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Sustainability reporting and audit reliability: Comparative analysis between financial and non-financial sectors in Nigeria

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Abstract

This study examines the effect of sustainability reporting (SR), measured through environmental, social, and governance (ESG) disclosure, on audit reliability in Nigeria's financial and non-financial sectors and determine whether the impact differs for the 2 sectors. Audit reliability is proxied by audit effort (ADE) and audit report lag (ARL), capturing the timeliness and intensity of auditing. The study focuses on 24 listed firms 12 banks and 12 manufacturing companies chosen to ensure sectoral comparability and due to the limited number of listed banks with complete data. Using a dynamic panel model estimated through the generalized method of moments (GMM), the results show that SR disclosure significantly increases both ADE and ARL across sectors, with financial firms exhibiting higher audit effort in response to sustainability reporting, while non-financial firms show longer audit report lag, suggesting differences in audit verification intensity and internal control systems. Economically, these findings imply that SR enhances audit reliability, enhances corporate legitimacy and strengthens stakeholder confidence but may increase audit costs and time. The study contributes to the literature by providing sector-comparative evidence from a developing economy, highlighting the role of ESG disclosure in improving audit quality, corporate legitimacy, and investor trust in Nigeria.

Introduction

During the last ten years, there has been a growing question of confidence of audited corporate reports globally as a result of repeated audit failures, misstatements of financial reporting and poor monitoring systems, especially in the emerging markets with dynamic regulatory systems. Previous findings indicate that the poor quality of audits and governance systems weaken the credibility of audited financial reports and destroy trust among stakeholders (Knechel et al., 2013; DeFond & Zhang, 2014; Akhidime, 2019). Simultaneously, companies are under increasing pressure by regulators, shareholders, and society to increase disclosures of sustainability in the environmental, social, and governance (ESG) areas as a way of rebuilding transparency and responsibility (García-Sánchez et al., 2019; Del Giudice & Rigamonti, 2020). Nevertheless, recent researches record that ESG disclosure also exudes complexity of audit and audit check requirements, thus escalating audit effort and influencing audit timeliness (Song et al., 2023; Ling et al., 2024).

These observations reflect international evidence on the importance of studying the question of whether sustainability reporting (SR) increases audit reliability (AR) in such emerging economies like Nigeria where institutional enforcement and assurance practices are not evenly distributed. Although sustainability reporting is likely to increase the transparency, lowering the information asymmetry, and improving the audit process by increasing the non-financial information that can be verified, there is limited empirical evidence on whether SR can actually increase the reliability of the audit, especially in various industries. Moreover, the financial and non-

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financial sphere of Nigeria is regulated and governed with other rules which might impact the impact of SR on the audit results. Nevertheless, there is no study done in Nigeria that has systematically studied or compared the relevance of sustainability reporting on audit reliability in either of the sectors.

This deficiency in sectoral evidence is an important gap in research that this study aims to fill especially in emerging economies such as Nigeria where sustainability guarantees are mostly voluntary and loosely governed (Del Giudice & Rigamonti, 2020). In Nigeria, stakeholders are still unable to determine the credibility of corporate financial reports because cases of misstatements, audit deficiency, and governance failure are common and undermine the credibility of financial and SR (Adeyemi & Fagbemi, 2012; Salawu et al., 2017). At the same time, ESG disclosure has become a trend in the international community as one of the ways to increase transparency, accountability, and corporate long-term value (Hamdouni, 2025; Bani-Khaled et al., 2025). According to international research, the effect of ESG reporting on audit results is positive, and it is demonstrated that more positive ESG reporting decreases the risk of audit, increases the audit effort, and improves the audit efficiency (Del Giudice & Rigamonti, 2020; Zhang et al., 2023; Zhang & Guo, 2024; Rawat et al., 2025).

The connection that has been made between sustainability and audit findings has been discussed in the recent scholarly literature especially in the context of the ESG disclosure. As shown in studies, most of the world, including Del Giudice & Rigamonti, 2020), Rawat et al. (2025), Li et al. (2025) indicate that good quality ESG disclosure enhance better audit results in the forms of audit risk reduction and enhancement of sustainability assurance, corporate transparency and credibility. In the same line, Ling et al. (2024), Zhang and Guo (2024), Song et al. (2023), and Zhang et al. (2023) find that tighter ESG performance leads to higher audit fees and less audit latency, which means that the ESG disclosure has an impact on the audit effort and audit efficiency. All these findings of the international studies are indicative that the information on ESG carries significant implication on the audit process. In Nigeria, sustainability disclosure practices or audit quality have been studied primarily on their own in the previous research. Adebunmi and Ajibolade (2022) and Usman (2024) evaluated the extent and the factors of sustainability reporting in the Nigerian listed companies, whereas Adeyemi and Fagbemi (2012), Nwanyanwu (2017), Ikpor et al. (2024), and Kurawa and Shuaibu (2022) examined the impact of audit quality and governance mechanisms on financial reporting credibility. These studies may be considered a valuable contribution to the research on ESG disclosure and auditing practices in Nigeria; however, they do not go further and provide empirical evidence that can be used to connect ESG disclosure with the credibility of audit results. However, with the increasing levels of ESG (sustainability) disclosure and the increment in regulatory focus in Nigeria, it is not evident whether these disclosures have any impact on the integrity of audits, especially in a developing economy where sustainability assurance is more of a voluntary and inconsistently applied process.

The content of the literature in Nigeria (Nweze et al., 2024; Ikpor et al., 2024; Kurawa & Shuaibu, 2022; Usman, 2024) considered sustainability disclosure and audit quality separately as independent variables, not as the results of the other. Also, these studies assumed that firms are a homogenous group, even though regulatory oversight, structure of governance and disclosure motivation differ greatly between financial and non-financial sectors. Consequently, there is no evidence in the literature on the issue of whether ESG disclosure effect on audit reliability is contingent on the sector. The problem that remains open restricts the academic knowledge and policy-making, as controllers and stakeholders are not able to determine whether SR has consistent positive impact on audit credibility in all industries. The current work fills this gap as it empirically investigates the ESG-audit reliability correlation and compares its effect on the financial and non-financial listed companies in Nigeria hence offering some evidence that is sensitive to the industry that is not available in the current body of literature.

This research objectives aims at evaluating the effect of ESG disclosure on audit reliability of listed companies in Nigeria, and to compare the effect of ESG on audit reliability between the financial sector and the non-financial sector. The current study contributes new information to the literature on sustainability and auditing in a number of important ways. To begin with, the current study contrasts SR and audit reliability, whereas earlier studies focused on audit quality defined by audit opinion or audit size. Second, the paper uses a sector-comparative research design, setting a distinction between financial and non-financial companies, providing new evidence on the role of regulatory intensity, governance structure, and disclosure incentives differences in determining the ESG audit reliability relationship, a problem that has not been adequately addressed in the literature. Third, the study contributes context-specific information to the challenge the implicit assumption underlying the earlier literature, most of which was grounded on developed markets, that sustainability reporting and assurance do not always positively influence audit outcome. In general, the results lead to novel empirical, sector-sensitive evidence to educate academic discussions, regulating policy, and audit practice on the provisions in which ESG disclosure enhances the credibility of audited corporate reporting.

The research is applicable to regulators and standard setters aiming to enhance SR and audit assurance frameworks, audit practitioners taking into consideration ESG matters in audit procedures, managers of corporations involved in the disclosure decision making process, and investors who depend on audited information of high quality. The study contributes to the academic debate, the policy of regulation, and the practice of audit by timely evidence, informed by studying a developing economy with heterogeneous regulatory environments and provides information on how ESG disclosure can contribute to the credibility of corporate reporting.

Literature Review and Hypotheses Development

Theoretical framework

According to legitimacy theory, organizations attempt to integrate their activities and disclosures in line with societal norms and expectations to ensure that they have a social license to operate (Suchman, 1995; Deegan, 2002). Sustainability disclosure (ESG reporting) is an instrument used by firms to indicate that their operations are socially and environmentally responsible, which supports the legitimacy and credibility of stakeholders (Gray et al., 2010; Christensen et al., 2021). ESG reporting will decrease the information asymmetry through evidence of the governance practices, environmental compliance, and social responsibility to the auditors to help assess the risks and increase the confidence of the corporate reporting (Del Giudice & Rigamonti, 2020; García-Sánchez et al., 2019).

Empirical evidence also suggests that ESG assurance by the annual report auditor enhances audit quality based on integrated procedures (Li et al., 2025), and that audit quality is a moderator of the impact of ESG disclosure on firm performance, such as valuation and earnings management (Vaihekoski & Yahya, 2025; Alharasis et al., 2025). In this respect, sustainability disclosure can be discussed as a legitimacy mechanism, which informs about compliance with the societal expectations about transparency, governance, and environmental responsibility and the reliability of the credibility of such disclosure should be checked by external verification and audit reliability (Michelon et al., 2015).

The credibility of ESG disclosure is operationalized through audit reliability, which is represented by audit effort and audit report lag through the legitimacy theory (Del Giudice & Rigamonti, 2020). Companies that disclose their ESGs at a higher quality need more audit effort, both in the complexity of non-financial reporting and its need to verify the information, in the form of higher audit fees and more intensive audits (Ling et al., 2024; Song et al., 2023). On the other hand, clear and regular ESG reporting will reduce the audit report lag because auditors can evaluate risk factors and internal controls more effectively (Zhang & Guo, 2024; Alsheikh & Alsheikh, 2026). In cases where disclosure is symbolic or only superficial, the audit work and report lag can be extended because of extra verification required to deal with uncertainty. To this effect, legitimacy theory clarifies that companies report on ESG and remit such reports to trusted auditors as one approach to mitigation of legitimacy gaps, stakeholder trust, as well as credible non-financial and financial reporting.

Conceptual review

Sustainability reporting (SR)

Sustainability reporting (SR), which includes environmental, social, and governance (ESG) reporting is a key focus in improving corporate transparency and improving the quality of the information that may be used by the consumers of financial statements. SR enhances both information asymmetry and evidence available to auditors on the non-financial risks, which improves their risk assessment and increases the confidence of the stakeholders to the corporate reporting (Hummel & Schlick, 2016; Reverte, 2016; Michelon et al., 2015). This expanded connection is justified by the empirical evidence of high impact studies: Li et al. (2025) results indicate that annual audit and ESG assurance by audit firms positively influence integrated processes, quality of audit and risk assessment; Vaihekoski and Yahya (2025) results reveal that audit quality reinforces the beneficial relationship between ESG performance and firm valuation; and Alharasis et al. (2025) results show that the relationship between earnings management and ESG reporting is modulated by audit quality in the banking sector. These results support the theoretical predictions of agency and legitimacy theories that more lucrative and open SR signals will entangle managerial actions to the interest of the stakeholders, which will raise the guaranteed capability of auditors to create reliable audit opinions (Deegan, 2002; Jensen & Meckling, 1976).

In the light of the audit outcomes, SR is directly correlated with the aspect of audit reliability, especially audit effort and audit report lag (ARL). Chinese studies can be used to support the relevance of evidence: both Ling et al. (2024) and Song et al. (2023) conclude that the higher the ESG rating of the firm, the higher audit fees, indicating that the auditors perform more work in order to prove the sustainability related information, which is quite consistent with the idea that ESG puts an extra burden and additional procedures onto audit engagements. Simultaneously, the introduction of open and uniform ESG reporting may improve the efficient audit planning and execution, which can reduce the lag in audit reports since auditors will be better informed on the risk factors and internal controls (Zhang & Guo, 2024; Alsheikh & Alsheikh, 2026). Nevertheless, in cases of symbolic sustainability disclosure, as opposed to substantive disclosure, the auditors might experience increased uncertainty and complexity in the process of conducting audit and this is likely to compromise the audit reliability and defer reporting. This collection of international evidence identifies the duality between sustainability disclosure in influencing audit effort and timing, and directly leads the hypotheses to be tested in this study in the following manner:

H1: There is no significant effect of Sustainability reporting on audit reliability.

H2: There are no differences in the effect of sustainability reporting on audit reliability in the financial and non-financial firms in Nigeria.

Corporate governance is a major determinant of the quality of SR in that it offers incentives and checks and balances on substantive disclosure of ESG. Board independence, size, expertise, and active audit and sustainability committees are examples of characteristics of effective governance, which increase the credibility and reliability of reported information (Oladejo, 2025; Erin et al., 2022; Michelon et al., 2015). Independent assurance enhances more confidence by the stakeholders, but in the case of governance weakness, assurance can still undermine the quality of disclosures. Nigeria has sectoral disparities that also affect the ESG reporting and audit reliability. Non-financial firms are not as regulated as financial institutions, which are required to report ESG information on transparency and sustainability (CBN, 2012; SEC, 2014), and are also less prone to reporting, which in fact is often done voluntarily due to reputational reasons (Noah et al., 2021; Emenyi & Okpokpo, 2023). These discrepancies influence the capacity of the auditors to evaluate risks related to ESG, which affects the audit effort, timeliness, and reliability (Del Giudice & Rigamonti, 2020; Afrăsinei et al., 2024). The comparative study offers evidence of context-specific importance on governance, disclosure quality, and regulatory intensity, which in combination with one another determine audit results in Nigeria, as a gap in the research where past studies have primarily ignored the interaction between ESG disclosure and audit reliability in an emerging market economy.

Conceptual framework

This research is anchored on legitimacy theory, which posits that SR is a process by which companies attempt to foster social acceptance of themselves by being accountable and transparent. ESG disclosures are proxies of SR and indicators of responsible corporate conduct to regulators. The result variable, audit reliability, is performed by audit effort and audit timeliness based on the credibility and rigor of the audit process. Increased ESG disclosure expands the scope of information of the auditor, minimizes information asymmetry, and increases the level of verification and, therefore, affect audit reliability. Control variables are firm size and sales growth to explain the organizational characteristics. The model creates a direct ESG-audit reliability connection, which offers a legitimacy-based basis of comparing financial and non-financial companies.

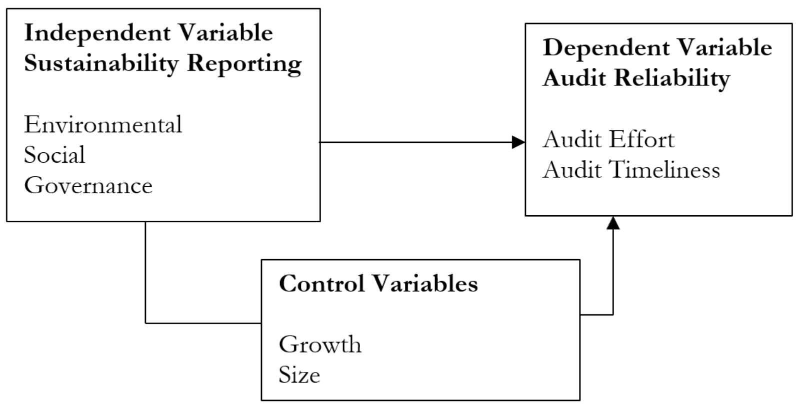

Figure 1. Conceptual Framework

Empirical review

Alsheikh and Alsheikh (2026) have conducted a study to establish the association between the intensity of SR and lag in audit report among Saudi non- financial firms. Environmental, social, governance and economic reporting aspects were used to quantify the concept of SR. The annual filings were retrieved to obtain data based on the 140 non-financial firms in Saudi Arabia. The hypothesis was checked through regression analysis and the result which it displays indicates that there is a substantial negative connection between the amount of SR as well as audit report lag meaning that disclosed sustainability information augments the timeliness of financial reporting.

Yip (2025) explored the link between the ESG disclosure and audit charges based on 323 firm-years of 49 Malaysian listed companies (20122020). The panel regression outcome reveals a strong positive relationship, which reveals that ESG reporting increases audit risk and complexity. This is reinforced by institutional ownership implying that advanced investor monitoring results in the more intensive auditing. The research arrives at a mixed solution to the mixed results of the past by showing that institutional ownership is a critical moderator.

Vaihekoski and Yahya (2025) analyze the variations of the quality of external audit on the connection of ESG performance–firm valuation with Nordic publicly listed firms. The fixed-effect panel regressions indicate that the higher the ESG rating is, the larger the value of a firm in case it is audited by a Big Four firm and, as a result, such a high quality of audit increases the plausibility of ESG ratings and the investor trust in ESG-based firm valuation.

Ling et al. (2024) discuss the impact of ESG rating differences on the audit fees based on A-share companies that traded in Shanghai and Shenzhen (2015-2022). Findings indicate that ESG rating discrepancy is a major factor in increasing an audit fee because of the increase in information asymmetry, operational risk and cost of debt. This is moderated by external factors including internationalisation and low-carbon efforts. The results, which are resistant to substitutes and endogeneity tests, point to the necessity of standardised ESG assessment of companies and policymakers.

Li et al. (2025) discuss the influence of an accounting firm's provision of yearly audit with ESG report certification on audit quality. The research outcome indicate that the quality of the audit is improved through knowledge spillovers and reputational capitals in the dual provision, which leads to the increased allocation of audit resources without reducing the independence. Their impact on firms is greater on the ones having a weak internal control, non- A shares and a low level of analyst coverage. Moreover, a dual assurance adds to the audit fee and adds to higher firm value, which is the advantages of integrated ESG and financial audit.

Using the concept of corporate ESG performance, Zhang and Guo (2024) tested the hypothesis related to whether it was possible to increase the effectiveness of audit of A-share firms in China spanning 2015 to 2022. Regression modeling demonstrates that ESG achievement resulted in a significant reduction in audit delay. The study further determines that the substantial influence of corporate ESG performance on audit efficiency are larger in firms that have superior ESGs, most so, non-state owned firms that have reduced institutional ownership and Big 4 audited companies.

Shaheen and Khan (2024) look at corporate sustainability audits (CSAs) and how they contribute to the increase in transparency and accountability within financial reporting. The research demonstrates that good CSAs lessen the risk of greenwashing, fraud, and regulatory non-compliance and increase stakeholder trust, corporate image and financial responsibility. The best practices are the utilization of modern auditing tools, facilitation of cross-functional communication, and the need to adhere with the global standards of sustainability, including GRI and SASB.

The relationship between ESG data disclosure and audit fees was studied by Zhang et al. (2023) on Chinese non-financial A-share public businesses between 2011 and 2020. According to the results, about 1/3 of chosen enterprises publish ESG data, and the publicly available ratings of the reported companies differ greatly. The empirical analysis also indicates that companies that report sustainability measures usually face more audit expenses. Moreover, an increase in the disclosure value of any of the categories of ESG leads to increased audit fees. Besides, the research concludes that the relationship between ESG disclosure and audit fee is mediated by operational risk.

Onwubiko et al. (2025) has considered association between sustainability indicators and audit views of oil and gas companies that have experienced listing in Nigeria over a 16-year time frame between 2006 and 2021. The findings display a negative, though insignificant, statistical association between ESG refiling and audit opinion and negative and significant association between economic sustainability and audit opinion with sampled corporations.

Research Methods

The study's initial population consists of 38 listed manufacturing enterprises and 14 listed deposit money banks (DMBs) in the Nigerian Exchange Group (NGX) as of December 31, 2024. Out of the 14 listed DMBs, two were excluded due to incomplete data throughout the study period, leaving 12 with complete data. Because the study was comparative in nature, an equal sample size of enterprises (manufacturing sector) was selected to avoid sample imbalance. In accordance with this, 12 manufacturing firms with complete data were purposively selected from the 38. The final sample thus covers 24 firms (12 DMBs and 12 manufacturing enterprises) from 2015 to 2024, which brings 240 firm-years of data to be utilized in the empirical analysis.

The dependent variable was audit reliability, which was assessed by audit effort, audit report lag, and the independent variable was SR, which was represented by a structured index of quality and comprehensiveness of ESG. Control variables were firm size and growth. The adequacy and reliability of the data were guaranteed by cross-verifying the reported ESG information with independent disclosures where possible and by including only those firms that have full data sets. Since there is a possibility of endogeneity and simultaneity between ESG disclosure and audit reliability, the generalized method of moments (GMM) estimation technique was used to correct the lack of unobserved heterogeneity, autocorrelation, and the possibility of reverse causality. Validation of the dataset before regression analysis was carried out through descriptive statistics, correlation analysis and sectoral comparisons. The possible bias, such as selection bias and voluntary characteristic of ESG reporting, was alleviated with the help of verified and publicly accessible reports and balance of the sample between the sectors.

Model specification

To estimate the connection between the ESG activities and audit reliability in both listed financial and non-financial companies in Nigeria, the proposed study modeled the following equations as analysis frameworks:

$$ADE_{it} = \alpha ADE_{it-1} + \alpha_1 ENV_{it} + \alpha_2 SOC_{it} + \alpha_3 GOV_{it} + \alpha_4 GRT_{it} + \alpha_5 FS_{it} + \omega_i + \varepsilon_{it} \quad (1)$$
$$ARL_{it} = \alpha ARL_{it-1} + \alpha_1 ENV_{it} + \alpha_2 SOC_{it} + \alpha_3 GOV_{it} + \alpha_4 GRT_{it} + \alpha_5 FS_{it} + \omega_i + \varepsilon_{it} \quad (2)$$

Where the terms abbreviated have the meaning:
α_0 = Constant term;
α_1 = Coefficient of the explanatory variables;
Subscript i = Firms (cross-section dimensions) ranging from 1 to 24;
Subscript t = Years (time-series dimensions) ranging from 2015 to 2024;
ω_i = Fixed-effect error term;
ε = iid disturbance term and $\varepsilon \sim N(0, \sigma^2\varepsilon$

Table 1. Variables Measurement

Variables	Measurement	Empirical Sources
Audit Effort	Natural log of audit fee	Yip (2025); Chen et al. (2023)
Audit Report Lag	Audit report date – fiscal year end date	Alsheikh & Alsheikh (2025)
Growth	Ratio of the increase in current period sales to previous period sales	Chen et al. (2023)
Firm Size	Logarithm of total asset	Vaihekoski & Yahya (2025)

Source: Researcher's compilation, 2025

Table 2. ESG Categories

Pillars	Categories	Indicators in scoring	Percentage (%)
Environment issues (ENV)	Resource use efficiency, emission and waste reduction, environmental innovation	61	34
Social issues (SOC)	Workforce, human right, community, product responsibility	63	35.5
Governance issues (GOV)	Management and oversight, shareholders right, CSR strategies	54	30.5
Total		178	100

Source: Asset 4 Thomson Reuters Data Score, 2019

Results and Discussion

Descriptive statistics of the study. This part shows the findings of the descriptive analysis of the variables being used in this study. The descriptives are classified into two groups which includes non-financial and financial firms.

Table 3. Descriptive Statistics

	Non-Financial Firms						Financial Firms			
	Obs	Mean	Max.	Min.	Std. Dev.		Mean	Max.	Min.	Std Dev
ADE	120	3.932	7.878	2.010	1.644	ADE	5.477	7.070	4.810	0.367
ARL	120	90.53	252.0	83.00	44.689	ARL	83.067	181.0	53.00	47.959
ENV	120	0.222	0.778	0.012	0.198	ENV	0.277	0.875	0.000	0.252
SOC	120	0.584	1.000	0.033	0.348	SOC	0.545	0.800	0.200	0.128
GOV	120	0.465	0.945	0.066	0.679	GOV	0.572	0.833	0.208	0.143
GRT	120	0.142	4.24	0.998	0.654	GRT	12.267	67.180	-65.94	19.356
FS	120	7.17	9.032	5.626	0.683	FS	8.165	8.730	7.400	0.333

Source: Researcher's computation, 2025

Descriptive statistics

Table 3 indicates the average amount of audit effort of non-financial companies as 3.932 with a minimum of 2.010 and a maximum of 7.878. In case of financial firms, the average audit work is 5.477 with a minimum of 4.810 and maximum of 7.070. This shows that auditors devote more efforts in financial firms compared to non-financial firms, probably because financial instruments, transactions, and the regulatory policies require increased scrutiny to ensure accuracy and compliance or financial firms have increased risk levels attributable to their involvement in financial transactions. The average lag of non-financial firm audit report is 90 days with range of an 83 days and 252 days. Comparatively, the audit report lag in financial companies is 83 days, with a minimum of 53 days and a maximum of 181 days. These results indicate that the audit report lag of financial firms is lower than those of non-financial firms, which would mean that financial firms report their financial information in a more efficient and timely manner. This can be explained by the fact that the regulations are more stringent and require financial companies to focus on the timely reporting on the sake of preserving transparency and compliance. Sustainability measures include environmental reporting, social reporting and governance reporting.

The mean values of environmental, social and governance reporting in non-financial firms are around 22% 58% 47% respectively. The mean of financial firms is 27%, 55%, and 57%. These findings indicate that, financial firms declare better percentages of environmental and governance measures as compared to non-financial firms. Precisely, the average rate of environmental reporting by financial firms is 5% more, which means that, in the financial sector, more emphasis is put on environmental sustainability. Moreover, the governance reporting mean of financial firms is 10% greater with an indication that they have better practices of governance transparency and accountability. Social metrics have a larger mean in non-financial companies (58% as opposed to 55%), which can be explained by the fact that the regulatory demands or expectations of stakeholders may vary.

Table 4. Correlation Matrix

Non-Financial Firms							
	ADE	ARL	ENV	SOC	GOV	GRT	FS
ADE	1.000						
ARL	-0.021	1.000					
ENV	0.073	-0.067	1.000				
SOC	0.148	0.030	-0.151	1.000			
GOV	0.021	-0.041	-0.337	0.587	1.000		
GRT	0.166	-0.019	0.047	0.051	0.047	1.000	
FS	-0.055	-0.050	-0.115	0.337	0.202	0.022	1.000
Financial Firms							
	ADE	ARL	ENV	SOC	GOV	GRT	FS
ADE	1.000						
ARL	-0.145	1.000					
ENV	0.235	-0.013	1.000				
SOC	0.076	0.128	0.075	1.000			
GOV	0.355	0.138	0.257	0.190	1.000		
GRT	-0.195	0.027	-0.139	-0.105	-0.045	1.000	
FS	0.086	-0.110	0.208	0.092	0.367	-0.086	1.000

Source: Researcher's computation, 2025

Correlation matrix

Correlation matrix Table 4 shows the degree of relationship between sustainability reporting and audit reliability in the sampled firms with the audit reliability being made by the audit effort (ADE) and the audit report lag (ARL). The correlation coefficients between the dependent, independent, or control variables capture the relationship indicating the strength and direction of relationships between the variables: the strength is strong, weak, or moderate. The larger the coefficient, the stronger the associations and the lower the coefficients, the weaker the associations. In non-financial companies, the relationships between ADE and ESG elements are not strong, yet the coefficients are positive and equal 0.073, 0.148, and 0.021 on the metrics of environment, social and governance, respectively.

Growth has a fair and positive correlation with ADE (0.166), and firm size is the one that shows a very weak negative correlation (-0.055). Environmental and governance measures have weak negative relationships with ARL, at -0.067 and -0.041, respectively, and governance weakly positively relates with ARL (0.030). The weak and negative relationships between ARL and growth (-0.019) and firm size (-0.050) exist. The independent and control variables have moderate relationships that are also less than the 0.80 value. The inter-variable relationships in financial companies show that there is a moderate relationship between financial companies, with the strongest level of 0.257 being the relationship between governance and environmental measures. The low correlation between the explanatory variables of Table 03 indicates that multicollinearity will not be an issue in this study.

Diagnostic tests

Table 5. Variance Inflation Factors

Non-Financial Firms				Financial Firms			
	Coefficient	Uncentered	Centered		Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF	Variable	Variance	VIF	VIF
C	1254.2	124.86	NA	C	0.1856	661.41	NA
ENV	294.03	2.5836	1.1427	ENV	0.0049	2.4564	1.1053
SOC	138.15	6.3574	1.6613	SOC	0.0180	20.098	1.0482
GOV	37.001	9.5920	1.6908	GOV	0.0170	21.070	1.2355
RGRT	23.744	1.0547	1.0074	GRT	7.80E-	1.4510	1.0327
FS	24.539	126.72	1.1338	FS	0.0030	715.03	1.1787

Source: Researcher's computation, 2025

Table 6. Serial Correlation and Heteroskedasticity

	Test	F-Stat	P-value	Remarks
Non-Financial Firms	Serial Correlation	2.6698	0.0263	Presence of serial correlation
Model 1 (ADE)	Heteroskedasticity	4.3400	0.0501	Presence of heteroskedasticity
Model 2 ARL	Serial Correlation	3.5295	0.0171	Presence of serial correlation
	Heteroskedasticity	0.4365	0.8062	Absence of heteroskedasticity
Financial Firms	Serial Correlation	5.4004	0.0542	Presence of serial correlation
Model 1 (ADE)	Heteroskedasticity	0.2766	0.9076	Absence of heteroskedasticity
Model 2 ARL	Serial Correlation	5.2579	0.0377	Presence of serial correlation
	Heteroskedasticity	2.6117	0.0157	Presence of heteroskedasticity

Source: Researcher's computation, 2025

To ensure that the achieved findings do not contravene the hypothesis of classical linear regression, the study conducted diagnostic tests on multicollinearity and stationarity and then presented the results of the tests in Table 5. The diagnostics included a test of multicollinearity with variance inflation factors (VIF). The VIF analysis showed no multicollinearity effect between the variables; the highest values of VIF were 1.6908 and 1.2355 of NFF and FF, respectively, which is significantly smaller than the traditional value of 10.

Table 6 shows the outcomes of the further diagnostic tests, which were conducted in respect of the study objectives, including serial correlation and heteroscedasticity. The null hypothesis of no first-order serial correlation is not rejected at the five-per-cent level as shown by an estimated Breusch-Pagan p-value of less than 0.05. However, on the other hand, the Breusch-Godfrey test shows the heteroscedasticity issue, which results in the null hypothesis of homoscedasticity being rejected at the 5 per cent level of significance. The study used generalized method of moments to come up with the estimates due to endogeneity evidence.

Table 7. Sustainability and Audit Effort

Non-Financial Firms				Financial Firms			
Variable	Coef.	Std. error	t-Stat.	Variable	Coef.	Std. error	t-Stat.
ADE(-1)	0.226	0.035	6.403***	ADE(-1)	0.289	0.043	6.680***
ENV	0.669	0.340	1.968**	ENV	0.200	0.069	2.898**
SOC	0.199	0.095	2.097	SOC	0.162	0.022	7.363**
GOV	-0.131	0.286	-0.457	GOV	-0.226	0.214	-1.056
GRT	-0.178	0.025	-7.248	GRT	-0.023	0.010	-2.323**
FS	-1.530	0.293	-5.218	FS	0.737	0.112	6.580***
Sangan Test	13.306			Sangan Test	7.1377		
J-stat P-value	0.5025			J-stat P-value	0.3082		
AR (2) P-value	0.8716			AR (2) P-value	0.2668		
Wald Test x2	18.594			Wald Test x2	22.522		
P-value	0.0000			P-value	0.0000		
Instrument rank	12			Instrument rank	12		

Source: Researcher's computation, 2025

Difference generalized methods of moments sustainability and audit effort

This paper looks into the impact of SR on audit reliability (AR), proxied by audit effort (ADE) in both non-financial (NFF) and financial firms (FF) in Nigeria based on the difference GMM methodology. This approach is used to deal with the possible endogeneity, bias, and inconsistency of panel regression with regressors that are related to the error term. The diagnostic tests showed heteroscedasticity and first-order serial correlation. Table 7 indicates that NFF and FF have J-statistic 13.306 ($p = 0.5025$) and 7.1377 ($p = 0.3082$), respectively; this indicates the null hypothesis of non-identifying restrictions is not rejected, which validates the dynamic panel specification. The coefficients of lagged audit effort are 0.226 (NFF) and 0.2289 (FF), the two are positive and significant at the 1% level, indicating moderate persistence, which is important in dynamic GMM. Arellano-Bond tests of second order serial correlation AR(2) have p-values of 0.8716 (NFF) and 0.2668 (FF), indicating that there are no second order serial correlation problems. The relationships between sustainability and control variables and the determinants of audit reliability are also proved by Wald tests (NFF = 18.559; FF = 22.522; $p < 0.05$).

The findings directly cover the hypotheses of the study. Hypothesis 1 was that there is no substantial impact of SR disclosure on audit effort in both companies whereas Hypothesis 2 held that the impact of SR on audit effort is not different between the two industries. Both null hypotheses are highly refuted by the empirical evidence. As it is revealed in Table 7, environmental disclosure (ENV) has a positive and substantial effect on audit effort in non-financial firms ($t = 1.968$; $p < 0.05$), whereas environmental and social disclosures (ENV: $t = 2.898$; SOC: $t < 0.05$) have a significant impact on audit effort in the financial firms. In particular, one unit increase in ENV disclosure increases audit effort by 49% in non-financial firms and by 20% in financial firms, and SOC disclosure increases audit effort by 16% in financial firms.

These results show that ESG involvement expands the audit platform and information background which demands a larger verification, risk assessment and substantive testing by the auditors and eventually, generates elevated audit fees. The ESG auditing work is industry sensitive: auditors working in less-regulated sectors with environmental exposure have to work more thoroughly to discover if both financial and sustainability reports are legitimate. Also, the control variables indicate anticipated effects of the firm growth being negatively related and firm size being positively related to audit effort in financial firms, as it is due to the complexity and scale of operations in the determination of audit resource allocation. These outcomes have an economic impact as they highlight that ESG disclosure is effective in increasing audit reliability and creating a difference in audit costs among industries, which supports the importance of sustainability engagement in the formation of auditor behavior and credibility in reporting.

Table 8. Sustainability and Audit Timeliness.

Non-Financial Firms				Financial Firms			
Variable	Coef.	Std. error	t-Stat.	Variable	Coef.	Std. error	t-Stat.
ARL(-1)	0.102	0.024	4.322***	ARL(-1)	-0.075	0.010	-7.681***
ENV	9.558	2.954	3.236***	ENV	6.739	2.063	3.266**
SOC	8.714	4.161	2.094**	SOC	7.995	1.639	4.877**
GOV	9.785	9.378	1.043	GOV	-17.900	30.570	-0.569
GRT	-0.301	0.568	-0.529	GRT	0.153	0.049	3.113**
FS	16.018	16.337	0.980	FS	35.608	36.477	0.976
Sangan Test	13.161			Sangan Test	5.6451		
J-stat P-value	0.5138			J-stat P-value	0.4640		
AR (2) P-value	0.4817			AR (2) P-value	0.8714		
Wald Test x2	22.522			Wald Test x2	48.529		
P-value	0.0000			P-value	0.0000		
Instrument rank	12			Instrument rank	12		

Source: Researcher's computation, 2025

Sustainability and audit timeliness

The first hypothesis was that SR does not have any material effect on audit timeliness, as disclosed through audit report lag (ARL) of firms, while the second one was that there is no difference in the influence of SR on audit timeliness across NFF and FF sectors. Table 8 reveals that ARL increases with NFF and FF when the firms report more and high-quality sustainability information, which reveals that better SR has a positive effect on the days between the auditor report and the fiscal year-end. In particular, ENV ($t = 3.236$, $p < 0.05$) and SOC ($t = 4.877$, $p < 0.05$) had substantial impact in NFF and ENV ($t = 3.266$, $p < 0.05$) SOC ($t = 2.094$, $p < 0.05$) FF respectively, revealing that auditors spend more time on verifying financial and non-financial information. The non-acceptance of the two hypotheses demonstrates that SR has a strong influence on the timeliness of audits and that its impact varies depending on the sector. These findings imply that, economically, greater sustainability disclosure enhances audit reliability but results in an increase in length of audit procedures, especially in companies where internal controls are weak. The findings correspond to Ling et al. (2024) and Zhang et al. (2024) but not to Alsheikh and Alsheikh (2025), Zhang and Guo (2024), and Onwubiko et al. (2025), making a difference between sectoral and contextual ESG and audit relationships.

Discussion of findings

This paper has investigated the effect of sustainability reporting on audit reliability and whether the effect is different between financial and non-financial firms in Nigeria. The overall results show that SR plays a significant role in the audit reliability (measured by audit effort, ADE, and audit report lag, ARL). In particular, environmental disclosure has a positive and significant effect on audit effort in the two sectors, suggesting that further broadening of environmental reporting raises the audit verification workload, risk evaluation processes, and intensity of assurance, environmental and social disclosures extend the lag in audit reports. Economically, the implications of such findings are that ESG disclosure would internalise the costs of monitoring and assurance of corporate reporting into the audit process, increasing the credibility and reliability of corporate reporting, but at the cost of increasing audit fees and delayed reporting.

The findings are well substantiated by Song et al., (2023), Ling et al., (2024), Li et al. (2025) and Meiying and Pervaiz (2021) who highlight that substantive reporting on ESG enhances audit quality by providing greater integration between financial and non-financial assurance yet that ESG-intensive companies face greater audit pressure and extended audit time owing to their complexity and perceived riskiness. This finding is refuted by the studies by Gidage and Bhide (2025), the arguments put forward by Onwubiko et al. (2025) that ESG impacted the audit fees negatively. These effects were statistically strong in all the models with high significance and model fit, the diagnostic tests revealed the model is valid, there is no second-order serial correlation and the instruments are relevant, and therefore provided confidence in the reported relationships with reliable and consistent relationships. Economically, the implications of the results suggest that higher ESG reporting internalises monitoring and assurance costs on the audit process, increasing the corporate reporting, credibility, and investor confidence without lowering the audit fees and increasing the reporting timeframes.

In comparison, the sectoral analysis demonstrates that the financial firms require more audit effort than the non-financial firms. This implies that financial institutions use auditors on a more aggressive basis in reaction to a larger range of ESG reports than non-financial companies in reaction to the extra regulatory supervision, more complicated stakeholder anticipations, and the higher systemic risk of the financial sector. Similarly, the effect of both environmental and social disclosures on audit report lag is observed to be longer in each sector and the nature of this effect varies, suggesting that auditors devote dissimilar time to address sector-specific risks to ESG.

These findings suggest that the economic costs and benefits of ESG disclosure to audit reliability are sector-dependent: financial institutions face an increased audit effort and possibly an increased cost of audit assurance as the ESG disclosures they present are more heavily scrutinized and therefore increase the credibility and investor trust in a sector that is both important to the stability of financial systems. Yip (2025) supports these findings by discovering that in regulated industries having a complex risk population, audit effort increases with the ESG disclosures. According to Msomi et al. (2025), companies in high governance and ESG profiles have reported differentiated audit results in an industry-based sectoral analysis. Li et al. (2022) affirmed that sustainability reporting in the metrics and company-specific levels format offer incremental information content. The result contradicts the report by Alsheikh and Alsheikh, (2026) and Onwubiko et al. (2025) who reported negative association between ESG and audit timeliness. This paper builds on the existing literature by offering industry comparative evidence on the part of a developing economy, where sustainability disclosure is mostly voluntarily based, and the nature of the impacts of sustainability disclosure on audit reliability are context-specific and sector-dependent. In holistic terms, the paper highlights that future researchers should investigate mechanisms like quality of ESG assurance, intensity of regulations, and governance systems that influence how sustainability reporting will be transformed into plausible audit results especially in emerging markets with varying structures of industries.

Conclusion and Implications

This paper concludes that the ESG disclosure, especially environmental and social aspects had a substantive and non-symbolic impact on audit reliability in Nigeria, by its increased audit effort and prolonged audit report lag, and the effect of this was found to vary significantly in the financial sector versus non-financial sector. The results affirm that sustainability reporting is firmly rooted in the audit procedure, which depicts increased levels of verification, risk evaluation and assurance requirements notably in the more controlled financial industry. Policy wise, these findings suggest that regulators and other standard setters like the NGX, CBN and SEC need to consolidate ESG disclosure and assurance policies to have uniformity, comparability, and credibility among industries. Increased audit fees and longer audit periods should also be seen by firms as a necessary trade-off between greater transparency and investor trust, and increased audit fees and longer auditing leads times should be expected of auditors to efficiently address the increasing number of audit projects of a sustainability nature. In general, the article highlights the importance of sector-sensitive ESG and audit policies that are more balanced in transparency, reliability, and timeliness in reporting in emerging markets.

Recommendations were as follows based on the result of the findings:

1. As environmental and social disclosures are major contributors to higher audit work and delayed reporting, companies ought to enhance the quality and inclusiveness of ESG information in their internal reporting procedures to decrease audit load and assurance expenses. This should be backed by better and standardized reporting and assurance guidelines on ESG by regulators.
2. Since the ESG-audit reliability impacts have been stronger in the financial sector, regulators ought to implement sector-specific ESG and audit assurance guidance that reinforces

compliance in the financial institutions and gradually intensifies the ESG disclosure mandate requirement in the non-financial firms in order to enhance audit reliability without exerting unnecessary compliance costs.

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