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Does Sustainability Transparency Moderate the Relationship between Audit Committee Characteristics and Firm Performance? Evidence from Sub Sahara Africa.

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ABSTRACT

This study looks at how sustainability transparency affects the relationship among firm performance and audit committee features in Sub-Saharan Africa. The study, which is based on agency and stakeholder theories, examines whether ESG openness improves the efficacy of an audit committee as represented by its size, independence, financial knowledge, and frequency of meetings in promoting company success. We use OLS and random-effects ML regression models on a manually gathered panel dataset of 100 listed non-financial companies from 10 sub-Saharan African nations between 2016 and 2023. The efficacy of audit committees greatly enhances corporate performance, according to the findings. Market-based performance is positively impacted by sustainability transparency, although accounting-based metrics yield inconsistent findings. Crucially, sustainability transparency modifies the governance-performance relationship in a complex way: it increases the relationship when audit committees are independent and financially knowledgeable, but it decreases it when committees are highly active or assessed using a composite index. These results demonstrate that sustainability transparency does not always improve governance effectiveness; rather, its impact depends on certain institutional settings and governance traits. By including sustainability transparency into the governance-performance link in an understudied emerging market scenario, this study advances corporate governance efforts and provides useful information for regulators, boards, and investors in sub-Saharan Africa.

Keywords: Audit Committee Effectiveness; Corporate Sustainability Transparency; Firm Financial Performance; Sub-Saharan Africa; Corporate Governance.

1. Introduction

The separation of ownership and control inherent in the contemporary firm creates the foundational agency problem that corporate governance mechanisms seek to address (Morri et al., 2023). The audit committee was formed as a crucial governance tool for monitoring financial reporting and guaranteeing accountability, and one of these instruments' main purposes is to reduce conflicts of interest among management and shareholders (Cohen et al., 2023). But the recurring high-profile corporate scandals from Enron and WorldCom to more recent instances like the 1MDB debacle in Malaysia and Petrobras in Brazil highlight these governance frameworks' potential for failure (Arsh et al., 2025; Kgwete, 2024). These crises undermine stakeholder trust and expose serious flaws in institutional frameworks and enforcement, especially in emerging economies (Areneke et al., 2022). They are frequently caused by fraudulent reporting, lax monitoring, and auditing failures.

Amid regional and global corporate failures, Sub-Saharan Africa has become more dependent on audit committees as a safeguard against fraud. Stakeholders anticipate that these committees will provide strict monitoring, stop directors from abusing their authority, and protect the correctness of financial statements. However, despite the official existence of audit committees, the frequency of catastrophic financial misstatements in sub-Saharan African corporations raises serious concerns about their efficacy within the region's distinct corporate governance systems (Asiedu & Mensah, 2023). This situation calls for a more thorough examination of the particular traits that make audit committees useful in improving company performance.

At the same time, the corporate objective is evolving. Beyond the traditional agency focus on maximizing shareholder wealth (Friedman, 1970), current discourse encourages businesses to balance the interests of a wider variety of stakeholders, which is frequently operationalized through Environmental, Social, and Governance (ESG) commitments (GRI, 2021; Simic et al., 2024; Turzo et al., 2022). In an effort to match managerial actions with long-term sustainability goals, this change has resulted in the incorporation of ESG criteria into CEO compensation (Hart & Zingales, 2022). However, because ESG metrics are opaque and difficult to verify, academics warn that ESG-linked compensation can be used for "window-dressing," acting as a kind of managerial rent or reputational propaganda rather than a sincere commitment to substantive change (Bebchuk & Tallarita, 2022; Cohen et al., 2023; Focke, 2022).

An important research opportunity is presented by this duality. Although earlier research has looked at the relationships amongst audit committee features, firm performance, and ESG practices independently, the results are still conflicting, and the majority of the empirical data comes from developed economies (Hamad et al., 2024; Nasta et al., 2024). The business environment in Sub-Saharan Africa is significantly different from these contexts due to the prevalence of family, state, and pyramidal ownership structures (Farooq et al., 2024; Kgwete, 2024). How a company's transparency about its actual sustainability performance affects the efficacy of its internal governance is a significant open subject. In particular, can high-quality sustainability disclosure increase the favourable correlation between a strong audit committee and business performance by reducing the possibility of ESG being used as a flimsy shield?

Therefore, the motivation of this research is to scrutinize how sustainability transparency impacts the link among firm performance and audit committee features in Sub-Saharan Africa. It asserts that the degree of reliable, verifiable information the company reveals about its ESG activities determines how well important audit committee facets like independence, financial knowledge, and meeting frequency drive financial performance. Unobservable management opportunism may undermine the link amongst governance and performance in low-transparency environments. This study attempts to offer fresh perspectives on the circumstances in which audit committees carry out their stewardship function most successfully by incorporating the corporate governance and sustainability transparency literatures within the unique institutional context of sub-Saharan Africa

The merger of agency and stakeholder theories represents the base of this research. The fundamental justification for the audit committee's function in reducing owner-manager disputes and keeping an eye on shareholder wealth protection comes from agency theory (Karim et al., 2024). This fiduciary focus is broadened by stakeholder theory, which promotes managerial accountability to a larger group of stakeholders through sustainable practices and openness. At the centre of these theories is the moderating role of sustainability transparency, which assesses

whether thorough disclosure improves the efficacy of audit committee governance on firm results by decreasing opacity and confirming managerial commitment to stakeholder promises. The remaining structure is arranged as follows: Section 2: Literature Review and Hypotheses Development; Section 3: research design; Section 4: Empirical Findings, Section 5: Discussion, implications limitations, future research direction and conclusion. Section 6: References.

2. The Review of Literature and Hypotheses Formulation.

2.1. Theoretical underpinnings and Conceptual framework

Agency theory posits that separation of shareholders and investors (Principals/ownership) and executive/managers (agents/control) results in the information asymmetry and opportunistic managerial behavior, increasing agency costs (Jensen & Meckling, 1976). The Audit committee is designed to alleviate these costs through enhanced monitoring of fiscal reportage, internal controls, and external audit processes (García et al., 2023). In emerging markets such as SSA where analyst coverage, investor activism, and legal enforcement are limited the audit committee assumes heightened importance as an internal monitoring substitute (Kgwete, 2024). Stakeholder theory extends this framework by arguing that firms are accountable not only to shareholders but also to a wider set of stakeholders, comprising workers, communities, regulators, and the natural environment (Cohen et al., 2023; Freeman et al., 2010). ESG disclosure operationalizes stakeholder accountability by translating sustainability commitments into observable information. Sustainability transparency thus becomes a governance-enabling mechanism that can either reduce informational opacity or, if poorly substantiated, facilitate managerial impression management.

The integration of these theories suggests a contingent governance framework: audit committee effectiveness enhances performance by reducing agency costs, while sustainability transparency determines whether these governance efforts are perceived as credible and value-enhancing by stakeholders (Nasta et al., 2024)

2.2 Audit Committee Characteristics and Firm Performance

Audit Committee Size

The Size of Audit committees reflect the breadth of monitoring capacity and diversity of expertise available to the committee. Larger committees may enhance oversight by pooling diverse skills, increasing scrutiny of management, and distributing workload more effectively (Bawuah, 2024). Results from sub-Sahara Africa and other emerging economies show that the size of audit committees are often positively related with firm performance and reporting quality, particularly where regulatory enforcement is weak (Al-Jalahma, 2022; Karim & Roshid, 2025; Kgwete, 2024). Nevertheless, disproportionately large committees may experience issues with coordination, free-rider issues, and slower decision-making (Rey, 2022). In sub-Saharan Africa contexts characterized by limited director pools and overlapping directorships the effectiveness of committee size depends on whether additional members contribute genuine expertise or merely satisfy formal compliance requirements (Kgwete, 2024; Rey, 2022). The results from a study by Mbelwa & Munyangabi (2024) show that while audit committee size has no discernible effect on public sector audit committee effectiveness, audit committee independence, objectivity, and competence have a significant positive impact. Hence, we hypothesize that:

H1a: *The size of Audit committee is positively related with firm performance (ROA, ROE, and Tobin's Q).*

Audit Committee Financial and Accounting Proficiency

Financial and accounting proficiency is widely regarded as the most critical audit committees' attribute. Members with financial or accounting experiences enhance the committee's ability to interpret complex fiscal reports, challenge management judgments, and interact effectively with external auditors (Abdullah, 2024; Raimo et al., 2021; Sahu et al., 2025). Empirical studies in African and other developing markets consistently show that financial proficiency is linked to improved reportage quality and, in many cases, higher firm profitability and valuation.

In sustainability-intensive environments, financial expertise also enables audit committees to translate ESG risks and opportunities into financial implications, strengthening integrated oversight. This attribute is therefore expected to be particularly influential in conditioning the impact of sustainability transparency on firm performance (Kolev et al., 2019; Mwasambu et al., 2025; Rey, 2022). We hypothesize that:

H1b: *Audit committee financial expertise is positively related to firm performance (ROA, ROE, and Tobin's Q).*

Audit Committee Meeting Frequency

Meeting frequency proxies audit committee diligence and engagement. More frequent meetings suggest active oversight and responsiveness to emerging risks. Evidence from sub-Saharan Africa indicates that meeting frequency is often positively related to firm performance, reflecting the importance of continuous oversight in weak governance environments (Bawuah, 2024; Kgwete, 2024).

Nevertheless, high meeting frequency may also signal reactive governance responding to crises rather than preventing them. When combined with extensive ESG reporting requirements, excessive committee activity may create governance overload, diverting managerial attention and resources away from value-creating activities (Jizi et al., 2025; Karim et al., 2024; Nouraldeen, 2024). Based on the above, we hypothesize that:

H1c: *Audit committee meeting frequency is positively related to firm performance (ROA, ROE, and Tobin's Q).*

Audit Committee Independence

Independence: This is considered the most critical attribute. An independent non-executive director is presumed to provide objective judgment, free from management influence, thereby strengthening oversight integrity. Meta-analyses generally support a positive link amongst committee independence and monitoring quality (Alshdaifat et al., 2024; Kgwete, 2024).

2.3 Sustainability Transparency and Firm Performance

Sustainability transparency has been linked to enhanced stakeholder trust, reduced cost of capital, and improved market valuation. By disclosing ESG information, firms signal long-term orientation and commitment to responsible business practices. Market-based performance measures like Tobin's Q often respond more positively to ESG disclosure than short-term accounting metrics, reflecting investor expectations of future value creation (Alodat & Hao, 2024; Elamer & Boulhaga, 2024; Maji & Lohia, 2023; Malik & Kashiramka, 2024; Veeravel et al., 2024). In sub-Saharan Africa, however, ESG disclosure practices remain heterogeneous and largely voluntary (Bukari et al., 2024; Narula et al., 2024; Tumwebaze et al., 2022). Limited assurance, inconsistent standards, and weak verification mechanisms raise concerns about greenwashing. Consequently, sustainability transparency may produce mixed performance outcomes: it can enhance legitimacy and valuation, yet impose short-term costs and expose firms to stakeholder scrutiny without immediate operational gains (Simic et al., 2024). We then hypothesize that:

H2: Sustainability transparency is positively related to firm performance, with stronger effects for market-based performance than accounting-based performance.

2.4 Sustainability Transparency as a Moderator

The moderating role of sustainability transparency lies at the intersection of governance credibility and stakeholder perception (Morri et al., 2025). High-quality ESG disclosure can amplify the effectiveness of audit committee oversight by reducing information asymmetry and validating governance mechanisms. Independent and financially expert committees are better positioned to ensure that disclosed sustainability information is accurate, consistent, and strategically aligned (Elmghaamez et al., 2024; Farooq et al., 2024; Vu, 2025).

Contrariwise, in firms with highly active committees or strong formal governance structures, extensive sustainability disclosure may produce diminishing returns. Stakeholders may interpret excessive reporting as symbolic compliance or managerial opportunism, particularly in environments where verification is weak. This creates a nuanced, non-linear governance–transparency performance relationship that is especially relevant in sub-Saharan Africa (Handoyo & Anas, 2024; Lee et al., 2023; Sahu et al., 2025; Zahid et al., 2022). Based on the above, we then hypothesize that:

H3a: Sustainability transparency positively moderates the link between audit committee size and firm performance.

H3b: Sustainability transparency positively moderates the link between audit committee financial expertise and firm performance.

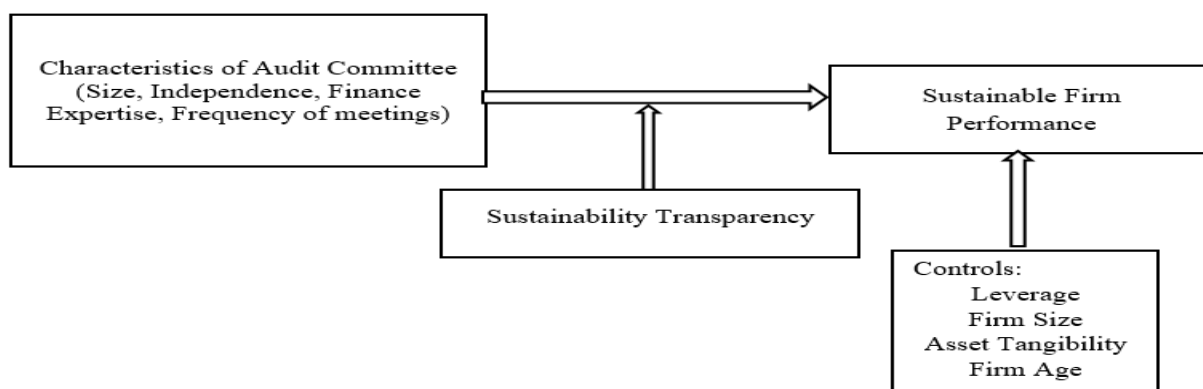
H3c: Sustainability transparency moderates the link between audit committee meeting frequency and firm performance, with the direction of the effect contingent on governance intensity.

Table 1: Hypotheses–Measurement Mapping Table

Hypothesis	Relationship Tested	Expected Sign	Empirical Proxy	Measurement Source
H1a	AC Size → FP	+	Number of AC members (binary ≥3)	Annual reports
H1b	AC Financial Expertise → FP	+	Presence of accounting/finance expert (binary)	Director profiles
H1c	AC Meeting Frequency → FP	+	≥2 meetings per year (binary)	Governance disclosures
H2	ESG Transparency → FP	+	ESG disclosure index (0–10)	Content analysis of reports
H3a	AC Size × ESG → FP	+	Interaction term	Panel regression
H3b	AC Expertise × ESG → FP	+	Interaction term	Panel regression
H3c	AC Meetings × ESG → FP	±	Interaction term	Panel regression

2. 5. Conceptual framework

This integrated framework demonstrates that sustainability transparency is not uniformly value-enhancing but operates as a contingent mechanism that conditions the effectiveness of audit committee characteristics. By situating the analysis within Sub-Saharan Africa, the study advances governance theory beyond developed markets and provides policy-relevant insights for regulators, boards, and investors operating in emerging institutional environments.

Figure 1: The conceptual framework

3. Research Design

3.1. Data

The study employs a manually collected panel dataset from 100 listed non-financial corporations across Sub-Saharan Africa for the period 2016–2023. Financial firms are excluded owing to their different regulatory governance frameworks (Alodat et al., 2023). Manual collection was necessitated by the limited coverage of SSA firms in major commercial databases (Areneke et al., 2022). Year-end reports represent the primary data source; although concerns exist regarding disclosure quality, they represent the most reliable and legally mandated source of corporate information in these jurisdictions (Areneke et al., 2022, Kgwete, 2024).

Their status as audited, foundational documents required by capital market authorities enhances their credibility for governance research (Huong Dau et al., 2024). A purposive and stratified random sampling approach ensured cross-industry representation. The sample of 10 firms per country was determined by the practical constraints of manual data extraction, consistent with similar research designs (Bawuah, 2024b).

3.2. Variables and their measurement

This study employs three primary variable categories: the dependent variable (Firm Performance), the independent variable (Effective Audit Committee characteristics), and the moderating variable (ESG Transparency). Standard firm-level control variables are also included. All data is manually sourced from annual reports.

3.2.1. Firm Performance

Firm performance is measured using a multi-dimensional approach that captures both accounting-based and market-based views (Asiedu & Mensah, 2023; Elmghaamez et al., 2024). Net revenue divided by total assets is known as return on assets, or ROA. This gauges how well assets are used to generate income. Net revenue divided by stockholders' equity is known as return on equity, or ROE. This measures profitability in relation to investment made by shareholders.

Tobin's Q: The market worth of the firm divided by the replacement cost of its assets (about equal to total assets). This is the market's assessment of the firm's intangible value and future prospects (Al-ahdal et al., 2020; Elmghaamez et al., 2024).

3.2.2. Independent Variable: Effective Audit Committee Characteristics

Audit committee characteristics is proxied by four key attributes, measured as direct metrics. *Independence*: The fraction of independent non-executive directors on the audit committee. If at

least two-thirds of the members of Audit committee are independent directors, we give a score of 1 and zero otherwise. *Financial Expertise*: The proportion of audit committee members possessing recognized accounting or financial certification (e.g., CPA, CFA). If at least one member of the Audit Committee has accounting expertise or skill in the field of finance, a score of 1 and zero otherwise. *Size*: The total number of members serving on the audit committee. A score of 1 if the size of the Audit Committee is at least three members, zero otherwise. *Activity*: The annual number of audit committee meetings held. A score of 1 if Audit Committee meets two or more times per year, otherwise zero. A composite *Effective Audit Committee Index* is also constructed by summing standardized scores of the above four attributes to provide a holistic measure (Al-ahdal et al., 2020; Bukari et al., 2024; Elmghamez et al., 2024; Kanapathippillai et al., 2024).

3.2.3. Corporate sustainability (ESG) Transparency

The term ESG originated in the 2006 UN PRI report (Ji et al., 2023). It includes environmental (climate change, resource use), social (labour practices, equality, corruption), and governance (board diversity, ethics) aspects (Singhanian & Saini, 2023). ESG ensures sustainable business practices that meet stakeholder expectations while preserving resources for future generations (Bausch et al., 2024; Kavadis & Thomsen, 2023). The study measures corporate sustainability (ESG) disclosure using a binary-coded index adapted from established frameworks, including the GRI Standards and LSEG methodology.

This index aggregates scores through three core pillars: Environmental, Social, and Governance. Each pillar comprises specific thematic categories (e.g., Emissions, Workforce, CSR Strategy), and a score of 1 for each category if the relevant information is disclosed in its public reports, and 0 otherwise. The total ESG disclosure score is the summation of the three pillar scores, resulting in a potential range from 0 to 10, providing a breadth-based assessment of disclosure completeness. Table 1 shows the material ESG issues firms ought to report (Bukari et al., 2024; GRI, 2021b). Table 1 shows ESG themes evaluated as proxies of Sustainability Transparency.

Table 2: Environmental, Social and Governance themes appraised as proxies of Sustainability Transparency

Sustainability (ESG) Transparency Theme	Dimension	Code	Description
Environmental Transparency	Energy efficiency	Env_T1	Evaluates how well the firm can optimize energy use in its facilities and activities.
	Carbon footprint	Env_T2	Emphasizes on the firm's efforts to reduce both its greenhouse gas emissions and its impact on climate change.
	Conservation of Biodiversity	Env_T3	Evaluates the company's efforts to improve and preserve biodiversity in its supply chain and operations.
	Ecologically friendly packaging	Env_T4	Assesses the application of environmentally friendly and sustainable packaging techniques and materials.
	Management of Waste	Env_T5	Evaluates how the business handles, minimizes, and recycles trash.
Social Transparency	Community Engagement	Soc_T1	Assesses how much the firm actively participates in and supports local communities.

	Human Rights and data privacy	Soc_T2	Evaluates the firm's dedication to protecting and respecting human rights in its supply chain and workforce.
	Labour practices	Soc_T3	Focuses on how employees are treated, including such like working conditions, safety, diversity, and fair labour practices.
	Responsible investment	Soc_T4	Evaluates the firm's investments in initiatives that have a beneficial social impact.
Governance Transparency	Anti-corruption practices	Gov_T1	Evaluates the firm's initiatives to stop and fight corruption in every facet of its business.
	Ethics and Transparency	Gov_T2	Evaluates the business's dedication to moral behaviour, open reporting, and CG
	Diversity and independence on the board	Gov_T3	Evaluates the independence and diversity of the board of directors
	Fairness of Executive compensation	Gov_T4	Evaluates how transparent and equitable executive compensation policies are.

Source: (Bukari et al., 2024; GRI, 2021; LSEG Data, 2024; Luo & Tang, 2023; VasIU, 2024).

3.3. Model specification

Primary Estimation Method:

The model is estimated using Ordinary Least Squares (OLS) regression with standard errors clustered at the firm level to account for within-firm correlation. Firm and year fixed effects are included to control for unobserved heterogeneity and time-variant shocks. OLS provides efficient and consistent estimates under the given panel structure and is widely used in corporate governance research for testing direct and moderating effects.

Robustness Tests:

To ensure the dependability of our results, we conduct robustness tests using Random Effects Maximum Likelihood (ML) regression. The random effects estimator accounts for unobserved time-invariant firm characteristics while allowing for variation across entities, providing an alternative estimation that complements the OLS results (Becker et al., 2023). Consistency between OLS and Random Effects ML models reinforces the validity of the reported relationships. The equations are derived as follows:

$$FP_{it} = \beta_0 + \beta_1 EAC_{it} + \beta_2 ESG_{it} + \beta_3 (EAC_{it} \times ESG_{it}) + \sum_{j=1}^4 \gamma_j controls_{jit} + \epsilon_{it}$$

where: FP_{it} represents Firm Performance for firm i in year t , measured alternately by ROA (return on assets), ROE (return on equity), and Tobin's Q. EAC_{it} is the Effective Audit Committee index score for firm i in year t . ESG_{it} is the Sustainability Transparency (ESG disclosure) score for firm i in year t . $EAC_{it} \times ESG_{it}$ is the interaction term testing the moderating effect. $controls_{jit}$ is a vector of four firm-level control variables for firm i in year t : Firm Size (log of total assets), leverage, asset tangibility and firm age. β_0 is the constant, $\beta_1, \beta_2, \beta_3$ are the coefficients for the main and interaction effects, γ_j are coefficients for the control variables, and ϵ_{it} is the error term. This equation tests Hypothesis 3 directly. The coefficient β_3 on the interaction term reveals whether sustainability transparency strengthens ($\beta_3 > 0$) or weakens ($\beta_3 < 0$) the link amongst audit committee efficacy and firm performance

4.0. Empirical Findings

4.1. Descriptive Statistics and Correlation Matrix

The sampled firms exhibit strong audit committee characteristics, according to descriptive statistics (Table 3): independence and financial knowledge are consistently present (mean = 1.00), and meeting frequency is high (mean = 0.834). The average composite Effective Audit Committee Index indicates strong formal governance systems, which is 3.824 out of 4. The average sustainability transparency (ESG) score is 7.194 out of 10, indicating moderate to high levels of disclosure. ROA (mean = 6.856%), ROE (mean = 8.407%), and Tobin's Q (mean = 3.056) are firm performance metrics that exhibit a fair amount of variation.

Stronger governance is linked to higher transparency, according to the Pearson correlation matrix (Table 4), which shows substantial positive relationships between audit committee features (size, independence, expertise, and meetings) and ESG disclosure scores. Interestingly, ESG transparency exhibits a feeble or adverse link with ROA and ROE but a positive correlation with Tobin's Q, indicating that market-based and accounting-based performance indicators may react differently to disclosure.

Table 2: Descriptive Statistics of Study Variables

Variable	Mean	SD	Min	25th Percentile	Median	75th Percentile	Max	N
Size	0.990	0.100	0	1	1	1	1	800
Independence	1.000	0.000	1	1	1	1	1	800
Finance Expert	1.000	0.000	1	1	1	1	1	800
Meeting Frequency	0.834	0.373	0	1	1	1	1	800
ENVD	2.141	0.929	1	1	3	3	3	800
S OCD	2.911	1.300	1	1	4	4	4	800
GOVD	2.141	0.929	1	1	3	3	3	800
EAC	3.824	0.407	2	4	4	4	4	800
SUST Transparency	7.194	3.112	3	3	10	10	10	800
ROA	6.856	3.504	1.299	3.872	6.389	9.539	14.878	800
ROE	8.407	3.970	1.267	5.430	7.877	11.661	15.927	800
Tobin's Q	3.056	0.614	1.930	2.808	2.986	3.198	7.986	800
Leverage_w	1.458	6.341	-32.234	0.378	0.954	1.938	35.435	800
Firm Size	15.247	3.146	8.026	13.278	15.300	17.596	22.102	800
Asset_Tangibility_w	3.335	26.898	0.0002	0.226	0.389	0.595	255.370	800
Firm_Age	40.250	23.781	5	20.5	34	59	105	800

Table 4. Pearson Correlation Matrix of Study Variables

Variable	Size	In de	FinE xp	Meet ing Frq	ENVD	SO CD	GOVD	AC E	ES G	RO A	RO E	TB's Q	Lev_ w	F_Siz e	As_Tan g_w	F_Ag e
Size	1			0.225**	0.124*	0.148**	0.124*	0.451**	0.136**	0.001	-0.021	0.021	0.001	-0.104**	0.008	-0.067*
Independence		1														
Fin Expertise			1													
Meeting Frq	0.225**			1	0.289*	0.347**	0.289*	0.971**	0.317**	0.082*	-0.014	0.091*	0.043	0.026	0.047	-0.009
ENVD	0.124*			0.289**	1	0.941**	1	0.295**	0.990**	0.041	-0.094**	0.069*	-0.051	-0.065*	0.099**	-0.052
S OCD	0.148**			0.347**	0.941**	1	0.941**	0.354**	0.980**	-0.008	-0.096**	0.086*	-0.036	-0.071*	0.090*	0.000

GOVD	0.1 24* *			0.289 **	1	0.9 41 **	1	0.2 95 **	0.9 90 **	0.0 41	- 0.0 94 **	0.06 9*	- 0.05 1	- 0.06 5*	0.099* *	- 0.05 2
EAC	0.4 51* *			0.971 **	0.295* *	0.3 54 **	0.295* *	1	0.3 24 **	0.0 75 *	- 0.0 18	0.08 8**	0.04 0	- 0.00 2	0.044	- 0.02 5
Sust Transpar ency	0.1 36* *			0.317 **	0.990* *	0.9 80 **	0.990* *	0.3 24 **	1	0.0 21	- 0.0 96 **	0.07 7*	- 0.04 5	- 0.06 8*	0.097* *	- 0.03 1
ROA	0.0 01			0.082 *	0.041	- 0.0 08	0.041	0.0 75 *	0.0 21	1	0.0 84 *	0.00 2	0.01 7	0.12 1**	-0.048	- 0.06 7*
ROE	- 0.0 21			- 0.014	- 0.094* *	0.0 96 **	0.094* *	- 0.0 18	- 0.0 96 **	0.0 84 *	1	- 0.10 8**	0.06 4*	0.08 1*	-0.050	0.06 5*
Tobin's Q	0.0 21			0.091 *	0.069* *	0.0 86 *	0.069* *	0.0 88 **	0.0 77 *	0.0 02	- 0.1 08 **	1	- 0.06 4*	- 0.11 5**	0.014	0.03 4
Leverage _w	0.0 01			0.043	-0.051	- 0.0 36	-0.051	0.0 40	- 0.0 45	0.0 17	0.0 64 *	- 0.06 4*	1	0.06 8*	-0.014	- 0.02 6
Firm_Size	- 0.1 04* *			0.026	- 0.065* *	- 0.0 71 *	- 0.065* *	- 0.0 02	- 0.0 68 *	0.1 21 **	0.0 81 *	- 0.11 5**	0.06 8*	1	- 0.235* *	- 0.02 3
Asset_Ta ngibility_ w	0.0 08			0.047	0.099* *	0.0 90 **	0.099* *	0.0 44	0.0 97 **	- 0.0 48	- 0.0 50	0.01 4	- 0.01 4	- 0.23 5**	1	- 0.02 8
Firm_Age	- 0.0 67*			- 0.009	-0.052	0.0 00	-0.052	- 0.0 25	- 0.0 31	- 0.0 67 *	0.0 65 *	0.03 4	- 0.02 6	- 0.02 3	-0.028	1

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

4.2. Regression Results and Hypothesis Testing

This section presents the results of a multivariate regression analysis that looked at the effect of audit committee attributes on firm performance, including Size, Independence, Financial/Accounting Expertise, and Meeting Frequency, as well as the moderating effect of sustainability transparency (ESG disclosure). ROA, ROE, and Tobin's Q serve as proxies for firm performance, encompassing both market-based and accounting-based aspects. The primary findings are Ordinary Least Squares (OLS) estimations with firm- and year-level controls, and robustness checks are provided by Random-Effects Maximum Likelihood (ML) estimations.

Audit Committee Size

The results in Table 3a show that *audit committee size* is positively and statistically significant across all performance measures. The coefficients for ROA ($\beta = 3.652$, $p < 0.01$), ROE ($\beta = 5.340$, $p < 0.01$), and Tobin's Q ($\beta = 2.482$, $p < 0.01$) indicate that firms with adequately sized audit committees exhibit superior accounting profitability and market valuation. These findings provide strong empirical support for **H1a**, suggesting that a minimum critical mass of audit committee members enhances monitoring capacity and governance effectiveness in the sampled Sub-Saharan African firms.

The interaction term between audit committee size and sustainability transparency is positive and significant for ROA ($\beta = 0.116$, $p < 0.05$), but insignificant for ROE and Tobin's Q. This implies

that sustainability transparency strengthens the size–performance relationship mainly through operational efficiency rather than through shareholder returns or market valuation.

Audit Committee Independence

Table 3b reports the results for **audit committee independence**. Independence is positively and significantly associated with ROA ($\beta = 5.324$, $p < 0.01$), ROE ($\beta = 7.648$, $p < 0.01$), and Tobin's Q ($\beta = 3.631$, $p < 0.01$). These results strongly support **H1b**, highlighting the importance of independent oversight in enhancing both internal performance and external firm valuation.

The moderating effect of ESG transparency is positive and statistically significant for ROA ($\beta = 0.172$, $p < 0.01$), while remaining insignificant for ROE and Tobin's Q. This suggests that sustainability transparency enhances the effectiveness of independent audit committees in improving asset utilization and operational outcomes.

Audit Committee Financial and Accounting Expertise

As reported in Table 3c, **financial and accounting expertise** within the audit committee exerts a positive and highly significant influence on all three-performance indicators. The estimated coefficients for ROA ($\beta = 5.324$, $p < 0.01$), ROE ($\beta = 7.648$, $p < 0.01$), and Tobin's Q ($\beta = 3.631$, $p < 0.01$) confirm **H1c**, emphasizing the critical role of technical competence in financial oversight and strategic decision-making.

The interaction between financial expertise and ESG transparency is positive and significant for ROA ($\beta = 0.172$, $p < 0.01$) and Tobin's Q ($\beta = 0.022$, $p < 0.05$), indicating that sustainability transparency reinforces the value of financial expertise by improving both operational performance and market perceptions.

Audit Committee Meeting Frequency

Table 3d presents the results for **audit committee meeting frequency**. Meeting frequency is positively and significantly related to ROA ($\beta = 2.648$, $p < 0.01$), ROE ($\beta = 3.306$, $p < 0.01$), and Tobin's Q ($\beta = 1.847$, $p < 0.01$), confirming that active audit committees contribute to improved firm performance.

However, the interaction term between meeting frequency and ESG transparency is **negative and statistically significant** across all performance measures (ROA: $\beta = -0.236$, $p < 0.05$; ROE: $\beta = -0.472$, $p < 0.01$; Tobin's Q: $\beta = -0.261$, $p < 0.01$). This indicates that sustainability transparency weakens the positive impact of frequent audit committee meetings on firm performance.

Composite Effective Audit Committee Index

Table 3e reports results using the **composite Effective Audit Committee (EAC) index**. The EAC index is positively and significantly associated with ROA ($\beta = 1.208$, $p < 0.01$), ROE ($\beta = 1.739$, $p < 0.01$), and Tobin's Q ($\beta = 0.856$, $p < 0.01$), confirming the overall importance of audit committee effectiveness.

Sustainability transparency exhibits a positive and significant direct effect on ROE and Tobin's Q but not on ROA. Notably, the interaction term (EAC \times ESG) is negative and significant for ROE ($\beta = -0.229$, $p < 0.01$) and Tobin's Q ($\beta = -0.111$, $p < 0.01$), suggesting diminishing or adverse marginal returns of sustainability transparency when audit committee effectiveness is already high.

Robustness Checks

The Random-Effects ML regression results (Tables 4a–4d) largely confirm the OLS findings. Audit committee size, independence, financial expertise, and meeting frequency remain positively associated with firm performance, while the moderating effects of ESG transparency retain their

direction and significance. This consistency across estimators supports the robustness of the empirical results.

Regressions

Table 3a: Regression Results for FP and Effectiveness of Audit Committee Characteristics of size, independence, Finance/Accounting Expertise, and Frequency of Meetings. Estimator: OLS

Variables	Models: 1, 2, and 3		
	<i>Model 1 (Size of Audit Committee With ROA)</i>	<i>Model 2 (Size of Audit Committee with ROE)</i>	<i>Model 3 (Size of Audit Committee with Tobin's Q)</i>
<i>Size of Audit Committee</i>	3.652*** (0.706)	5.340*** (0.881)	2.482*** (0.305)
<i>Environmental Transparency</i>	0.821 (0.550)	0.457 (0.671)	0.217 (0.166)
<i>Social Transparency</i>	-1.631*** (0.362)	-0.2512 (0.424)	0.097 (0.106)
<i>Governmental Transparency</i>	-	-	-
<i>Interaction Term</i>	0.116** (0.054)	-0.031 (0.065)	-0.016 (0.012)
<i>Leverage_w</i>	0.006 (0.018)	0.035 (0.027)	-0.005 (0.003)
<i>Firm size</i>	0.188*** (0.036)	0.188*** (0.044)	-0.004 (0.021)
<i>Asset tangibility_w</i>	-0.005 (0.005)	-0.001 (0.006)	0.001 (0.000)
<i>Firm age</i>	-0.003 (0.005)	0.017*** (0.006)	0.004* (0.002)
Model Fit (Models 1,2 and 3)			
Number of observations	800	800	800
R-squared	0.801	0.820	0.847
F-statistic	220.10***	243.74***	1757.05***

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

Table 3b: Regression Results for FP and Effectiveness of Audit Committee Characteristics of size, independence, Finance/Accounting Expertise, and Frequency of Meetings. Estimator: OLS

	Models 4, 5 and 6		
	<i>Model 4 (Audit Committee Independence with ROA)</i>	<i>Model 5 (Audit Committee Independence with ROE)</i>	<i>Model 6 (Audit Committee Independence with Tobin's Q)</i>
<i>Audit Committee Independence</i>	5.324*** (0.796)	7.648*** (0.869)	3.631*** (0.295)
<i>Environmental Transparency</i>	0.239 (0.526)	-0.372 (0.672)	-0.180 (0.142)
<i>Social Transparency</i>	-1.804*** (0.353)	-0.500 (0.423)	-0.021 (0.103)
<i>Interaction Term</i>	0.172*** (0.050)	0.049 (0.065)	0.022 (0.011)
<i>Leverage_w</i>	0.006 (0.018)	0.035 (0.027)	-0.005 (0.003)
<i>Firm size</i>	0.117*** (0.039)	0.089* (0.043)	-0.053** (0.023)
<i>Asset tangibility_w</i>	-0.005 (0.005)	-0.004 (0.006)	-0.000 (0.000)
<i>Firm age</i>	-0.007 (0.005)	0.011 (0.006)	0.000 (0.002)
Model Fit			

Number of observations	800	800	800
R-squared	0.804	0.824	0.855
F-statistic	224.49***	250.07***	2334.25***

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

Table 3c: Regression Results for FP and Effectiveness of Audit Committee Characteristics of size, independence, Finance/Accounting Expertise, and Frequency of Meetings. Estimator: OLS

Models 7, 8, and 9			
	<i>Model 7 (Finance Expertise with ROA)</i>	<i>Model 8 (Finance Expertise with ROE)</i>	<i>Model 9 (Finance Expertise with Tobin's Q)</i>
<i>Financial/Accounting Expertise</i>	5.324*** (0.796)	7.648*** (0.869)	3.631*** (0.294)
<i>Environmental Transparency</i>	0.239 (0.526)	-0.372 (0.672)	-0.180 (0.142)
<i>Social Transparency</i>	-1.804*** (0.353)	-0.496 (0.423)	-0.021 (0.103)
<i>Interaction term</i>	0.172*** (0.050)	0.049 (0.065)	0.022** (0.011)
<i>Leverage_w</i>	0.006 (0.018)	0.035 (0.027)	-0.005 (0.003)
<i>Firm size</i>	0.117*** (0.039)	0.089** (0.043)	-0.053** (0.023)
<i>Asset Tangibility_w</i>	-0.005 (0.005)	-0.004 (0.006)	-0.000 (0.000)
<i>Firm age</i>	-0.007 (0.005)	0.011 (0.006)	0.001 (0.002)
Model Fit (Models 1, 2 and 3)			
Number of observations	800	800	800
R-squared	0.8043	0.8240	0.8549
F-statistic	224.49***	250.07***	2334.25***

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

Table 3d: Regression Results for FP and Effectiveness of Audit Committee Characteristics of size, independence, Finance/Accounting Expertise, and Frequency of Meetings. Estimator: OLS

Models 10, 11 and 12			
	<i>Model 10 (Meeting Frequency with ROA)</i>	<i>Model 11 (Meeting Frequency with ROE)</i>	<i>Model 12 (Meeting Frequency with Tobin's Q)</i>
<i>Meeting Frequency</i>	2.648*** (0.572)	3.306*** (0.705)	1.847*** (0.137)
<i>Environmental Transparency</i>	3.877*** (0.841)	4.322*** (0.952)	2.344*** (0.218)
<i>Social Transparency</i>	-0.479 (0.442)	1.217** (0.513)	0.899*** (0.118)
<i>Interaction Term</i>	-0.236** (0.096)	-0.472*** (0.109)	-0.261*** (0.018)
<i>Leverage_w</i>	0.005 (0.018)	0.033 (0.028)	-0.007 (0.003)
<i>Firm size</i>	0.242*** (0.030)	0.283*** (0.035)	0.031* (0.016)
<i>Asset Tangibility_w</i>	-0.001 (0.005)	0.002 (0.006)	0.002*** (0.000)
<i>Firm age</i>	0.001 (0.005)	0.0233*** (0.006)	0.007*** (0.002)
Model Fit			
Number of observations	800	800	800
R-squared	0.7985	0.8140	0.8414

F-statistic		216.00***	232.69***	1038.78***
Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level				
Table 3e: Regression Results for FP and Effectiveness of Audit Committee Characteristics of size, independence, Finance/Accounting Expertise, and Frequency of Meetings. Estimator: OLS				
		<i>Model 13 (Effectiveness of Audit Committee with ROA)</i>	<i>Model 14 (Effectiveness of Audit Committee with ROE)</i>	<i>Model 15 (Effectiveness of Audit Committee with Tobin's Q)</i>
Effective Audit Committee		1.208*** (0.195)	1.739*** (0.217)	0.856*** (0.063)
Sustainability Transparency		0.154 (0.232)	0.765*** (0.266)	0.450*** (0.033)
Interaction Term		-0.040 (0.059)	-0.229*** (0.067)	-0.111*** (0.008)
Leverage_w		0.001 (0.018)	0.032 (0.027)	-0.006 (0.003)
Firm size		0.158*** (0.037)	0.136*** (0.041)	-0.036 (0.020)
Asset Tangibility_w		-0.002777 (0.005)	-0.002 (0.006)	0.000 (0.000)
Firm age		-0.008 (0.005)	0.014** (0.006)	0.003 (0.002)
Model Fit				
Number of Observations	800	800	800	800
R-Squared	0.7983	0.8218	0.8533	
F-Statistic	228.07***	263.28***	1879.99***	

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

Robustness Checks

Table 4a. Random-Effects ML Regression

Variable	ROA	ROE	Tobin's Q
Size of Audit Committee	4.499*** (1.054)	6.002*** (1.157)	2.812*** (0.229)
Environmental Transparency	0.808 (1.002)	0.589 (1.091)	0.277 (0.221)
Social Transparency	-1.558** (0.661)	-0.390 (0.720)	0.122 (0.145)
Interaction Term	0.108 (0.097)	-0.025 (0.106)	-0.026 (0.021)
Leverage_w	-0.006 (0.017)	0.040* (0.020)	-0.001 (0.003)
Firm_Size	0.147 (0.056)	0.145** (0.062)	-0.008 (0.012)
Asset_Tangibility_w	0.001 (0.007)	-0.004 (0.008)	-0.002 (0.001)
Firm_Age	-0.002 (0.009)	0.018* (0.010)	0.004* (0.002)
Model Fit			
Observations	800	800	800
Firm ID	100	100	100
σ_u (between-firm Standard Deviation)	1.975	2.079	0.466
σ_e (within-firm Standard Deviation)	2.830	3.380	0.485
Rho (intra-class correlation)	0.327	0.275	0.481
LR test of σ_u	155.46***	116.25***	284.41***

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

Table 4b. Random-Effects ML Regression

Variable	ROA	ROE	Tobin's Q
Independence of audit committee	5.928*** (1.198)	7.907*** (1.313)	3.499*** (0.221)
Environmental Transparency	0.133 (1.005)	-0.312 (1.082)	-0.125 (0.188)
Social Transparency	-1.756 (0.007)	-0.640 (0.703)	0.018 (0.122)
Interaction Term	0.173 (0.097)	0.061 (0.104)	0.011 (0.018)
Leverage_w	-0.006 (0.725)	0.039* (0.020)	-0.001 (0.003)
Firm_Size	0.081 (0.061)	0.055 (0.068)	-0.036*** (0.011)
Asset_Tangibility_w	-0.000 (0.007)	-0.006 (0.008)	-0.002 (0.001)
Firm_Age	-0.007 (0.009)	0.011 (0.010)	0.001 (0.002)
Model Fit			
Observations	800	800	800
Group ID	100	100	100
σ_u (between-firm SD)	1.924	1.994	0.372
σ_e (within-firm SD)	2.827	3.376	0.482
Rho (intra-class correlation)	0.317	0.259	0.373
LR test of σ_u	147.35***	105.66***	190.70***

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

Table 4c. Random-Effects ML Regression

Variable	ROA	ROE	Tobin's Q
Finance/Accounting Expertise/Experience	5.928*** (1.198)	7.907*** (1.313)	3.499*** (0.221)
Environmental Transparency	0.133 (1.005)	-0.312 (1.082)	-0.125 (0.188)
Social Transparency	-1.756** (0.652)	-0.640 (0.703)	0.018 (0.122)
Governance Transparency	omitted	omitted	omitted
Interaction Term	0.173 (0.097)	0.061 (0.104)	0.011 (0.018)
Leverage_w	-0.006 (0.017)	0.039* (0.020)	-0.001 (0.003)
Firm_Size	0.081 (0.061)	0.055 (0.068)	-0.036*** (0.011)
Asset_Tangibility_w	-0.000 (0.007)	-0.006 (0.008)	-0.002 (0.001)
Firm_Age	-0.007 (0.009)	0.011 (0.010)	0.001 (0.002)
Model Fit			
Observations	800	800	800
Group ID	100	100	100
σ_u (between-firm Standard Deviation)	1.924	1.994	0.372
σ_e (within-firm Standard Deviation)	2.827	3.376	0.482
Rho (intra-class correlation)	0.317	0.259	0.373
LR test of σ_u	147.35***	105.66***	190.70***

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

Table 4d. Random-Effects ML Regression

Variable	ROA	ROE	Tobin's Q
Meeting Frequency	3.051*** (0.937)	3.945*** (1.065)	1.875*** (0.208)
Environmental Transparency	4.625*** (1.426)	5.516*** (1.608)	2.783*** (0.340)
Social Transparency	-0.060 (0.771)	1.519 (0.863)	1.131*** (0.188)
Interaction Term	-0.330* (0.160)	-0.586*** (0.180)	Omitted
Leverage_w	-0.006 (0.017)	0.039* (0.020)	-0.313 (0.038)
Firm_Size	0.228*** (0.048)	0.257*** (0.054)	-0.000*** (0.003)
Asset_Tangibility_w	0.003 (0.007)	-0.001 (0.008)	0.036 (0.011)
Firm_Age	0.005 (0.009)	0.028*** (0.010)	-0.001*** (0.002)
Model Fit			
Observations	800	800	800
Group ID	100	100	100
σ_u (between-firm Standard Deviation)	2.009	2.0203	0.531
σ_e (within-firm Standard Deviation)	2.839	3.0388	0.497
Rho (intra-class correlation)	0.334	0.297	0.533
LR test of σ_u	160.90***	132.43***	327.950***

Note: ***significant at 1% level **significant at 5% level, and *significant at 10% level

5. Discussion

This study investigates whether sustainability transparency moderates the relationship between audit committee characteristics and firm performance in Sub-Saharan Africa. The findings reveal strong main effects of audit committee attributes and a nuanced, context-dependent moderating role of ESG disclosure.

5.1. Main Effects of Audit Committee Characteristics

The results provide *strong and consistent support* for H1a, H1b, and H1c, proving that audit committee size, independence, financial expertise, and meeting frequency are all positively related with firm performance. These results align with *agency theory*, which posits that effective monitoring mechanisms reduce information asymmetry and managerial opportunism. In the Sub-Saharan African context where external governance mechanisms such as analyst coverage, investor activism, and legal enforcement are relatively weak, the audit committee serves as a critical internal governance substitute.

The positive impact of *audit committee size* suggests that having at least three members enhances monitoring capacity by pooling diverse expertise and distributing oversight responsibilities. Similarly, the strong effects of *independence* confirm that objective, non-executive oversight is essential in environments characterized by concentrated ownership and potential principal–principal conflicts. The robust influence of *financial expertise* underscores the importance of technical competence in scrutinizing financial reports, engaging with external auditors, and translating complex sustainability risks into financial implications.

Finally, the positive association between *meeting frequency* and performance indicates that active engagement and diligence improve oversight outcomes. Together, these findings highlight

that audit committee effectiveness is multidimensional and that no single attribute alone is sufficient to ensure superior performance.

5.2. Direct Effects of Sustainability Transparency

The mixed results for H2 indicate that sustainability transparency is not uniformly value enhancing. ESG disclosure shows a positive and significant relationship with *market-based performance (Tobin's Q) and ROE*, but not with ROA. This suggests that investors interpret sustainability transparency as a signal of long-term value creation, risk management, and ethical commitment, which is incorporated into firm valuation.

However, the lack of a significant effect on ROA implies that sustainability disclosure does not immediately translate into operational efficiency. This may be due to the short-term costs of ESG initiatives, the lag between sustainability investments and financial returns, or concerns about symbolic disclosure and greenwashing in environments with weak assurance mechanisms. These findings are consistent with stakeholder theory, which emphasizes legitimacy and long-term orientation rather than short-term profitability.

5.3 Moderating Role of Sustainability Transparency

The most salient contribution of this study lies in the *contingent moderating role of ESG transparency (H3)*. The results show that sustainability transparency does not uniformly strengthen the governance–performance relationship; instead, its effect depends on the specific audit committee attribute.

Supported Moderation Hypotheses

Sustainability transparency *positively moderates* the relationship between firm performance and both *audit committee independence and financial expertise*, particularly for ROA. This supports H3b and partially supports H3a. These findings suggest that when audit committees are independent and technically competent, ESG disclosure enhances governance credibility by reducing information asymmetry and validating managerial accountability. In such cases, transparency complements internal monitoring and reinforces stakeholder confidence.

Unsupported and Negative Moderation Effects

In contrast, sustainability transparency *negatively moderates* the relationship between meeting frequency and firm performance, as well as between the composite EAC index and ROE/Tobin's Q. These findings do *not support H3c in a positive sense*, but rather indicate a negative or diminishing moderating effect.

Several plausible explanations emerge. First, excessive audit committee activity combined with extensive ESG reporting may lead to *governance overload*, where managerial attention and organizational resources are diverted from value-creating activities toward compliance and reporting. Second, stakeholders may interpret high levels of disclosure in already highly governed firms as symbolic or impression management, especially in contexts where ESG assurance is limited. This can result in skepticism and legitimacy discounting by investors.

Third, in Sub-Saharan Africa's institutional environment characterized by concentrated ownership and weak enforcement ESG transparency may be used strategically by controlling shareholders to gain external legitimacy without substantively improving internal practices. In such cases, additional transparency may weaken rather than strengthen the perceived effectiveness of governance mechanisms.

5.4 Theoretical and Contextual Implications

Overall, the findings bridge **agency theory and stakeholder theory** by showing that sustainability transparency can enhance governance effectiveness, but only under certain conditions. The results challenge the assumption that more transparency is always better and instead propose a **contingent governance–transparency framework**. The effectiveness of ESG disclosure depends on the quality of underlying governance structures and the institutional context in which firms operate.

In conclusion, the study demonstrates that in Sub-Saharan Africa, effective audit committees are a key driver of firm performance, while sustainability transparency plays a nuanced, conditional role. Independence and financial expertise amplify the benefits of transparency, whereas excessive activity and over-reporting may erode them. These insights provide important guidance for regulators, boards, and investors seeking to promote sustainable and effective corporate governance in emerging markets.

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