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Green Investment, Environmental, Social and Governance Disclosures, and Corporate Social Responsibility: The Case of Nigerian Companies

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ABSTRACT

Existing research provides little evidence that investments with an environmental focus promote better corporate social responsibility (CSR) practices or are simply symbolic actions in weak institutional environments. Hence, this study investigated the effect of green investment and ESG disclosures on the CSR performance of listed companies in Nigeria. The research was grounded in stakeholder and institutional theories to explain the relationship between environmentally driven investments and corporate social outcomes. Secondary data was collected from annual reports of selected listed companies for ten years and analysed using the Feasible Generalised Least Squares (FGLS) and Driscoll-Kraay Standard Error (DKSE) estimation techniques. The findings revealed that green investment has a positive and significant impact on CSR practices ($Z = 4.849$, $P < 0.01$). This implies that companies with higher green investment practices have more participation in environmental protection, community development, and responsible governance. The results also suggested that supporting factors such as green capital expenditure, ESG initiatives, green technological innovation, and carbon emission reduction efforts have an influence on the success of green investment. The study found that green investment improves CSR performance; however, its effect may be reduced to a legitimacy tool where institutional structures are weak. The research indicates that policymakers should tighten sustainability regulations and foster transparent ESG reporting. At the same time, companies should connect green investment to long-term environmental and social strategies to achieve meaningful CSR outcomes.

Keywords: Climate Change, Corporate Social Responsibility, Green Investment, Environmental Social Governance, Listed Companies
JEL Classifications: G32, M14, Q56, G38

1. INTRODUCTION

The growing relevance of CSR is closely linked to the increasing awareness of the environmental and social consequences of industrial activities. In many countries, stakeholders including investors, regulators, customers, host communities, and civil society organizations now demand greater accountability from firms regarding their environmental impacts and contributions to sustainable development. However, despite the increasing emphasis on sustainability, many firms in developing economies continue to face substantial challenges in integrating environmental sustainability into their core business operations. In Nigeria, weak institutional frameworks, inadequate enforcement of environmental regulations, and limited sustainability governance mechanisms often constrain the effective implementation of responsible business practices (KPMG, 2023; Adejumo et al., 2025; Ololade et al., 2025a).

Evidence from Nigeria suggests that CSR initiatives are frequently driven by regulatory requirements, stakeholder pressure, and legitimacy concerns rather than genuine commitments to sustainability (Ololade et al., 2025b). As a

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result, many organizations engage in symbolic CSR activities that create positive public perceptions but have limited impact on environmental sustainability. This challenge is particularly evident in environmentally sensitive sectors such as oil and gas, manufacturing, industrial goods, and construction, where issues such as environmental pollution, gas flaring, carbon emissions, poor waste management practices, and inadequate environmental disclosures remain widespread. These persistent environmental concerns have generated increased calls for stricter sustainability regulations, improved environmental disclosure requirements, and stronger corporate accountability mechanisms.

The recent adoption of sustainable finance and green investment is a move to curtail environmental challenges occasioned by the footprints of companies whose operations impact the environment negatively (Musa, 2024; Elaigwu, 2024; Adeku et al., 2026). Hence, research efforts have been concentrated in the developed countries to examine the effect of green investment on financial performance (Indriastuti and Chariri, 2021; Zhang and Berhe, 2022; Cherkasova and Nenuzhenko, 2022), with little research effort in Nigeria as an emerging economy. Also, recent studies in Nigeria, for instance, Appah and Tebepah (2025) examined the relationship between green investment and corporate performance without incorporating the extent to which green investment impacts corporate social responsibility. Hence, this study disaggregated corporate social responsibility and examine the influence of green investment and Environmental, Social and Governance performance on corporate social responsibility of listed manufacturing companies in Nigeria.

2. LITERATURE REVIEW AND HYPOTHESES

Green investment refers to the allocation of financial resources to projects, technologies, and business activities that promote environmental sustainability while generating economic value. Such investments are commonly directed toward renewable energy, energy-efficient technologies, pollution control systems, waste management initiatives, carbon reduction programmes, and environmentally friendly production processes. Green investment has become an important mechanism through which firms respond to increasing environmental concerns and stakeholder demands for sustainable business practices. Huang and Lei (2021) describe green investment as environmentally responsible investment aimed at improving environmental quality and supporting long-term sustainable development. Similarly, Chen and Ma (2021) argued that green investment enhances corporate reputation, competitiveness, and long-term firm value by improving environmental performance and stakeholder confidence.

The growing importance of green investment is closely linked to the global sustainability agenda and the transition toward low-carbon economies. Firms are increasingly expected to commit resources to environmental initiatives that reduce ecological footprints and promote sustainable production. However, the adoption of green investment varies considerably across countries and industries due to differences in institutional quality, environmental regulations, access to sustainable finance, technological capabilities, and governance structures. In emerging economies such as Nigeria, weak environmental enforcement mechanisms, limited green financing opportunities, and inconsistent sustainability reporting practices continue to constrain firms' willingness to undertake substantial green investments (Adeku et al., 2026).

Recent studies emphasize that green investment alone may not be sufficient to achieve sustainability objectives. Supporting initiatives such as green innovation, ESG practices, green capital expenditure, and carbon emission reduction strategies are necessary for translating financial commitments into measurable environmental outcomes. According to Gul et al. (2025), organizations that combine green investment with innovation and sustainability-oriented operational practices achieve stronger environmental performance and long-term resilience.

Environmental, Social and Governance (ESG) disclosure refers to the communication of information relating to a firm's environmental performance, social responsibility activities, and governance practices. ESG disclosure has become an important component of corporate transparency because it enables stakeholders to evaluate how organizations manage sustainability-related risks and opportunities. The environmental dimension focuses on issues such as carbon emissions, energy consumption, pollution control, biodiversity protection, and climate-related risks. The social dimension encompasses employee welfare, diversity, human rights, community engagement, and customer relations, while governance addresses board effectiveness, accountability, transparency, executive compensation, and ethical conduct.

The increasing significance of ESG disclosure has been reinforced by the introduction of global sustainability reporting standards. The International Sustainability Standards Board (ISSB) introduced IFRS S1 and IFRS S2 in 2024 to establish a globally consistent framework for sustainability reporting. These standards require organizations to disclose sustainability-related risks and opportunities that may influence enterprise value and investment decisions (IFRS Foundation, 2024). ESG disclosure therefore serves as an important mechanism through which firms communicate their sustainability commitments and demonstrate accountability to stakeholders.

Recent evidence suggests that firms with stronger ESG disclosure practices enjoy improved stakeholder trust, enhanced reputation, and better access to capital. Nursida et al. (2025) observed that stakeholder engagement significantly improves sustainability performance through greater transparency and disclosure quality. Likewise, Nur et al. (2025) reported that organizations with comprehensive ESG disclosure are better positioned to manage sustainability risks and strengthen stakeholder relationships.

Corporate Social Responsibility (CSR) represents the commitment of organizations to conduct business ethically while contributing positively to society and the environment. Modern CSR extends beyond philanthropic activities to include environmental stewardship, stakeholder engagement, employee welfare, ethical governance, and sustainable business practices. Consequently,

green investment and ESG disclosure have emerged as important mechanisms for enhancing CSR performance.

Green investment contributes to CSR by providing financial support for environmentally sustainable initiatives. Investments in renewable energy, cleaner technologies, pollution control systems, and carbon reduction programmes demonstrate an organization's commitment to environmental responsibility and sustainable development. ESG disclosure complements these investments by providing transparent information regarding sustainability activities and outcomes. Together, green investment and ESG disclosure strengthen organizational accountability and improve stakeholder confidence.

According to Indriastuti and Chariri (2021), green investment and CSR investment jointly enhance sustainable corporate performance. Similarly, Zhang and Berhe (2022) found that CSR mediates the relationship between green investment and business performance. More recently, Appah and Tebepah (2025) reported that CSR positively strengthens the impact of green investment on sustainable business performance among Nigerian firms. These findings suggest that organizations that combine green investment with transparent ESG disclosure are more likely to achieve stronger CSR outcomes.

Despite growing evidence, the applicability of these findings to Nigeria remains uncertain due to weak environmental governance, inconsistent sustainability reporting practices, and limited green financing opportunities. Most existing studies have focused on developed economies or countries with more advanced ESG systems, leaving an important gap regarding how green investment and ESG disclosure influence CSR among listed Nigerian firms operating in environmentally sensitive sectors.

Stakeholder theory suggests that firms respond to stakeholder expectations by adopting environmentally and socially responsible practices that enhance organizational legitimacy and long-term sustainability (Freeman, 1984). Green investment represents a strategic response to stakeholder demands for environmental responsibility, while ESG disclosure enhances transparency and accountability regarding sustainability performance. Through these mechanisms, organizations can strengthen CSR outcomes and improve stakeholder relationships.

Previous studies on Environmental, Social, and Governance (ESG) practices in Nigeria have produced inconsistent findings regarding their influence on corporate performance. Ezejiofor and Ufot (2025) found that environmental and governance disclosures reduced firm value, whereas social disclosure improved it among listed consumer goods firms. Similarly, Terkuma and Aga (2024) reported that governance disclosure negatively influenced market value, while environmental disclosure had a positive effect and social disclosure remained insignificant. In contrast, Olaoye et al. (2025) concluded that stronger environmental disclosure and higher ESG performance significantly enhanced the market performance of multinational firms. Likewise, Oladutire (2025) found that environmental disclosure was positively related to financial performance, although the relationship was insignificant, while social disclosure exerted a negative effect. These contrasting findings suggest that the relationship between ESG practices and corporate performance remains inconclusive, largely because studies differ in industry coverage, measurement of performance, and analytical methods.

Beyond examining performance outcomes, some researchers have focused on the institutional environment surrounding ESG reporting. Soetan et al. (2024) showed that ESG reporting in Nigeria is still largely voluntary and supported by fragmented regulatory frameworks, while Nnadi and Yahaya (2024) identified governance structures and firm characteristics as important drivers of ESG adoption. Although these studies enrich the ESG literature, they pay little attention to the role of green investment and corporate social responsibility (CSR) in strengthening sustainability outcomes. Most existing studies treat ESG disclosure, green investment, and CSR as separate concepts rather than examining their combined influence on corporate performance. In addition, the heavy reliance on secondary data, single-sector samples, and isolated performance indicators limits the generalisability of existing evidence. This creates an important gap for the present study, which integrates green investment, ESG, and corporate social responsibility within a unified framework to provide a more comprehensive understanding of how these sustainability practices jointly influence corporate performance in Nigeria.

Empirical evidence generally supports a positive relationship between green investment and CSR performance. Indriastuti and Chariri (2021) found that green investment significantly improves sustainable performance through enhanced CSR activities. Likewise, Appah and Tebepah (2025) observed that green investment contributes positively to CSR engagement among firms operating in sustainability-sensitive sectors. Based on these findings, the following hypothesis is proposed:

- H_1: Green investment has a significant positive effect on corporate social responsibility among listed Nigerian firms
- H_2: ESG disclosure has a significant positive effect on corporate social responsibility among listed Nigerian firms
- H_3: Research and development on green innovation has a significant positive effect on corporate social responsibility among listed Nigerian firms
- H_4: Carbon emission reduction investment has a significant positive effect on corporate social responsibility among listed Nigerian firms
- H_5: Green investment and ESG disclosure jointly have a significant positive effect on corporate social responsibility among listed Nigerian firms.

3. METHODS

This study investigates the effect of green investment and ESG on Corporate Social Responsibility (CSR) among listed companies in Nigeria using a quantitative research approach. Data were obtained through content analysis of annual reports from 35 purposively selected firms out of 60 companies listed on the Nigerian Exchange Group (NGX) as of December 2024. The selected firms were drawn from environmentally sensitive sectors, including construction and real estate, healthcare, consumer goods, natural

resources, industrial goods, and oil and gas. Using descriptive and ex post facto research designs, the study analysed panel data from 2015 to 2024 to examine trends and relationships between green investment and CSR performance.

This study created disclosure checklists for Green Investment and Corporate Social Responsibility (CSR) disclosure, using the most cited sustainability reporting frameworks: Global Reporting Initiative (GRI 302, 305 and 306), SASB Standards, the MSCI ESG methodology and the GHG Protocol (Scopes 1-3). There were 6 disclosure items for each construct. Green Investment included in its scope Green Capital Expenditure, ESG Scores, Green Research and Development, Carbon Emission Reduction Investments, and CSR, which was related to Environmental Performance and Social Impact Metrics.

A content analysis method was adopted to analyse the sustainability information found on firms' annual and sustainability reports. The disclosures were evaluated on a three-point scale: 2 for disclosure that was comprehensive with quantitative evidence; 1 for partial disclosure or disclosure that was qualitative; and 0 for no disclosure. This method assessed the accessibility and information quality of sustainability.

The study has adopted the Entropy Weighting Method (EWM) to minimize the subjectivity in the disclosure index construction. EWM is an objective method of assigning weights to the disclosure items according to the amount of information that each disclosure item provides, unlike the equal-weight methods. The process was: Normalized disclosure scores, entropy value and degree of divergence at each item, and calculated the item weights. The more information items had, the more useful they proved to be, and the higher their weights were.

The final sustainability disclosure indexes were calculated by multiplying the index scores of each firm by the entropy weights and adding them together for the 6 items of the index. This method results in a stable and data-based measure of sustainability disclosure, enhances the construct validity, reduces researcher bias, and offers a solid basis for future econometric analysis.

The entropy value for each disclosure item was computed as:

$$e_j = -k\sum_{i=1}^{n} p_{ij}\ln(p_{ij}) \text{ , where } p_{ij} = \frac{x_{ij}}{\sum_{i=1}^{n} x_{ij}}, k = \frac{1}{\ln(n)}$$

and x_{ij} denotes the disclosure score of item j for firm i, while n represents the number of firms included in the sample.

The degree of divergence for each item was then obtained as: $d_j = 1\text{-}e_j$.

The entropy weight for each item was subsequently calculated as:

$$w_j = \frac{d_j}{\sum_{j=1}^{m} d_j}$$, where m = 6 corresponds to the number of disclosure items within each sustainability construct.

Finally, the sustainability disclosure index for each firm i is computed as: $Index_i = \sum_{j=1}^{m} w_j x_{ij}$.

3.1. Measurement of Variable

Green Capital Expenditure (GCE) is measured by the Green Capital Expenditure Index (GCE): A weighted composite of renewable energy projects, energy-efficient technology, green infrastructure, pollution control investments, and green CAPEX allocation.

Environmental, Social, and Governance (ESG) is measured by the ESG Score (ESG), a composite measure based on the overall ESG rating, environmental score, peer ranking, and ESG assessment outcomes.

Research and Development on Green Innovation (RDG) is measured by the Green Innovation R&D Index (R&DGI): a weighted composite of green R&D expenditure, green patents, sustainable product development, and green technology partnerships.

Carbon Emission Reduction Investments (CER) is measured by the Carbon Emission Reduction Investment Index (CERI): A weighted composite of emission reduction investments, GHG targets, emission reductions achieved, and carbon management initiatives.

Firm Size (FS): The natural logarithm of the firm's total assets or total sales is used to measure the size of the firm. This approach allows to reduce variance across firms and provides a standardised measure of organisational size.

Leverage (LEV) Leverage is proxied by debt over total assets, which shows the extent to which a firm's assets are financed by debt. It is a measure of how much a company is funded by debt to carry on its activities and investments.

Corporate Social Responsibility Expenditure (CSRE): CSRE refers to the expenditure by a company on CSR activities reported in its financial statements. These expenditures are often presented as part of sustainability initiatives, social responsibility programmes or community development expenses.

Accordingly, the study estimates the nexus between green investment, ESG and corporate social responsibility of the listed firms in Nigeria by employing the Driscoll-Kraay standard error (DKSE) and Feasible Generalized Least Squares (FGLS) techniques, respectively. The data analysis was conducted using (FGLS), with green investment as the independent variable and corporate social responsibility as the dependent variable. The methods propounded by Beck and Katz (1995) and Driscoll and Kraay (1998) respectively, are appropriate for this study owing to the inherent characteristics of unbalanced datasets. These analytical techniques are renowned for their capacity to address challenges such as cross-sectional dependency, heteroskedasticity, serial correlation, and autocorrelation while still delivering reliable standard errors. Specifically, FGLS is apt for managing

potential problems of panel-related heteroskedasticity, covering all asymptotic attributes related to generalized least squares. This method not only allows for the modelling of heterogeneity for a set of exogenous variables simultaneously, but also efficiently addresses problems of heteroscedasticity in a data sequence (Asghar et al., 2024). Secondly, as a methodological approach, this is also recognized for its capability in panel heteroscedasticity treatment, contemporaneous interdependencies, and certain problems related to serial correlation at the unit level that mostly exist in other methods of estimation (Beck and Katz, 1995; Hoechle, 2007; Al-Malki et al., 2022).

$$CSR = f(GI)$$

$$CSR = \beta_0 + \beta_1 GCE_{it} + \beta_2 ESG_{it} + \beta_3 RDG_{it} + \beta_4 CER_{it} + \beta_5 LEV_{it} + \beta_6 FIR_{it} + \varepsilon_i$$

Where:
CSR = Corporate Social Responsibility
GCE = Green Capital Expenditure
ESG = Environmental, Social and Government
RDG = Research and Development (R&D) on Green Innovation
CER = Carbon Emission Reduction Investments
LEV = Leverage
FIR = Firms Size
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ = Regression coefficient of independent variables.
ε_i = Error term.

4. RESULTS

The basic features of the variables under scrutiny were checked by conducting descriptive statistics. Table 1 displays the summary statistics for the variables. The descriptive statistics analysis contains the features of the mean, median, minimum, maximum, standard deviation, skewness, kurtosis, and Jarque-Bera statistics. The statistical analysis demonstrates that all variables exhibit a significant level of consistency and variability, as their mean and median values fall within the minimum and maximum values. The average value of the corporate social responsibility is 2.45E-16 signifying the rising corporate social responsibility of the analysed firms for the period under examination.

Moreover, the average values of the green investment indicators including green capital expenditure (GCE), environmental, social and government (ESG) scores, research and development on green innovation (RDG), and carbon emission reduction (CER) are 0.215, 0.111, 0.087, and 0.148 respectively with GCE and RDG showing the highest and lowest expenditure on green investment respectively. The mean values of leverage and firm size are 0.674 and 17.330 respectively. The skewness distribution that account for the extent of asymmetry in the variable distribution depicts that all variables are positively skewed to the right.

Furthermore, the standard deviation analysis that reflects the extent of dispersion among the variables indicate that firm size (FIR) maintains the most volatile variable whereas research and development on green innovation (RDG) depicts the lowest volatile variable. The kurtosis statistics that show the peakedness or flatness of the distribution of the variables indicate that all the variables are leptokurtic given that their kurtosis values are greater than three except firm size that is platykurtic in nature. The normality status of all the variables is ascertained by the Jarque-Bera statistics which indicates that all the variables are not normally distributed at 1% except firm size which leads to the acceptance of the null hypothesis of no normal distribution. Additionally, the correlation analysis is also conducted to determine the extent of relationship among the variables under consideration.

Table 2 displays the outcomes of the correlation matrix. The correlation analysis shows that the all the variables are positively correlated with corporate social responsibility (CSR). Conversely, the leverage is negatively correlated with corporate social responsibility (CSR). Overall, the correlation analysis indicates a mixed correlation nexus between the variables. The analysis indicates that there is no existence of multicollinearity among the variables.

4.1. Principal Component Analysis (PCA)

The empirical analysis procedure of this study is to evaluate the influence of green investment and ESG on corporate social responsibility in selected companies in Nigeria begin with generating composite index for all the green investment metrics including green capital expenditure (GCE), environmental, social and government (ESG), research and development on green innovation (RDG), and carbon emission reduction investment (CER). This study uses principal component analysis (PCA) advanced by Pearson (1901) and expanded further by Hotelling (1936). Table 3 reveals that the first component of the green investment indicators is selected because its eigenvalue accounts for 3.528%, which is the largest share of the total variation.

Table 1: Descriptive statistics

Variable	CSR	GCE	ESG	RDG	CER	GREX	LEV	FIR
Mean	2.45e-16	0.215	0.111	0.087	0.148	4.09e-16	0.674	17.330
Median	0.379	0.000	0.000	0.000	0.000	−0.985	0.604	17.405
Maximum	19.916	1.000	1.000	1.000	0.877	6.646	3.270	22.792
Minimum	0.885	0.000	0.000	0.000	0.000	−1.058	0.100	12.856
Standard deviation	1.480	0.326	0.247	0.200	0.263	1.881	0.365	2.078
Skewness	7.646	1.382	2.295	2.930	1.822	1.989	2.471	0.002
Kurtosis	96.692	3.440	7.230	11.273	4.994	5.449	12.906	2.512
Jarque-Bera	1314.4	114.327	568.565	1499.144	251.831	357.657	178.469	3.461
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.177

Table 2: Correlation matrix

Variable	CSR	GCE	ESG	RDG	CER	GREX	LEV	FIR
CSR	1.000							
GCE	0.521	1.000						
ESG	0.533	0.684	1.000					
RDG	0.549	0.603	0.660	1.000				
CER	0.542	0.688	0.678	0.558	1.000			
GREX	0.571	0.647	0.659	0.609	0.539	1.000		
LEV	−0.015	0.055	0.087	−0.035	0.024	0.035	1.000	
FIR	0.449	0.352	0.389	0.272	0.450	0.390	−0.067	1.000

Source: Authors' computation (2026)

Table 3: Principal component analysis

Eigenvalues: (Sum=4, Average=1)					
Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	3.528467	3.268383	0.8821	3.528467	0.8821
2	0.260084	0.133582	0.0650	3.788551	0.9471
3	0.126502	0.041555	0.0316	3.915053	0.9788
4	0.084947	---	0.0212	4.000000	1.0000
Eigenvectors (loadings)					
Variable	PC 1	PC 2	PC 3	PC 4	
GCE	0.504313	−0.308965	0.736442	−0.328423	
ESG	0.511023	0.088722	−0.589069	−0.619663	
RDG	0.484150	0.781121	0.157379	0.361499	
CER	0.500123	−0.535275	−0.293058	0.614390	

Furthermore, the eigenvalues of the other components are nearly equal to one, indicating that they also have significant loadings. In summary, the variables satisfy all the standard criteria necessary for inclusion in the calculation of the green investment index.

4.2. Cross-sectional Dependency Test

This study proceeds accordingly to verify the existence of cross-sectional dependency (CSD) status of the variables under consideration as panel data is generally considered to exhibit CSD which might lead to misleading inferences. Therefore, this study utilizes Pesaran (2015) CD tests. The outcomes in Table 4 shows that the null hypothesis of cross-section independence is rejected, suggesting that there is presence of firm-based spillovers effects among the list companies in Nigeria.

4.3. Panel Unit Root Test

The stationary attributes of the aforementioned variables are checked with using second-generation unit root test known as cross-sectional Augmented Dickey-Fuller (CADF) test propounded by Pesaran (2007). It used to address the issues of cross-sectional dependence and heterogeneity in panel data in order to provide more accurate stationarity assessments when units in a panel are interconnected. The findings of the unit root tests are displayed in Table 5. The outcomes show that almost the variables exhibit unit root at level except corporate social responsibility (CSR), carbon emission reduction (CER) and firm size (FIR) which are stationary. Nonetheless, all the variables are stationary at first difference after subjecting them to first differencing. Overall, the unit root test indicates that the variables exhibit mixture of integrating order of variables.

Table 6 represents the outcomes of DKSE and FGLS models, showing that firm size plays an important role in promoting

Table 4: Cross-sectional dependence results

Variables	Pesaran CD	Prob
CSR	57.16*	0.000
GCE	7.74*	0.000
ESG	14.79*	0.000
RDG	9.90*	0.000
CER	20.34*	0.000
GREX	37.22*	0.000
LEV	6.50*	0.000
FIR	35.18*	0.000

*Represents the 1% level of significance

Table 5: The results of CADF unit root test

Variables	Level	First-difference	Inference
CSR	−2.610*	--	Level
GCE	−1.365	−3.460*	First difference
ESG	−0.986	−3.017**	First difference
RDG	−1.662	−4.294*	First difference
CER	−3.428*	--	Level
GREX	−1.017	−3.771*	First difference
LEV	−1.614	−3.725*	First difference
FIR	−3.658*	--	Level

* and ** represent the 1% and 5% level of significance

Corporate Social Responsibility (CSR) among the selected firms in Nigeria. Larger firms were said to be more engaged in CSR activities as they have larger financial capacity, stronger stakeholder attention and higher public expectations on environmental and social responsibility. This implies that larger firms are more likely to adopt sustainability practices to safeguard corporate reputation and investors' confidence. The finding supports stakeholder theory, which emphasises the need for firms to respond to the expectations of investors, customers, regulators and host communities. The results are consistent with

Table 6: Green investment and corporate social responsibility (DKSE and FGLS outcomes)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	CSR	CSR	CSR	CSR	CSR	CSR	CSR	CSR	CSR	CSR
LEV	−0.0738	−0.136	0.0935**	−0.0333	−0.0577	−0.0494	−0.0839	0.0566	−0.000189	−0.0673
	(−1.212)	(−1.406)	(3.124)	(−0.676)	(−1.046)	(−0.914)	(−1.059)	(0.818)	(0.00291)	(−1.078)
FIR	0.215***	0.200***	0.232***	0.183**	0.189***	0.165***	0.178***	0.220***	0.150***	0.157***
	(3.390)	(3.698)	(3.991)	(3.030)	(3.571)	(12.28)	(11.69)	(15.26)	(10.04)	(11.28)
GCE	1.886***					1.683***				
	(4.674)					(20.44)				
ESG		2.555***					2.158***			
		(4.138)					(17.22)			
RDG			3.419***					2.387***		
			(4.853)					(11.35)		
CER				2.395***					2.115***	
				(4.035)					(17.14)	
GREX					0.368***					0.293***
					(4.849)					(16.78)
Constant	−4.075***	−3.659***	−4.376***	−3.501***	−3.239***	−3.343***	−3.409***	−4.193***	−3.083***	−2.863***
	(−4.538)	(−5.276)	(−5.302)	(−4.202)	(−4.181)	(−16.06)	(−14.58)	(−18.38)	(−13.50)	(−13.08)

***P<0.01; **P<0.05. Source: Authors' Compilation (2026)

the studies of Hernández Rodríguez et al. (2020), Ting (2021), and Chen et al. (2024).

The study also found a positive but statistically insignificant relation between leverage and CSR. This suggests that the debt position of firms does not affect their commitment to social and environmental responsibility significantly. The finding indicates that firms might prioritise their financial obligations over sustainability initiatives when under high debt pressure.

5. DISCUSSION

The results show that the introduction of the main explanatory variables such as green capital expenditure has a positive and significant impact on CSR. Research has revealed that organisations that invest in sustainable production methods, green technology, and eco-friendly projects tend to be more committed to social responsibility and environmental preservation. It has also been shown that Environmental, Social and Governance (ESG) approaches highly improve CSR performance by increasing accountability, transparency, operational effectiveness and stakeholder trust. These findings are consistent with the concepts of sustainability and legitimacy which emphasise the importance of integrating social and environmental concerns into business operations. The results are also consistent with previous studies by (Indriastuti and Chariri, 2021), (Rahman et al., 2024), (Wu, and Badariah, 2023) and (Suriyankietkaew et al., 2025).

The findings also showed that investment in research and development for green innovation positively influences CSR. Firms that invest in green innovation were observed to improve their competitiveness, environmental compliance, and long-term sustainability practices. In the same direction, carbon emission reduction investments were found to significantly promote CSR by improving energy efficiency, reducing environmental risk, and strengthening corporate reputation. These findings support innovation and ecological modernization theories, which argue that sustainable technological advancement can improve both environmental performance and business growth. The results are consistent with the studies of (Novitasari and Tarigan, 2022), (Shuwaikh et al., 2023), and (He and Wang, 2025). Generally, the study demonstrates that green investment and ESG-related activities play a significant role in strengthening CSR among listed firms in Nigeria, particularly within environmentally sensitive sectors.

6. CONCLUSION

This study investigated the effect of green investment and ESG disclosure on corporate social responsibility (CSR) among listed firms in Nigeria. The findings provide evidence that green investment plays a significant role in promoting responsible corporate behaviour and strengthening sustainability practices. Specifically, the results revealed that Green Capital Expenditure (GCE), Environmental, Social and Governance (ESG) practices, Research and Development on Green Innovation (RDE), and Carbon Emission Reduction (CER) investments all have positive and statistically significant effects on CSR. These findings suggest that firms that commit more resources to environmentally sustainable projects, innovation, and responsible governance are more likely to improve their social and environmental contributions to stakeholders and society at large.

The study further demonstrates that green investment is not merely an environmental strategy but an important driver of corporate responsibility. As sustainability concerns continue to shape business operations globally, organizations that integrate green financing initiatives into their strategic decisions are better positioned to enhance their CSR performance, strengthen stakeholder relationships, and contribute to sustainable development. The evidence from this study therefore underscores the need for firms operating in environmentally sensitive sectors to increase investments in green projects and sustainability-oriented initiatives. It also highlights the importance of supportive policies and regulatory frameworks that encourage greater participation in green investment activities, particularly in areas such as green capital expenditure, ESG implementation, green innovation, and carbon emission reduction.

Despite its contributions, this study has some limitations. The analysis focused on 35 listed firms operating in environmentally sensitive sectors of the Nigerian Exchange Group (NGX), which may limit the generalizability of the findings to small and medium-sized enterprises (SMEs) and unlisted firms facing similar sustainability challenges. In addition, the study relied largely on secondary data obtained from annual reports and sustainability disclosures. Consequently, the quality of the findings depends on the accuracy, completeness, and transparency of information reported by the companies. There is also the possibility that some firms disclose sustainability activities primarily to enhance their public image rather than to reflect genuine environmental commitment.

Furthermore, although the study employed robust estimation techniques, including Feasible Generalized Least Squares (FGLS) and Driscoll-Kraay Standard Errors (DKSE), the observed relationships may still be influenced by broader economic, institutional, and regulatory factors that were not explicitly captured in the model. The measures of green investment and CSR adopted in this study may also not fully reflect the wider social, cultural, and institutional dimensions of sustainability practices within the Nigerian business environment.

Future research should therefore extend the scope of investigation beyond listed firms to include SMEs and privately owned enterprises. Studies may also focus on specific sectors to provide deeper insights into industry-related sustainability practices. In addition, the use of primary data through surveys, interviews, and case studies could complement secondary data and offer a richer understanding of firms' motivations, challenges, and commitments toward green investment and corporate social responsibility in Nigeria.

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