Navigating sustainability: the impact of corporate governance on sustainable practices in Indian firms

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Abstract: This study looks at how corporate governance and sustainability committees affect sustainable practices in 404 non-financial Indian companies from 2014–2015 to 2023–2024. It focuses on board size, independent directors, women on the board, board meetings, CEO duality (when the CEO is also the board chair), audit committee meetings, and the presence of a corporate social responsibility (CSR) sustainability committee. Using environmental, social, and governance (ESG) scores to measure sustainability, the study found that according to panel data regression analysis, women directors, CEO duality, audit committee meetings, and having a CSR sustainability committee improve ESG performance. However, more independent directors were linked to lower sustainability performance. The outcomes suggest that having too many independent directors might not always be good for sustainability. This is because independent directors often focus on short-term financial results instead of long-term goals that benefit the environment and society.

Keywords: corporate governance attributes; CSR sustainability committee; ESG; environmental, social, and governance; dynamic panel data.

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1 Introduction

All over the world, businesses are under growing pressure to act responsibly in how they treat the environment, people, and how they manage their operations. This is known as environmental, social, and governance (ESG). This pressure is especially rising in developing countries like India, where investors, customers, regulators, and the general public want companies to be open and honest about their actions (Slacik and Greiling, 2020). To meet these expectations, companies follow different reporting methods to show what they are doing to care for the environment (Basah et al., 2024), treat workers and communities fairly (Oyinlola, 2025), and run their business in an ethical way (Veltri et al., 2023). These reports help people to see if companies are truly responsible or just making claims without action (Handayati et al., 2025). However, problems related to ESG, like unsafe products, mistreatment of workers, corruption, or environmental harm, are becoming more common (Alrobai and Albaz, 2025). When these issues are exposed, they can damage a company's image (Zahller et al., 2015), cause financial loss (Guerrero-Villegas et al., 2018), and reduce trust from shareholders and the public (Maroun, 2022). Even companies praised for strong ESG efforts can face such controversies (Oyinlola, 2025). This happens because once a company is seen as good in one area, people expect it to do well in all areas. So, if something goes wrong, they are judged more harshly (Ying et al., 2021). For example, a company doing well in protecting the environment may still face criticism if it treats workers unfairly, showing that success in one area does not cover failures in others. This shows that doing well in just one part of ESG is not enough; companies must perform responsibly in all areas (Guping et al., 2020). It is not easy to manage all these aspects at the same time, and this makes ESG a complex challenge for businesses (Shackleton et al., 2022). That is why it is very important for companies to build strong systems inside the organisation and truly commit to ethical and sustainable practices, rather than just trying to look good to the public (Rooh et al., 2021). Only then can they avoid such controversies and maintain trust among their stakeholders.

Corporate governance mechanisms such as the size of the board, the number of independent directors, board diversity, frequency of board meetings, CEO Duality, audit committee meetings, and CSR sustainability committees are designed to monitor and guide the decisions made by company executives. These structures help to ensure that a company's actions, especially those related to social responsibility and community engagement, are well-managed and in line with ethical standards (Handayati et al., 2025). According to agency theory, strong governance helps to make sure that company leaders act in the best interest of shareholders by aligning their actions with the company's

financial and ethical goals (Muhammad and Tadele, 2026). On the other hand, stakeholder theory focuses on balancing the needs and expectations of all groups involved with or affected by the company such as employees, customers, communities, and investors to avoid problems or controversies (Brooks and Oikonomou, 2018). Expanding on the previous idea, it is important to note that while governance is seen as a key factor in improving a company's responsibility, there is still limited understanding of how it works in practice when it comes to ESG. A lot of research talks about how board structures, such as the number of independent directors or the presence of specific committees, can influence outcomes, but many of these studies stop at measuring financial results or CSR activities (Xu et al., 2022; Vetrivel et al., 2025; Aboud and Yang, 2022; Ledi et al., 2025). They often do not explore whether these governance tools actually help to improve the quality and honesty of ESG reporting or support responsible behaviour across the company. This creates a gap between theory and real-world practice. Without this understanding, it is hard to say if companies are truly being guided by good governance to do the right thing, or if they are just following rules on paper without making real changes. More detailed research is needed to see how governance affects not just what companies report, but how they behave every day when it comes to environmental care, social responsibility, and ethical decision-making.

Therefore, this study aims to add to the ongoing discussion about how corporate governance systems can improve ESG reporting. It highlights the importance of looking at these issues with a fresh and modern perspective. By doing so, the research helps to fill a gap in the current knowledge, especially in the area of how governance affects ESG practices. This study makes a valuable contribution to the existing literature on non-financial reporting, particularly in the Indian context, where such research is still growing. It offers new insights into how different governance features such as board structure and the presence of CSR sustainability committees can influence the quality and transparency of ESG reporting. By focusing on these specific attributes, the research not only expands our understanding but also supports the idea that strong and well-structured corporate governance plays a key role in responsible and transparent business practices.

2 Theoretical background

The conceptual framework of this study is based on four main theories like agency, stakeholder, legitimacy, and signalling to explain the link between corporate governance, CSR sustainability committees, and ESG reporting. Agency theory is considered the most important for understanding how board members impact a company's success. It explains the relationship between principals (like shareholders) and agents (like managers), where principals aim to increase shareholder value (Brogi and Lagasio, 2025), but agents may act in their own interest instead (Raimo et al., 2021). Some researchers have found that managers sometimes use more company resources than necessary for their own benefit (Carnini Pulino et al., 2022). Agency theory is often linked to ESG practices, as managers may use them to improve their own image or meet personal goals (Alsayegh et al., 2020). When managers have more information than shareholders and choose not to share it, this creates a problem called information asymmetry, leading to moral risks (Manita et al., 2018). To reduce this, companies may increase ESG disclosure to improve trust and reduce misunderstandings between managers and investors (Connelly et al., 2011). In this way, sharing ESG performance can help to lower the risk and increase transparency

(Manita et al., 2018). Meanwhile, stakeholder theory focuses on balancing business goals with ethical responsibilities by considering the needs of all affected groups (Connelly et al., 2011). Any study pertaining to business stakeholders and society can be supported by the theory (Peng and Isa, 2020). The theory suggests that since corporations are a part of society, it is their duty to make up for the harm they inflict by polluting the environment and creating a lot of noise (Kouam, 2024). According to the theory, stakeholders play a significant role in determining an organisation's success and long-term sustainability. Another theory, signalling, focuses on reducing the asymmetry of information. The expansion of communication channels increases the amount of information available to the firm and its users, reducing information asymmetry (Rezaee, 2016). The end users of this information decide how to interpret the signal sent by the company (Healy and Palepu, 2001). According to Thornton and Flynn (2003), signalling theory suggests that voluntary disclosure of information yields value-related information on ESG performance. This voluntary non-financial disclosure helps stakeholders to forecast financial earnings, corporations use it to signal their sustainability achievement, legitimise their existence, and maintain their corporate reputation (Helfaya and Moussa, 2017). However, according to legitimacy theory, organisations work to make sure that society views their actions as legitimate (Helfaya and Moussa, 2017). ESG disclosures can be viewed in this light as a means for businesses to show that they are in line with the values and expectations of society, thus preserving their social licence to operate (Reber et al., 2022; Brogi and Lagasio, 2025). Legitimacy theory also plays an important role in explaining why companies choose to share more ESG information. According to this theory, businesses want to be seen as responsible and acceptable by the public, so they try to align their actions with what society expects from them. By doing this, companies aim to gain support and approval from the community, which helps them to maintain their reputation and continue operating smoothly. Sharing ESG details is one way they show they are meeting these social expectations (Shaukat et al., 2016).

3 Review of literature and hypotheses development

3.1 Corporate governance and ESG disclosure

Board size is an important part of corporate governance and can affect how well a company is managed (Yin and Xu, 2025). Some researchers believe that larger boards are better for ESG reporting because they bring in more diversity and different viewpoints, which helps to represent more stakeholder interests (Al-Sarraf et al., 2025; Treepongkaruna et al., 2024). Agency theory also supports the idea that bigger boards can improve ESG oversight (Jeyhunov et al., 2025). However, other studies say that large boards can slow down decisions, raise costs, and make it harder to manage ESG issues effectively (Arora and Sharma, 2016; Kamarudin et al., 2025; Suttipun, 2021; Maroun, 2022). Having more independent directors is usually seen as good for governance because they can reduce conflicts of interest and push for more transparency (Konstantin and Elena, 2022; Brinette et al., 2023; Kamarudin et al., 2025). They are also linked to better ESG results by encouraging ethical behaviour and clear reporting (Muhammad and Tadele, 2026). Still, some argue that too many independent directors may not help ESG reporting if they are only focused on their pay and not the company's long-term goals (Albitar et al., 2023; Zhu et al., 2025). Board diversity, especially having women on the

board, is often seen as positive for ESG because women are thought to be more ethical and less tolerant of bad behaviour (Rooh et al., 2021; Brinette et al., 2023; Vette, 2017). Legitimacy theory suggests that having women on boards helps companies to build networks and gain social approval (Alexandra and Daria, 2021). But some researchers note that women may be more cautious in decision-making and that gender diversity can sometimes create trust issues in the boardroom (Konstantin and Elena, 2022; Zhu et al., 2025). Holding regular board meetings is another factor that can help to improve ESG performance by allowing directors to stay informed and act quickly (Khlifi and Zouari, 2022; Ihbal et al., 2024; Birindelli et al., 2018). However, too many meetings can become just a formality or even cause conflicts that make ESG decisions harder (Konstantin and Elena, 2022; Wei et al., 2025; Alkurdi et al., 2024). CEO duality, where the CEO is also the board chair, has mixed results. It can lead to excessive pay and less concern for long-term sustainability (Alrobai and Albaz, 2025), though some studies say it can improve ESG disclosure and support long-term goals (Romano et al., 2020; Rath et al., 2025). Yet, strong CEO control can also reduce board involvement, hurting ESG decisions (Arora and Sharma, 2016; Oyinlola, 2025; Rath et al., 2025). Audit committees also play a role in ESG by reviewing risks and performance, especially when they meet often (Al-Sanasleh et al., 2025; Alsultan and Hussainey, 2025; Sahu et al., 2025; Karim et al., 2024). But too many meetings can reduce focus and increase costs, which may hurt ESG efforts (Pernamasari and Chariri, 2024; Al-Sanasleh et al., 2025).

While some studies (Albitar et al., 2023; Nuhu and Alam, 2024) have looked at how governance affects ESG as a whole, most research has mainly focused on how board characteristics relate to ESG performance. Many researchers have explored how changes in the board's makeup can influence a company's sustainability efforts (Gerged et al., 2023; Helfaya et al., 2023). However, areas like board meetings, CEO Duality, gender diversity and audit committee meetings have not been studied much, especially in the Indian context. Based on this gap, the current study aims to add to existing research by examining how different corporate governance attributes affect corporate sustainability disclosure. Based on this gap, the study proposes the following hypothesis.

H1: Corporate Governance attributes influence the level of Corporate Sustainability.

3.2 CSR sustainability committee on corporate sustainability

Good corporate governance often includes different board committees to help to oversee management more effectively (Muhammad and Tadele, 2026). One such committee is the CSR sustainability committee, which is responsible for improving accountability and transparency on ESG issues by monitoring ethical behaviour and supporting sustainable decisions (Maroun, 2022). According to Bradbury et al. (2022), companies with CSR committees usually provide better-quality sustainability disclosures and face fewer ESG-related problems. Kouam (2024) also noted that these committees help the companies to meet public expectations and limit unethical behaviour by managers. Some researchers believe that just having a CSR committee does not always lead to better ESG reporting (Moolkham, 2025; Handayati et al., 2025). For example, Elamer and Boulhaga (2024) found that while CSR committees can help with sustainability efforts, their presence alone is not enough to deal with all the risks and issues related to sustainability.

The role of the CSR committee is becoming more important, as it helps to plan, monitor, and carry out the company's CSR strategy across different departments. Earlier

studies have looked at how the makeup of the board and having a CSR committee can influence a company's environmental actions (Baraibar-Diez and Odriozola, 2019; Velte and Stawinoga, 2020). However, in India, there is still very little research that looks at how different board features, audit committee meetings, and CSR committees together affect ESG performance (Fahad and Rahman, 2020; Helfaya et al., 2023). Based on these points, the study develops the second hypothesis.

H2: CSR Sustainability committee influence the level of Corporate Sustainability.

4 Research methodology

4.1 Sample design

Looking at the research done so far, it is clear that there are not many studies in India that explore the connection between corporate governance, CSR sustainability committees, and how well companies perform on ESG. Compared to developed countries, India has fewer studies on this topic, showing a need for more research to understand how these factors work together in the Indian business environment. To address this gap, the current study focuses on companies listed in the NSE 500 index in India and looks at how corporate governance features, the presence of a CSR sustainability committee, and some control factors influence ESG practices between 2014 and 2024. This time period was chosen because CSR became a legal requirement in India starting from April 2014 under the Companies Act, 2013, making it the ideal point from which companies began actively implementing and reporting on CSR activities and ESG practices. Out of the 500 firms in the index, only 404 non-financial companies were included in the study, as 96 financial and service sector companies were excluded due to differences in how they report their financial data and follow accounting rules, which makes comparisons difficult.

The secondary data for this study was gathered from financial databases called 'Capitaline Plus' and 'Prowess', which are created by Capital Market Publishers Private Limited (Mumbai) and the Centre for Monitoring Indian Economy (CMIE), respectively. Additionally, data was also collected from other sources like the Global Reporting Initiative website, as well as the sustainability and annual reports available on the websites of the companies involved in the study.

4.2 Variables used in the study

To simulate the corporate governance and corporate sustainability practices of Indian manufacturing corporations, the study considers several important variables. In addition, a set of relevant and empirically supported firm-specific variables is taken into consideration to regulate the influence of other likely components of firm performance. All the variables are described in Table 1.

4.2.1 Dependent variables

a *Corporate sustainability practices*

The ESG score is the primary dependent variable in this study and is used to gauge corporate sustainability practices. The ESG score is a composite or combined score that

evaluates how well a business discloses and performs in three important areas: governance (including board structure and transparency), social (like employee welfare and community engagement), and environmental (like pollution control and resource use). These ratings are determined by the significance and calibre of the data that businesses make available to the public, frequently through reports or disclosures. Since industries differ in their risks, expectations, and regulatory pressures, the ESG scoring system is tailored to each industry, ensuring a fair and accurate comparison among corporations operating in different sectors. This helps capture a clearer picture of a company's overall sustainability performance (Bamahros et al., 2022; Moussa, 2024).

Table 1 Description of variables

	Variable	*Acronym*	*Measurement*
Dependent variables	Environmental, Social and Governance Score	ESG	A composite indexed score derived from disclosures made in terms of Environmental, Social and Governmental (ESG) activities of firms, measured in terms of importance of the information. The score is also tailored to different industry sectors
Independent variables	Board Size	BS	Number of directors who are present on board
	Proportion of Independent Directors	IDP	Number of independent directors on the company's board divided by total number of directors
	Proportion of Women Director	WDP	Number of women directors on the supervisory board divided by total number of directors
	Number of Board Meetings	NBMY	Total number of board meetings held in a specific year
	CEO Duality	ceoduality	It calculated as binary coding system of content analysis, where '1' is allocated if the firm is having CEO who are holding the position of the Chairman of the firm, and '0' if they are not
	Audit Committee Meetings	AC MEETINGS	Number of meetings held in a particular year
	CSR Sustainability Committee	CSR_SC	It calculated as binary coding system of content analysis, where '1' is allocated if the firm is having CSR sustainability committee, and '0' if it is not
Control variables	Liquidity (Quick Ratio)	QR	It is calculated by adding Cash plus Effect plus Receivables whole divided by Current debt*100
	Firms Age	AGE	The age of the firm, calculated from its incorporation year
	Leverage (Debt-equity ratio)	DE	Total Debt/ Shareholders' Equity * 100
	Profitability (Tobin's Q)	TQ	The sum of book value to total assets after reducing both book and market value of equity, whole divided by book value of total assets
	Research and Development Expenses	RDEXP	Research and development (R&D) expenditures is measured as a percentage of revenue (net sales)

Source: Prepared by Researchers

4.2.2 Independent variables

a *Corporate governance parameters*

This study looks at several features of a company's board to understand their impact on sustainability practices. These features include the size of the board (BS), the proportion of independent directors (IDP), the percentage of women directors (WDP), the number of board meetings (NBMY), the number of CEOs present in the company's board (CEO Duality), the number of meetings held by the audit committee (AC Meetings). The size of the board means the total number of directors who are part of the board (Chebbi and Ammer, 2022; Khalid et al., 2022; Pozzoli et al., 2022). Board independence is measured by looking at how many independent directors are on the board compared to the total number of board members. It is calculated by dividing the number of independent directors by the total number of directors, which gives the percentage of board members who are independent (Birindelli et al., 2018; Abdelfattah and Elfeky, 2021). Women's representation on the board is measured by dividing the number of female directors by the total number of board members (Kathy Rao et al., 2012; Alazzani et al., 2019). The number of board meetings is measured by counting how many times the company's board met during a specific year (Nicolo and Andrades-Peña, 2024; Umar et al., 2024). CEO Duality is measured with the help of binary value of 'one' if it exists and 'zero' otherwise (Remo-Diez et al., 2024; Abdullah et al., 2024). Audit committee meetings are measured by counting how many times the audit committee meets in a year (Cucari et al., 2018; Pozzoli et al., 2022; Cheung and Lai, 2023).

b *CSR sustainability committee*

The binary value assigned to the CSR sustainability committee is 'one' if it exists and 'zero' otherwise (Wasiuzzaman et al., 2022; Dicuonzo et al., 2022).

c *Control variables*

The study takes into consideration a few additional factors that might affect ESG reporting and practices and to avoid model misspecification. The model used in the study comprises liquidity, firm age, leverage, profitability and research and development components based on firm-specific characteristics. First, quick ratio is used to approximate liquidity. It is calculated as follows: Cash+ Effect+ Receivables/Current Debt * 100 (Yu and Van Luu, 2021; Quintiliani, 2022). Previous research shows that companies with more liquidity are better prepared to handle unexpected ESG risks like social protests or environmental fines, and they are more likely to invest in sustainability voluntarily (Fatemi et al., 2018; Moolkham, 2025; Lys et al., 2015). However, some studies argue that companies with extra liquidity may spend money on stock buybacks or executive bonuses instead of ESG projects (Do and Kim, 2020; Ho and Lu, 2025). Second, firm age is measured as the incorporation years of a particular company (Korkmaz and Tuğba, 2023; Wang et al., 2023). Past researchers like KB (2021), Dahal et al. (2024) reports that corporations with more experience are expected to have expertise and better sustainable performance. Older companies tend to have more experience and better sustainable performance since they understand their community and environment better (KB, 2021; Dahal et al., 2024; Yustin and Suhendah, 2023). But on the other hand, some research shows that older firms might stick to traditional,

less sustainable practices (Han and Kim, 2020). Third, leverage is represented by the debt-equity ratio, which is calculated as the long-term debt of shareholders' funds (Adeneye and Kammoun, 2022; Asimakopoulos et al., 2024). Companies with high debt often face pressure from creditors to disclose social and environmental information and do so to show financial risk management (Adeneye and Kammoun, 2022; KB, 2021). Though some studies like Khan et al. (2013) reports high leverage limits ESG reporting because of financial constraints. Fourthly, profitability, as measured by market-based financial performance, or Tobin's Q, which is calculated as the sum of book value to total assets after deducting both book value and market value of equity, and then divided by the book value of total assets. Generally, more profitable companies can better meet their social and environmental responsibilities because they can afford the costs (Dahal et al., 2024; Tharavanij, 2024). Contradictorily, researcher like Gregory (2021) reported that firms with higher financial performance do not believe that they need to legitimise their actions through implementations of ESG related activities. Finally, Research and development expenses are measured by comparing the money a company spends on R&D to its total sales (Tang, 2022; Ding et al., 2024). Research shows that companies investing more in research and development (R&D) tend to have better environmental and social disclosures and improve ESG ratings (Li et al., 2008; Flammer, 2013). But others (Ziegler et al., 2007; Surroca et al., 2010) warn that heavy R&D spending without including CSR might hurt environmental and social performance.

4.3 Research methods

Panel data, also known as longitudinal data, involves observing multiple entities over a period of time. This study looks at data from 404 companies over 10 years, from 2014 to 2024. While a simple method called pooled ordinary least squares (OLS) can be used to analyse this kind of data, it might not always give the best results because it does not consider differences between companies or changes over time. To get better results, the study uses two types of panel data models: the fixed effects model (FEM) and the random effects model (REM). These models help take into account both company-specific and time-specific differences. Which model to use depends on whether unseen factors that do not change over time are connected to the main variable being studied. If they are related, the FEM works better. If not, the REM is the right choice. To decide which model to use, the Hausman test (Hausman, 1978) is applied, which checks whether the key assumption of the REM holds true. Additionally, the Breusch-Pagan Lagrange Multiplier (BPLM) test suggested by Breusch and Pagan (1980) is used to determine whether a panel data model is even necessary, or if a simple pooled OLS would suffice. Based on these tests, the study uses the appropriate panel data regression model to test the research hypotheses.

$$\begin{aligned} ESG_{it} = {} & \alpha + \gamma_1\,(BS) + \gamma_2\,(IDP) + \gamma_3\,(WDP) + \gamma_4\,(NBMY) \\ & + \gamma_5\,(CEO\ DUALITY) + \gamma_6\,(AC\ MEETINGS) + \gamma_7\,(CSR\_SC) \\ & + \beta_1\,(QR) + \beta_2\,(AGE) + \beta_3\,(DE) + \beta_4\,(TQ) + \beta_5\,(RDEXP) + \varepsilon_{it} \end{aligned}$$

where ESG_{it} indicates to environmental, social and governance score of i_{th} corporations at time period t, α denotes the constant term, γ_1–γ_7 specifies the coefficients of corporate governance attributes (such as board size, proportion of independent directors, proportion of women directors, number of board meetings, CEO Duality, audit committee meetings), and CSR sustainability committee respectively, β_1 to β_5 embodies several companies'

specific characteristics such as liquidity, firm age, leverage, profitability, and research and development expenses and ε_{it} means to the error term.

Endogeneity happens when we leave out important explanatory variables, causing the included variables to be linked with the error term in the model. As a result, the OLS estimates become biased and unreliable. This problem gets worse when we also ignore differences between companies that are not directly measured, known as unobserved random effects.

To deal with unobserved differences between companies that do not change over time, we can use a random effects model. However, this does not fully solve the endogeneity problem, where some variables are still linked with the error term. To fix this, Arellano and Bond (1991) suggested using the 'Generalised Method of Moments (GMM)', specifically the Arellano-Bond (AB) approach. This method helps to correct endogeneity by using past values (lags) of variables as instruments. It is important to choose the right number of lags, as earlier performance can strongly affect current sustainable performance (Muftah and Zainuddin, 2025). To better capture this effect and handle endogeneity, the model includes the previous year's performance (one-year lag) as one of the explanatory variables.

5 Analysis and findings

5.1 Descriptive statistics

Table 2 presents the summary statistics for the main variables used in the study, including the dependent, independent, and control variables. The average ESG score is 27.23 with a standard deviation of 13.84, showing that ESG performance varies widely across companies, likely due to different challenges in meeting ESG goals. On average, board size is 10.32 members, and the proportion of independent directors is 52.77%, while female directors make up only 8.94% of the board. The high variation in these numbers suggests that many companies still lack diversity and independent oversight. Companies hold about 6 board meetings per year. CEO duality, where the CEO also serves as board chair, has an average of 0.28, meaning this practice is moderately common. Firms typically hold 7 audit committee meetings annually. About 59% of firms have a CSR sustainability committee. The average liquidity ratio is 0.89, ranging from 0.01 to 3.55, showing variation in short-term financial health. The average age of companies is nearly 40 years, indicating that most firms are well-established. The average leverage is 13.22%, profitability is 26.85%, and spending on research and development is relatively low at 8.18.

5.2 Diagnostic tests

5.2.1 Test of multicollinearity

Table 3 shows the pairwise correlation matrix, which looks at how strongly each pair of independent variables is related to each other. The results show that while some variables are moderately correlated, these relationships are not too strong, meaning multicollinearity which happens when independent variables are too closely related is probably not a big problem here. To double-check, the study also used the variance inflation factor (VIF) test (Table 3) a common tool to detect multicollinearity. All the

independent variables' VIF values were significantly below the critical value of 10, which is a sign of no significant multicollinearity by experts such as Field (2009) and Chatterjee and Hadi (2013). This indicates that the model's variables are sufficiently different from one another, and the findings are trustworthy without running the risk of bias from overlapping data.

Table 2 Summary statistics of dependent and independent variables

Variable	*Mean*	*Standard deviation*	*Minimum value*	*Maximum value*
ESG	27.23	13.84	0	57.69
BS	10.32	3.22	7	16
IDP	52.77	8.99	29.62	82.37
WDP	8.94	7.29	0	26.67
NBMY	5.97	1.90	2	12
CEO DUALITY	0.28	0.45	0	1
AC MEETINGS	7.07	3.28	3	9
CSR_SC	0.59	0.49	0	1
QR	0.89	0.66	0.01	3.55
AGE	39.77	23.90	1	116
DE	13.22	14.12	0	60.33
TQ	26.85	13.24	0	56.65
RDEXP	8.18	63.98	–91.24	1158.5

Source: Calculated by Researchers

5.2.2 Test of heteroskedasticity

The study also tested for heteroskedasticity, which refers to a situation where the errors in the model do not have constant variance. This is important because if the error terms vary too much, it can affect the accuracy of statistical tests and lead to unreliable outcomes. To check this, the 'Breusch-Pagan test' and the 'White test' were used to see if the error variance stayed the same across different levels of the independent variables. As shown in Table 4, the results confirmed that heteroskedasticity was present in the model. To fix this issue and improve the reliability of the results, the study used robust standard errors (based on White, 1980), which adjust for this problem and provide more accurate estimates.

5.3 Empirical evidence from static panel data analysis

Linear regression with fixed and random effects has been used to verify correlation and heteroskedasticity. The Breusch-Pagan and Hausman tests were used to determine whether a fixed effect or random effect model fit the data the best. Table 6 shows that a random effect model was used because the Hausman test was found to be insignificant.

Table 3 Pair-wise correlation matrix with variance inflation factor

Independent variables	*BS*	*IDP*	*WDP*	*NBMY*	*CEODUALITY*	*ACMEETINGS*	*CSR_SC*	*QR*	*AGE*	*DE*	*TQ*	*RDEXP*	*VIF*
BS	1.00												**1.08**
IDP	–0.001	1.00											**1.05**
WDP	–0.004	–0.0420	1.00										**1.38**
NBMY	0.0874***	–0.071***	0.031	1.00									**1.30**
CEO DUALITY	0.048 **	–0.001	–0.089***	0.123***	1.00								**1.03**
ACMEETINGS	0.179***	–0.029	0.051**	0.433***	0.062***	1.00							**1.33**
CSR_SC	0.072***	–0.033	0.491***	0.118***	–0.037	0.146***	1.00						**1.44**
QR	–0.060***	–0.046*		–0.056***	–0.023	–0.074***	–0.009	1.00					**1.11**
AGE	0.107***	0.022	0.028	0.007	–0.033	0.108***	0.137***	–0.026	1.00				**1.06**
DE	0.083***	0.095***	0.034 –0.035	0.092***	0.115***	0.055	–0.082**	–0.237***	–0.091***	1.00			**1.14**
TQ	–0.037	–0.099***	0.111***	–0.103***	–0.119***	–0.049*	0.084***	0.223***	0.064***	–0.222***	1.00		**1.15**
RDEXP	–0.027	0.027	0.023	–0.007*	–0.024	0.012	–0.004	0.027	0.021	–0.006	0.013*	1.00	**1.01**

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.

Source: Calculated by Researchers

Table 4 Heteroskedasticity

Test	*Chi-Square value*	*Probability*
Breusch-Pagan/ Cook-Weisberg test	chi2(1) = 29.27	Prob > chi2 = 0.0000
White's test	chi2(117) = 245.10	Prob > chi2 = 0.0000

Source: Calculated by Researchers

Therefore, based on the results of random effect model shown in Table 5, the study concludes that corporate governance indicators, such as the proportion of independent directors (IDP) [–2.40], have a negative impact on corporate sustainability practices, as measured by an ESG score at the 5% level. The findings show that having more independent directors can help to reduce managers' self-serving behaviour because these directors do not have a financial interest in the company apart from their director fees. As a result, this may lead to lower performance and disclosure related to ESG issues (Albitar et al., 2023; Zhu et al., 2025). However, another corporate governance parameter such as proportion of women directors (WDP) [6.98], have a positive effect on corporate sustainability practices, as measured by an ESG score at 10%. These results agree with the findings of Rooh et al. (2021) and Handayati et al. (2025), who also found that female directors are more likely to carefully review potential problems, which helps to improve ESG practices. Moreover, another corporate governance variable like CEO Duality (CEO DUALITY) [–2.24], have a negative impact on corporate sustainability practices, as measured by an ESG score at the 5% level. The results are similar to the findings of Oyinlola (2025) and Rath et al. (2025), who also report that companies with highly paid CEOs are more likely to face ESG controversies, as these leaders tend to focus more on short-term financial goals rather than long-term sustainability. Further, the CSR sustainability committee (CSR_SC) [21.25] has a positive impact on corporate sustainability practices, as evidenced by an ESG score at 1% level. This result shows that companies with CSR committees perform better in ESG areas than companies that do not have these dedicated committees (Bradhbury et al., 2022; Kouam, 2024).

Furthermore, in terms of control variables, the study reports that liquidity, as measured by the Quick Ratio (QR) [2.81], has positive impact on ESG reporting and practices at 1% level. Similarly, firm age (AGE) [8.39] has positive effect on ESG reporting and practices at 1% level. These results support the findings of Dhaliwal et al. (2011) and Moolkham (2025), who reveal that companies with more cash (liquid) are better able to handle unexpected ESG risks such as social protests, environmental fines, and supply chain issues. Similarly, older companies are usually more familiar with their communities and surroundings, so they are more likely to act responsibly and aim to be good corporate citizens (Ning et al., 2024; Moolkham, 2025). However, another control variable like leverage which is proxied by debt-equity ratio (DE) [–2.29], has a negative impact on ESG reporting and practices at 5% level. According to this finding, businesses with higher debt levels prioritise their financial survival over social and environmental projects (Khan et al., 2013; Zhu et al., 2025). Further, another control variable, profitability, which is proxied by market-based financial performance, Tobin's Q (TQ) [–3.05], has a negative impact on ESG reporting and practices at 1% level. This finding is consistent with Gregory (2021) and D'Amato et al. (2024), who also reports that financially successful businesses are reluctant to use their privileged position to promote

social or environmental causes. Last but not the least control variable like research and development expenses (RDEXP) [–2.41], has a negative impact on ESG reporting and practices at 5% level. According to this finding, businesses that heavily invest in R&D without incorporating CSR may see a decline in their social and ecological performance (Ziegler et al., 2007; Surroca et al., 2010).

Table 5 Panel regression results (Dependent variable: ESG)

Ordinary least square model			*Fixed effect model*		*Random effect model*	
Number of observation [*N*] = *1,744*						
Variables	*Coefficient*	*t-Stat*	*Coefficient*	*t-Stat*	*Coefficient*	*z-Stat*
BS	0.969	9.63***	0.007	0.07	0.152	1.42
IDP	0.0115	0.48	–0.057	–2.53***	–0.057	–2.40**
WDP	0.095	2.64***	0.027	1.08	0.184	6.98***
NBMY	–0.012	–0.08	0.091	0.94	0.074	0.70
CEO DUALITY	–2.161	–4.10***	–0.831	–1.56	–1.225	–2.24**
AC MEETINGS	1.074	5.22***	0.074	0.54	0.239	1.61
CSR_SC	8.896	16.30***	2.535	6.07***	7.637	21.25***
QR	0.673	1.99**	0.861	3.12***	0.834	2.81***
AGE	0.024	2.36**	1.342	21.67***	0.209	8.39***
DE	–0.034	–2.12**	–0.017	–1.31	–0.031	–2.29**
TQ	0.176	1.51	–0.203	–2.08**	–0.321	–3.05***
RDEXP	–0.017	–4.90***	–0.005	–1.91*	–0.007	–2.41**
Intercept	5.821	2.99***	–28.256	–9.54***	13.159	6.12***
F-Stat	81.27***		210.42***			
Wald-χ^2					1768.08***	
R^2	0.322		0.632		0.076	

***Significant at 1% level ** Significant at 5% level *Significant at 10% level.

Source: Calculated by Researchers'

Table 6 Selection of appropriate model

Purpose	*Null hypothesis*	*Test*	*Test statistic*
Ordinary least square model vs. fixed effect model	All $u_i = 0$	Restricted F Test	$F(260, 1471) = 23.22$***
Pooled regression model vs. random effect model	$\sigma^2_u = 0$	Breusch-Pagan LagrangeMultiplierTest	χ^2 (1) = 1854.55***
Fixed effect model vs. random effect model	Difference in coefficients is not systematic	Hausman Test	χ^2 (12) = 285.03

***Significant at 1% level.

Source: Calculated by Researchers'

Table 7 Results of Arellano Bond dynamic panel data model using two-step estimation

	Two-step estimates	
	Number of observation [*N*] = *1,156*	
Variables	*Coefficient*	*z-Stat*
ESG_{it-1}	0.119	3.03***
BS	–0.056	–0.83
IDP	–0.022	–1.62*
WDP	0.022	1.21*
NBMY	0.005	0.11
CEO DUALITY	0.437	1.83*
AC MEETINGS	0.134	1.81*
CSR_SC	1.559	4.97***
QR	0.737	3.19***
AGE	1.016	10.69***
DE	–0.014	–1.49
TQ	0.116	1.94*
RDEXP	–0.003	–0.67
Intercept	–19.132	–5.14***
Wald–Chi^2	677.65***	
Sargan Test for over-identification	43.2323	0.4350
Arellano Bond Test for AR (1)	–2.572*** (p = 0.0001)	
Arellano Bond Test for AR (2)	1.1178 (p = 0.2637)	

i. *** Significant at 1% level; *Denotes significance level at 10%.

ii. z-statistics in one step estimation are based on the robust-standard error to control for heteroskedasticity and autocorrelation.

Source: Calculated by Researchers

The analysis then moves on to Arellano-Bond's (1991) dynamic panel data estimation, which includes both one-step and two-step estimations (Table 7). The dynamic panel data regression also evaluates the effectiveness of the instrument and the autocorrelation of the model's indicators. The model does not have an over-identification restriction problem, according to the insignificant Sargan test statistic for over-identification [43.2323 (p = 0. 4350)].

5.4 Empirical evidence from dynamic panel data analysis: GMM estimation

Similarly, based on the 'GMM-based panel data' in Table 7, the Arellano-Bond test for AR (1), including one and two-step, is found to be insignificant, whereas for AR (2), one version is found to be significant and the other to be insignificant. As a result, second-order auto correlation has no effect on the model with highly significant Wald-$\chi 2$ statistics, which makes it suitable for inference. Therefore, the two-step GMM-based

panel data regression analysis used in the study indicates that the corporate governance parameters like proportion of women directors (WDP) [1.21], CEO Duality (CEO DUALITY) [1.83], and audit committee meetings (AC MEETINGS) [1.81] have a positive impact on ESG reporting and practices at 10% level. These findings show that having more female directors on the board helps to improve the quality of environmental reporting and increases investors' trust in what management communicates (Velte, 2017; Albitar et al., 2023). Also, when more CEOs are part of the board, they have greater control over the company's actions, which can lead to better ESG disclosure (Abdullah et al., 2024; Rath et al., 2025). In addition, regular audit committee meetings help the board to stay informed and discuss ESG-related performance and disclosures (Burcă et al., 2024; Fayad et al., 2024). But in case of other corporate governance variable like proportion of independent director (IDP) [–1.62] is found to be negatively significant on ESG reporting and practices at 10% level because having too many independent directors on board can reduce the influence of insiders who bring valuable experience, reputation, and expertise. This can lead to lower-quality ESG reporting and weaker sustainability practices (Abdelazim and Khalaf, 2024; Kamarudin et al., 2025). Also, when there are many independent directors, it becomes harder to coordinate and communicate effectively, making it difficult to make timely decisions about environmental and social issues (Suttipun, 2021; Jeyhunov et al., 2025). Further in case of CSR sustainability committee (CSR_SC) [4.97], it is found to influence ESG reporting and practices at 1% level. The results agree with Kouam (2024) and Muhammad and Tadele (2026), who found that companies with CSR committees tend to have better quality sustainability disclosures, which helps to reduce ESG-related conflicts. Additionally, CSR committees are more focused on including ESG goals into the company's overall strategy (Dicuonzo et al., 2022; Maroun, 2022).

However, in terms of control variables, the study finds that liquidity, as measured by a quick ratio (QR) [3. 19], firm age (AGE) [10.69], and profitability, as measured by market-based financial performance, Tobin's Q (TQ) [1.94], all positively affect the performance of ESG at the 1% and 10% levels, respectively. This is because more liquid companies are more likely to disclose information about their ESG performance because they can meet both short-term and long-term stakeholder expectations (Lys et al., 205; Fatemi et al., 2018). Mature companies recognise that environmental and social performance have the potential to shape brand image and attract customers (KB, 2021; Ning et al., 2024). Furthermore, companies with high profitability give management the freedom and flexibility to implement and disclose extensive ESG programs (Albitar et al., 2023; Dahal et al., 2024).

6 Conclusion and policy recommendations

This study looked at how different aspects of corporate governance and company characteristics affect sustainable performance, which was measured through ESG reporting and practices. It analysed data from 404 non-financial companies in India over a 10-year period, from 2014 to 2024, using panel data regression analysis. The corporate governance factors examined included board size, board independence, the percentage of women directors, the number of board meetings, CEO duality (where the CEO is also the board chair), and the number of audit committee meetings, along with the presence of a CSR sustainability committee. The results showed that having more women directors,

CEO duality, and frequent audit committee meetings improves ESG reporting and practices within the corporations. Interestingly, board independence was found to have a negative impact on sustainable performance. Moreover, the presence of a CSR sustainability committee also had a positive influence on ESG outcomes. Additionally, among the company-specific control variables, higher liquidity, older firm age, and better profitability were linked with improved ESG reporting and practices. Overall, the study highlights that both internal governance structures and certain financial characteristics play an important role in how actively companies engage in sustainability efforts.

The results of the study will be helpful in assessing the level of knowledge that managers, shareholders, lawmakers, and decision-makers have regarding corporate governance and its relationship to ESG ratings. First, women should be included on key committees such as the ESG, audit, risk, or CSR committees so that they can have a greater direct impact on decisions and policies, which will further improve ESG performance. Second, more women directors with backgrounds in social development, sustainability, and climate policy can be appointed to directly influence ESG choices. Third, larger boards have the capacity to attract individuals with a wider range of expertise, networks, and ESG skills. This improves comprehension of ESG issues. Fourth, since independent directors frequently prioritise short-term financial gain over long-term environmental and social objectives, increasing the number of them may not be good for sustainability. Finally, in order to guarantee ongoing monitoring of ESG-related risks and reporting, companies should increase the frequency of their audit committee meetings to quarterly or monthly, particularly in ESG-sensitive industries.

This study has a few limitations that open opportunities for future research. It focuses only on Indian companies, so future studies could look at firms across different countries to see how corporate governance and CSR sustainability committees affect ESG performance in various contexts. The ESG data used in this study was taken from the Bloomberg database and is only available yearly, but using monthly data in future research could give a more detailed and accurate picture. The study covers the years 2014 to 2024, so researchers could compare the results before and after the implementation of CSR policies. Also, this study only includes non-financial companies listed on the NSE 500 index. Future research could expand the sample to include all companies listed on the National Stock Exchange. Lastly, while this study focused on internal aspects of corporate governance, such as board structure and CSR committees, future research could explore external governance factors like market regulations, investor pressure, or stakeholder engagement.

Conflict of interest

All the authors declare that they have no conflict of interest.

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