiveness in overseeing financial reporting, internal controls, and risk management (Buallay & Al-Ajmi, 2020; Dwekat et al., 2020). The size of an audit committee strengthens its capacity, knowledge base and adds credibility to the corporate reporting practices (Omair & Hussainey, 2016). According to resource dependence theory, a larger audit committee size can provide diverse expertise and resources necessary for effective governance. This diversity in skills and knowledge within the committee can facilitate a more thorough evaluation of sustainability issues and encourage detailed reporting on environmental and social performance (Hasan et al., 2022).

Research on the impact of audit committee size and its subsequent effectiveness offers two diverging perspectives. One group of studies argues that an audit committee with more members simply fuels disagreement, conflict, and results in slow decision making. Proponents of this view contend that a large-sized audit committee is associated with poor internal controls and weak monitoring (Abbott et al., 2002; Collier & Gregory, 1999). However, another school of thought disagrees with this assertion, arguing that audit committees with more members benefit from a diversity of opinions and expertise (Barua et al., 2010). This diversity assists in the effective functioning of the audit committee (Wang & Sun, 2022).

The relationship between audit committee size and sustainability reporting is a subject of interest, with studies providing mixed results. Bataineh et al. (2023), Omair and Hussainey (2016), and Musallam (2018) argue that a larger audit committee is positively linked to corporate social behaviour and enhances oversight effectiveness, diversifies expertise, and strengthen the reliability of corporate disclosures. Furthermore, Al-Shaer and Zaman (2018) and Buallay and Al-Ajmi (2020) find that larger audit committees are more effective in monitoring and improving the extent of corporate sustainability reporting practices. These findings are supported by Hasan et al. (2022) who conclude that firms with larger audit committees have a higher likelihood of issuing a sustainability report.

On the other hand, Karamanou and Vafeas (2005) argue that the larger the size of the committee may lead to the loss of process and responsibility diffusion and the emergence of free riders (Klein, 2002). Mangena and Pike (2005) indicate that larger audit committees may suffer from the free-rider problem and scattered responsibilities, which can impair interim

disclosure policies. Similarly, Hermawan and Gunardi (2019) conclude that firms with large size of audit committees tend to have less corporate social responsibility (CSR) disclosure. These contrasting findings highlight the complexity of the relationship between audit committee size and sustainability reporting practices.

In the context of Nigeria, Section 359 (3 & 4) of the Companies and Allied Matters Act (CAMA) 2004 and Part E, Article 30 of the Nigerian Securities and Exchange Commission (SEC) Code of Corporate Governance 2011, the audit committee of a public company in Nigeria must consist of an equal number of directors and shareholder representatives. Specifically, this means the committee should be composed of three directors and three shareholder representatives, totaling six members (Companies and Allied Matters Act, 2004; Nigerian SEC, 2011). This balanced composition is designed to ensure that both management and shareholders have an equal voice in the oversight of the company's financial reporting and internal controls. This framework underscores the importance of audit committee size and composition in fostering robust sustainability practices and enhancing the overall quality of corporate disclosures.¹

While substantial literature exists on audit committee size and sustainability reporting in developed countries (Al-Shaer & Zaman, 2018; Buallay & Al-Ajmi, 2020; Hermawan & Gunardi, 2019), there is currently no specific research in Nigeria linking audit committee size with sustainability reporting practices. Based on the existing literature, we argue that larger audit committees can provide the necessary resources and diversity of perspectives to effectively monitor and enhance sustainability practices, ultimately leading to improved

¹ The 2020 Companies and Allied Matters Act (CAMA, 2020) has changed the previous provisions in the repealed CAMA on the composition of the statutory audit committee for public companies. In the repealed CAMA, the composition of the audit committee of public companies was six members with an equal number of shareholders and directors. However, in CAMA (2020), the audit committee of a public company should have five members, i.e., three shareholders and two non-executive directors with at least one member being a member of a professional accounting body in Nigeria established by an Act of the National Assembly. This provision is in line with the principles of the Nigerian Code of Corporate Governance (2018).

sustainability reporting outcomes. Moreover, larger audit committees can enhance accountability and transparency by providing more rigorous oversight of sustainability disclosures, reducing the risk of inaccurate or misleading reporting. Therefore, we formulate our first hypothesis as follows:

H1a. Audit committee size is positively associated with disclosure of sustainability information.

The SASB (Sustainability Accounting Standards Board) recognizes the importance of effective governance and oversight mechanisms, including the role of the audit committee, in ensuring high-quality sustainability reporting (SASB, 2017). While audit committee size is not explicitly mentioned, some relevant connections can be drawn. The "Management of the Legal & Regulatory Environment" and "Business Ethics" general issue categories highlight the importance of effective compliance, risk management, ethical conduct, and transparency, which the audit committee plays a crucial role in overseeing. Certain industry-specific disclosure topics, such as "Critical Incident Risk Management," underscore the need for robust risk oversight mechanisms, where a larger and more diverse audit committee could potentially enhance effectiveness (SASB, 2017; Buallay & Al-Ajmi, 2020).

Furthermore, the SASB conceptual framework and rules of procedure emphasize the importance of cost-effective standards development and decision-usefulness for investors, which could be facilitated by comprehensive and high-quality sustainability disclosures overseen by an effective audit committee (SASB, 2017; Hasan et al., 2022). While the SASB standards primarily focus on identifying and standardizing disclosure topics and metrics specific to each industry, rather than prescribing governance structures or processes, a larger and more diverse audit committee could potentially enhance the oversight function, leading to improved disclosure of financially material sustainability information relevant to investors.

In the Nigerian context, there is currently no research that examines the link between audit committee size and disclosure of financially material sustainability information based on SASB guidelines. The Nigerian corporate governance landscape, regulatory environment, and industry-specific dynamics may influence the nature and strength of this association. Particularly, in Nigerian, the role of audit committee size may promote transparency and more financially material disclosures aligned with globally recognized standards like SASB. Based on these arguments, we formulate the following hypothesis:

H1b. Audit committee size is positively associated with disclosure of financially material sustainability information.

3.2.2 Audit committee meetings and sustainability reporting

An audit committee meeting refers to the assembly of the company's audit committee, a subgroup of the board of directors tasked with supervising financial reporting, risk management, and compliance procedures. The frequency of audit committee meetings may reflect the committee's effort and diligence (Cai et al., 2015). The more frequently audit committee meetings are held, the more likely audit committee members are informed and actively handle issues related to disclosures. Audit committee meetings provide time and opportunities to directors for the oversight of corporate disclosures (Karamanou & Vafea 2005). Therefore, studies show that the regular participation of members in meetings is a key driver in promoting audit committee effectiveness (Wang & Sun, 2022; Zaman et al., 2021).

The relationship between audit committee meetings and sustainability reporting is examined through the lens of resource dependency theory. According to the theory, organizations depend on various resources, including information, to achieve their goals. The audit committee, as a governance mechanism, plays a vital role in managing information flows within an organization. Increased frequency of audit committee meetings can be seen as a strategy to enhance the organization's ability to gather and process information related to sustainability reporting (Buallay & Aldhaen, 2018).

Empirical studies provide support for the relationship. For instance, Al-shaer and Zaman (2018), Bravo and Reguera-Alvarado (2019) and Orazalin and Mahmood (2018) find a positive association between the frequency of audit committee meetings and sustainability reporting quality. These studies suggest that more frequent meetings provide opportunities for in-depth discussions, thorough reviews, and effective oversight of sustainability practices, leading to improved sustainability reporting outcomes. This is in line with a previous study suggesting that the presence of more audit committee meetings increases integrated reporting (Chariri & Januarti 2017).

Furthermore, Buallay and Al-Ajmi (2020) explore the impact of audit committee attributes on corporate sustainability reporting in the Gulf Cooperation Council. The findings indicate that meeting frequency positively influences corporate sustainability reporting, emphasizing the significance of regular audit committee meetings in promoting transparency and accountability in corporate sustainability reporting. Furthermore, DeZoort et al. (2002) postulate that the frequency of meetings is seen as a measure of an audit committee's due diligence. Researchers have shown that the frequency of meetings attended by the audit committee members improves the sustainability reporting process (Jibril et al., 2024; Wang & Sun, 2022).

In this regard, the Nigerian Code of Corporate Governance recommends that companies disclose members' meeting attendance details in their annual reports (Nigerian Code of Corporate Governance, 2018). Disclosing this information allows corporate stakeholders to evaluate directors' performance, thereby enabling stakeholders/principals to hold their directors/agents accountable. Apart from Jibril et al. (2024), research on

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environmental sustainability in Nigeria is limited. Jibril et al. (2024) focus on audit committee characteristics and energy disclosure using GRI standards, finding a positive link between number of audit committee meetings and energy disclosure. However, their study is limited in scope, focusing solely on energy disclosure and not considering other crucial aspects of environmental sustainability. Our study extends this research by examining a broader range of sustainability metrics and incorporating the SASB framework, which provides a more comprehensive and financially material approach to sustainability reporting.

Our study explores financially material sustainability reporting, covering a wider range of ESG factors. This approach provides comprehensive insights into how audit committee attributes influence sustainability practices, contributing to the limited knowledge on sustainability reporting in Nigeria. Based on the resource dependence theory and extant literature in the Nigerian context, we argue that active participation in audit committee meetings improves members' understanding of sustainability reporting processes, enabling them to effectively oversee and contribute to the improvement of sustainability reporting practices. Therefore, we formulate the following hypothesis:

H2a. Audit committee meeting is positively associated with disclosure of sustainability information.

The SASB conceptual framework and rules of procedure emphasize the importance of costeffective standards development and decision-usefulness for investors, which could be facilitated by comprehensive and high-quality sustainability disclosures overseen by an effective and diligent audit committee that meets frequently.

In the Nigerian context, there is currently no study that specifically examines the relationship between audit committee meeting frequency and the disclosure of financially material sustainability information based on SASB guidelines. We argue that more frequent audit committee meetings can facilitate better oversight, monitoring, and integration of material sustainability issues into the organization's reporting processes, leading to more financially material disclosure consistent with SASB standards. Based on these arguments and the existing literature, we formulate the following hypothesis:

H2b. Audit committee meeting is positively associated with disclosure of financially material sustainability information.

3.2.3 Audit committee gender diversity and sustainability reporting

Audit committee gender diversity refers to the active presence of both male and female members on the audit committee within an organization, signifying a balanced representation of genders in the committee's composition, aiming to leverage diverse perspectives, skills, and experiences to enhance corporate governance practices and decision-making processes (Rezaei et al., 2022). Additionally, the literature suggests that women in monitoring roles tend to be more conservative, make more ethical decisions, and perform better in oversight functions, which can contribute to improved sustainability reporting (Oradi & Izadi, 2020).

This diversity in the composition of audit committees plays a crucial role in shaping the oversight and monitoring functions within organizations. The relationship between audit committee gender diversity and sustainability reporting can be understood through the lens of agency theory. Agency theory posits that a diverse composition can enhance monitoring and oversight functions, reducing agency conflicts and promoting transparency in reporting practices (Zalata et al., 2018). The presence of female members on audit committees is believed to improve transparency, reduce agency conflicts, and promote ethical decisionmaking, ultimately leading to better sustainability disclosures (Low et al., 2015). Studies suggest that gender diversity on audit committees can positively impact the quality of sustainability reporting, aligning with the principles of agency theory that aim to align the interests of managers with those of shareholders (Jibril et al., 2024; Wang & Sun, 2022).

Prior research documents a positive relationship between gender diversity on audit committees and sustainability reporting. For example, Appuhami and Tashakor (2017) examine the impact of audit committee characteristics on CSR disclosure by Australian firms and find a position association between audit committee gender diversity and CSR, arguing that gender diversity brings important human resources and varied opinions that help improve the work of audit committees and the quality of decisions. Their results suggest that the quality of discussion is improved when audit committee have both male and female directors, and better oversight of a firm's CSR disclosures is also achieved.

Similarly, Wang and Sun (2022) find that audit committee gender diversity are more effective in enhancing disclosures than their male counterparts, suggesting a demand for more female directors on Chinese audit committees. Gul et al. (2011) contend that gender diversity improves the level of discussion and debate on sensitive and emotional issues, which may not gain much attention from an all-male audit committee. Black and Kim (2012) argue that gender diversity is a crucial human characteristic that improves the effectiveness and enhances the decisions of audit committees due to the diversity of opinions from male and female members. However, some studies have reported negative or not significant findings. Ashfaq and Rui (2019) find a negative association between females on the audit committee and environmental regulatory disclosure, while Campbell et al. (2013) report a not significant relationship between audit committee gender and voluntary disclosure.

In the Nigerian context, for example, Jibril et al. (2024) indicate that the volume of energy disclosure enhances with a large number of women represented on the committee. This phenomenon is linked to the widespread belief in Nigerian firms that appointing women to managerial or executive positions requires a high level of exceptional ability. Based on previous findings and the only research in Nigeria (Jibril et al., 2024), the overall trend indicates that gender diversity on audit committees contributes to more comprehensive, transparent, and stakeholder-oriented sustainability reporting practices in Nigeria. Therefore, we argue that the presence of gender diversity in audit committees enhances sustainability reporting disclosure by incorporating diverse perspectives, skills, and experiences in decision-making processes in Nigerian firms. Drawing from these arguments, we formulate the following hypothesis:

H3a. Audit committee gender diversity is positively associated with disclosure of sustainability information.

Several studies find that gender diversity on audit committees is associated with better quality of voluntary disclosure, enhanced transparency and higher sustainability disclosures (Campbell et al. 2013; Jibril et al., 2024; Low et al., 2015). While these studies do not specifically examine sustainability disclosure based on SASB standards, the general premise is that gender diversity can improve oversight, ethical decision-making, and transparency, which are crucial for ensuring the disclosure of financially material sustainability information relevant to investors.

There is currently no study using Nigerian firms examining the relationship between audit committee gender diversity and the disclosure of financially material sustainability information based on SASB guidelines. We argue that gender diversity on audit committees can enhance the oversight and monitoring of sustainability reporting processes, leading to more financially material disclosure aligned with SASB standards. Gender diversity on audit committees can bring diverse perspectives, ethical considerations, and a focus on transparency, which are crucial for ensuring the disclosure of financially material sustainability information relevant to investors and stakeholders. Based on these arguments and the existing literature, we formulate the following hypothesis:

H3b. Audit committee gender diversity is positively associated with disclosure of financially material sustainability information.

3.2.4 Audit committee chairperson and sustainability reporting

The audit committee chairperson serves as the formal head of the firm's audit committee, tasked with ensuring the committee's effectiveness and the quality of its reporting (Chaudhry et al., 2020; Tanyi & Smith, 2015). The audit committee chairperson holds the authority to set and manage the agenda for the committee's meetings, allowing them to steer the focus and priorities of the committee. Additionally, the chairperson is responsible for building and maintaining strong, collaborative relationships with the other audit committee members, as well as with the firm's management and external auditors (Bedard & Gendron, 2010). Several studies report that an effective audit committee chair can drive a culture of accountability and ethical behavior within the organization (Furqaan et al., 2019). This helps ensure the committee's work aligns with the company's long-term strategic objectives. Bédard and Gendron (2010) point out that the audit committee chairperson is the main element that determines the effectiveness of the audit committees.

The relationship between the audit committee chairperson and sustainability reporting is examined through the lens of agency theory. According to the theory, an effective audit committee, led by a competent and independent chairman, can mitigate agency problems by enhancing oversight and monitoring of management (Qaderi, et al., 2023). This oversight role extends beyond financial reporting to encompass sustainability disclosures, which are increasingly important for stakeholders (Buallay & Al-Ajmi, 2020). Several studies suggest that the chairperson's expertise, particularly in areas like finance, accounting, and sustainability, can enhance the audit committee's effectiveness in monitoring and ensuring transparent sustainability reporting practices (Alodat et al., 2023; Wu et al., 2018). Furthermore, the chairperson's leadership and commitment to sustainability issues can drive the organization's approach to stakeholder engagement and ESG disclosures (PwC, 2022; Albitar et al., 2023).

There is a growing body of research that explores the association between the audit committee chairperson and sustainability reporting. Several studies investigate this relationship and provide evidence that the audit committee chair's leadership, expertise, and commitment to sustainability issues are crucial in shaping the organization's approach to environmental, social, and governance (ESG) disclosures and stakeholder engagement. Qaderi, et al. (2023) highlight the pivotal role of audit committee leadership in enhancing the committee's effectiveness in monitoring management and promoting increased CSR voluntary disclosure. Furthermore, Alodat et al. (2023) argue that an audit committee chairperson with strong characteristics may reduce agency problems and costs, thus helping to align the interests of management and shareholders in improving performance and creating sustainable business results.

In the context of Nigeria, no study has examined the relationship between the audit committee chairperson and sustainability reporting disclosure. However, Section 359(4) of CAMA 2004 mandates that audit committees must have equal representation from shareholders and directors. This peculiarity in the composition of the audit committee in Nigeria means that the chairmanship of the committee is managed by either a shareholder or a director. Drawing from the agency theory and existing literature, we argue that the audit committee chairperson is pivotal in overseeing the sustainability reporting process, ensuring that the information disclosed is both reliable and transparent. By extension, the chairperson's leadership and expertise may augment sustainability disclosure, which is becoming increasingly important for investors and the public. Therefore, we hypothesize that:

H4a. Audit committee chairman is positively associated with disclosure of sustainability information.

While the SASB standards do not explicitly address the audit committee chairperson's role, the general principles of effective governance, ethical conduct, and decision-useful reporting suggest that a knowledgeable and committed chairperson could potentially enhance the disclosure of financially material sustainability information relevant to investors.

There is currently no study within the Nigerian framework exploring the relationship between the audit committee chairperson and disclosure of financially material sustainability information using the SASB guidelines. The corporate governance landscape, regulatory environment, and industry-specific dynamics in Nigeria may affect the nature and strength of this relationship.

The general premise, supported by studies in other countries, is that the audit committee chairperson's expertise, leadership, and commitment to sustainability issues can facilitate better oversight, monitoring, and integration of material sustainability topics into the organization's reporting processes, leading to improved disclosure quality aligned with globally recognized standards like SASB (Deloitte, 2023; Institute of Directors, 2023). Therefore, applying previous findings to a Nigerian scenario, we argue that knowledgeable and committed chairperson can drive the organization's focus on stakeholder engagement, ethical conduct, and transparent reporting, ultimately enhancing the disclosure of financially material sustainability information relevant to investors. Based on these arguments and the existing literature, we formulate the following hypothesis: *H4b.* Audit committee chairman is positively associated with disclosure of financially material sustainability information.

3.2.5 Audit committee financial accounting experts and sustainability reporting

Financial expertise indicates the level of financial and accounting experience and knowledge of the audit committee members. Most corporate governance codes worldwide require an audit committee to include at least one member with appropriate accounting and financial expertise. The primary responsibilities are to oversee firms' financial reporting integrity, internal control systems, and risk management (SOX, 2002). An effective audit committee requires members with financial experience to understand various reporting and financial matters (Abbott et al., 2004). Those without appropriate accounting and financial skills are unlikely to be able to deal with reporting and financial problems (Agrawal & Chadha, 2005).

Agency theory suggests that members with financial expertise improve an audit committee's ability to evaluate auditors' judgments, develop rigorous internal control systems and risk management frameworks, and question financial reporting more effectively (Badolato et al., 2014; Sultana et al., 2015). A lack of financial expertise in audit committees can lead to reliance on external auditors' judgments, and the effectiveness of an audit committee is enhanced by the financial expertise of its members (Baxter & Cotter, 2009). Peters and Romi (2014) suggests that the presence of experts on the audit committee is positively associated with the likelihood of voluntary disclosure of greenhouse gas emissions, a key sustainability metric for many industries. This finding indicates that expertise can contribute to enhanced sustainability reporting practices.

The effectiveness of the audit committee is influenced by its unique attributes and competencies (Al-Shaer & Zaman, 2018), with some research focusing on the impact of audit committee attributes on social responsibility and sustainability (Pozzoli et al., 2022; Trotman

& Trotman, 2015). One important factor contributing to the efficiency of the audit committee is the presence of financial experts (Miglani & Ahmed, 2019). These experts enhance the committee's monitoring role by possessing knowledge of financial and accounting matters, thereby improving the detection of problems and enhancing financial reporting (Dhaliwal et al., 2011; Buallay & Al-Ajmi, 2020). This notion could also be applied to sustainability reporting, as financial accounting experts can leverage their expertise to ensure the credibility, accuracy, and decision-usefulness of sustainability disclosures, aligning them with relevant accounting standards and guidelines.

However, there is limited understanding regarding the impact of audit committee financial expertise and sustainability disclosure, and the few existing studies on this topic have yielded conflicting results (Al-Shaer & Zaman 2018; Jizi et al., 2014: Wang & Sun, 2022). For example, recent studies by Dwekat et al. (2022) and Wang and Sun (2022) suggest that the presence of audit committee members with financial expertise could enhance CSR and environmental disclosure. Other studies also document a positive relationship between the audit committee member with financial expertise and corporate sustainability (Chariri et al., 2018; Li et al., 2012). Contrary to the above empirical findings, Buallay and Al-Ajmi (2020) argue that audit committee financial expertise does not necessarily imply effective monitoring of corporate sustainability reporting but depends on other factors such as top management power. Similarly, Jibril et al. (2024) report a significant negative association between members' financial expertise and energy disclosure for environmental sustainability.

Nigeria has implemented several policies and regulations related to financial accounting expertise and sustainability reporting. For example, the Code of Corporate Governance 2018 emphasizes the importance of having financial experts on the audit

committee.² Jibril et al. (2024) examine the impact of audit committee characteristics on energy disclosure among Nigerian firms using GRI standards, finding a negative association between financial expertise and energy disclosure.

Instead of energy disclosure, we focus on sustainability disclosure in general. This ample scope aims to capture the sustainability reporting status more comprehensively. Based on the extant literature arguing that audit committee members with financial expertise improve the effectiveness of financial oversight, enhance the quality of financial reporting, and contribute to greater transparency and accountability, we argue that financial expertise also can influence the sustainability disclosure practices in Nigerian firms. Therefore, we formulate the following hypothesis:

H5a. Audit committee financial accounting experts is positively associated with disclosure of sustainability information.

The Sustainability Accounting Standards Board (SASB) guidelines emphasize the importance of disclosing financially material sustainability information to investors and other stakeholders (SASB, 2017). These guidelines focus on industry-specific sustainability topics that are likely to have material financial impacts. The audit committee, particularly members with financial accounting expertise, plays a crucial role in overseeing the quality and integrity of financial reporting, including sustainability disclosures (Al-Shaer & Zaman, 2018).

Financial accounting experts on the audit committee possess specialized knowledge and skills that can enhance the committee's ability to evaluate and monitor the disclosure of financially material sustainability information. Their expertise allows them to better understand the financial implications of sustainability issues and ensure that such information

² Recently, the 2020 Companies and Allied Matters Act (CAMA) mandates the establishment of audit committees for public companies, requiring at least one member with knowledge of internal control processes, implying the need for financial accounting expertise.

is accurately reported and integrated into financial disclosures (Cohen et al., 2014). Several studies find a positive relationship between audit committee financial expertise and the quality of financial reporting (Badolato et al., 2014; Pozzoli et al., 2022). While these studies primarily focus on traditional financial reporting, the same principles can be applied to sustainability reporting, especially when considering financially material information as defined by SASB.

In the Nigerian context, there is currently no research studying the association between audit committee financial accounting experts and financially material sustainability information disclosure using the SASB guidelines. Based on the existing literature and the potential benefits of financial accounting expertise in increasing the disclosure of financially material sustainability information, we formulate the following hypothesis:

H5b. Audit committee financial accounting experts is positively associated with disclosure of financially material sustainability information.

4. Research design and methodology

4.1 Sample

The initial sample consists of all the 170 firms listed on the Nigerian Exchange Group (NGX) from 2011 to 2020. We choose listed firms on NGX as our research subject because NGX firms are considered leaders in African for promoting sustainability reporting. The 2011–2020 is the period in which overall environmental disclosure witnessed important regulatory improvement by the country. The KPMG Survey of Sustainability Reporting 2022 shows that the N100 companies, which include the top 100 companies listed on the NGX, have seen a steady increase in reporting rates, with 79% of these companies reporting on sustainability in 2022, up from 64% in 2012.

We collect required data from several sources and at different stages. First, we manually collect data on audit committee attributes from annual reports, stand-alone corporate governance report, the NGX and companies' websites. Second, we check the extent of sustainability reporting by reviewing the existence of sustainability disclosure, and where and how it is disclosed. The process involves reviewing stand-alone sustainability reports, annual reports, or equivalent documents (such as Impact report, CSR report and ESG report) obtained from the companies' websites, NGX database and the "sustainability" section of companies' homepages. Then, we use keywords to search for specific sustainability-related information disclosed; for instance, "Sustainability", "Sustainable", "Environment", "CSR", "ESG", "Pollution", "GHG", "Emission", "Air", "Energy", "Ecological", "Water", "Recycle", "Waste", "Reuse", "Packaging", "Community", and "Employee". If a company has disclosed any sustainability-related information, it will be marked as "yes" for sustainability disclosure in that year, otherwise, it will be marked as "no".

Following prior studies (Carvajal & Nadeem, 2023; Jones et al., 2016), we classify the 170 companies using the Sustainable Industry Classification System (SICS) developed by the SASB. The SICS classification system groups 77 industries across 11 sectors, and SICS Look-up Tools are employed for the SICS sector classification.³ If a company cannot be classified using the SICS Look-up Tools, they are classified using the SICS Mapping Archive, which is private information source obtained directly from SASB through an Academic Licensing Agreement. We select all the 11 SICS sectors except for the financial sector, due to their different regulation and nature related to reporting social and environmental disclosures (Dwekat et al., 2022; Hong & Andersen, 2011).

We also exclude 8 firms with 80 firm-year observations due to missing required SICS information and an additional of 14 firms with 140 firm-year observations lacking complete

³ www.sasb.org/standards-overview/download-current-standards

information necessary for calculating the dependent and independent variables. Therefore, our final sample consists of 98 firms, comprising 980 firm-year observations.⁴ The final sample consists of 98 industries distributed across ten major SICS sectors: 3 industries in Consumer Goods, 16 industries in Extractives and Minerals Processing, 23 industries in Food and Beverage, 8 industries in Health Care, 8 industries in Infrastructure, 1 industry in Renewable Resources and Alternative Energy, 13 industries in Resource Transformation, 16 industries in Services, 5 industries in Technology and Communications, and 5 industries in Transportation. Table 1 describes the final sample for the period 2011 to 2020.

Table 1 Sample selection

Sample selection			
Panel B: Sample Selection	Unique	Firm-Year	(%)
Tullet D. Sumple Selection	Firms	Observations	(70)
Firms listed in the NGX	170	1,700	100
Less:			
Financial firms	50	500	29.41
Total non-financial service firms	120	1,200	70.59
Sample after removing financial services firms	120	1,200	100
Less:			
Missing required SICS information	8	80	6.67
Less:			
Firms that did not provide complete information	14	140	11.67
Final sample firms	98	980	81.67

Notes: This table reports the distribution of sample firm-year observations over the period of 2011–2020.

4.2 Measurement of Variables

4.2.1 Dependent variables

Following Carvajal & Nadeem (2023), we employ two measures to capture sustainability reporting: DISCLOSE and SRINDEX. The first measure is DISCLOSE, a binary variable that takes a value of 1 if a company includes sustainability information in its annual reports or standalone sustainability reports, and 0 otherwise. The second measure is SRINDEX, which represents the sustainability reporting score that goes from 0% to 100% and is based on the

⁴ We winsorize all continuous variables at the 1st and 99th percentiles to remove measurement error caused by extreme values.

company's disclosure of financially material sustainability information. Our methodology adheres closely to the SASB's industry guidelines for measuring material sustainability disclosure, employing a distinct approach by integrating audit committee attributes with financially material sustainability reporting. Unlike Grewal et al. (2021) and Khan et al. (2016), who primarily focus on the financial materiality of sustainability disclosures, our approach places a particular emphasis on the governance mechanisms, audit committee attributes, that influence these disclosures.

The SASB standards have the objective of generating information that is "reasonably likely to be material; decision-useful for companies and their investors; and cost-effective for corporate issuers" (SASB, 2017a, p. 9). In relation to the concept of materiality, the SASB describes that: "Information is considered material if there is a strong possibility that the reasonable investor would have concluded that the revelation of the withheld fact had materially changed the 'total mix' of the information made available" (SASB, 2017a, p. 9). In the realm of sustainability literature, the concept of materiality refers to the process of identifying and disclosing those environmental, social, and economic issues that have the most significant impact on a company and its stakeholders (Jones et al., 2016).

The SASB standards categorize major sectors into 11 groups and their respective industries to guide companies in disclosing sustainability information. These sectors include Consumer Goods, Extractives and Minerals Processing, Financials, Food and Beverage, Health Care, Infrastructure, Renewable Resources and Alternative Energy, Resource Transformation, Services, Technology and Communications, and Transportation. Within each sector, various industries are classified as sub-categories. For instance, the Extractives & Minerals Processing sector consist of eight industries: coal operations, construction materials, iron and steel producers, metals and mining, oil and gas exploration and production, oil and

gas midstream, oil and gas refining and marketing, and oil and gas services. Further details on the SICS industry classification are provided in Appendix 2.

Furthermore, the SASB standards offer a distinct set of standards for each industry, outlining sustainability disclosure topics and corresponding accounting metrics. For example, in the Extractives & Minerals Processing sector, the construction materials industry has a comprehensive list of sustainability disclosure topics, such as Greenhouse Gas Emissions, Air Quality, Energy Management, Water Management, Waste Management, Biodiversity Impacts, Workforce Health & Safety, Product Innovation, and Pricing Integrity & Transparency. For each topic, for instance 'Greenhouse Gas Emissions' topic, one or more accounting metrics are provided, such as Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations, Discussion of long- and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets. These accounting metrics may be measured in units such as metric tons (t) CO₂-e₂ or percentage (%). Appendix 4 provides list of sustainability disclosure topics and corresponding metrics for construction materials sector under extractives and minerals processing.

We base the scoring of disclosure status in this study on the SASB guidelines provided in The State of Disclosure (2017), which evaluates the quality of corporate disclosure on SASB topics and categorizes it as No disclosure, Boilerplate, Company-tailored narrative, and Metrics. Table 2 provides a description of each category.

Table 2

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Score	Category	Description
0	No disclosure	The company does not disclose any information related to
		the sustainability issue.
1	Boilerplate	The company discloses generic or standardized information
		that is not tailored to the company's specific circumstances.
		Such disclosure has not been sufficiently tailored to reflect

Scoring disclosure status based on SASB guidelines

		the company's specific and unique circumstances,
		including, but not limited to, its past performance, future
		targets, and individual risk/opportunity management
		strategies. The disclosure thus does not provide the reader
		with sufficient and significant information to differentiate
		between the company and most, if not all, of its peers.
2	Company-tailored	The company provides disclosure using specific language
	narrative	that can only be understood in the context of the issuer.
		Such disclosure has been sufficiently tailored to reflect the
		company's specific and unique circumstances, including,
		but not limited to, its past performance, future targets, and
		individual risk/opportunity management strategies. The
		disclosure thus provides the reader with sufficient and
		significant information to differentiate between the
		company and most, if not all, of its peers; if analyzed
		outside the context of the company, such disclosure would
		not be applicable to other issuers. However, such disclosure
		may not provide information allowing for quantitative
		comparisons between companies.
3	Metrics	The company provides disclosure using quantitative
		performance indicators, which, by their nature, can be
		understood only in the context of the issuer.

We follow Carvajal and Nadeem (2023) and score each disclosure topic between 0 and 3 based on the criteria provided by the SASB. We review the company websites, standalone sustainability reports, and annual reports to check the sustainability disclosure status regarding the disclosure topic and accounting metrics suggested by the SASB industry guideline. For each accounting metric, if a firm has no disclosure, then it is scored as 0. If the disclosure is "Boilerplate", then it is scored as 1. If it is "Company-tailored narrative", it is scored as 2. If it is a "Metric", then it is scored as 3. After scoring each accounting metric, these figures are summed up to conclude a final score for each firm and year.

Following that, we create an index that provides disclosure scores based on the SASB materiality map, which serves as a proxy for material sustainability disclosure. This map reveals sustainability issues that are likely to have an influence on the operational performance or company's financial position within a particular industry. The materiality map provides a comprehensive summary of the 5 dimensions and 26 categories of

sustainability-related business issues, along with the specific issues deemed material for each industry.

The materiality map contains multiple industries within a single sector, with each industry displaying different colouring. The map contains 26 rows, each representing a general category of issues, and 77 columns, symbolizing the different industries. The materiality map simplifies the identification of whether a particular topic is relevant to an industry or not. For instance, in the Extractives and Minerals Processing sector, the Greenhouse Gas (GHG) Emissions category under the Environment dimension is painted dark grey on the map, whereas it is not painted for Financials sector. This indicates that GHG Emissions are likely to be material for firms in the Extractives and Minerals Processing sector, necessitating their disclosure. On the contrary, GHG Emissions are not considered material for financial firms, and thus, they are not required to disclose this information. Appendix 3 provides the SASB's sector-level materiality map.

We use the SASB materiality map to create an index comprising 26 general issue categories. The disclosure topics of each company are listed in the index and coloured to indicate their materiality based on the SASB industry classification. Any disclosure topics that are not coloured are not considered material for the company, and they are not required to disclose them. We record the aggregate scores for each coloured topic and calculate the disclosure rate for each firm-year by dividing the total score obtained by the total score available for that year. We record the scores for all companies in the same way. Appendix 5 provides an example of the material sustainability disclosure rate for the company Dangote Cement Plc.

During the mapping and scoring process, we exclude certain accounting metrics, specifically those related to compliance with US laws, as they are unlikely to be disclosed by most companies outside the USA.⁵

4.2.2 Independent variables

We identify five internal audit committee attributes that could impact the extent of sustainability reporting. Our first attribute is audit committee size (ACS), measured as the total number of audit committee members on the board (e.g., Buallay & Al-Ajmi, 2020; Hasan et al., 2022). Secondly, audit committee meetings (ACM), captured as the number of meetings held by the audit committee during the year. Thirdly, audit committee gender diversity (ACGD), the proportion of female directors on audit committee to total number of audit committee members during the year (Oradi & Izadi 2020; Wang & Sun, 2022).

Fourthly, audit committee chair (ACC), a binary variable with a value of 1 if the audit committee is chaired by a shareholder, and 0 when the audit committee is chaired by a director. Lastly, audit committee financial accounting experts (ACFAE) is the proportion of audit committee members who qualified as accountants with a professional association (Association of National Accountants of Nigeria or Institute of Chartered Accountants of Nigeria) and the total number of audit committee members during the year (Appuhami & Tashakor, 2017; Buallay & Al-Ajmi, 2020; Dhaliwal et al., 2011).

4.2.3 Control variables

We employ a series of control variables derived from firm-specific and board attributes. The firm-specific attributes include firm size (FMSIZ), measured as the natural logarithm of total

⁵ For example, one accounting metric in Biotechnology and Pharmaceuticals is "Number of Settlements of Abbreviated New Drug Application (ANDA) litigation that involved payments and/or provisions to delay bringing an authorized generic product to market for a defined time period". This refers to a US regulation and thus it is very unlikely that Nigerian firms would disclose such accounting metrics, which are mainly tailored for US firms.

assets; leverage (LEVRG), defined as the long-term debt to total assets; return on assets (ROA), proxied as net income before extraordinary items scaled by total assets (Al-Shaer & Zaman, 2018; Wang & Sun, 2022); firm growth (FMGRH), computed as the change in sales divided by previous sales; and firm age (FMAGE), calculated by subtracting the year of listing from the year of observation (Bédard & Gendron, 2010; Yorke et al., 2023).

From the board attributes, we control for foreign directors (FBMB) using the proportion of foreign directors to total board members; CEO expertise (CEOEX), a binary variable with a value of 1 if the CEO possesses an accounting or business-related qualifications or membership of a professional accounting body, and 0 otherwise; CEO tenure (CEOT), measured as the number of years the CEO has served in the firm; and foreign shareholders (FSO), computed as the proportion of foreign investors to total issued shares (Buallay, 2019; Ghardallou, 2022; Gull et al., 2024). Lastly, we incorporate year (YEAR) and industry (INDUS) indicator variables to control for fixed effects. Appendix A provides a detailed definition of all variables.

4.3 Regression models

To empirically estimate the impact of audit committee attributes on disclosure of sustainability information, we estimate the baseline regression model to test the individual hypothesis H1a–H5a.

Where: DISCLOSE is disclosure of sustainability information, AC is audit committee attributes, specifically, ACS is AC size, ACM is AC meeting, ACGD is AC gender diversity, ACC is AC chair and ACFAE is AC financial accounting experts. To test the individual hypotheses *H*1a through *H*5a, we focus on the coefficient β 1 in our regression model. This coefficient represents the effect of audit committee attributes on the disclosure of sustainability information.

Then, we estimate the second model to examine the association between audit committee attributes and disclosure of financially material sustainability information to test the individual hypothesis H1b–H5b.

Where: SRINDEX is sustainability reporting index, AC is audit committee attributes, ACS is AC size, ACM is AC meeting, ACGD is AC gender diversity, ACC is AC chair and ACFAE is AC financial accounting experts. To test the individual hypotheses *H*1b through *H*5b, we focus on the coefficient β 1 in our regression model. This coefficient represents the effect of audit committee attributes on the disclosure of financially material sustainability information.

5. Results

5.1 Descriptive Statistics

Table 3 provides the descriptive statistics for the variables examined in this study. Regarding our sustainability reporting measures DISCLOSE and SRINDEX, the mean value for DISCLOSE is 0.41, indicating that 41% of Nigerian firms disclose sustainability information, suggesting a lower disclosure rate compared to non-disclosing firms. This lower rate is attributed to the voluntary nature of sustainability reporting and the lack of enforcement and adequate legislation (Erin et al., 2022). Notably, Notably, this rate is slightly lower than the 71% reported for New Zealand firms (Carvajal & Nadeem, 2023). The mean value of SRINDEX is 0.10, indicating that Nigerian firm's disclosure only 10% of financially material

sustainability information out of full score of 100%. This percentage is notably higher than the 5.2% reported for New Zealand firms (Carvajal & Nadeem, 2023).

With regard to the audit committee attributes, we find that the mean value of audit committee size (ACS) is 5.4, indicating that audit committees in our sample firms have on average 5 members. The mean value of audit committee meetings (ACM) is 3.6 which indicates that audit committees in our sample meets on average 4 times in a 12-month calendar year. Audit committee gender diversity (ACGD) has a mean of 0.12 suggesting that female representation on audit committees is relatively low, with an average of 12%. The mean value of audit committee chair (ACC) is 0.667, indicating that, on average, about 66.7% of the firm have their audit committee chaired by a shareholder representative, while the remaining firms are led by the directors' representatives. The mean value of audit committees financial accounting experts (ACFAE) is 0.29, indicating that around 30% of audit committees members possess financial accounting expertse.

Regarding control variables, the average size of the sample firm is 7.9 with a mean leverage of 14%. Furthermore, a typical firm in our sample is profitable, yielding an average return (ROA) of 6%. The mean value of firm growth is 18.9%, while the average age is 27 years. On average, around 16% of the board consists of foreign directors, and 75% of CEOs possess expertise in accounting or business-related qualifications. The average CEO tenure is approximately 6 years, and foreign shareholders own 20% of the shares.

Table 3 Descriptive statistics

Desemptive statis								
Variables	Ν	Mean	Median	Std. Dev.	Min	Max	P25	P75
DISCLOSE	980	0.413	0.000	0.493	0.000	1.000	0.000	1.000
SRINDEX	980	0.099	0.000	0.158	0.000	0.792	0.000	0.167
ACS	980	5.407	6.000	0.899	3.000	6.000	4.000	6.000
ACM	980	3.649	4.000	0.898	2.000	6.000	3.000	4.000

ACGD	980	0.115	0.000	0.140	0.000	0.500	0.000	0.167
ACC	980	0.667	1.000	0.471	0.000	1.000	0.000	1.000
ACFAE	980	0.299	0.333	0.106	0.167	0.667	0.000	0.167
FMSIZ	980	7.921	7.769	1.044	5.752	9.906	7.181	8.807
LEVRG	980	0.138	0.091	0.135	0.000	0.680	0.044	0.180
ROA	980	0.057	0.059	0.094	-0.316	0.298	0.027	0.097
FMGRH	980	0.188	0.125	0.199	-0.139	0.792	0.050	0.289
FMAGE	980	26.841	26.000	15.812	3.000	71.000	12.000	39.000
FBMB	980	0.160	0.000	0.199	0.000	0.667	0.000	0.333
CEOEX	980	0.746	1.000	0.436	0.000	1.000	0.000	1.000
CEOT	980	5.540	4.000	5.271	1.000	27.000	2.000	7.000
FSO	980	0.203	0.000	0.279	0.000	0.750	0.000	0.507

Note: This table reports the descriptive statistics of the dependent, independent, and control variables used in this study. The dataset comprises 980 firm-year observations spanning the period from 2011-2020 with N referring to the number of observations for each proxy. Appendix A provides a detailed definition of all variables.

We perform a univariate analysis to compare the differences in mean values between firms that disclose sustainability information and firms that do not disclose sustainability information. The results are presented in Table 4. A total of 405 observations are classified as "Disclose," while 575 observations are classified as "Non-Disclose." The number of firms disclosing sustainability information is fewer compared to those that do not, indicating that a significant proportion of firms may not yet prioritize or are unwilling to share their sustainability information publicly. This finding suggests that despite growing stakeholder pressure for transparency, many firms still opt not to engage in sustainability disclosure.

The mean of the SRINDEX is significantly higher in disclosing firms (0.240) compared to non-disclosing firms (0.000), with a significant difference of -0.240 (p<0.001). Additionally, the means for the key audit committee attributes such as size (mean = 5.578 vs. 5.287), meetings (mean = 3.884 vs. 3.483), gender diversity (mean = 0.129 vs. 0.104), the presence of an audit committee chair (mean = 0.728 vs. 0.624), and financial accounting expertise (mean = 0.144 vs. 0.092) are all significantly higher in firms that disclose

sustainability information in comparison to the ones not disclosing sustainability information, with all differences being statistically significant.

These findings indicate a clear distinction in audit committee attributes between firms that engage in sustainability disclosure and those that do not. In particular, firms that disclose sustainability information have larger audit committees, more frequent meetings, higher presence of gender diversity in the audit committee, more audit committees chaired by a shareholder, and bigger presence of financial accounting experts than firms do not disclosing sustainability information.

	Disclos (N=	Disclose Firms (N=405)		Non-Disclose Firms (N=575)		Wilcoxon Test
Variables	Mean	Median	Mean	Median	(1) (2)	(4) (2)
	(1)	(2)	(3)	(4)	(1)-(3)	(4)-(2)
SRINDEX	0.240	0.190	0.000	0.000	0.240***	-29.874***
ACS	5.578	6.000	5.287	6.000	0.291***	-4.879***
ACM	3.884	4.000	3.483	3.000	0.400***	-7.427***
ACGD	0.129	0.167	0.104	0.000	0.025**	-2.684***
ACC	0.728	1.000	0.624	1.000	0.104***	-3.402***
ACFAE	0.144	0.000	0.092	0.000	0.052***	-4.979***
FMSIZ	8.311	8.322	7.647	7.566	0.664***	-9.645***
LEVRG	0.138	0.083	0.139	0.101	-0.001	0.826
ROA	0.074	0.067	0.046	0.051	0.028***	-5.561***
FMGRH	0.234	0.177	0.156	0.102	0.078***	-6.355***
FMAGE	29.247	28.000	25.146	23.000	4.101***	-4.406***
FBMB	0.182	0.143	0.145	0.000	0.038**	-4.122***
CEOEX	0.714	1.000	0.769	1.000	-0.055	1.951**
CEOT	4.899	3.000	5.991	4.000	-1.093**	3.342***
FSO	0.269	0.002	0.157	0.000	0.112***	-6.059***

Table 4 Univariate Statistics

Note: This table reports the difference of t-test and Wilcoxon test for variables of disclosure and non-disclosure firms. The sample consist of 980 firm-year observations for the period 2011-2020. Significance levels are

denoted by ***, **, and *, representing statistical significance at 1%, 5%, and 10%, respectively. Appendix A provides a detailed definition of all variables.

We perform pairwise correlation matrix for our variables of interest and present the results in Table 5. Sustainability reporting index and firm size have the highest correlation coefficient of 0.39. This value is below the threshold of 0.80 suggested by Hair et al. (2019), indicating that multicollinearity is not a significant concern for the model estimation. Furthermore, we compute the variance inflation factors (VIF) for the empirical models and find that none of the variables surpassed the threshold of 10 in the VIF test, indicating that multicollinearity is not affect the interpretation of regression coefficients.

The results show that the five proxies of audit committee attributes are significantly and positively correlated with both measures of sustainability reporting disclosure, indicating that larger audit committees, with more frequent meetings, female representation, representatives of shareholders as chairs of audit committee and financial accounting expertise are associated with engagement of sustainability reporting practices. This preliminary finding indicates support to our hypotheses related to the influence of audit committee attributes on sustainability reporting disclosure. Regarding the control variables included in the model, a majority reveal a positive and significant correlation with one another, while only a few shows a negative and significant correlation with each other.

Pairwise correlations								
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DISCLOSE	1.000							
(2) SRINDEX	0.749***	1.000						
(3) ACS	0.159***	0.196***	1.000					
(4) ACM	0.220***	0.225***	0.328***	1.000				
(5) ACGD	0.087***	0.123***	0.018	0.113***	1.000			
(6) ACC	0.109***	0.077**	0.204***	0.124***	0.046	1.000		
(7) ACFAE	0.159***	0.108***	0.026	0.114***	-0.022	0.107***	1.000	
(8) FMSIZ	0.313***	0.393***	0.349***	0.189***	0.017	0.214***	0.110***	1.000
(9) LEVRG	-0.006	-0.075**	-0.107***	-0.049	0.059*	0.014	-0.056*	-0.054*
(10) ROA	0.147***	0.145***	0.082**	0.045	-0.047	0.021	0.016	0.196***
(11) FMGRH	0.193***	0.252***	-0.050	0.010	0.081**	0.016	0.022	0.046
(12) FMAGE	0.128***	0.196***	0.074**	0.055*	0.067**	0.076**	-0.004	-0.010
(13) FBMB	0.094***	0.158***	0.272***	0.151***	-0.101***	0.090***	0.040	0.259***
(14) CEOEX	-0.062*	-0.071**	-0.009	0.051*	0.054*	-0.129***	0.006	-0.052*
(15) CEOT	-0.102***	-0.103***	-0.074**	0.009	-0.119***	-0.039	-0.012	-0.138***
(16) FSO	0.197***	0.312***	0.232***	0.199***	-0.086***	0.031	0.082**	0.329***
Variables	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) DISCLOSE								
(2) SRINDEX								
(3) ACS								
(4) ACM								
(5) ACGD								
(6) ACC								
(7) ACFAE								
(8) FMSIZ								
(9) LEVRG	1.000							
(10) ROA	-0.272***	1.000						
(11) FMGRH	0.087***	-0.041	1.000					
(12) FMAGE	-0.021	0.085***	0.064**	1.000				
(13) FBMB	-0.172***	0.243***	-0.036	0.224***	1.000			
(14) CEOEX	0.089***	0.017	-0.057*	0.014	-0.008	1.000		
(15) CEOT	0.134***	-0.093***	0.074**	-0.094***	-0.074**	0.126***	1.000	1 0 0 0
(16) L(7)	() 16/***	1105***	0.011	11 76/***	N 77N***	N N77**	A 100***	1 000

Table 5 Pairwise correlati

(16) FSO-0.164***0.185***-0.0110.264***0.720***0.077**-0.109***1.000Note: This table presents the Pairwise correlation. The dataset comprises 980 firm-year observations spanning the period from 2011-2020. Significance levels are denoted by ***,

**, and *, representing statistical significance at 1%, 5%, and 10%, respectively. Appendix A provides a detailed definition of all variables.

5.2 Main results

Tables 6 and 7 present the regression results from Equation (1), examining the relationship between audit committee attributes and sustainability reporting using two proxies; disclose (DISCLOSE) and index (SRINDEX), as per our hypotheses. In both tables, Columns (1) to (6) presents the baseline regressions, with DISCLOSE and SRINDEX as the dependent variables, and audit committee size (ACS), audit committee meetings (ACM), audit committee gender diversity (ACGD), audit committee chairman (ACC) and audit committee financial accounting experts (ACFAE) as independent variables. Columns (1) to (5) report the results for individual attributes of audit committee on DISCLOSE and SRINDEX, while Column (6) reports the results of the combined effect of all audit committee attributes, i.e., the bundle effect.

We present results on DISCLOSE using logistic regression in Table 6. Our Pseudo R² value across the 6 models ranges from 47.7% to 53.8%, implying that the independent variables explain a substantial portion of the variation in the dependent variable. In general, the results from Columns (1) to (6) support our hypotheses, except for H4a and H5a. Specifically, in Column 1 the coefficients for audit committee size (ACS) ($\beta = 0.802, p < 0.05$) presents a significant positive relationship with DISCLOSE, suggesting that larger audit committees may provide more resources and oversight, leading to increased transparency and disclosure. This finding aligns with prior research by Buallay and Al-Ajmi (2020) and Hermawan and Gunardi (2019), which indicates that a larger audit committee size increases the disclosure of sustainability information.

The findings of Column 2 report a statistically significant and positive relationship between audit committee meetings (ACM) ($\beta = 0.667$, p<0.01) and DISCLOSE, suggesting that active engagement of the audit committee through frequent meetings contributes positively to the likelihood of companies disclosing sustainability information. This finding is consistent with the research of Al-shaer and Zaman (2018) and Bravo and Reguera-Alvarado (2019), which emphasizes the critical role of frequent audit committee meetings in enhancing sustainability disclosure. Moreover, the findings of Column 3 report a statistically significant and positive relationship between audit committee gender diversity (ACGD) ($\beta = 3.028$, p<0.05) and DISCLOSE, indicating that firms with a higher proportion of female directors on the audit committee are more likely to disclose sustainability information. This finding aligns with prior research by Appuhami and Tashakor (2017) and Low et al. (2015), indicating that audit committee female representation positively influences corporate social responsibility disclosures.

However, in Column 4, the coefficient for audit committee chairman (ACC) (β = -0.957, *p*<0.05) indicates a significant negative relationship with DISCLOSE, suggesting that having the audit committee chaired by a shareholder is significantly associated with a lower likelihood of engaging in sustainability reporting, leading to the rejection of H4a. One possible explanation is that the presence of a shareholder as the audit committee chairman might limit the independence and objectivity of the committee. Independence is crucial for effective oversight, as it allows the committee to critically assess management's decisions and ensure that sustainability practices are aligned with the company's long-term strategy (Carcello & Neal, 2003). A lack of independence could result in less rigorous scrutiny of sustainability disclosures and a reduced emphasis on non-financial reporting. Additionally, in Column 5, audit committee financial accounting expertise (ACFAE) is not significant (β = 1.588, *p*>0.10), which does not support H5a.

To account for the potential variability of individual factors, we re-run the baseline model by integrating all audit committee attributes and the DISCLOSE into one comprehensive model. The results are reported in Column 6. Once again, we find that the coefficients of audit committee size (ACS) ($\beta = 0.805$, p < 0.10), audit committee meetings (ACM) ($\beta = 0.596$, p < 0.01), and audit committee gender diversity (ACGD) ($\beta = 3.348$, p < 0.05) are all positive and statistically significant in relation to DISCLOSE using the combined effect. However, we find that the coefficient for audit committee chairman (ACC) ($\beta = -1.381$, p < 0.01) remains negative and statistically significant, while audit committee financial accounting expertise (ACFAE) ($\beta = 1.907$, p > 0.10) remains not significant in relation to DISCLOSE under the combined effect.

Regarding our control variables in of Table 6 Column 1–6, we find that larger firms (FMSIZ) and the presence of foreign shareholders (FSO) are associated with higher sustainability disclosure. This finding is in line with the idea that larger firms typically face more public scrutiny and have greater resources to dedicate toward sustainability initiatives. As such, they may be more inclined to disclose sustainability information to enhance their reputation and meet stakeholder expectations (Dienes et al., 2016). Similarly, foreign shareholders may pressure firms to adopt globally recognized sustainability practices, contributing to enhanced disclosure (Oh et al., 2011).

On the other hand, firms with higher levels of financial debt (LEVRG) and with foreign directors (FBMB) are associated with lower sustainability disclosure. This is consistent with the idea that firms with higher levels of debt financing may be more focused on short-term financial performance and may be less likely to invest in sustainability initiatives. Similarly, firms with foreign directors may be less focused on sustainability disclosure, as they may have different priorities and cultural backgrounds that do not prioritize sustainability (Buallay, 2019). Additionally, we find that the relationship between return on assets (ROA), firm growth (FMGRH), firm with longer history (FMAGE), CEO experience (CEOEX), and CEO tenure (CEOT) with sustainability disclosure are not significant, suggesting that these factors do not have a significant impact on a firm's decision to disclose sustainability information.

Table 6								
Audit commit	Audit committee attributes and sustainability disclosure							
	(1)	(2)	(3)	(4)	(5)	(6)		
VARIABLES	DISCLOSE	DISCLOSE	DISCLOSE	DISCLOSE	DISCLOSE	DISCLOSE		
ACS	0.802**					0.805*		
	(2.299)					(1.949)		
ACM		0.667***				0.596***		
		(3.071)				(2.948)		
ACGD			3.028**			3.348**		
			(2.380)			(2.471)		
ACC				-0.957**		-1.381***		
				(-2.292)		(-2.652)		
ACFAE					1.588	1.907		
					(1.592)	(1.441)		
FMSIZ	1.199***	1.310***	1.425***	1.502***	1.396***	1.428***		
	(4.156)	(4.361)	(4.932)	(4.619)	(4.695)	(4.604)		
LEVRG	-5.896***	-6.669***	-6.406***	-6.258***	-6.361***	-6.596***		
/	(-2.880)	(-3.315)	(-3.338)	(-3.172)	(-3.213)	(-3.487)		
ROA	0.437	-0.866	-0.124	0.583	0.316	0.864		
	(0.237)	(-0.470)	(-0.079)	(0.338)	(0.187)	(0.450)		
FMGRH	-1.461	-1.104	-1.443	-2.226**	-1.479	-1.917		
	(-1.416)	(-1.095)	(-1.577)	(-1.975)	(-1.514)	(-1.535)		
FMAGE	0.013	0.010	0.010	0.017	0.014	0.014		
	(1.064)	(0.805)	(0.880)	(1.349)	(1.188)	(0.997)		
FBMB	-3.886***	-2.88/**	-3./3/***	-3.528***	-3.396***	-3.839***		
GEOEV	(-3.227)	(-2.338)	(-2.873)	(-3.131)	(-2.932)	(-2.684)		
CEOEX	0.267	0.313	0.117	0.073	0.167	-0.151		
CLOT	(0.737)	(0.774)	(0.301)	(0.193)	(0.459)	(-0.352)		
CEOT	0.004	-0.000	0.017	0.005	0.005	0.00^{7}		
FGO	(0.119)	(-0.010)	(0.533)	(0.155)	(0.144)	(0.206)		
FSO	2.121***	1.891***	2.581***	2.025***	1.9/6***	2.403***		
	(3.014)	(2.583)	(3.256)	(2.906)	(2.857)	(2.823)		
Constant	11 0/1***	10 702***	0 112***	0 0 0 0 * * *	0 005***	15 240***		
Constant	-11.901	-10.793	-9.112^{+++}	-8.828^{+++}	-8.883^{+++}	-13.340^{+++}		
	(-4./69)	(-4./99)	(-4.698)	(-4.184)	(-4.399)	(-4.948)		
Observations	713	713	713	713	713	713		
Pseudo R ²	0 488	0 491	0 485	0 483	0 477	0 538		
Year FF	YES	YES	YES	YES	YES	YES		
Industry FE	YES	YES	YES	YES	YES	YES		

Note: This table reports the results of logit regression models examining the association between audit committee attributes and sustainability disclosure (Columns 1–6). *t*-statistics reported in parentheses are calculated using robust standard errors. Significance levels are denoted by ***, **, and *, representing statistical significance at 1%, 5%, and 10%, respectively. Appendix A provides a detailed definition of all variables.

We present the results on SRINDEX using OLS regression in Table 7. Our adjusted R² value across the 6 models ranges from 53.4% to 54.5%, implying that the independent variables adequately account for the variation in the dependent variable. We find that Columns (1) to (6) supports all our hypotheses, except for H4b and H5b. Specifically, the coefficients for audit committee size (ACS) ($\beta = 0.010$, p < 0.05), audit committee meetings (ACM) ($\beta = 0.010$, p < 0.05), and audit committee gender diversity (ACGD) ($\beta = 0.067$, p < 0.05) are statistically significant and positive at the 5% level, providing strong evidence for H1b to H3b. However, the coefficient for audit committee chairman (ACC) ($\beta = -0.017$, p < 0.05) indicates a significant negative relationship with SRINDEX, resulting in the rejection of H4b. Equally, the coefficient for audit committee financial accounting expertise (ACFAE) remains not significant ($\beta = 0.026$, p > 0.10), leading to not supporting H5b. These findings are consistent with the previous reported using DISCLOSE as dependent variable.

Our results report that an increase in audit committee size, the number of meetings held by the audit committee, and the presence of a female member on the audit committee are all positively associated with higher levels of financially material sustainability reporting, as measured by SRINDEX. Specifically, these findings support the argument that a larger audit committee size, as indicated by previous research (Al-Shaer & Zaman, 2018; Hasan et al., 2022), may indicate a more robust and diverse committee, which can lead to more comprehensive and thorough review of sustainability reporting practices. Our finding is also consistent with the theoretical predictions that an increase in the number of audit committee meetings may suggest that the committee is more actively engaged in overseeing and guiding sustainability reporting efforts (Buallay & Al-Ajmi, 2020; Jibril et al., 2024). Moreover, the presence of a female member on the audit committee may reflect a more inclusive and diverse perspective, which can contribute to a greater emphasis on sustainability reporting (Black & Kim, 2012; Wang & Sun, 2022).

However, we find that the presence of a shareholder as the chair of the audit committee is significantly associated with decreased levels of financially material sustainability reporting. This finding is consistent with the research of Appuhami and Tashakor (2017) and Dwekat et al. (2020), suggesting that independent directors, as opposed to shareholder representatives, may be more inclined to push for greater sustainability disclosures. Overall, our findings suggest that audit committee attributes can significantly impact sustainability reporting, and companies with stronger audit committee practices are more likely to prioritize and increment disclose sustainability-related information.

It is important to note that, to our knowledge, no existing literature has specifically linked audit committee attributes with material sustainability reporting using the SASB framework, either globally or in emerging markets like Nigeria. Previous literature has primarily focused on general sustainability disclosures without considering the financial materiality aspect (Al-Shaer & Zaman, 2018; Dwekat et al., 2020). This gap in the literature underscores the significance of our study, as it provides a comprehensive examination of how different aspects of audit committees influence sustainability reporting, particularly in an emerging market setting.

To account for the potential variability of individual factors, we re-run the baseline model by integrating all audit committee attributes and the SRINDEX into one comprehensive model. The results are reported in Column 6. Once again, we find that the coefficients of audit committee size (ACS) ($\beta = 0.010$, p < 0.05), audit committee meetings (ACM) ($\beta = 0.007$, p < 0.10), and audit committee gender diversity (ACGD) ($\beta = 0.064$, p < 0.05) are all positive and statistically significant in relation to SRINDEX using the combined effect. However, we find that the coefficient for audit committee chairman (ACC) ($\beta = -0.022$, p < 0.01) remains negative and statistically significant, while that of audit committee financial accounting expertise (ACFAE) ($\beta = 0.030$, p > 0.10) remains not significant with SRINDEX under the combined effect.

Table 7

Audit committee attributes and sustainability reporting index							
	(1)	(2)	(3)	(4)	(5)	(6)	
VARIABLES	SRINDEX	SRINDEX	SRINDEX	SRINDEX	SRINDEX	SRINDEX	
ACS	0.010**					0.010**	
	(2.500)					(2.336)	
ACM		0.010**				0.007*	
		(2.493)				(1.675)	
ACGD			0.067**			0.064**	
			(2.475)			(2.371)	
ACC				-0.017**		-0.022***	
				(-2.225)		(-2.789)	
ACFAE					0.026	0.030	
					(1.050)	(1.270)	
FMSIZ	0.043***	0.045***	0.045***	0.048***	0.045***	0.044***	
	(8.876)	(9.806)	(9.988)	(10.059)	(9.926)	(9.067)	
LEVRG	-0.100***	-0.104***	-0.107***	-0.104***	-0.103***	-0.097***	
	(-4.025)	(-4.083)	(-4.278)	(-4.078)	(-4.055)	(-3.919)	
ROA	0.052	0.042	0.050	0.039	0.044	0.053	
	(1.417)	(1.167)	(1.370)	(1.059)	(1.188)	(1.471)	
FMGRH	0.050**	0.050**	0.044*	0.044*	0.047*	0.048**	
-	(2.067)	(2.068)	(1.853)	(1.806)	(1.923)	(2.010)	
FMAGE	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	
-	(3.675)	(3.856)	(3.625)	(3.843)	(3.738)	(3.886)	
FBMB	-0.137***	-0.129***	-0.127***	-0.123***	-0.127***	-0.128***	
	(-4.100)	(-3.980)	(-3.902)	(-3.782)	(-3.913)	(-3.921)	
CEOEX	-0.009	-0.010	-0.011	-0.011	-0.009	-0.014	
020211	(-0.946)	(-1.049)	(-1.178)	(-1.209)	(-0.969)	(-1.556)	
CEOT	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	
0201	(-0.376)	(-0.405)	(-0.126)	(-0.368)	(-0.393)	(-0.115)	
ESO	0.136***	0.130***	0.140***	0.131***	0.134***	0.130***	
150	(5.871)	(5,783)	(6.070)	(5,669)	(5 842)	(5.662)	
	(5.671)	(5.765)	(0.070)	(5.005)	(3.012)	(5.002)	
	0.040****	0.000	0.011****	0.01.5****	0.00****		
Constant	-0.340***	-0.332***	-0.311***	-0.317/***	-0.309***	-0.366***	
	(-9.266)	(-9.111)	(-8.843)	(-8.897)	(-8.740)	(-9.613)	
Observations	980	980	980	980	980	980	
$\Delta di R^2$	0.536	0.536	0 537	0.536	0 534	0 545	
Auj. K Voor FF	VES	VES	VES	VES	VES	VFS	
Industry FF	VES	VES	VES	VES	VES	VFS	
Industry FE	YES	YES	YES	YES	YES	YES	

Note: This table reports the results of OLS regression models examining the association between audit committee attributes and sustainability reporting index (Columns 1–6). *t*-statistics reported in parentheses are calculated using robust standard errors. Significance levels are denoted by ***, **, and *, representing statistical significance at 1%, 5%, and 10%, respectively. Appendix A provides a detailed definition of all variables.

Regarding our control variables in (Column 1–6) of Table 7, we find that larger firms

(FMSIZ), that experienced significant firm growth (FMGRH), with a longer history as a firm

(FMAGE), and the presence of foreign shareholders (FSO) are associated with higher material sustainability reporting. On the other hand, we find that firms with higher levels of debt financing (LEVRG) and those with foreign directors (FBMB) are associated with lower levels of material sustainability reporting. The relationship between return on assets (ROA), CEO experience (CEOEX), and CEO tenure (CEOT) with material sustainability reporting is not significant, suggesting that these factors do not have a significant impact on a firm's decision to disclose material sustainability information. These results are in line with the previous ones using DISCLOSE as dependent variable.

5.3 Additional Analyses

5.3.1 Alternative variable measures

Following previous literature (Bofinger et al., 2022; Weber, 2017), we employ a lagged dependent variable (SRINDEX) to examine the robustness of our main findings and explore the time-lagged effects of audit committee attributes on sustainability reporting. By using a one-year lag of the dependent variable (I.SRINDEX), we investigate whether the influence of audit committee characteristics on sustainability reporting persists over time. Table 8, Columns 1 to 5, is consistent with our main findings, with ACS, ACM and ACGD significantly positively related with lagged SRINDEX, whereas ACC presents a significantly negative association and ACFAE shows a not significant relationship with lagged SRINDEX. The consistency of these results with our main analysis strengthens the validity of our findings and suggests that the impact of audit committee attributes on sustainability reporting disclosure extends into subsequent reporting periods.

Table 8

Audit committee attributes and Lagged-sustainability reporting index								
(1) (2) (3) (4) (5)								
VARIABLES	1.SRINDEX	1.SRINDEX	1.SRINDEX	1.SRINDEX	1.SRINDEX			
ACS	0.007*							

	(1.820)				
ACM		0.015***			
ACGD		(5.802)	0.064**		
ACC			(2.385)	-0.015*	
ACFAE				(-1.930)	0.013
FMSIZ	0.041***	0.041***	0.042***	0.045***	(0.552) 0.042***
LEVRG	(8.240) -0.072***	(8./68) -0.074***	(8.9/5) -0.077***	(8.851) -0.074***	(8.854) -0.075***
ROA	(-2.698) 0.054 (1.400)	(-2.735) 0.047	(-2.852) 0.056	(-2.717) 0.045 (1.240)	(-2.743) 0.049
FMGRH	(1.496) 0.052**	(1.345) 0.055**	(1.570) 0.048**	(1.248) 0.048**	(1.3/3) 0.050**
FMAGE	(2.262) 0.001**	(2.451) 0.001***	(2.102) 0.001**	(2.070) 0.001***	(2.178) 0.001**
FBMB	(2.484) -0.125***	(2.734) -0.121***	(2.427) -0.119***	(2.609) -0.116***	(2.499) -0.119***
CEOEX	(-3.846) -0.011	(-3.849) -0.012	(-3.720) -0.013	(-3.642) -0.013	(-3.745) -0.011
CEOT	(-1.211) 0.000	(-1.334) 0.000	(-1.447) 0.000	(-1.441) 0.000	(-1.236) 0.000
FSO	(0.443) 0.145***	(0.471) 0.137***	(0.692) 0.148***	(0.448) 0.141***	(0.436) 0.144***
	(6.176)	(6.065)	(6.373)	(5.993)	(6.164)
Constant	-0.092** (-1.999)	-0.106** (-2.303)	-0.071 (-1.584)	-0.075 (-1.631)	-0.070 (-1.552)
Observations	909	909	909	909	909
Adj. \mathbb{R}^2	0.506	0.512	0.509	0.507	0.505
Year FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES

Note: This table reports the results of OLS regression models (Columns 1–5) for lagged-sustainability reporting index. *t*-statistics reported in parentheses are calculated using robust standard errors. Significance levels are denoted by ***, **, and *, representing statistical significance at 1%, 5%, and 10%, respectively. Appendix A provides a detailed definition of all variables.

5.3.2 Additional test using standalone sustainability reporting

As part of an additional test, we examined the relationship between audit committee attributes and standalone sustainability reporting (STANDSP), proxied by a binary variable where 1 indicates the company published a standalone sustainability report and 0 otherwise, following the methodology outlined by Orazalin and Mahmood (2018). The results presented in Table 9, Columns 1 to 5, are consistent with our main findings. These results underscore the importance of various audit committee attributes in influencing a company's decision to publish standalone sustainability reports, contributing to the growing body of literature on corporate governance and sustainability reporting.

Table 9							
Audit committee at	tributes and sta	indalone sustain	nability reportion	ng			
	(1)	(2)	(3)	(4)	(5)		
VARIABLES	STANDSP	STANDSP	STANDSP	STANDSP	STANDSP		
ACS	0.416*						
	(1.863)						
ACM		0.653***					
		(3.486)					
ACGD			2.588**				
			(2.489)				
ACC				-0.667**			
				(-1.964)			
ACFAE					0.145		
					(0.163)		
FMSIZ	0.957***	0.997***	1.070***	1.154***	1.055***		
	(4.632)	(4.810)	(5.049)	(5.168)	(5.167)		
LEVRG	-5.106***	-5.717***	-5.698***	-5.552***	-5.575***		
	(-3 575)	(-4.258)	(-4 167)	(-4.026)	(-4.028)		
ROA	0 210	-0 792	-0.003	0 221	0.027		
non	(0.135)	(-0.524)	(-0.002)	(0.122)	(0.027)		
FMGRH	-0.653	(0.324)	-0.680	(0.145)	-0.773		
1 monu	(-0.782)	(-0.351)	(-0.864)	(-1, 307)	(-0.944)		
FMAGE	(-0.782)	(-0.331)	(-0.00+)	(-1.307)	(-0.77)		
TMAGE	(1.271)	(1, 150)	(1,002)	(1.478)	(1, 224)		
ERMR	(1.371) 2 050***	(1.130) 2 260**	(1.093)	(1.470)	(1.334) 2.751***		
	-3.030^{-11}	-2.309^{+1}	$-2.8/2 \cdots$	-2.815	-2.731		
CEOEV	(-2.903)	(-2.552)	(-2.073)	(-2.822)	(-2.723)		
CEOEA	$(1,010)^{+}$	(1.507)	(1.250)	(1, 259)	0.318		
CEOT	(1.818)	(1.587)	(1.259)	(1.358)	(1.031)		
CEOI	0.00/	0.004	0.016	0.012	0.009		
500	(0.298)	(0.156)	(0.619)	(0.497)	(0.363)		
FSO	1.408**	1.219*	1./94**	1.325*	1.368*		
	(1.979)	(1.707)	(2.358)	(1.853)	(1.928)		
Constant	-7.138***	-7.559***	-5.834***	-5.685***	-5.508***		
	(-4.070)	(-4.323)	(-3.860)	(-3.865)	(-3.899)		
	7(1	7(1	7(1	7(1	7(1		
Observations \mathbf{D}_{a}	/01	/01	/01	/01	/01		
rseudo K ²	U.440	0.460 VES	0.450 VES	U.445	0.439 NES		
Year FE	YES	YES	YES	YES	YES		
Industry FE	YES	YES	YES	YES	YES		

Note: This table reports the results of logit regression models (Columns 1–5) using standalone sustainability reporting as the dependent variable. *t*-statistics reported in parentheses are calculated using robust standard errors. Significance levels are denoted by ***, **, and *, representing statistical significance at 1%, 5%, and 10%, respectively. Appendix A provides a detailed definition of all variables.

5.3.3 Audit committee cooption

To further investigate the impact of audit committee attributes on material sustainability reporting, we follow Coles et al. (2007) and analyze sub-samples of high AC co-option and low AC co-option. Analyzing AC co-option is important because it provides insights into the independence and effectiveness of the audit committee. Audit committee co-option is quantified by the number of audit committee members who joined the board after the current CEO's appointment, divided by the total number of audit committee members (Cassell et al., 2018).

Our findings reveal significant differences in material sustainability reporting practices between the two groups, as shown in Table 10, Columns 1 to 10, which reinforce our main conclusions. The high AC co-option group tends to have lower quality material sustainability reporting due to reduced independence, whereas the low AC co-option group exhibits higher quality reporting, likely resulting from greater oversight. The presence of new members in the audit committee post-CEO appointment may introduce diverse perspectives and enhance the committee's effectiveness in overseeing material sustainability reporting practices, ultimately leading to improved material reporting quality.

		nign AC co	-option	Low AC co-option						
VARIABLES	(1) SRINDEX	(2) SRINDEX	(3) SRINDEX	(4) SRINDEX	(5) SRINDEX	(6) SRINDEX	(7) SRINDEX	(8) SRINDEX	(9) SRINDEX	(10) SRINDEX
ACS	0.027***					0.015**				
ACM	(2.090)	0.015**				(2.000)	0.002 (0.282)			
ACGD		()	0.065* (1.413)				(0.202)	0.070** (2.062)		
ACC			(1110)	-0.031** (-2.335)				()	-0.004 (-0.370)	
ACFAE				()	0.015 (0.462)				()	0.019 (0.646)
FMSIZ	0.058*** (8.300)	0.060*** (8.557)	0.061*** (8.688)	0.065*** (9.044)	0.061*** (8.677)	0.023*** (3.509)	0.029*** (4.848)	0.030*** (4.998)	0.030*** (4.872)	0.029*** (4.839)
LEVRG	-0.104** (-2.104)	-0.137*** (-2.795)	-0.130*** (-2.649)	-0.118** (-2.406)	-0.129*** (-2.629)	-0.119*** (-3.357)	-0.116*** (-3.235)	-0.119*** (-3.344)	-0.118*** (-3.304)	-0.115*** (-3.215)
ROA	0.090 (1.310)	0.059 (0.858)	0.066 (0.949)	0.066 (0.955)	0.071 (1.023)	0.011 (0.199)	-0.005 (-0.082)	0.019 (0.345)	-0.007 (-0.123)	-0.004 (-0.076)
FMGRH	0.062** (2.048)	0.059* (1.936)	0.053* (1.734)	0.051*	0.057*	0.039 (1.548)	0.033 (1.319)	0.035 (1.400)	0.032 (1.290)	0.033 (1.319)
FMAGE	0.001*** (3.128)	0.001*** (2.923)	0.001*** (2.889)	0.001*** (3.188)	0.001*** (2.885)	0.000 (1.304)	0.001*	0.000 (1.347)	0.001* (1.715)	0.001* (1.763)
FBMB	-0.164*** (-3.952)	-0.153*** (-3.662)	-0.154*** (-3.684)	-0.157*** (-3.762)	-0.154*** (-3.653)	-0.098*** (-2.644)	-0.082** (-2.248)	-0.084** (-2.309)	-0.081** (-2.198)	-0.082** (-2.243)
CEOEX	-0.014	-0.011	-0.011	-0.012	-0.009	0.000	-0.004	-0.006	-0.005 (-0.479)	-0.005
CEOT	0.000 (0.370)	0.000 (0.373)	0.001 (0.731)	0.001 (0.504)	0.001	-0.002	-0.002*	-0.001 (-1.440)	-0.002* (-1.740)	-0.002*
FSO	0.157*** (5.822)	0.146*** (5.359)	0.157*** (5.782)	0.149*** (5.491)	0.155*** (5.661)	0.121*** (4.109)	0.115*** (3.872)	0.125*** (4.198)	0.115*** (3.898)	0.115*** (3.895)

Audit committee attributes and sustainability reporting index: High AC co-option and Low AC co-option subsamples

Table 10

Constant	-0.577***	-0.490***	-0.459***	-0.469***	-0.455***	-0.201***	-0.167***	-0.170***	-0.163***	-0.164***
	(-8.230)	(-8.387)	(-8.097)	(-8.281)	(-8.026)	(-3.902)	(-3.249)	(-3.422)	(-3.290)	(-3.300)
Observations	486	486	486	486	486	494	494	494	494	494
Adj. R ²	0.582	0.579	0.576	0.579	0.574	0.522	0.516	0.520	0.516	0.516
Year FE	YES									
Industry FE	YES									

Note: This table reports the results of OLS regression models (Columns 1–10) for high AC co-option and low AC co-option subsamples. *t*-statistics reported in parentheses are calculated using robust standard errors. Significance levels are denoted by ***, **, and *, representing statistical significance at 1%, 5%, and 10%, respectively. Appendix A provides a detailed definition of all variables.

5.4 Endogeneity

Our research potentially faces challenges related to endogeneity bias between the outcome and explanatory variables, a common issue in studies examining audit committee effectiveness and corporate governance studies (Ghafran & Yasmin, 2018; Gull et al., 2024). The possibility exists that audit committee attributes and SRINDEX may be endogenously determined, which could impact our primary findings due to factors such as omitted variable bias, reverse causality, or self-selection issues. To mitigate these endogeneity concerns, particularly regarding audit committee attributes and SRINDEX, we employ the generalized method of moments (GMM) technique and incorporate lagged values of the dependent variable in our analysis. This methodology helps address potential biases and provides more robust estimates of the relationships under investigation.

Endogeneity tests					
VARIABLES	(1) SRINDEX	(2) SRINDEX	(3) SRINDEX	(4) SRINDEX	(5) SRINDEX
L1_SRINDEX	0.970*** (78.966)	0.965*** (69.395)	0.970*** (72.435)	0.962*** (69.749)	0.265 (1.184)
ACS	0.012*** (3.527)				
ACM	(0.027)	0.003** (2.108)			
ACGD			0.010* (0.805)		
ACC				-0.017*** (-4.774)	
ACFAE					0.004 (0.124)
AR 1 (p-value)	0.000	0.000	0.000	0.000	0.002
AR 2 (p-value)	0.884	0.785	0.795	0.790	0.285
Hansen J. test	0.299	0.264	0.314	0.288	0.421
Difference-in-Hansen J	0.627	0.372	0.626	0.638	0.421
Controls	YES	YES	YES	YES	YES
Constant	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES

Table 12

Observations	878	878	878	878	878
Prob > F	0.000	0.000	0.000	0.000	0.000

Note: This table presents findings derived from employing the two-step system GMM method to address endogeneity. *t*-statistics reported in parentheses are calculated using robust standard errors. Significance levels are denoted by ***, **, and *, representing statistical significance at 1%, 5%, and 10%, respectively. Appendix A provides a detailed definition of all variables.

The existing literature offers three methods to address endogeneity bias: the Structural Equation Modelling (SEM), Two-Stage Least Squares (2SLS) regression model, and the GMM regression estimates. However, the first two methods necessitate the identification of reliable external instruments, which are extremely difficult to find in the literature (Wintoki et al., 2012). Given the lack of suitable external instruments in prior research, the system GMM technique proposed by Blundell and Bond (1998) is deemed most appropriate for this study. This approach is particularly effective in addressing endogeneity bias because it relies on a set of internal instruments inherent to the panel data, eliminating the need for external instruments. Given the difficulties associated with obtaining external variables for corporate governance research (Ghafran & Yasmin, 2018; Gull et al., 2024), we follow the methods used by Zaman et al. (2021) and Wintoki et al. (2012).

We estimate the baseline model using a system GMM approach, incorporating lagged SRINDEX in the regressor, and treating all other variables as endogenous, with the exception of the year dummies. The results reported in columns (1) to (5) of Table 12 are consistent with the findings reported in Table 7. Moreover, the coefficients and signs reported in Columns (1) to (5) of Table 12 are consistent with those reported in the baseline model. Overall, the results of the instrument validity tests are reported in Column (1) to (5) of Table 12. The p-values for AR 1 in Columns (1) to (5) are statistically significant, but the p-values for AR 2, Hansen test, and Difference-in-Hansen in columns (1) to (5) are not statistically significant. This suggests that our primary results remain robust against potential endogeneity issues.

6. Conclusion

In response to recent calls in the literature to further examine the relationship between other corporate governance mechanisms, such as audit committee attributes and sustainability reporting (Buallay & Al-Ajmi, 2020; Dwekat et al., 2020; Hasan et al., 2022; Orazalin & Mahmood, 2018; Wang & Sun, 2022), this study examines the impact of audit committee attributes on sustainability reporting practices. Sustainability reporting is proxied by the existence of sustainability disclosure (DISCLOSE) and the level of financially material sustainability information disclosure (SRINDEX). The key attributes of audit committee are audit committee size, audit committee financial accounting expertise. We collect data from multiple sources, including annual reports, stand-alone sustainability reports, corporate governance reports, impact reports, CSR reports, ESG reports, as well as the NGX websites and Bloomberg databases. The sample comprises 98 firms listed on the NGX spanning the period from 2011 to 2020, resulting in a total of 980 firm-year observations.

Using the sustainability reporting proxy DISCLOSE, we find that larger audit committees provide more sustainable disclosure. Audit committees with more frequent meetings and the presence of a female member are also associated with higher sustainable disclosure. However, having the audit committee chaired by a shareholder is linked to lower disclosure. There is no significant association between audit committee financial accounting expertise and disclosure. For SRINDEX, the results are similar. Larger audit committees, more frequent meetings, and the presence of a female member are linked to higher levels of material sustainability reporting. Having the audit committee chaired by a shareholder is associated with lower levels of material sustainability reporting, and there is no significant association between audit committee financial accounting expertise and material sustainability reporting. These results indicate that audit committee attributes play an important role not only in sustainability reporting disclosure but also in the level of financially material information provided to the market.

Our robustness test results remain consistent after using alternative measurements for the dependent variable, using lagged SRINDEX and standalone sustainability reporting as alternative dependent variables. we explore the impact of audit committee co-option on material sustainability reporting by comparing high and low co-option levels. Our analysis reveals significant differences, suggesting that the introduction of new audit committee members following a CEO's appointment enhances oversight and improves the quality of material disclosures. To address potential endogeneity bias, we employ the Generalized Method of Moments (GMM), and our findings remain robust, further reinforcing the consistency of our main results.

Our study contributes to the existing literature in different ways. First, it extends research on financially material sustainability reporting beyond developed economies like the United States and New Zealand, focusing instead on Nigeria, an emerging market with unique institutional, cultural, and regulatory contexts. Second, our study is the first to investigate the relationship between audit committee attributes such as size, frequency of meetings, gender diversity, chairperson involvement, and financial expertise and financially material sustainability reporting in Nigeria. In a country where corporate governance structures are still developing, these attributes play a crucial role in enhancing the quality and transparency of sustainability disclosures.

Third, our research distinguishes itself methodologically by moving beyond descriptive analysis and applying SASB standards to empirically examine the audit committee's impact on sustainability reporting in Nigeria. This provides a more comprehensive understanding of how audit committee attributes influence financially

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material sustainability disclosures in an emerging market. Lastly, our findings offer valuable insights for regulatory bodies and practitioners, showing that audit committees with larger memberships, regular meetings, and gender diversity can significantly improve sustainability reporting quality. These insights are particularly important as Nigeria continues to strengthen its regulatory frameworks, such as the Climate Change Act of 2021, which mandates sustainability reporting and promotes accountability among businesses.

Our study has certain limitations that future research can address. First, our study sample is limited to firms listed on the Nigerian Stock Exchange from 2011 to 2020, which may limit the generalizability of the findings to unlisted companies or firms in other countries with different regulatory environments and corporate governance structures. Second, while our study used two proxies, DISCLOSE and SRINDEX, to measure sustainability reporting, there may be other dimensions or aspects of sustainability reporting that are not captured by these measures. Third, our study focuses solely on audit committee attributes and does not consider the potential impact of other corporate governance mechanisms, such as board composition, ownership structure, or executive compensation, on sustainability reporting practices.

To address these limitations, future research can explore a broader sample of companies, including unlisted firms and firms from other countries, to enhance the generalizability of the findings. Additionally, future studies can examine the interplay between audit committee attributes and other corporate governance mechanisms to provide a more holistic understanding of their impact on sustainability reporting practices. Furthermore, future research can employ alternative methodologies, such as qualitative or mixed methods approaches, to gain deeper insights into the underlying mechanisms and processes through which audit committee attributes influence sustainability reporting practices. Finally, future studies can investigate the potential impact of external factors, such as regulatory changes, industry dynamics, or stakeholder pressures, on the relationship between audit committee

attributes and sustainability reporting practices.

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Variable	Acronyms	Definitions
Dependent variables	i i ci ci j i i s	
Disclosure of	DISCLOSE	A binary variable with the value of 1 if the company
Sustainability		discloses a sustainability report; 0 otherwise.
Information		
Sustainability	SRINDEX	Sustainability reporting score based on the firm's
Reporting Index		disclosure of financially material sustainability
		information, ranging from 0% to 100%
Independent variable	S	
AC Size	ACS	Total number of audit committee members on the
		board
AC Meetings	ACM	Number of meetings held by audit committee during
AC Condor diversity	ACGD	Department of female directors on audit committee to
AC Oender diversity	ACUD	total number of audit committee members during the
		vear
AC chair	ACC	Binary variable with the value of 1 if the audit
		committee is chaired by a shareholder, and 0 when the
		audit committee is chaired by a director
AC Financial	ACFAE	Proportion of audit committee members who qualified
Accounting Experts		as professional accountants with (ANAN or ICAN) to
		the total number of audit committee members during
		the year
Control variables Σ^{\cdot}		
Firm Size	FMSIZ	Natural logarithm of total assets
Leverage Return on Assets		Net income before extraordinary items scaled by total
Keluin on Assels	KOA	assets
Firm Growth	FMGRH	Change in sales divided by previous sales
Firm Age	FMAGE	Year of observation minus of listing year
Foreign Directors	FBMB	Proportion of foreign directors to total board members
CEO Expertise	CEOEX	Binary variable with the value of 1 if the CEO has
		accounting or business-related qualification or
		membership of a professional accounting body, and 0
		otherwise
CEO Tenure	CEOT	Number of years held as CEO in the firm
Foreign	FSO	Percentage of foreign investors to the total issued
Shareholders		shares
Year	YEAR	Year fixed effects
Industry Type	INDUS	Industry fixed effects

APPENDIX 1: DEFINITIONS OF VARIABLES

Note: This reports the definition and acronym of all variables in the study.

APPENDIX 2: SASB's Sustainable Industry Classification System (SICS)

SUSTAINABILITY ACCOUNTING STANDARDS BOARD

SASB'S SUSTAINABLE INDUSTRY CLASSIFICATION SYSTEM® (SICS®)

It is increasingly clear that a company's market value is determined by more than financial performance. In many industries, as much as 80 percent of market capitalization is made up of intangibles such as intellectual capital, customer relationships, brand value, and other forms of capital—e.g., environmental, social and human. Traditional financial tools tell only a part of the story. SASB's **Sustainable Industry Classification System®** (SICS®) uses an impact-focused methodology categorizing companies under a sustainability lens. SICS builds on and complements traditional classification systems by grouping companies into sectors and industries in accordance with a fundamental view of their business model, their resource intensity and sustainability impacts, and their sustainability innovation potential. Each of the following 77 industries (across 11 sectors) has its own unique set of **sustainability accounting standards** in the SASB system.

CONSUMER GOODS

- Apparel, Accessories & Footwear
- Appliance Manufacturing
- > Building Products & Furnishings
- > E-Commerce
- > Household & Personal Products
- Multiline and Specialty
- Retailers & Distributors
- › Toys & Sporting Goods

EXTRACTIVES & MINERALS PROCESSING

- > Coal Operations
- > Construction Materials
- > Iron & Steel Producers
- > Metals & Mining
- > Oil & Gas Exploration & Production
- > Oil & Gas Midstream
- > Oil & Gas Refining & Marketing
- Oil & Gas Services

- > Asset Management & Custody Activities
- > Commercial Banks
- > Consumer Finance
- Insurance
- > Investment Banking & Brokerage
- › Mortgage Finance
- > Security & Commodity Exchanges

FOOD & BEVERAGE

- Agricultural Products
- > Alcoholic Beverages
- > Food Retailers & Distributors
- Meat, Poultry & Dairy
- > Non-Alcoholic Beverages
- > Processed Foods
- > Restaurants
- Tobacco

HEALTH CARE

- > Biotechnology & Pharmaceuticals
- Drug Retailers
- > Health Care Delivery
- Health Care Distributors
- Managed Care
- Medical Equipment & Supplies

INFRASTRUCTURE

- > Electric Utilities & Power Generators
- > Engineering & Construction Services
- Gas Utilities & Distributors
- > Home Builders
- Real Estate
- > Real Estate Services
- Waste Management
- > Water Utilities & Services

RENEWABLE RESOURCES & ALTERNATIVE ENERGY

- Biofuels
- Forestry Management
- > Fuel Cells & Industrial Batteries
- > Pulp & Paper Products
- Solar Technology & Project Developers
- > Wind Technology & Project Developers

SASB.ORG

Source: Sustainability Accounting Standards Board (2018)

RESOURCE TRANSFORMATION

- > Aerospace & Defense
- > Chemicals
- > Containers & Packaging
- > Electrical & Electronic Equipment
- Industrial Machinery & Goods

SERVICES

- › Advertising & Marketing
- Casinos & Gaming
- › Education
- > Hotels & Lodging
- Leisure Facilities
- > Media & Entertainment
- > Professional & Commercial Services

TECHNOLOGY & COMMUNICATIONS

- Electronic Manufacturing Services & Original Design Manufacturing
- Hardware
- Internet Media & Services
- Semiconductors
- > Software & IT Services
- > Telecommunication Services

TRANSPORTATION

- > Air Freight & Logistics
- Airlines
- > Auto Parts
- > Automobiles
- > Car Rental & Leasing
- Cruise Lines
- > Marine Transportation
- Rail Transportation
- Road Transportation

APPENDIX 3: Sector-level materiality map

		Consumer Goods				Extractives & Mi	nerals Processing				Financials	Food & Beverage	Health Care	Infrastructure
Dimension	General Issue Category ⁽¹⁾	Click to expand	Coal Operations	Construction Materials	iron & Steel Producers	Metals & Mining	Oil & Gas – Exploration & Production	Oil & Gas – Midstream	Oil & Gas – Refining & Marketing	Oil & Gas – Services	Click to expand	Click to expand	Click to expand	Click to expand
	GHG Emissions													
	Air Quality										-			
Frederica	Energy Management													
Environment	Water & Wastewater Management													
	Waste & Hazardous Materials Management													
	Ecological Impacts													
	Human Rights & Community Relations													
	Customer Privacy													
	Data Security													
Social Capital	Access & Affordability													
	Product Quality & Safety													
	Customer Welfare													
	Selling Practices & Product Labeling													
	Labor Practices													
Human Capital	Employee Health & Safety													
	Employee Engagement, Diversity & Inclusion													
	Product Design & Lifecycle Management													
Business	Business Model Resilience													
Model &	Supply Chain Management													
Innovation	Materials Sourcing & Efficiency													
	Physical Impacts of Climate Change													
	Business Ethics													
	Competitive Behavior													
Leadership & Governance	Management of the Legal & Regulatory Environment													
	Critical Incident Risk Management													
	Systemic Risk Management													

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Source: Sustainability Accounting Standards Board

APPENDIX 4: Sustainability Disclosure Topics and Metrics for Construction Materials sector under Extractives and Minerals Processing

The disclosure topics and associated metrics contained in this Standard have been identified as those that are likely to be useful to investors. However, the responsibility for making materiality judgements and determinations rests with the reporting entity.

TOPIC	METRIC	CATEGORY	UNIT OF MEASURE	CODE
	Gross global Scope 1 emissions, percentage covered under emissions- limiting regulations	Quantitative	Metric tons (t) CO ₂ -e, Percentage (%)	EM-CM-110a.1
Greenhouse Gas Emissions	Discussion of long- and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	Discussion and Analysis	n/a	EM-CM-110a.2
Air Quality	Air emissions of the following pollutants: (1) NOx (excluding N2O), (2) SOx, (3) particulate matter (PM10), (4) dioxins/furans, (5) volatile organic compounds (VOCs), (6) polycyclic aromatic hydrocarbons (PAHs) and (7) heavy metals	Quantitative	Metric tons (t)	EM-CM-120a.1
Energy Management	(1) Total energy consumed, (2)percentage grid electricity, (3)percentage alternative and (4)percentage renewable	Quantitative	Gigajoules (GJ), Percentage (%)	EM-CM-130a.1
Water Management	(1) Total water withdrawn, (2) total water consumed; percentage of each in regions with High or Extremely High Baseline Water Stress	Quantitative	Thousand cubic metres (m ³), Percentage (%)	EM-CM-140a.1
Waste Management	Amount of waste generated, percentage hazardous and percentage recycled	Quantitative	Metric tons (t), Percentage (%)	EM-CM-150a.1
Biodiversity	Description of environmental management policies and practices for active sites	Discussion and Analysis	n/a	EM-CM-160a.1
Impacts	Terrestrial acreage disturbed, percentage of impacted area restored	Quantitative	Acres (ac), Percentage (%)	EM-CM-160a.2
Workforce Health & Safety	(1) Total recordable incident rate (TRIR) and (2) near miss frequency rate (NMFR) for (a) full-time employees and (b) contract employees	Quantitative	Rate	EM-CM-320a.1
	Number of reported cases of silicosis	Quantitative	Number	EM-CM-320a.2
Product	Percentage of products that qualify for credits in sustainable building design and construction certifications	Quantitative	Percentage (%) by annual sales revenue	EM-CM-410a.1
Innovation	Total addressable market and share of market for products that reduce energy, water or material impacts during usage or production	Quantitative	Presentation currency, Percentage (%)	EM-CM-410a.2
Pricing Integrity & Transparency	Total amount of monetary losses as a result of legal proceedings associated with cartel activities, price fixing, and anti-trust activities	Quantitative	Presentation currency	EM-CM-520a.1

Source: Sustainability Accounting Standards Board

APPENDIX 5: Example illustrating the steps involved in creating the Sustainability Reporting Score (SRINDEX) for a specific Nigerian company

The Dangote Cement Plc is categorized under the Extractives and Minerals Processing sector within the Construction Materials industry, as per the Sustainable Industry Classification System (SICS). Within the sustainability map, each industry has different disclosure items. Among the 26 general issue categories, the ones that should be disclosed in the Extractives and Minerals Processing sector are coloured in the map. For Dangote Cement Plc, the issues to be disclosed are as follows: GHG Emission, Air Quality, Energy Management, Water and Wastewater Management, Waste and Hazardous Materials Management, Ecological Impacts, Employee Health and Safety, Product Design and Lifecycle Management, and Competitive Behaviour.

These categories are highlighted in the map, and for each category, the score achieved by Dangote Cement Plc is recorded. For example, within the Environment dimension, Dangote Cement Plc should provide disclosure on GHG Emission, Air Quality, Energy Management, Water and Wastewater Management, Waste and Hazardous Materials Management, Ecological Impacts, as these topics are material to sustainability reporting. However, they are not required to disclose Human Rights and Community Relations, Customer Privacy, Data Security, Access and Affordability, Product Quality and Safety, Customer Welfare, Selling Practices and Product Labelling for the Social Capital dimension, given that the Extractives and Minerals Processing industry does not consider them to be material issues. Therefore, Dangote Cement Plc is required to disclose a total of 13 accounting metrics. This allows for a maximum achievable score of 39, obtained by multiplying 13 by 3, representing the highest score ranging from 0 to 3.

Specifically, in the year 2014, it has 1 point in GHG Emission, 0 points in Air Quality, 0 points in Energy Management, 1 point in Water and Wastewater Management, 1 point in Waste and Hazardous Materials Management, 2 points in Ecological Impacts, 0 points in Employee Health and Safety, 1 point in Product Design and Lifecycle Management, and 0 points in Competitive Behaviours, as recorded in the index. The total sum of Dangote Cement Plc in 2014, D2014, is 6 points out of 39 total points possible, resulting in a disclosure rate of 15.38%, calculated by dividing the total obtained score by the full marks. Similarly, for subsequent years: D2015 is 12.82%, D2016, D2017, and D2018 are 46.15%, D2019 is 53.85%, and D2020 is 56.41%, all computed using the same method. These are the final figures used to represent the disclosure of material sustainability information (SRINDEX) for Dangote Cement Plc.

Example of Sustainability disclosure Index and scoring procedures											
		D2011	D2012	D2013	D2014	D2015	D2016	D2017	D2018	D2019	D2020
Dimension	General Issue Category										
2	GHG Emissions	0	0	0	1	1	6	6	6	6	6
	Air Quality	0	0	0	0	0	3	3	3	3	3
г · ,	Energy Management	0	0	0	0	0	3	3	3	3	3
Environment	Water & Wastewater Management	0	0	0	1	1	2	2	2	3	3
	Waste & Hazardous Materials Management	0	0	0	1	1	1	1	1	2	2
	Ecological Impacts	0	0	0	2	2	2	2	2	3	3
	Human Rights & Community Relations										
	Customer Privacy										
	Data Security										
Social Capital	Access & Affordability										
	Product Quality & Safety										
	Customer Welfare										
	Selling Practices & Product Labelling										
	Labour Practices										
Human Capital	Employee Health and Safety	0	0	0	0	0	1	1	1	1	1
	Employee Engagement, Diversity & Inclusion										
	Product Design & Lifecycle Management	0	0	0	1	0	0	0	0	0	1
Business Model	Business Model Resilience										
& Innovation	Supply Chain Management										
	Materials Sourcing & Efficiency										
	Physical Impacts of Climate Change										
	Business Ethics										
	Competitive Behaviour	0	0	0	0	0	0	0	0	0	0
Leadership &	Management of the Legal & Regulatory										
Governance	Environment										
	Critical Incident Risk Management										
	System Risk Management										
Total Scores Obt	ained	0	0	0	6	5	18	18	18	21	22
Full Marks for ea	ich industry	39	39	39	39	39	39	39	39	39	39
Disclosure Rate		0.0%	0.0%	0.0%	15.38%	12.82%	46.15%	46.15%	46.15%	53.85%	56.41%