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Audit Committee Characteristics and Sustainability Disclosures – A Meta-Analytical Perspective

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Abstract

This research examines the association between audit committee characteristics (e.g., audit committee presence, audit committee meetings, audit committee size, audit committee financial expertise, audit committee independence, and audit committee effectiveness) and sustainability disclosures by conducting a meta-analysis of 93 peer-reviewed studies. Meta-regression analyses were performed using Stata 18.0. This study intends to fill the literature gaps by including three potential moderators: financial reporting quality, the social progress index, and the world corporate governance index. The findings show that considering different country settings, audit committee characteristics are vital in determining sustainability disclosures regardless of geographical variances. However, the world corporate governance index indicates insignificant moderation. Additionally, high-ranked journal studies have shown positive and significant results compared to low ranked because of properly handling endogeneity. The findings are consistent with institutional, agency, and stakeholder theories, suggesting that audit committee characteristics help firms meet societal and stakeholder interests by promoting sustainability disclosures. In contrast, the findings challenge the resource dependence theory and indicate that the internal control mechanism, specifically the audit committee, has more impact on sustainability disclosures than external mechanisms.

Keywords: Audit committee characteristics, sustainability disclosures meta-analysis, financial reporting quality, social progress index, world corporate governance index.

1. Introduction

Audit committees have become crucial as corporate governance faces increasing demands for transparency and accountability (Alhababsah & Azzam, 2024; Safari & Parker, 2024). Global financial crises and stakeholder pressure have exposed weaknesses in governance, exemplified by the collapse of Lehman Brothers and Enron (Agrawal & Chadha, 2005). The rise of environmental, social, and governance (ESG) issues has further heightened expectations for both financial and non-financial transparency (Eccles et al., 2014) as investors prioritize ESG information in their decisions (Khan et al., 2016). Standards developed by Sustainability Accounting Standard Board and Task Force on Climate-Related Financial Disclosures highlight the need for accurate and high-quality reporting (Dumitru & Dragomir, 2021). Meanwhile, digitalization, including big data analytics and digital reporting, reshapes audit committee functions. Audit committees must adopt these technological advancements to maintain their role in promoting accountability and safeguarding stakeholders' interests to ensure accurate, timely, and reliable reporting (Alles, 2015).

Compliance with the firm's financial statements according to international standards ensures the audit committee's knowledge (Dharwadkar et al., 2024). The audit committee's size is also essential for the organization because it oversees financial reporting processes effectively (Eyenubo et al., 2017). Additionally, the audit committee's expertise is essential, especially the expertise of the audit committee in accounting and finance. The audit committee ensures completeness in financial reporting (Ghafran & Yasmin, 2018) and is responsible for adopting the accounting policies in a better way (Al-Shaer et al., 2021); the chance of fraud is decreased because the expertise of the audit committee in accounting deduct the error and fraud easily (Rehman & Hashim, 2020), and the identification and mitigation of risks in collaboration with executives (Alzharani & Aljaaidi, 2015). These audit committee characteristics hold paramount importance for stakeholders because due to the existence of the audit committee, the quality of financial reporting is improved, and earnings management is reduced (Mustafa et al., 2018). Meanwhile, audit committee effectiveness varies across countries (better in developed countries because of strong regulatory environment (Dhaliwal et al., 2014) and industries (better in technology and financial sector (Dharwadkar et al., 2024; MNIF & Tahri, 2023)) due to differences in regulations, cultural practices, and challenges. These differences highlight the necessity of customized subgroup analysis and governance procedures to comprehend audit committee efficacy fully.

Sustainable reporting requires improved environmental disclosures, which include actions to lower carbon footprint, manage waste, preserve water, improve ecosystem health, and guarantee that ecological rules and regulations are followed (Deswanto & Siregar, 2018). Enhanced social aspects of sustainability disclosures are achievable through fair labor practices (Alsayegh et al., 2020), a focus on health and safety, active community and

stakeholder engagement (Bellucci & Manetti, 2018), and good governance underpinned by diversity and independence in board structure (Cucari et al., 2018), ethical codes, anti-corruption policies, whistleblower protection (Cucari et al., 2018), and compliance with risk management policies and internal controls (Chan et al., 2021). While established accounting standards like IFRS and GAAP ensure comparability in corporate financial reporting, complexity arises in sustainability disclosure reporting due to numerous global and local standards (Ioannou & Serafeim, 2017). To ensure consistency, the Global Reporting Initiative (GRI) standards theses standard play an essential role in the improvement of the assurance quality, and the Sustainability Accounting Standards Board (SASB) framework plays a pivotal role globally (Afolabi et al., 2022). These standards enable investors and stakeholders to access information regarding the assurance quality of the firm that is linked with non-financial such as sustainability disclosures; these standards also improve the company's long-term sustainability, ethical practices, and overall societal and environmental impact (Cho et al., 2020).

The effectiveness, expertise, size and frequency of audit committee meetings significantly influence sustainability disclosures, enhance the integrity of financial and non-financial reporting (Abbas & Siregar, 2021), foster communication among directors (Khemakhem & Fontaine, 2019), internal and external auditors (Eulerich et al., 2017; He et al., 2017), and managers (Lee & Park, 2019). These audit committee characteristics reduce information asymmetry between executives and directors and improve transparency and trust between the firm and its stakeholders (Patnaik & Suar, 2020).

In the realm of theories, Agency Theory emphasizes audit committees' role in improving sustainability disclosures by reducing information asymmetry and ensuring transparency (Mohammed, 2018). They also mitigate agency conflicts, aligning actions with company interests. Furthermore, the Legitimacy Theory emphasizes that audit committees legitimize and validate organizational credibility through sustainability disclosure (Tumwebaze et al., 2022). Stakeholder Theory also stresses the significance of fulfilling the needs of all stakeholders, including investors, employees, and communities. Audit committees achieve expectations through transparent reporting (Dzomira, 2020).

The nexus between the audit committee and the sustainability disclosures has been subjected to rigorous scholarly examination, with seminal contributions from researchers such as (Al-Shaer & Zaman, 2018b) highlighting the complexity of this relationship. The empirical outcomes of the audit committee and the sustainability disclosures are mixed findings by several experts (Bose et al., 2022; Raimo et al., 2021; Utami et al., 2021). Therefore, one of the critical objectives of this study is to examine the overall impact of audit committee characteristics on sustainability disclosures, focusing on attributes such as audit committee size, audit committee meetings, audit committee independence, audit committee financial expertise, audit committee tenure female on audit committee and audit committee effectiveness.

To address heterogeneity, we divided the audit committee into subgroups for further analysis, as model variations indicated this need. A total of 93 studies were synthesized to resolve the inconclusive findings. Additionally, we assess how financial reporting quality, social progress, and world corporate governance moderate the relationship between audit committees and sustainability disclosures. This study seeks to clarify the mixed findings based on publication quality, differences in economic classification and moderators, which resultantly provide insights into the influence of audit committees on sustainability disclosures. Building upon these theoretical frameworks, this study contributes to the literature by providing the first meta-analysis on the relationship between audit committee characteristics and sustainability disclosures.

The findings provide practical insights for corporate governance, suggesting that firms can enhance sustainability disclosure reporting by aligning audit committee practices with regulatory and market conditions, particularly in regions with weaker governance. Methodologically, the study employs subgroup analysis to address heterogeneity across different contexts, offering more profound insights into audit committee effectiveness.

The remaining study is arranged as follows: Section 2 consists of the literature review; Section 3 provides methods and meta-analysis procedures; Section 4 explains the results and discussion; and Section 5 contains the conclusion.

2. Literature Review

The relationship between audit committee characteristics and sustainability disclosures has garnered significant attention in the literature. However, findings remain inconclusive, necessitating further examination to address this inconsistency. The first group of studies finds a positive relationship between audit committee characteristics (such as independence, frequent meetings, size, expertise, tenure, and diversity) and sustainability disclosures grounded in Agency Theory (Al-Shaer et al., 2017; Aprianti et al., 2022; Baroroh et al., 2022). Agency Theory highlights the audit committee's role in reducing information asymmetry and fostering transparency in sustainability disclosures. On the other hand, Resource Dependence Theory explains the negative impact, as audit committees may prioritize resource management over sustainability disclosures. These conflicting perspectives highlight the need for a nuanced analysis of audit committee characteristics and their interaction with contextual moderators (Al-Shaer & Zaman, 2018a). While prior literature shows mixed findings on the association between AC characteristics and sustainability disclosures, dominant literature supports a positive relationship between audit committee characteristics and sustainability disclosures. Given the mixed results, we hypothesize that;

- H1: There is a positive relationship between audit committee characteristics and sustainability disclosures.

2.1 Financial Reporting Quality

Financial reporting quality refers to financial statements' accuracy, reliability, and transparency. High-quality reporting reflects strong internal controls and governance practices (Ali et al., 2024), fostering greater confidence in financial and non-financial disclosures, including sustainability disclosure reports (Dechow et al., 2010). It supports informed decision-making by stakeholders by adhering to accounting standards and regulations (Hope et al., 2013). The effectiveness of audit committees in enhancing integrated reporting quality is influenced by governance structures and ownership types, such as family ownership, which can moderate the relationship between audit committee characteristics and reporting quality (Li et al., 2023; Qaderi et al., 2024). Financial reporting quality ensures accurate and transparent sustainability disclosures, reinforcing governance structures. However, existing studies do not fully explore how variations in financial reporting quality moderate the audit committee-sustainability disclosure relationship. This study fills this gap by examining the moderating effect of financial reporting quality, emphasizing its role in aligning sustainability reporting with stakeholder expectations (Dechow et al., 2010). In summary, high financial reporting quality enhances audit committees' ability to ensure transparent and reliable sustainability disclosures, building stakeholder trust (García-Sánchez et al., 2013). Following is the first hypothesis for this study;

- H2: Financial reporting quality moderates the positive relationship between audit committee characteristics and sustainability disclosures.

2.2 World Corporate Governance Index (WCGI)

This study categorized 150 countries into three groups based on the SAHA rating developed by WCGI (World Corporate Governance Index). (Ararat & Ugur, 2003); Christensen et al. (2010); (Kleffner et al., 2003) 22 countries with high levels of world corporate governance index fall in 1st group. A medium level of world corporate governance index found 36 countries in 2nd group (Black et al., 2010; Chong & López-de-Silanes, 2007; Jiang & Kim, 2020). In low levels of the World Corporate Governance Index, 92 countries are included in 3rd group (Okike, 2007; Rashid, 2011). Aguilera and Jackson (2010) explained that WCGI-higher countries have improved governance standards and regulatory compliance, assisting the audit committees to enhance sustainability disclosures. Overall, the WCGI contributes to a positive relationship between the audit committee characteristics and sustainability disclosures by improving transparency, openness, and responsibility (Abdullahi & Yahaya, 2024), compliance (Asyik et al., 2024), and accountability (Dammak Ben Hlima et al., 2024). This study examines WCGI as a moderator to address gaps in prior research on governance variations in sustainability disclosures.

The association between audit committee characteristics and sustainability disclosures is moderated by the World Corporate Governance Index (WCGI).

- H3: The relationship between audit committee characteristics and sustainability disclosures is moderated by world corporate governance index

2.3 Social Progress Index

According to Porter et al. (2014), the Social Progress Index analyses social and environmental performance outside traditional economic indicators. The Social Progress Index captures societal expectations for transparency and ethical practices. In environments with higher social progress, there is a greater societal demand for transparency and ethical practices (Fanning et al., 2022), which increases the pressure on firms to enhance their sustainability disclosure reporting (Chankseliani & McCowan, 2021). Lin and Ma (2022) amplify the positive impact of audit committees on sustainability disclosures, as firms in such environments strive to meet these heightened social standards and demonstrate their commitment to sustainable development (Troise et al., 2022). Limited research explores its moderating role in this context of Higher SPI scores, which amplify pressure on firms to enhance sustainability disclosures. This study addresses this gap by investigating how SPI influences the audit committee's effectiveness in promoting sustainability reporting (Porter & Heppelmann, 2014). Thus, the Social Progress Index moderates how audit committees approach sustainability disclosures by reflecting societal expectations (Kolk, 2008).

- H4: The relationship between audit committee characteristics and sustainability disclosures is moderated by social progress index.

2.4 Additional Potential Moderator

2.4.1 Publication Quality

It is crucial to know about the quality of journals for studies included in the sample of this meta-analysis for the robustness of the results. The quality of journals can significantly influence the reliability of research. The publication quality of journals can vary. Some factors to consider are the peer review process, impact factor and reputation (Teixeira da Silva, 2023). Journals are classified based on their subject area, helping researchers find relevant articles. The ranking of journals provided by Journal Citation Reports (JCR) Thomas Reuters is used to evaluate the significance of journals. Low-quality research has been published in low-ranked journals. Journals are often categorized into different tiers, such as top-tier, high-impact, or reputable journals. Based on the impact factor of journals in specific fields, Q1 represents the top journals, while Q4 represents the bottom. These quartiles assess the relative impact of journals (Archambault & Larivière, 2009), with higher-ranking journals linked to stronger peer review and methodology (Moed, 2005).

2.4.2 Country Classification

The relationship between the audit committee and sustainability disclosures in emerging markets is crucial for economic development. The audit committee ensures transparency and accountability in financial reporting, while Sustainability disclosures promote responsible business conduct and environmental stewardship (Qaderi et al., 2020). Financial markets have been classified into three distinct categories. First, The Frontier market refers to the group of countries at earlier stages of economic development compared to emerging markets. These markets have unique characteristics such as smaller market size, lower liquidity, higher political and regulatory risk, and less developed infrastructure. However, they have the potential for high growth and investment opportunities. Second, the emerging markets have a promising future with their economies growing, sizeable middle class, and increasing consumer demand. They offer great potential for investment and business opportunities. These markets are expected to continue experiencing rapid growth and development, attracting foreign and domestic investors. Advanced economies, well-established financial systems, and high industrialization characterize developed markets. They have mature infrastructure, stable political systems, and robust regulatory frameworks. These markets offer a wide range of investment opportunities and are known for their liquidity and transparency.

3. Methodology

To compile the database of empirical studies, we followed a multi-step process (Botella & Gambara, 2006; Field & Gillett, 2010). Initially, we conducted searches on Web of Science, Scopus, and Google Scholar using key terms such as audit committees, audit committee independence, audit committee expertise, audit committee size, audit committee meeting, audit committee gender diversity, audit committee effectiveness, audit committee financial expertise, audit committee accounting expertise, audit committee characteristics, audit committee chair and corporate social responsibility, corporate social responsibility disclosure, carbon footprint, sustainability disclosures, environmental sustainability disclosures, climate change, renewable energy, renewable energies, and global warming. These keywords could appear in the article's abstract, title, keywords, or full text. We restricted our data collection to articles published before June 2023.

In the subsequent phase, we applied a series of inclusion and exclusion criteria. We restricted the inclusion of English-language articles. We selected studies that provided substantial statistical data, like regression coefficients or data that could be converted using established methods (Borenstein et al., 2021). However, we excluded event studies because their methodology differs significantly (Endrikat et al., 2014). We also omitted studies that failed to report the relationship between the variables relevant to our research: audit committee and sustainability disclosures. We further reviewed the references of the selected articles to ensure completeness and found no omissions of relevant studies (Ghisetti & Pontoni, 2015). This rigorous screening yielded a final sample of 93 empirical studies, yielding 59 effect sizes (K = 281).

3.1 Effect Size Calculation

An effect size (ES), a standard correlation measure, was calculated from the individual coefficient's student t-test statistics (i.e., t-statistics data was taken from the selected studies regarding audit committee and Sustainability disclosures). We calculated studies without t-statistics from coefficients, standard errors, and p-values. Conversion of p-values into the ES involved a two-step process. Every p-value of the selected studies was first converted to a t-statistic using an online converter via p-values and the degree of freedom values.

The ES of each selected study was calculated through the following formula:

$$ES = \frac{t}{\sqrt{t^2 + df}} \qquad (1)$$

Where: df = degree of freedom and t = t-statistic. (n-3) is the degree of freedom in the study, and n is the sample size of every article.

We extracted all the possible ESs from the selected studies, as these studies used multiple proxies of the audit committee and sustainability disclosures. After the calculation of the ESs, the formula is given in Eq. 1; then we calculate the standard errors (SE_{es}) from the following formula given in Eq. 2:

$$SEes = \frac{ES}{\sqrt{\sum ES * n}} \qquad (2)$$

3.2 Meta-Regression

Meta-regression examined the connection between audit committee characteristics and sustainability disclosures through relevant moderators like financial reporting quality and corporate governance. The random-effect model acquires sampling error and context differences heterogeneity in effect size among studies (Clarke et al., 2010; Schmidt et al., 2009). The model provides deeper insights and understanding of audit committees' impact on sustainability disclosures in different contexts of studies. It was chosen because of its feature, which allows the findings to be generalized (Gonzalez-Mulé & Aguinis, 2018). Our dataset is diagnostic with high heterogeneity because all research published may not provide the same results, so that's the reason for the existence of heterogeneity indicated in the study with I^2 statistic. Therefore, the random-effect model is specifically suited to our research. This model ensures the reliability and consistency of study findings in different variations in research contexts, population, and methodology (DerSimonian & Laird, 1986). Using this model, the study can signify the audit committee variations that exist in the real world and influence sustainability disclosure reporting.

4. Results and Discussion

4.1 Overall Results

This section consists of a thorough examination of connections amid audit committee characteristics and sustainability disclosures. First, the relationship between audit committee characteristics and sustainability disclosure results was presented from meta-regression. After that, a comprehensive analysis of the results of the three study moderators' corporate governance, quality of financial reporting, and social progress are stated. The study also incorporates other factors to ensure the generalizability and robustness of the findings in different scenarios, i.e., financial market on the country classification basis and quality of publications.

Table 1: Audit Committee and Sustainability Disclosures (Overall Results)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	_meta_es	_meta_es	_meta_es	_meta_es	_meta_es	_meta_es
AUDIT-COMMITTEE	0.0762***	0.0698***	0.0766***	0.0702***	0.0820***	0.0765***
	(0.0140)	(0.0140)	(0.0141)	(0.0140)	(0.0146)	(0.0144)
CSRD			0.9130	1.8073**	1.5627***	1.7078***
			(0.8233)	(0.7123)	(0.4922)	(0.5771)
CSRP			3.1699***	4.2830***	4.1322***	4.1226***
			(1.0376)	(0.7033)	(0.5472)	(0.4665)
ACIND					1.5972***	3.7490***
					(0.5314)	(0.6639)
ACMEETING					1.7971***	1.9908***
					(0.5727)	(0.6738)
AC Size					2.0679***	1.9404***
					(0.7723)	(0.5905)
ACFE					2.0578***	2.0702***
					(0.6686)	(0.6588)
AC tenure					1.7106*** (0.5952)	1.1403 (0.9222)
					2.6165**	2.7224**
FEMALEONAC					(1.0220)	(1.0997)
AC-EFFECTIVENESS					2.7647***	3.3333***
					(0.4186)	(0.4564)
FIRMSIZE		0.0271		0.0276		0.0238
		(0.0187)		(0.0187)		(0.0188)
FIRMAGE		0.0208		0.0215		0.0279*
		(0.0154)		(0.0153)		(0.0158)
LEVERAGE		-0.0524***		-0.0560***		-0.0623***
		(0.0186)		(0.0188)		(0.0189)

ROAROE		0.0104		0.0130		0.0156
		(0.0159)		(0.0160)		(0.0162)
BOARDSIZE		-0.0576***		-0.0645***		-0.0695***
		(0.0180)		(0.0188)		(0.0190)
BOARD-INDEPENDENCE		0.0725***		0.0808***		0.0795***
		(0.0194)		(0.0204)		(0.0209)
BODMEET		0.0148		0.0123		0.0095
		(0.0192)		(0.0192)		(0.0192)
DUAL		-0.0410*		-0.0420*		-0.0485**
		(0.0246)		(0.0246)		(0.0247)
CEOAGE		-0.1271***		-0.1177***		-0.1388***
		(0.0402)		(0.0408)		(0.0427)
CEOTENURE		0.0077		0.0097		0.0248
		(0.0193)		(0.0193)		(0.0200)
INDUSTRY		-0.0621***		-0.0615***		-0.0620***
		(0.0190)		(0.0190)		(0.0198)
DIVIDEND		0.0546		0.0551		0.0580
		(0.0398)		(0.0397)		(0.0400)
LIQUIDITY		0.0412		0.0432		0.0531*
		(0.0312)		(0.0311)		(0.0315)
DEBT		-0.0327		-0.0389		-0.0584*
		(0.0330)		(0.0333)		(0.0344)
MTB		-0.0817***		-0.0789***		-0.0785**
		(0.0300)		(0.0300)		(0.0305)
BC		0.0002**		0.0002**		0.0002***
		(0.0001)		(0.0001)		(0.0001)
Constant	0.0486***	0.0460*	0.0426***	0.0241	0.0957**	0.0347
	(0.0080)	(0.0261)	(0.0135)	(0.0313)	(0.0406)	(0.0543)
tau2	0.009771	0.008674	0.009775	0.008626	0.009679	0.008507
I2 (%)	97.94	97.48	97.9	97.45	97.69	97.17
H2	48.65	39.72	47.7	39.28	43.21	35.32
R-squared (%)	9.45	19.65	9.41	20.1	10.31	21.2
Wald chi2(3)	29.51	80.51	29.8	82.37	41.58	96.35
Prob > chi2	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000
Observations	278	277	278	277	278	277

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

4.1.1 Baseline Random Effect Results

Table 1 (above) presents the results of the meta-regression of the impact of the audit committee on Sustainability disclosures. The findings in table 1 (above) align with established theories, such as Agency Theory and Stakeholder Theory, which provide a theoretical lens for understanding the audit committee's influence on sustainability disclosures. Stakeholder theory stresses the necessity of governance mechanisms considering stakeholders' diverse demands, including employees, investors, and communities (Freeman, 2010). Meanwhile, Independent audit committees (ACIND) diminish agency issues through agency theory, enhancing accountability and transparency leading to reputable sustainability disclosures (Fama & Jensen, 1983; Meckling & Jensen, 1976). Financial expertise (ACFE) and gender diversity (FEMALEONAC) among audit committees foster ethical practices and improve decision-making processes and credible reporting (Bravo & Reguera-Alvarado, 2019; D. S. Dhaliwal et al., 2011). In our main finding, the audit committee has a positive and significant relationship with sustainability disclosures in all six models. Our first hypothesis is accepted as H1 if the p-value is less than 0.001, indicating that audit committee characteristics positively affect sustainability disclosures. Because of positive correlation the audit committee's is responsible for an accountability, organization's transparency, and good governance. These roles are necessary for sustainable operations as they stimulate commitment with social and environmental and ethical norms. Audit committees assist the firms to achieve legislative standards and maintain stakeholders' trust by closely observe and report these issues. This, in turn, can lead to more sustainable business operations and long-term financial performance (Mubeen et al., 2024). Our results are supported by previous empirical findings such as (Al-Shaer et al., 2017; Aprianti et al., 2022; Baroroh et al., 2022). Further, the results are robust because corporate social responsibility disclosure (CSRD) and corporate social responsibility performance (CSRP) are positive and significant.

The results reveal that audit committee independence (ACIND) has a significant positive relationship with sustainability disclosures (models 5: 1.5972***; model 6: 3.7490***). This finding underscores the critical role of independent members in ensuring unbiased oversight, consistent with prior studies such as Al-Shaer and Zaman (2018a) and Tumwebaze et al. (2022). Independent audit committees prioritize stakeholder interests and long-term ESG goals, which enhance transparency and accountability. Audit committee financial expertise (ACFE) is also positively and significantly associated with sustainability disclosures (models 5: 2.0578***; model 6: 2.0702***). Financially skilled members integrate sustainability metrics into financial reports, ensuring accurate and comprehensive disclosures (Al-Shaer et al., 2022; Ghafran & Yasmin, 2018). This expertise is particularly critical in industries with complex sustainability reporting requirements. Gender diversity in audit committees (FEMALEONAC) further strengthens sustainability disclosures (models 5 and 6). Women directors often bring diverse perspectives and prioritize corporate social responsibility (CSR) initiatives, leading to more thorough disclosures (Liao et al., 2015). This finding supports stakeholder theory's

premise that diverse governance structures align corporate practices with societal expectations (Bravo & Reguera-Alvarado, 2019).

Further, we move to subgroup analysis, which is presented in models 5 and 6, where we show the study of different proxies of the audit committee; it is necessary because, in models 1 and 2, where we present the main analysis, the value of tau2 is (model 1, 0.009771, model 2, 0.008674) the main function of tau2 quantifies the between-study variance in a meta-analysis. It helps to understand how much of the variability in effect sizes across studies can be attributed to differences beyond chance. A high τ^2 suggests substantial heterogeneity, indicating that the effect sizes vary widely across studies, potentially due to different study characteristics or contexts. I^2 (%) presents the heterogeneity level in percentage, which indicates that all studies do not demonstrate equal results. The random effect model was accepted in meta-analysis in our study of the value of I^2 (model 197.94% and model 2 97.48%). So, there is a need to move subgroup analysis of different proxies of the audit committee; the audit committee independence (ACIND) has a positive and significant association in (model 5 1.5972*** and model 6 3.7490***) the positive relationship indicates that Audit committee independence ensures unbiased oversight, promoting transparency and ethical practices.

The subgroup analysis highlights variations across countries and industries, aligning with the Institutional Theory perspective that external environments shape corporate governance practices (DiMaggio & Powell, 1983). Developed economies with strong regulatory frameworks demonstrate a stronger association between audit committee characteristics and sustainability disclosures, as evidenced in studies by Dhaliwal et al. (2014) and Clarkson et al. (2008). In contrast, emerging markets face challenges such as weaker governance systems, which limit the audit committee's effectiveness in promoting sustainability disclosures (Chen et al., 2008; La Porta et al., 2000). Industry-specific differences also emerge. High-risk sectors like energy and pharmaceuticals show stronger relationships between audit committees and sustainability disclosures due to heightened public scrutiny and regulatory demands (Michelon & Parbonetti, 2012). Based on these findings, a specific governance system is essential, and sustainability obstacles are unique in different sectors.

This integrity fosters comprehensive sustainability disclosures and enhances corporate social responsibility, as independent members are likely to prioritize stakeholder interests and long-term environmental, social, and governance goals over immediate financial gains (Mahmood et al., 2023). While audit committee meetings (ACMEETING) have a significant positive relationship (model 5 1.7971***and model 6 1.9908***), the positive association indicates that frequent audit committee meetings facilitate thorough review and oversight of corporate activities, including sustainability disclosure initiatives. This regular scrutiny ensures that sustainability disclosures are accurate and comprehensive, promoting accountability and encouraging enhanced corporate social responsibility practices to meet

stakeholder expectations and regulatory standards. On the other hand, audit committee size (AC Size) also has a positive and significant relationship in (model 5 2.0679***and model 6 1.9404***) the results indicate that a larger audit committee size brings diverse perspectives and expertise, enhancing the scrutiny of sustainability disclosures. The audit committee size fosters a more robust evaluation of corporate social responsibility initiatives, leading to more transparent and comprehensive reporting that aligns with stakeholders' environmental and social expectations. Further, audit committee financial expertise (ACFE) has a positive and significant relationship in (model 5 2.0578***and model 6 2.0702***); the positive coefficient indicates that Audit committee members with financial expertise are adept at analyzing and integrating sustainability disclosure metrics into financial reports, ensuring accurate and comprehensive disclosures. Their skills enhance the credibility of corporate social responsibility reports, fostering trust and satisfying investor demands for transparency in sustainability disclosures. While audit committee tenure (AC tenure) has a positive and significant association (model 5 1.7106***), the positive relationship indicates that longer tenure fosters a deep understanding of company operations and historical CSR practices, enabling more effective oversight and strategic guidance for sustainability disclosure initiatives. This continuity ensures consistent and enhanced disclosures, building stakeholder trust and advancing corporate social responsibility commitments. On the other hand, female on audit committees (FEMALEONAC) also has a positive and significant relationship in (model 5 and model 6); the positive association indicates that Female representation on audit committees can enhance focus on sustainability disclosures and CSR due to diverse perspectives that often prioritize ethical governance and long-term societal impact. This diversity leads to more robust discussions and thorough disclosures, improving transparency and fostering greater accountability in corporate social responsibility efforts. Further audit committee effectiveness (ACEFFECTIVENESS) also has a positive and significant association with Sustainability disclosures in (model 5 2.7647***and model 6 3.3333***); the positive association indicates that an effective audit committee ensures rigorous oversight and enforcement of Sustainability disclosures, demanding high-quality disclosures. Their proactive approach enhances accountability and transparency, leading to more reliable and detailed reporting on CSR activities. This thoroughness meets stakeholder expectations and supports the corporate reputation for responsible governance.

Table 2: Moderation Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	_meta_es	_meta_es	_meta_es	_meta_es	_meta_es	_meta_es
AUDITCOMMITTEE		0.0702***	0.0710***	0.0670***	0.0678***	0.0685***
		(0.0144)	(0.0142)	(0.0143)	(0.0143)	(0.0141)
FRQ HIGH	0.0338**			-0.0076		
	(0.0158)			(0.0179)		
FRQ LOW	-0.0044			0.0148		
	(0.0176)			(0.0183)		
BESTPERFORMANCE		0.0494**			0.0440*	
		(0.0244)			(0.0259)	
MEDIUMPERFORMANCE		0.0448*			0.0590**	
		(0.0232)			(0.0262)	
WORSTPERFORMANCE		0.0211			0.0551**	
		(0.0225)			(0.0275)	
WCG high			0.0152			0.0058
			(0.0375)			(0.0377)
WCG low			0.0500			0.0299
			(0.0375)			(0.0376)
MEDIUM			0.0290			0.0147
			(0.0398)			(0.0421)
FIRMSIZE				0.0260	0.0279	0.0304
				(0.0191)	(0.0190)	(0.0190)
FIRMAGE				0.0194	0.0181	0.0127
				(0.0159)	(0.0157)	(0.0166)
LEVERAGE				-0.0519***	-0.0488***	-0.0556***
				(0.0187)	(0.0188)	(0.0188)
ROAROE				0.0117	0.0190	0.0113
				(0.0160)	(0.0164)	(0.0167)
BOARDSIZE				-0.0616***	-0.0439**	-0.0541***
				(0.0184)	(0.0193)	(0.0182)
BOARDINDEPENDENCE				0.0718***	0.0592***	0.0717***
				(0.0196)	(0.0202)	(0.0206)
BODMEET				0.0161	0.0233	0.0211
				(0.0193)	(0.0196)	(0.0203)
DUAL				-0.0351	-0.0385	-0.0380
				(0.0252)	(0.0248)	(0.0261)
CEOAGE				-0.1202***	-0.1005**	-0.1032**
				(0.0427)	(0.0432)	(0.0451)
CEOTENURE				0.0053	0.0036	0.0048
				(0.0194)	(0.0195)	(0.0210)
INDUSTRY				-	-	-

				0.0603***	0.0641***	0.0535***
				(0.0206)	(0.0200)	(0.0200)
DIVIDEND				0.0573	0.0729*	0.0583
				(0.0401)	(0.0411)	(0.0400)
LIQUIDITY				0.0400	0.0229	0.0316
				(0.0314)	(0.0321)	(0.0321)
DEBT				-0.0302	-0.0244	-0.0308
				(0.0331)	(0.0331)	(0.0331)
MTB				-0.0871***	-0.0772**	-0.0776**
				(0.0305)	(0.0300)	(0.0306)
BC				0.0002**	0.0002**	0.0002**
				(0.0001)	(0.0001)	(0.0001)
Constant	0.0859***	0.0182	0.0191	0.0435	-0.0187	0.0231
	(0.0102)	(0.0200)	(0.0362)	(0.0267)	(0.0387)	(0.0449)
tau2	0.01066	0.01048	0.01045	0.00868	0.008532	0.008689
I2 (%)	98.13	98.07	98.09	97.49	97.45	97.48
H2	53.57	51.7	52.44	39.89	39.2	39.64
R-squared (%)	1.17	2.87	3.19	19.6	20.97	19.51
Wald chi2(3)	4.96	11.35	10.41	81.68	86.67	82.55
Prob > chi2	0.0838	0.0229	0.0154	0.0001	0.0003	0.0000
Observations	278	278	278	277	277	277

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

These outcomes highlight how financial expertise, independence, and diversity affect audit committees to enhance sustainability disclosures. Agency and stakeholder theory support these results by emphasizing governance accountability and transparency (Fama & Jensen, 1983; Freeman, 2010). Moreover, the outcomes detect that contextualized governance strategies are needed by drawing attention to various cross-country and industry-specific (Clarkson et al., 2008; Dhaliwal et al., 2014). This study underscores that strong audit committee characteristics are integral to fostering long-term trust, stakeholder engagement, and responsible corporate behavior.

After primary findings, it is essential to analyze the outcome's robustness to ensure investigations and reliability across contexts. To further ensure the validity identified among relationships, robustness checks are used, including the analysis of corporate social responsibility performance (CSRP) and disclosure (CSRD. Furthermore, subgroup analysis evaluates how audit committee proxies affect sustainability disclosure to adjust for study heterogeneity. Additional analyses help to understand the audit committees' responsibilities in diverse business conditions.

4.1.2 Moderation Analysis

Based on moderating analysis, financial reporting quality, world corporate governance, and social progress are identified as moderating variables shown in Table 2. Financial reporting quality, world corporate governance, and social progress are crucial elements in the

association of audit committees and sustainability disclosures. These outcomes verify the Institutional theory concept, which emphasizes that external mechanisms influence corporate governance practices (DiMaggio & Powell, 1983). They also align with agency theory, reducing information asymmetry through internal governance mechanisms (Fama & Jensen, 1983).

In model 1, high financial reporting quality has a positive and significant association coefficient value of 0.0338** compared to low financial reporting quality coefficient value of -0.0044, which is negative and insignificant. High financial reporting quality improves the audit committee's effectiveness and implies robust internal controls and accurate disclosures.

The results for financial reporting quality (FRQ) demonstrate a significant positive association for high FRQ (model 1: coefficient 0.0338**) and an insignificant or negative relationship for low FRQ (-0.0044). This suggests that robust financial reporting systems enhance audit committees' compliance with comprehensive sustainability disclosures. The audit committee's ability to ensure the credibility of sustainability reports is suffered by low FRQ. Alternatively, High FRQ ensures accurate and reliable data, fostering transparency and accountability in line with findings by Dechow et al. (2010) and Hope et al. (2013).

As a result, the audit committee is free to take actions that ensure improvement of CSR and sustainability disclosure, representing the actual environmental and social effect of business. The financial reporting quality results have variation in coefficient see in main (table 1) that indicates it will play the moderator role; thus, we accept the H2: *financial reporting quality moderates the relationship between sustainability disclosures and the Audit committee.* We divided the world corporate governance index into three different categories according to the world corporate governance index: high, medium, and low. The high 0.0152, medium 0.0290, and low 0.0500 coefficient values are both positive and insignificant. The variation in coefficients for the world corporate governance index (WCG) — high (0.0152), medium (0.0290), and low (0.0500) — reveals an insignificant moderation effect (Dhaliwal et al., 2014; La Porta et al., 2000). This result diverges from studies suggesting that strong governance environments amplify the role of audit committees. Instead, it indicates that internal governance mechanisms, such as audit committee characteristics, play a more decisive role in sustainability disclosures than country-level governance systems. But the value of corporate governance coefficients is different from the main finding of the audit committee that is in Table 1; the variation in coefficients indicates that corporate governance moderates the relationship between the audit committee and sustainability disclosures; thus, we reject the H3: *corporate governance moderates the relationship between sustainability disclosures and Audit committee.* Next, we move to our 3rd moderator, social progress. Based on the social

progress index, we divide social progress into three categories: best-performing, medium-performing, and worst-performing.

The social progress index (SPI) demonstrates significant moderation, with coefficients increasing across categories: best-performing (0.0494**), medium-performing (0.0448*), and worst-performing (0.0211). This result aligns with Stakeholder Theory, which posits that higher societal expectations drive corporate responsibility and transparency (Freeman, 2010). Audit committees in countries with strong social norms are more effective in promoting sustainability disclosures (Clarkson et al., 2008; Michelon & Parbonetti, 2012). In contrast, regions with lower social progress exhibit weaker audit committee impacts, consistent with findings by (Chen et al., 2008). The coefficient value of best performing is 0.0494**, medium performing is 0.0448*, and worst performing is 0.0211. This relationship suggests that higher social progress indices have stronger norms and expectations for corporate responsibility, amplifying the impact of audit committees on sustainability disclosures and CSR efforts.

Conversely, in areas with lower social progress, the influence of audit committees may be less pronounced due to weaker societal pressure and regulatory frameworks. Further, there is variation in the coefficient of social progress and the main finding in the table because it moderates the relationship; thus, we accept that the H4: social progress index moderates the relationship between sustainability disclosures and the a*udit committee.* Having established the role of critical moderators such as financial reporting quality, social progress, and corporate governance, it is equally important to consider other potential factors that could influence the relationship between audit committee characteristics and sustainability disclosures. In the following section, we explore additional moderators, including publication quality, country classification, and the treatment of endogeneity, to further examine the robustness of our findings.

The moderation effects of FRQ and SPI underscore the importance of external pressures and societal expectations in enhancing audit committee functions. High FRQ and SPI amplify the positive relationship between audit committees and sustainability disclosures, particularly in developed economies and socially progressive regions (Bravo & Reguera-Alvarado, 2019; Dhaliwal et al., 2014). Conversely, in countries with weaker governance or lower societal expectations, internal mechanisms such as financial expertise and frequent meetings become critical to bridging these gaps (Al-Shaer & Zaman, 2018a; Raimo et al., 2021). The findings for Table 2 reinforce the importance of internal and external factors in influencing audit committees' effectiveness. While high financial reporting quality and strong societal expectations significantly enhance sustainability disclosures, broader governance frameworks exhibit limited moderation effects. These results contribute to the literature by highlighting the nuanced interplay of internal audit committee characteristics and external pressures, offering a comprehensive perspective for policymakers and practitioners seeking to enhance sustainability reporting frameworks.

4.1.3 Additional Positional Moderation Analysis

In this section, we delve into the analysis of additional potential moderators, explicitly focusing on publication quality, country classification, and the treatment of endogeneity. The additional positional moderation analysis in Table 3 provides a nuanced understanding of the variability in audit committee and sustainability disclosure relationships by incorporating publication quality, country classification, and endogeneity considerations as moderators. These insights align with Institutional Theory, emphasizing the external environment's role in shaping corporate governance practices (DiMaggio & Powell, 1983), and Agency Theory, which highlights the significance of robust governance mechanisms in mitigating conflicts of interest and enhancing transparency (Fama & Jensen, 1983). The discussed factors are vital to understanding the variability and association between sustainability disclosures and audit committee characteristics. Investigating them helps validate the research findings within different study designs and contexts.

Table 3: Additional Positional Moderator

	(1)	(2)	(3)	(4)
VARIABLES	_meta_es	_meta_es	_meta_es (covered endogeneity)	_meta_es (Not-covered endogeneity)
AUDITCOMMITTEE	0.0953***	0.0886***		
	(0.0249)	(0.0178)		
Non rank		-0.0388		
		(0.0274)		
q1		0.2189***		
		(0.0686)		
q2		0.0003**		
		(0.0002)		
q3		0.0661**		
		(0.0321)		
q4		0.0003**		
		(0.0002)		
cross-country	0.0298*			
	(0.0170)			
Develop market	0.0364***			
	(0.0136)			
emerging market	0.0492*			
	(0.0271)			
frontier markets	0.0050			
	(0.0210)			
Cover Endo			0.0375*	
			(0.0195)	
Not cover Endo				-0.0375*
				(0.0195)

Control Variables				
FIRMSIZE	0.0135	0.0228	0.0139	0.0139
	(0.0386)	(0.0359)	(0.0382)	(0.0382)
FIRMAGE	0.0294	0.0280	0.0298	0.0298
	(0.0288)	(0.0254)	(0.0286)	(0.0286)
LEVERAGE	-0.0817*	-0.0742*	-0.0833**	-0.0833**
	(0.0444)	(0.0400)	(0.0410)	(0.0410)
ROAROE	0.0110	0.0169	0.0122	0.0122
	(0.0272)	(0.0255)	(0.0258)	(0.0258)
BOARDSIZE	-0.0939***	-0.0744**	-0.0967***	-0.0967***
	(0.0315)	(0.0296)	(0.0299)	(0.0299)
BOARDINDEPENDENCE	0.0968**	0.0865**	0.1005***	0.1005***
	(0.0385)	(0.0340)	(0.0380)	(0.0380)
BODMEET	-0.0021	0.0108	-0.0032	-0.0032
	(0.0367)	(0.0320)	(0.0368)	(0.0368)
DUAL	-0.0418	-0.0554	-0.0426	-0.0426
	(0.0462)	(0.0410)	(0.0463)	(0.0463)
CEOAGE	-0.2227***	-0.1588***	-0.2193***	-0.2193***
	(0.0512)	(0.0448)	(0.0561)	(0.0561)
CEOTENURE	0.0416	0.0178	0.0424	0.0424
	(0.0376)	(0.0308)	(0.0381)	(0.0381)
INDUSTRY	-0.0805**	-0.0757***	-0.0802**	-0.0802**
	(0.0316)	(0.0286)	(0.0322)	(0.0322)
DIVIDEND	0.0570	0.0669	0.0571	0.0571
	(0.0467)	(0.0439)	(0.0466)	(0.0466)
LIQUIDITY	0.0650*	0.0478	0.0661**	0.1823
	(0.0342)	(0.0298)	(0.0321)	(0.1486)
DEBT	-0.0687	-0.0504	-0.0709*	-0.0709*
	(0.0427)	(0.0418)	(0.0411)	(0.0411)
MTB	-0.0916*	-0.0919*	-0.0910	-0.0910
	(0.0546)	(0.0529)	(0.0550)	(0.0550)
BC	0.0171	0.0003*	-0.0065	0.0003**
	(0.0218)	(0.0001)	(0.0254)	(0.0002)
Constant	0.0364***	0.0301*	0.0667***	0.1042***
	(0.0068)	(0.0168)	(0.0205)	(0.0173)
tau2	0.01026	0.009449	0.2252	0.01067
I2 (%)	97.93	97.74	99.97	98
H2	48.34	44.23	3514.28	49.97
R-squared (%)	4.94	12.47	36.2	1.14
Wald chi2(3)	26.25	52.83	145.58	9.39
Prob > chi2	0.0059	0.0001	0.0003	0.01526
Observations	278	278	278	278
R-squared	0.1391	0.3865	0.0467	0.0467

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3 presents the results of additional potential moderators: publication quality and country classification. This analysis explores the reasons behind the inconclusive findings of previous empirical studies, which provide both positive and negative results. First, we discuss the relationship between the audit committee and sustainability disclosures. The audit committee demonstrates a positive and significant relationship in both models, confirming consistent results across all our models. This positive and significant relationship is evident in our first model. Next, we examine the financial market results, our first potential moderator. The primary aim of this test is to synthesize the relationship between the audit committee and sustainability disclosures and to explore the reasons for mixed findings in previous empirical studies. The cross-country results are positive, and both emerging and developed markets show a positive relationship. Country classification further clarifies the contextual variability in audit committee effectiveness. The findings indicate that developed and emerging markets exhibit a positive and significant relationship with sustainability disclosures, aligning with prior studies emphasizing strong governance systems and skilled labor in these economies (Dhaliwal et al., 2014; La Porta et al., 2000). In contrast, frontier markets show a positively insignificant association, reflecting challenges such as weaker regulatory environments, limited resources, and insufficient audit expertise (Chen et al., 2008). These disparities underscore the need for tailored governance mechanisms to address contextual constraints in frontier markets.

This indicates that studies conducted in or using data from these countries demonstrate a positive association between the audit committee and sustainability disclosures. However, the frontier market displays a positively insignificant association, confirming the mixed findings attributed to frontier markets. This may be due to inadequate internal controls and less skilled workers, which affect the proper handling of audit committee functions and sustainability disclosures in these markets. Next, we examine publication quality by categorizing our data based on the journal rankings.

The results reveal that publication quality significantly influences the observed relationship. Journals ranked in Q1, Q2, Q3, and Q4 categories demonstrate a positive and significant association between audit committees and sustainability disclosures. This finding highlights the reliability and credibility of studies published in higher-ranked journals (Dechow et al., 2010; Hope et al., 2013). However, publications in non-ranked journals exhibit a negative and insignificant relationship. This supports the mixed findings observed in studies published in non-ranked journals. High-quality publications often employ rigorous methodologies and robust theoretical frameworks, ensuring accurate and generalizable results. This underscores the importance of journal quality in advancing governance research and reducing ambiguities in empirical outcomes. The moderation analysis in Table 3 highlights the complex interplay between audit committee characteristics and sustainability disclosures. By incorporating additional moderators such as publication quality, country classification, and endogeneity considerations, this study

provides a more nuanced perspective on the mixed findings in the literature. These results underscore the importance of rigorous research designs, context-sensitive governance practices, and high-quality publications in advancing the field of corporate governance. Ranked journals typically publish high-quality research articles, whereas non-ranked journals are often associated with lower-quality research. Our third potential moderator is endogeneity. We divided our data based on whether the research articles address endogeneity issues through various tests. Articles that account for endogeneity exhibit a positive and significant relationship.

Addressing endogeneity emerges as a critical factor in ensuring the robustness of findings. Studies that account for endogeneity through appropriate tests show a positive and significant relationship between audit committees and sustainability disclosures, consistent with best practices in empirical research (Roberts & Whited, 2013). Conversely, studies failing to address endogeneity exhibit a negative and significant relationship, potentially introducing bias and undermining the validity of their conclusions. This finding reinforces the necessity of rigorous methodological approaches in governance research.

4.2 Discussion and Future Directions

4.2.1 Discussion

Audit committee characteristics are crucial in improving sustainability disclosures, including longer tenure, independence, gender diversity, larger size, frequent meetings, and financial expertise. In corporate governance, it also significantly contributes to enhancing accountability and transparency. The independent audit committees provide unbiased monitoring because they face no pressure from internal management. Therefore, they ensured the firms had more accurate disclosures and comprehensive information on sustainability disclosures (Al-Shaer & Zaman, 2016; Klein, 2002). Likewise, frequent meetings can facilitate quick responses to emergent issues, sustainability disclosures, and thorough monitoring, leading to effective control (Vafeas, 1999). The firms achieved long-term goals and ensured transparent practices with the larger audit committees as they brought more diverse perspectives and expertise, which enhanced their capability to take initiatives related to sustainability disclosures (Kallamu & Saat, 2015). A firm’s overall performance is improved if its audit committee has high financial expertise as it helps to integrate sustainability disclosure metrics into the financial reports, enhancing the credibility of sustainability disclosures (Dhaliwal et al., 2011). The consistent and enhanced monitoring achieved with the longer tenures of audit committees helps them improve their capability to understand the company’s historical sustainability disclosures and operations (Bédard & Gendron, 2010). Furthermore, audit committee diversity, including gender and professional expertise, significantly enhances the quality of sustainability disclosures (Lewa et al., 2025). The audit committee's characteristics align with the governance theories emphasizing monitoring and accountability, vital for better corporate social responsibility (CSR) disclosures. High standards of ethics can be achieved through quality CSR practices. Audit committees are helpful in high transparency,

supporting stakeholder trust, and promoting enduring sustainability disclosures (Bataineh et al., 2023; Kaur et al., 2023).

Additionally, the world corporate governance index, financial reporting quality, and social progress inclusion as moderators reinforce the understanding of characteristics that impact sustainability disclosures particularly. For instance, the robustness of internal controls ensured by the high quality of financial reporting allows the audit committees to concentrate on enhancing sustainability disclosures (Dwekat et al., 2020). The findings show that a significant and positive influence on sustainability disclosures is linked with high financial reporting quality. At the same time, an insignificant effect is traced in the low quality of financial reporting. The firms already recognized for compliance in countries with high corporate governance, resilient regulations, and implementation certifying transparency make the audit committee role less significant. In thriving-regulated settings, the audit committee might have imperfect further influence (Aguilera & Cuervo-Cazurra, 2004; Brown et al., 2011). Conversely, the audit committee's effectiveness is hindered because of a lack of resources and corruption in countries with weedy regulations and implementation and low corporate governance, limiting the effect on sustainability disclosures (Chen et al., 2009; La Porta et al., 2000). The audit committee's influence on sustainability disclosures is reduced in both extremes. Social progress also plays a significant role. Consistent with the past findings that highpoint the societal pressure role in determining corporate behavior, the countries with robust regulations and implementations for CSR and high social progress intensify the audit committee influence on sustainability disclosures and efforts on CSR (Clarkson et al., 2008).

The audit committee considered one factor in promoting the quality sustainable disclosure revealed in the country classification analysis in the developed and emerging markets compared to frontier markets. In developing and developed economies, it contributes to higher societal expectations and solid regulatory frameworks, enhancing the audit committee's role in promoting the transparency and implementation of high ethical standards (La Porta et al., 2000). The audit committee's ability to impact the sustainability disclosures is restricted in markets with weak governance mechanisms. According to the study findings, it is essential to consider the context of the efficiency of corporate governance mechanisms. Lastly, non-ranked journals followed less rigorous standards and provided mixed results.

Collectively, these audit committee characteristics have significance in enhancing and improving the sustainability disclosures to meet the stakeholders' pressuring demand for sustainable practices. In previous literature, the results support that with more robust corporate governance frameworks, meeting stakeholders' expectations related to disclosures, and enhanced accountability, the audit committee's characteristics positively affect sustainability disclosures (Michelon & Parbonetti, 2012; Rao & Tilt, 2016).

5. Conclusion

The empirical nexus investigated between audit committee characteristics on sustainability disclosures considering global governance mechanisms in enhancing accountability and transparency. The base of the study is 93 peer-reviewed studies using meta-analysis, and results certify that audit committee characteristics precisely, financial expertise, meeting frequency, size, gender diversity, and independence positively and significantly enhance sustainability disclosures. Previous literature provides contradictory results regarding the influence of audit committee characteristics on sustainability disclosures. This study clarifies inconsistencies by examining the moderating role of the World Corporate Governance Index (WCGI), financial reporting quality, and social progress. In countries with robust governance systems and higher societal expectations for CSR, social progress and financial reporting quality significantly strengthen the association between sustainability disclosures and audit committee characteristics. The moderator's role is exciting here and contributes knowledge about audit committee characteristics and sustainability disclosures. First, the overall corporate governance framework is aligned with the reliability and accuracy of sustainability disclosures; firms with stronger financial reporting quality can implement these controls for credibility. In contrast, the World Corporate Governance Index (WCGI) role as moderator is weak. The broader governance environment in enhancing sustainability disclosures does not alter the audit committee's effectiveness. Lastly, the Social Progress Index (SPI) displayed significant moderation, indicating that the audit committee's role in enhancing ethical governance and improving transparency in high Social Progress Index countries has more societal expectations to promote corporate responsibility because societal pressures are significant in determining sustainability disclosures. Country-level governance frameworks provide interesting information in altering the efficiency of the audit committee in improving sustainability disclosures. First, the audit committee has more influence on sustainability disclosures in emerging markets. Secondly, in frontier markets, audit committees' impact is restricted due to weak governance frameworks. The results of this meta-analysis are consistent with the stakeholder, agency and institutional Theory. However, the study acknowledges the prominent role of internal governance mechanisms in promoting sustainability disclosures, particularly audit committees, as they challenge the Resource Dependence Theory. To achieve the goal of improved sustainability disclosure reporting, companies prioritize the attributes of audit committees such as financial expertise, frequent meetings, and independence. Industries with sustainability challenges should maintain a minimum number of committee meetings and ensure rigorous governance mechanisms to improve and promote sustainability disclosures. Long-term relationships with stakeholders and trust are essential to responsible corporate governance and sustainable practices.

5.1 Implications

5.1.1 Implications for Theory

The literature on corporate governance is extended with this study's contribution as financial reporting's pivotal role in considering sustainability disclosures helps to understand the audit committees. The audit committee characteristics, including expertise, independence, meeting frequency, and size, improve the quality of sustainability disclosures while reducing agency cost and extending agency theory (Fama & Jensen, 1983; Meckling & Jensen, 1976). Meanwhile, stakeholder theory has also been extended while this study explains the firm's obligations towards the environmental and societal stakeholders (Freeman, 2010; Michelon & Parbonetti, 2012; Rao & Tilt, 2016). Lastly, institutional theory is also further explained because this study has explored the role of external pressure in determining the behavior of corporations by including financial reporting quality and social progress as moderators (Clarkson et al., 2008; DiMaggio & Powell, 1983). However, the Resource Dependence Theory is challenged by these results, reducing the non-financial reporting context of the audit committee (Pfeffer & Salancik, 2015).

5.1.2 Implication for Practice

The findings provide essential insights on audit committee development for organizations to improve their sustainability disclosures. The audit committee characteristics are necessary for companies with high sustainability risks in the operating cycle, including agriculture, energy, and pharmaceuticals, to meet the stakeholders' expectations and enhance the reporting quality. Corporate regulators and managers must focus on the optimum size of audit committees to foster gender diversity, balance financial expertise, and longer tenure to enhance committees' capability to monitor associated sustainability risks while devising policies for audit committees. Regulators in developing markets should focus on financial expertise and audit committee independence because of weak governance frameworks in these countries. Regulatory policies must be followed to maintain a minimum number of annual audit committee meetings to ensure a more robust governance mechanism, especially in industries with higher sustainability disclosure challenges. Finally, stakeholders should force managers of firms to collaborate with Big4 audit companies for third-party audits to enhance the credibility of financial and non-financial reporting. The firms ensure financial performance in the long term, strengthen stakeholder trust and promote sustainability disclosures by considering the attributes of the audit committee and the incorporation of moderating effects of financial reporting quality and social progress.

5.2 Limitations of the Study

Despite the robustness of methodologies regarding meta-analysis, the study still depends on the results of past published articles. First, all factors relevant to the sustainability

disclosures may be captured because the study only focuses on secondary data. There is a limitation regarding the quality of different studies published and data availability on specific audit committee characteristics. Moreover, the study does not investigate other potential moderators', e.g., particular regulations, industry, and cultural differences. These limitations influence the generalizability of the findings, and future studies must use different methodologies and include nuanced data to investigate these research gaps.

5.3 Future Research Directions

This study provides comprehensive insights into the association between audit committee characteristics and sustainability disclosures and provides several future directions in new areas of sustainability disclosures and corporate governance. Future studies may investigate the audit committee oversight, national culture, and regulatory framework interaction to understand different contexts comprehensively. Future research can also examine the influence of outside pressures on the efficiency of audit committees to promote sustainability disclosures, such as global sustainability initiatives, media attention, and activist investors. The governance mechanism may be affected by these outside pressures that might not have committee characteristics alone as internal control. In the era of technology, future studies must consider the role of digital tools, including AI and blockchain, in monitoring function effectiveness and how technology changes the need to enhance. The longitudinal research may provide a deeper understanding of the audit committee's role and sustainable corporate strategies. This study's findings certify that economic fluctuations at the macro-level, not included in the micro-level studies, contribute significantly to the differences reported. Future research could include underrepresented geographical perspectives to enrich the study findings, considering the relationship between audit committees' attributes and sustainability disclosures.

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