
How do governance and CSR synergise for superior ESG performance?

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Abstract: This paper examined the impact of various aspects of corporate governance and corporate social responsibility (CSR) on the sustainability of a company. The corporate sustainability practice was assessed in terms of the environmental, social and governance (ESG) scores provided by Bloomberg. The proposed study will add to the current knowledge about the influence of corporate governance structures and CSR sustainability committees on the ESG outcomes of businesses in the sphere of Indian non-financial corporations through careful analysis of existing literature and the establishment of a model. The hypotheses were tested over a 13-year period (2010–2022) using a static and dynamic panel data regression analysis of 404 corporations listed on National Stock Exchange. According to the findings, board size, female directors, and audit committee meetings have an impact on corporate sustainability. However, the proportion of independent directors influences EDS, SDS and ESG. Furthermore, CSR committee practices demonstrate that employee CSR training has a significant effect on overall corporate sustainability. Moreover, CSR committee meetings influence certain aspects of corporate sustainability. These results suggest that paying executives based on ESG performance can push companies to think more about the future and the environment.

Keywords: corporate governance; CSR committee practices; environmental; social; governance.

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1 Introduction

The contemporary business environment is shifting, and it is not sufficient merely to consider the bottom line of financials because business success in the long run relies on how effectively businesses address broader societal and environmental challenges (Grewatsch and Kleindienst, 2017). In contemporary times, corporate governance principles have grown to become relevant not merely as a principle of acquiescence but as a long-term value creation engine in the corporate world. Although financial indicators are still used, environmental, social and governance (ESG) ratings help to quantify a corporation's real commitment to sustainability and ethics (Naik et al., 2024). This could be due to quite a lot of factors, including government regulations, social responsibility initiatives, investor interest in sustainability performance, and potential benefits of ESG practices for business performance. Because of this, the public and investors have placed more emphasis on corporate sustainability in recent years, putting pressure on companies to compile comprehensive data concerning the benefits and drawbacks of their social and environmental initiatives and incorporate them into their business and strategic plans (Nicolo et al., 2023). However, financial experts and investors have shifted their tactics for capital allocation. The majority of organisations are giving priority to ESG data to enhance future cash flow assessment and risk profiles and to price investments more precisely (Veltri et al., 2023). In general, every corporation issues special ESG reports in order to demonstrate that it is sustainable and responsible due to the relevance of such values to society and investors (Slacik and Greiling, 2020). To generate long-term benefits and subsequently boost the quantity and calibre of information reported on these

problems, corporate executives and business leaders are also considering how to effectively identify sustainability issues. In addition to policies, procedures, and laws, the ESG reporting activities are driven by the recognition of the importance of focusing on ESG issues that impact corporate value and economic performance (Shackleton et al., 2022). Numerous organisations that monitor and disseminate ESG metrics are also calling for improved disclosure. Investing in ESG requires self-governing ratings that concentrate on examining a corporation's policies and behaviour regarding societal impact, ecological impact and regulator issues. ESG metrics are typically not mandated in financial reporting requirements, but businesses are progressively including them in their annual reports or standalone sustainability reports. The reason for this is that businesses regard ESG reporting as a tactical tool for bridging information gaps, establishing legitimacy, and ensuring investor confidence.

Few research has been conducted concerning the effects of various corporate governance indicators and corporate social responsibility (CSR) committee operations on the respective elements of ESG performance, that is, 'the ESG' scores in non-financial companies in India. The majority of the available literature scrutinises the ESG score in general or looks at governance and CSR separately (Bucchetti et al., 2024). The significance of CSR sustainability committees, especially their frequency of meetings and employee training, has not yet received wider recognition in the Indian context despite their growing importance in CSR sustainability governance. Few studies have actually covered the development of the ESG scores across a long-time span, including the years between 2010 and 2022, which creates a gap in terms of comprehending the dynamics of corporate sustainability performance over an extensive time period. Also, few studies have been conducted using multiple theoretical lenses to explain the role of governance structures and CSR practices in determining ESG performance.

Corporate governance structures, like board size, independence, women directors, and audit committee meetings, are in place to regulate and monitor executive decisions and corporate activities that involve society and community engagement and offer both direct and indirect benefits to investors (Kumar and Sujit, 2022). The board of directors, which is principally in charge of corporate governance, oversees keeping an eye on executives and ensuring that investors' needs are encountered (Naciti et al., 2022). Previous research (Albitar et al., 2023; Khalid et al., 2022) shows a positive association between board size and ESG reporting because larger boards are more likely to implement eco-friendly work practices and management regulations. Similarly, by inhibiting opportunistic behaviour of corporations, independent directors enhance the efficiency of the board (Helfaya et al., 2023). Women on boards are also believed to contribute to making a significant impact on ESG disclosure (Mondal and Sahu, 2024). Also, the directors of audit committees have the possibility to bring a wide range of expertise, perspectives, skills, and experience to their meetings, which results in more effective monitoring (Arif et al., 2021).

Moreover, a CSR committee is usually envisioned as a subcommittee of the board of directors. Its members can be drawn from various categories, including sustainable development, ethics, public responsibility, and health and safety (Abdullah et al., 2024). The aim of 'CSR' training is to provide employees with basic information concerning the company's CSR undertakings and how they are realised (Fahad and Rahman, 2020).

The proposed study will augment to the current knowledge about the impact of corporate governance structures and CSR sustainability committees on the ESG outcomes of businesses in the sphere of Indian non-financial corporations through careful analysis

of existing literature and the establishment of a model. So, the guiding principle of the research is to study the impact of the governance structure and composition of the CSR sustainability committees on ESG performance in Indian non-financial firms. In addition, the study evaluates how Indian companies perform annually concerning ESG practices. The lingering part of the article is organised in the following way. In Section 2, the effect of corporate governance characteristics and CSR committee practices on ESG practices is examined, and a hypothesis along with its theoretical background is constructed. The theoretical backgrounds applied in this research are agency theory, stakeholder theory, signalling theory, institutional theory, and legitimacy theory, which seek to provide different outlooks on how organisations relate to the environment, maintain relationships and ensure legitimation. This entails details on how the samples have been selected, the dataset used, the description of the variables, and the econometric models utilised in the analysis shown in Section 3. In Section 4, the findings of the empirical analysis are provided in the form of descriptive statistics, diagnostic tests, and both static and dynamic panel data regressions. Section 5 entails the results and discussion part. Lastly, Section 6 concludes the paper, makes real-life recommendations, and highlights limitations of the research and future research opportunities.

2 Theoretical underpinning, literature review and hypotheses development

2.1 Theoretical underpinning

Based on different underlying corporate governance theories, like agency, stakeholder, signalling, institutional, and legitimacy, a wide range of research on ESG disclosure in current years has expanded vastly. According to Raimo et al. (2021), agency theory pinpoints the prevalence of agency complications and information asymmetry between principals or shareholders and agents or managers. Agency theory has often been related to the effect of ESG practices and reporting on corporate performance, according to Alsayegh et al. (2020). In accordance to this theory, managers use ESG practices to accomplish their goals. Although the manager should act in the best interests of the shareholders, he usually pursues his own goal to ascertain the shareholders' interests (Carnini Pulino et al., 2022), whereas stakeholder theory recommends that all company actors should be held responsible to shareholders and other investors (Freeman, 1994). This theory supports the internal use of a tool that is strategised towards the improvement of the environment and societal welfare, which are non-financial goals. Furthermore, signalling theory enhances information asymmetry by focusing on the market signals, which leads to a probable occurrence of two parties making informed decisions. Researchers such as Thornton and Flynn (2003) argue that the signalling theory indicates that voluntary disclosure leads to value-related data concerning ESG practices and disclosure activities. Businesses use this optional non-financial disclosure to show off their accomplishments in sustainability, justify their existence, and maintain their standing as reputable companies (Helfaya and Moussa, 2017). According to Scott and Meyer (1994), some organisational practices are adopted because they are consistent with institutional expectations that are not under a corporation's control. Corporate success is examined in relation to social and ecological performance through the lens of institutional theory (Bilyay-Erdogan, 2022). This pertains to legitimacy in that more detailed ESG data releases that assist investors in evaluating the social and eco-friendly effects of

companies' operations can help establish corporate legitimacy (Helfaya and Moussa, 2017). Thus, to accomplish sustainable growth through societal acceptance of their community and to legitimise their existence, firms are highly motivated by the legitimacy theory to disclose additional ESG information (Shaukat et al., 2016). Hence, by establishing connections between these five theories, a framework for corporate ESG disclosure is established. As a result, by disclosing ESG, companies can convince the public that their operations are compliant with social acceptability (Shaukat et al., 2016).

2.2 Empirical literature review and hypotheses development

Most countries have launched initiatives to encourage organisations to engage in sustainability disclosure activities and align with Sustainable Development Goals as part of their overall performance improvement strategies. Yet, the understanding of corporate governance, CSR acceptance, and ESG disclosures remains scanty. The existing study pursued the understanding by identifying the potential corporate governance characteristics and CSR committee practices that may influence voluntary ESG disclosures. In this context, past scholars have expressed their opinions using a number of ESG reporting indicators, which are explained below.

2.2.1 Corporate governance characteristics and corporate sustainability

The board of directors is among the most crucial elements of the corporate governance framework. Its role has attracted a lot of consideration because it frequently expands its mandate to include social and ecological issues to better serve investors' needs and raise the bar for integrated reporting (Agyemang et al., 2020; Zaman et al., 2022). A number of authors have noted a positive linkage between board size and disclosure about the environment (De Villiers et al., 2011; Khalid et al., 2022; Mondal and Sahu, 2025); board size and disclosure about social issues (Maswadi and Amran, 2023; Oware et al., 2024); board size and disclosure about governance (Hu and Loh, 2018; Chebbi and Ammer, 2022); and board size and ESG practices (Husted and De Sousa Filho, 2019; Amin et al., 2021). This is because more diverse backgrounds on larger boards lead to better environmental governance. However, larger boards can oversee more CSR initiatives and more effectually communicate their social performance to investors due to their reduced workload and distractions. However, other studies (Yahaya et al., 2022; Agarwala et al., 2023; Vig, 2024) found adverse effects because an excessive number of directors could impede the board's ability to make decisions and the costs associated with a larger board may outweigh any environmental benefits. Many directors who are independent are becoming more worried about the corporation's goodwill and reputation as a result of disclosures (Oware et al., 2024; Sridhar et al., 2025). Most of the researchers revealed a positive impact of board independence on environmental, social governance, and combined disclosure because larger independent directors are revealing more ESG information and are more interested in the CSR programmes and performance of their companies in order to fulfil their social and environmental duties to investors (Dah and Jizi, 2017; Helfaya et al., 2023; Dhochak et al., 2024). A sizable number of independent directors are adept at promoting policies that uphold the company's social obligations and promote transparency because they are impartial (Nicolo et al., 2023; Handayati et al., 2025). But some researchers also report inverse impact of board independence and

environmental performance because independent directors usually distrust non-financial data disclosure because endorsing potentially inaccurate information jeopardises their reputational credibility with shareholders (Mallin et al., 2012; Zhang et al., 2023). The presence of female directors on the board has shown an improvement on governance, social, and environmental outcomes in previous studies (Wang et al., 2021; Vacca et al., 2020; Le et al., 2023) for the following reasons such as female board members are typically viewed as cautious and involved in the community, attributes that align with a greater focus on sustainability and ethical governance. Likewise, the presence of female directors is imperative in advancing ethical decision-making and transparent reporting of CSR related business operations. In contrast, studies such as those conducted by Gavana et al. (2023) and Atmadya (2025) reveal that the occurrence of more female directors on boards has a unfavourable effect on ecological and social disclosure due to their role as silent partners in business. One of the Audit Committee's many features are how frequently it meets, which enables members to monitor environmental activities more effectively and routinely (Lisic et al., 2016; Appuhami and Tashakor, 2017). Furthermore, the regularity of audit committee meetings has a substantial positive relationship with governance disclosure score (GDS) because regular meetings strengthen the AC's ability to adequately monitor and ensure accuracy of CSR disclosures (Namakavarani et al., 2021). However, other studies, such as Elmghaamez et al. (2023), found that audit committee meetings had a negative effect on the environmental and social performance.

Most studies (Albitar et al., 2023; Le et al., 2023; Yadav et al., 2025) focused on the association between board attributes and overall ESG performance, with few examining the impact of corporate governance attributes on individual and combined ESG scores. Numerous empirical investigations have examined corporate governance and the possible effects on corporate sustainability that may arise from modifications to the composition of the board of directors (Gerged et al., 2023; Helfaya and Moussa, 2017). But in India, there has not been enough focus on the effects of different corporate governance facets, like gender diversity and audit committee meetings. In light of these details, the study contributes to the expanding corpus of literature by exploring the connection between corporate governance characteristics and corporate sustainability. In particular, the following hypothesis is proposed:

H1 Corporate governance characteristics affect the level of corporate sustainability.

2.2.2 CSR committee practices and corporate sustainability

In terms of the CSR committee's attributes, a clear connection exists between the number of corporate sustainability meetings and corporate sustainability (Vinjamury, 2025). Accordingly, a number of studies (Hussain et al., 2018; Nguyen et al., 2021) have demonstrated that committee members who attend regular meetings have more opportunities to build network and stay informed through the inherent connections that a company has with external resources. Through regular meetings, the committee members will get access to external networks, including industry experts, partners, or consultants, which means they will learn about trends, best practices and emerging ideas. The external insight will guide them in making better decisions and eventually improve the governance and CSR of the business firm. According to studies like La Fuente et al.

(2017), there is a possibility that ongoing CSR committee interactions in their meetings will lead to more comprehensive governance disclosures. However, other researchers, such as Abdullah et al. (2024) and Muhammad and Tadele (2025), found that the ethical reputation of CSR committees is negatively impacted by frequent board meetings.

Employee CSR training ensures that staff members are fundamentally aware of the company's various ecological and social projects (Fahad and Rahman, 2020). Previous research (Brieger et al., 2019; Fahad and Rahman, 2020; Yu et al., 2021) has demonstrated that the inclusion of CSR employee training on the board improves ESG outcomes for the following reasons: CSR training and initiatives not only improve competitive advantages, but also have a positive impact on employee behaviour toward ecological sustainability. In a similar vein, training can aid in an employee's education regarding the company's CSR endeavours (Jóhannsdóttir and Ólafsson, 2015).

To avoid spurious regression estimates, model misspecification, and omitted variable bias (OVb), which could affect the range of the ecological, social and governance scores, the study used several firm-specific control variables like liquidity, firm age, leverage and profitability. Liquidity is measured using the quick ratio, while leverage is represented by the debt-equity ratio. Profitability is measured using a market-based financial indicator called Tobin's Q, which provides a more complete, future-oriented, and market-sensitive measure compared to accounting-based indicators like ROA or ROE. Tobin's Q reflects how investors view a company's potential and value its ethical behaviour, governance quality and sustainability efforts (Gompers et al., 2003; Lu and Bhattacharya, 2009; Yahaya et al., 2022). A company's ability to devote more capital to sustainability-related expenses is enhanced by liquidity's favourable effects on market capitalisation and sales growth (Farhan et al., 2023). However, researchers like Luo (2022) report that investors receive lower returns when they buy stocks of high-ESG businesses because of their high liquidity. More environmental disclosure and a heightened awareness of social responsibility are provided by mature companies due to their more consolidated information collection and representation systems (Maswadi and Amran, 2023). On the other hand, older businesses are less flexible and have greater costs related to environmental activities (Le et al., 2023). To reduce their agency costs to both short and long-term creditors, higher leveraged companies are more inclined to share eco-friendly information (Adeneye and Kammoun, 2022). On the other hand, businesses with substantial financial leverage may limit voluntary disclosures due to the high cost of preparation (Andrikopoulos and Kriklani, 2012). According to Giannopoulos et al. (2022), profitable businesses can more readily adopt socially integrated disclosure programmes to show off their social responsibility and improve the public's opinion of their performance. However, because CSR initiatives are expensive and do not always pay off, more profitable companies typically reveal less information about their ecological and social disclosures to highlight their social contributions (Saygili et al., 2022).

The impact of CSR practices, such as employee CSR training and the frequency of CSR sustainability meetings, on overall ESG scores has been the subject of a small number of specific studies (Nguyen et al., 2021; Abdullah et al., 2024). Even less research has been done on how these practices affect how each person rates the ESG dimensions (Hussain et al., 2018; Fahad and Rahman, 2020). In light of these facts, the

study adds to the expanding body of literature by examining the connection between corporate sustainability and CSR committee practices. Specifically, the subsequent hypothesis is proposed:

H2 CSR committee practices influence the level of corporate sustainability.

3 Research methodology

3.1 Sample design

The study sought to ascertain the impact of corporate governance parameters such as board size, board independence, women directors, audit committee meetings, and CSR sustainability committee practices indicators such as CSR committee meetings and employee CSR training, as well as control variables such as liquidity, firm age, leverage, and profitability, on the firm's corporate sustainability. To conduct the research, the study employs a set of moderately balanced panel data that includes 404 non-financial businesses listed on the 'National Stock Exchange (NSE)' 500 index India for 13 years, from 2010 to 2022. The study period 2010–2022 represents the era when CSR transitioned from being voluntary to a regulated corporate responsibility. This period was a turning point for India's corporate governance with the SEBI LODR (2015) and Kotak Committee (2018). It was also a time when the world started paying more attention to ESG and sustainability.

However, 96 financial sector firms are eliminated from the final 500 sample firms due to incomparability and inconsistent use of guidelines and rules when preparing the accounts in the annual reports, as well as to maintain constancy in the data structure of the sampled firms. The NSE 500 Index was used in the study to make further deductions regarding the accepted standards and guidelines for Indian companies' corporate sustainability. The broad Indian market stocks of the country's principal industries are included in the NSE 500 Index.

The sustainability reports, annual reports, and Global Reporting Initiative (GRI) reports were thoroughly reviewed to identify environmental performance and disclosure practices. Annual reports and sustainability reports were gathered from corporations' official websites. The disclosure items were gathered from the GRI websites. All financial datasets were obtained from database software such as 'Prowess', which is marketed and powered by the Centre for Monitoring the Indian Economy (CMIE) Analytics, and 'Capitaline Plus', which is powered and marketed by Capital Market Publishers Private Limited (Mumbai).

3.2 Variables used in the study

The study uses several significant variables to predict corporate governance characteristics, CSR committee practices, and corporate sustainability in Indian manufacturing corporations. In addition, a set of empirically supported and relevant firm-specific variables are considered to control the impact of other possible aspects of firm performance. Table 1 describes the entire set of variables that were used in the study.

Table 1 Description of variables

	<i>Variable</i>	<i>Acronym</i>	<i>Measurement</i>
Explained variables	Environmental disclosure score	EDS	A composite score taken from Bloomberg, which varies between the minimum amount of 0.1 and the maximum amount of 100, has been developed as an indicator to signify ecological practices and doings like (material consumption, carbon emission, water withdrawal, hazardous waste, etc.) (Ozparlak and Gurol, 2023).
	Social disclosure score	SDS	A composite score taken from Bloomberg, which varies between the minimum amount of 0.1 and the maximum amount of 100, has been developed as an indicator to signify employee relations, such as employee health and welfare, as well as their training and development including training in CSR. It also likely to be reflective of a firm's actual social performance (Teja, 2024).
	Governance disclosure score	GDS	A composite score taken from Bloomberg. It ranges from 0.1 for companies that disclose a minimum amount of governance data to 100 for those that disclose every data point. Each data point is weighted in terms of importance, with board of directors' data carrying greater weight than other disclosures (Saha and Kabra, 2022).
	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 (Al-Duais et al., 2021).
	Board size	BS	Number of directors who are available on board (Khalid et al., 2022).
	Proportion of independent directors	IDP	Number of independent directors on the company's board divided by total number of directors (Kamaludin et al., 2022).
	Proportion of women director	WDP	Number of women directors on the supervisory board divided by total number of directors (Kamaludin et al., 2022).
	Audit committee meetings	AC MEETINGS	Number of meetings held in a specific year (Cheung and Lai, 2023).
	No. of CSR sustainability committee meetings	CSR_SC MEETINGS	The number of meetings that committees have each year (Elmaghrabi, 2021).

Source: Prepared by researchers

Table 1 Description of variables (continued)

	<i>Variable</i>	<i>Acronym</i>	<i>Measurement</i>
Explanatory variables	Employee CSR training	EMPLOYEE CSRTRAINING	It is calculated using a binary coding system of content analysis, with '1' assigned if the firm provides employee training policies and '0' otherwise (Fahad and Rahman, 2020).
Control variables	Liquidity (quick ratio)	QR	It is calculated by adding cash plus effect plus receivables whole divided by current debt * 100 (Yu et al., 2021).
	Firms age	AGE	The age of the company, calculated from its incorporation year (Nadiyasu and Samuel, 2025).
	Leverage (debt-equity ratio)	DE	Total debt / shareholders' equity * 100 (Adeneye and Kammoun, 2022).
	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 (Saygili et al., 2022).

Source: Prepared by researchers

3.3 Research methods

This study makes use of both dynamic specifications [using generalised method of moments (GMM)] and static estimations [using pooled ordinary least square (OLS), fixed effect model (FEM) and random effect model (REM)]. If time-invariant covariates are removed from the simple pooled OLS model, bias and unpredictable results because unobserved error terms have a strong correlation with error terms. The FEM produces unbiased and consistent parameters if time-invariant variables that are omitted and correlated with the dependent variable. The Breusch-Pagan Lagrange (BPLM) test (Breusch and Pagan, 1980) tests the validity of this assumption. However, if the omitted variables are not covariates with the regressand variable, the REM will yield unbiased and consistent results. The validity of this assumption is tested using the Hausman (1978) specification test. Thus, the study intended to test the research hypothesis using the subsequent four models, as shown below:

$$\begin{aligned}
 EDS_{it} = & \alpha + \gamma_1(BS) + \gamma_2(IDP) + \gamma_3(WDP) + \gamma_4(AC\ MEETINGS) \\
 & + \gamma_5(CSR_SC\ MEETINGS) + \gamma_6(EMPLOYEECSRTRAINING) \\
 & + \beta_1(QR) + \beta_2(AGE) + \beta_3(DE) + \beta_4(TQ) + \varepsilon_{it}
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 SDS_{it} = & \alpha + \gamma_1(BS) + \gamma_2(IDP) + \gamma_3(WDP) + \gamma_4(AC\ MEETINGS) \\
 & + \gamma_5(CSR_SC\ MEETINGS) + \gamma_6(EMPLOYEECSRTRAINING) \\
 & + \beta_1(QR) + \beta_2(AGE) + \beta_3(DE) + \beta_4(TQ) + \varepsilon_{it}
 \end{aligned} \tag{2}$$

$$\begin{aligned}
 GDS_{it} = & \alpha + \gamma_1(BS) + \gamma_2(IDP) + \gamma_3(WDP) + \gamma_4(AC\ MEETINGS) \\
 & + \gamma_5(CSR_SC\ MEETINGS) + \gamma_6(EMPLOYEECSRTRAINING) \\
 & + \beta_1(QR) + \beta_2(AGE) + \beta_3(DE) + \beta_4(TQ) + \varepsilon_{it}
 \end{aligned} \tag{3}$$

$$\begin{aligned}
 ESG_{it} = & \alpha + \gamma_1(BS) + \gamma_2(IDP) + \gamma_3(WDP) + \gamma_4(AC\ MEETINGS) \\
 & + \gamma_5(CSR_SC\ MEETINGS) + \gamma_6(EMPLOYEECSRTRAINING) \\
 & + \beta_1(QR) + \beta_2(AGE) + \beta_3(DE) + \beta_4(TQ) + \varepsilon_{it}
 \end{aligned} \tag{4}$$

Here, EDS_{it} refers to environmental disclosure score (EDS) of i^{th} corporations at time period t , SDS_{it} refers to social disclosure score (SDS) of i^{th} corporations at time period t , GDS_{it} refers to GDS of i^{th} corporations at time period t , and ESG_{it} signifies to ESG score of i^{th} corporations at time period t ; α symbolises the constant term, γ_1 to γ_4 indicates the coefficients of corporate governance characteristics such as board size, proportion of independent directors, proportion of women directors, audit committee meetings, and γ_5 and γ_6 represents the coefficients of CSR committee practices such as CSR sustainability committee meetings, employee CSR training respectively, β_1 to β_4 embodies several companies' specific characteristics such as liquidity, firm age, leverage, and profitability, and ε_{it} denotes to the error term.

Furthermore, the study switches back to testing the dynamic effect in the model by simply adding a lagged dependent variable after determining which of the three models (OLSR, FEM and REM) fits best for the static panel data analysis (Mondal and Sahu, 2023). It is common knowledge that the inclusion of the dependent variable that is lagged will typically reveal an inconsistent standard estimator. It has been noticed that consistent estimators employ the 'GMM' approach developed by Arellano and Bond (1991). This method involves modifying an equation to account for first differences and then using the lag value of endogenous variables as an instrument to determine how many instruments are used in each time period. This method was applied in the current study to obtain estimates using Strata version 17.0 for the dynamic panel data. In the non-appearance of serial correlation, the GMM estimates will be erratic. The lack of second-order autocorrelation in the first differenced model would provide evidence of this problem in the model. Thus, in addition to the Sargan test of instrumental validity, the study reports a diagnostic test for both first- and second-order auto correlation.

To test the hypotheses discussed in the previous section, the study develops and uses dynamic models. These models help examine how different factors change over time and how past performance or decisions influence current outcomes. By using dynamic models, the study can better understand the ongoing relationships between corporate governance, CSR committee attributes, and ESG practices, rather than looking at them as one-time effects.

$$\begin{aligned}
 EDS_{it} = & \alpha EDS_{it-1} + \gamma_1(BS) + \gamma_2(IDP) + \gamma_3(WDP) + \gamma_4(AC\ MEETINGS) \\
 & + \gamma_5(CSR_SC\ MEETINGS) + \gamma_6(EMPLOYEECSRTRAINING) \\
 & + \beta_1(QR) + \beta_2(AGE) + \beta_3(DE) + \beta_4(TQ) + \varepsilon_{it}
 \end{aligned} \tag{5}$$

$$\begin{aligned}
 SDS_{it} = & \alpha SDS_{it-1} + \gamma_1(BS) + \gamma_2(IDP) + \gamma_3(WDP) + \gamma_4(AC\ MEETINGS) \\
 & + \gamma_5(CSR_SC\ MEETINGS) + \gamma_6(EMPLOYEECSRTRAINING) \\
 & + \beta_1(QR) + \beta_2(AGE) + \beta_3(DE) + \beta_4(TQ) + \varepsilon_{it}
 \end{aligned} \tag{6}$$

$$\begin{aligned}
 GDS_{it} = & \alpha GDS_{it-1} + \gamma_1(BS) + \gamma_2(IDP) + \gamma_3(WDP) + \gamma_4(AC\ MEETINGS) \\
 & + \gamma_5(CSR_SC\ MEETINGS) + \gamma_6(EMPLOYEECSRTRAINING) \\
 & + \beta_1(QR) + \beta_2(AGE) + \beta_3(DE) + \beta_4(TQ) + \varepsilon_{it}
 \end{aligned} \tag{7}$$

$$\begin{aligned}
 ESG_{it} = & \alpha ESG_{it-1} + \gamma_1 (BS) + \gamma_2 (IDP) + \gamma_3 (WDP) + \gamma_4 (AC \text{ MEETINGS}) \\
 & + \gamma_5 (CSR_SC \text{ MEETINGS}) + \gamma_6 (EMPLOYEECSRTRAINING) \\
 & + \beta_1 (QR) + \beta_2 (AGE) + \beta_3 (DE) + \beta_4 (TQ) + \varepsilon_{it}
 \end{aligned} \tag{8}$$

Here, EDS_{it} denotes to EDS of i^{th} corporations at time period t , SDS_{it} denotes to SDS of i^{th} corporations at time period t , GDS_{it} denotes to GDS of i^{th} corporations at time period t , and ESG_{it} indicates to ESG score of i^{th} corporations at time period t ; α symbolises the constant term, EDS_{it-1} refers to one year lag period of EDS; SDS_{it-1} refers to one year lag period of SDS; GDS_{it-1} refers to one year lag period of GDS and ESG_{it-1} refers to one year lag period of ESG score; γ_1 to γ_4 indicates the coefficients of corporate governance characteristics such as board size, proportion of independent directors, proportion of women directors, audit committee meetings, and γ_5 and γ_6 represents the coefficients of CSR committee practices such as CSR sustainability committee meetings, employee CSR training, respectively, β_1 to β_4 embodies several companies' specific characteristics such as liquidity, firm age, leverage, and profitability, and ε_{it} denotes to the error term.

4 Analysis and findings

4.1 Descriptive statistics

The descriptive statistics, which include the mean, standard deviation, minimum and maximum values, are shown in Table 2. The findings of the study interprets that there exists a rising trend for 'EDS' (Figure 1); 'GDS' (Figure 3); and combined 'ESG disclosure' score (Figure 4). However, in case of the 'SDS', a significant positive jump occurred in the year 2018 and is still increasing (Figure 2). When considering the independent variable, it is discovered that the minimum number of female directors is 0. This indicates that many businesses have not yet appointed women to the board of directors. Additionally, the average value for employee CSR training is 0.68, meaning that approximately 68% of organisations train their staff in CSR. Furthermore, the firm liquidity has a standard deviation of 0.65 and an average of 0.88. The average age of the corporations is 39.77, which suggests that they have been in operation for a longer duration. On average, leverage is 11.12%, while profitability is 25.55%.

4.2 Diagnostics test

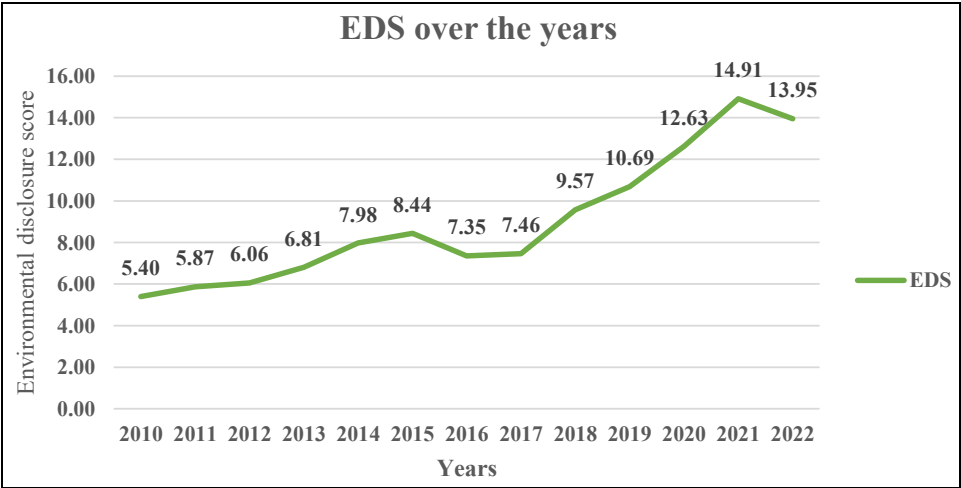
Table 3 indicates that the multicollinearity property is not found in the current research, as the correlation value between the regressor variables is less than 0.80 (Gujarati, 2009). Table 3 also contains the variance inflation factor (VIF) values for the regressor and control variables. Researchers from the past, such as Chatterjee and Hadi (2013), suggested using a VIF of 10 as a threshold for high correlations between variables. The VIF values in this instance were all less than 2, indicating that multicollinearity property was not present.

Table 2 Summary statistics of dependent and independent variables

<i>Variable</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum value</i>	<i>Maximum value</i>
<i>EDS</i>	8.86	11.22	0	45.42
<i>SDS</i>	14.06	11.30	0	42.32
<i>GDS</i>	66.70	14.61	0	96.12
<i>ESG</i>	25.55	12.14	0	55.65
<i>BS</i>	9.44	2.22	5	14
<i>IDP</i>	51.78	8.78	28.57	72.73
<i>WDP</i>	8.94	7.29	0	26.67
<i>AC MEETINGS</i>	5.07	1.35	2	9
<i>CSR_SC MEETINGS</i>	2.39	1.28	0	8
<i>EMPLOYEE CSR TRAINING</i>	0.68	0.25	0	1
<i>QR</i>	0.88	0.65	0.01	3.51
<i>AGE</i>	39.77	23.90	1	114
<i>DE</i>	11.12	14.12	0	59.33
<i>TQ</i>	25.55	12.14	0	55.65

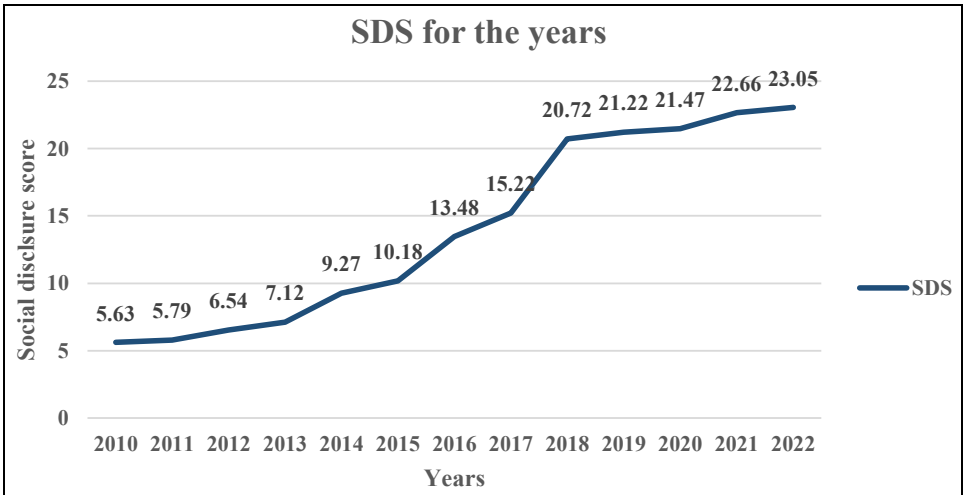
Source: Calculated by researchers

Figure 1 Year-wise trend of EDS (see online version for colours)



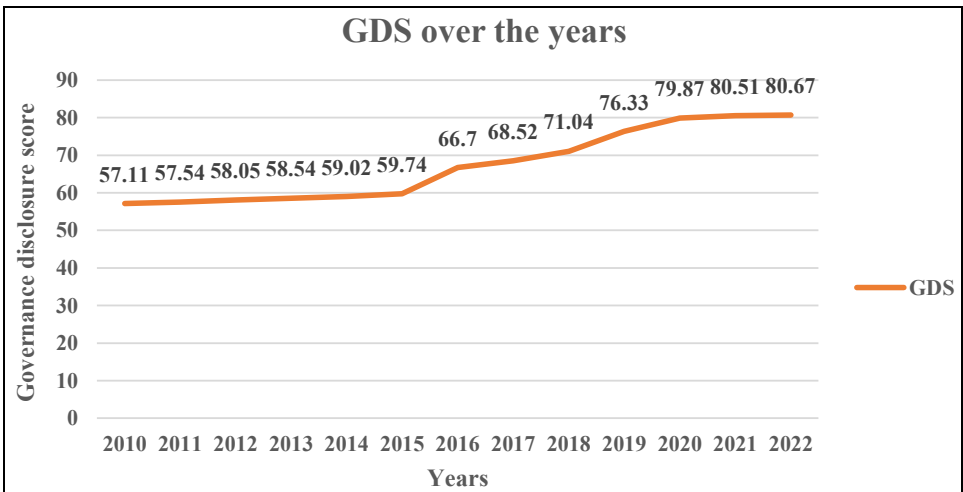
Source: Prepared by researchers

Figure 2 Year-wise trend of SDS (see online version for colours)



Source: Prepared by researchers

Figure 3 Year-wise trend of GDS (see online version for colours)



Source: Prepared by researchers

Table 3 Pairwise correlation matrix with VIF

Independent variables	BS	IDP	WDP	ACMEETINGS	CSR_SC MEETINGS	EMPLOYEE CSRTRAINING	QR	AGE	DE	TQ	VIF
BS	1.00										1.18
IDP	-0.001	1.00									1.05
WDP	-0.004	-0.042**	1.00								1.19
ACMEETINGS	0.179***	-0.029*	0.051**	1.00							1.12
CSR_SC MEETINGS	0.056	-0.103***	-0.063	0.259***	1.00						1.10
EMPLOYEE CSRTRAINING	-0.004	-0.031	0.106***	0.089***	0.052	1.00					1.06
QR	-0.060***	-0.045*	0.028	-0.074***	-0.028	0.015	1.00				1.20
AGE	0.107***	0.022	0.034	0.1088***	-0.017	0.029	-0.026	1.00			1.06
DE	0.083***	0.095***	-0.035	0.055***	-0.048	0.038	-0.237***	-0.091***	1.00		1.17
TQ	-0.037	-0.099***	0.111***	-0.049*	-0.007	-0.028	0.222***	0.064***	-0.222***	1.00	1.10

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

Source: Calculated by researchers

Figure 4 Year-wise trend of ESG score (see online version for colours)

Source: Prepared by researchers

4.3 Empirical evidence from static panel data analysis

The study proceeds to a comprehensive panel data regression to assess the impact of corporate governance and CSR committee practices on the EDS, SDS, GDS and overall ESG performance. Before initiating the dynamic panel data analysis, a preliminary static panel data analysis was performed (see Table 4), which provided an initial understanding of the correlations between corporate governance, CSR committee procedures, and the various disclosure scores and ESG measures. In this early analysis, the best model was chosen after running numerous diagnostic tests, including the restricted F test, the Breusch-Pagan Lagrange multiplier (BP-LM) test (Breusch and Pagan, 1980), and the Hausman (1978) test, as described in Appendix. The substantial results of the restricted F and BP-LM tests (Table 4) indicated that a fixed effects (FEs) or REM would be appropriate. Lastly, the Hausman test, which produced significant findings for all scenarios, indicated the FEM as the best option. So, according to FE model, the study found that board size has a significant positive relationship with both EDS (0.7329361, significant at the 1% level) and SDS (0.3284494, significant at the 5% level). However, it has a significant negative relationship to the comprehensive ESG disclosure score, or ESG (−0.365329, significant at the 5% level). However, no significant association exists between board size and GDS. Further analysis of the makeup of these boards shows that EDS, SDS, GDS, and ESG are not significantly impacted by the proportion of independent directors. Moreover, the findings demonstrate an affirmative and robust connection between the proportion of female directors on boards and two dependent variables, namely, SDS (0.2243796, significant at 1% level) and GDS (0.1336359, significant at 1% level). WDP and comprehensive ESG, however, have a strong negative correlation (−0.0503725, significant at 1% level). Also, the frequency of audit meetings is positively associated with gains in EDS (0.6219055, significant at 1% level) and GDS (0.4078058, significant at 1% level) ratings, highlighting their value in promoting full disclosure procedures. However, these meetings have no significant effect on the SDS

and ESG. The study finds that, with regard to CSR committee practices, the quantity of CSR sustainability meetings has no noticeable impact on any of the dependent variables: EDS, SDS, GDS and ESG. However, employee CSR training, has significant positive connections to all measured scores, i.e., EDS (0.5497445, significant at 10% level), SDS (3.433807, significant at 1% level), GDS (6.526219, significant at 1% level), and ESG (2.985266, significant at 1% level).

Table 4 Panel regression results (static)

<i>Independent variables</i>	<i>Dependent variables</i>			
	<i>EDS</i>	<i>SDS</i>	<i>GDS</i>	<i>ESG</i>
	<i>Coefficient</i>	<i>Coefficient</i>	<i>Coefficient</i>	<i>Coefficient</i>
<i>BS</i>	0.7329361***	0.3284494*	-0.0736362	-0.365329**
<i>IDP</i>	-0.0243574	0.016601	0.037074	0.000837
<i>WDP</i>	-0.0982352	0.2243796***	0.1336359***	-0.0503725***
<i>AC MEETINGS</i>	0.6219055**	0.271793	0.4078058***	-0.1920437
<i>CSR_SC MEETINGS</i>	0.1967109	0.3215026	0.02201	0.2599346
<i>EMPLOYEE CSR TRAINING</i>	0.5497445*	3.433807***	6.526219***	2.985266***
<i>QR</i>	0.1519937	0.8583463*	0.4237449	0.7467136*
<i>AGE</i>	1.409241***	0.0771739***	0.0602134***	1.230767***
<i>DE</i>	-0.945375***	-0.0636564***	-0.115972	-0.0405012**
<i>TQ</i>	-0.3029671	-0.2309868	-0.1628314	-0.0983573
Intercept	-38.96212***	10.97706***	70.42932***	-16.23165***
R ²	0.2279	0.0249	0.1472	0.3701
Restricted F test	16.54***	13.42***	12.18***	20.89***
BP-LM test	373.36***	358.32***	376.49***	342.94***
Hausman test	103.24***	358.32***	141.54***	145.77***
Hetest	38.27***	4.18**	3.67**	4.58***
Imtest	116.56***	101.03**	131.23***	93.60*

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

Source: Calculated by researchers

In terms of control variables, the quick ratio does not interact with EDS or GDS but has a significant positive association with SDS (0.8583463, significant at the 10% level) and ESG (0.7467136, significant at the 10% level). All the dependent variables, including EDS (1.409241, significant at 1% level), SDS (0.0771739, significant at 1% level), GDS (0.0602134, significant at 1% level), and ESG (1.230767, significant at 1% level), show a significant association with the firm's age as well, suggesting that older businesses use more disclosure practices. Tobin's Q has no significant association with any of the dependent variables, including EDS, SDS, GDS and ESG ratings. In contrast, the debt-to-equity ratio has a negative impact on EDS (-0.945375, significant at 1% level), SDS (-0.0636564, significant at 1% level), and ESG (-0.0405012, significant at 5% level).

4.4 Empirical evidence from dynamic panel data analysis: GMM estimation

In evaluating environmental disclosure practices using dynamic panel data (Table 5), the study noted several interesting patterns in which corporate governance and CSR characteristics, as well as specific control factors, influence the EDS. To begin, there is a positive link between board size and environmental disclosure, implying that larger boards relate to greater transparency in environmental topics. This is consistent with the finding of Agyemang et al. (2020) and De Villiers et al. (2011). Contrary to expectations, board independence has a substantial adverse relationship with EDS, illustrating that the mere presence of independent directors is unlikely to enhance eco-friendly disclosure practices directly (Zhang et al., 2023; Albitar et al., 2023). However, there is a significant positive association between the percentage of women directors and EDS. This finding coincides with the outcomes of Wei et al. (2017) and Wang et al. (2021), who imply that a substantial number of women in leadership roles can lead to increased environmental disclosure. Furthermore, the frequency of audit committee meetings appears to have a positive substantial impact on EDS, which agrees with Arif et al. (2021) and Appuhami and Tashakor (2017). Regarding the practices of the CSR committee, there is no discernible correlation between the frequency of corporate sustainability meetings and EDS. Nevertheless, employee CSR training and EDS are positively correlated. Which is in conformity with Yu et al. (2021), who states that CSR training and initiatives not only improve competitive advantages but also positively influence employee behaviour towards environmental sustainability.

When the components influencing SDSs are explored, it is discovered that larger board sizes exhibit a substantial positive association with SDS, implying that larger boards may be more operative in promoting transparency in social practices, which is consistent with Maswadi and Amran (2023) and Oware et al. (2024). Similarly, percentage of independent director has a significant positive relation with SDS (Dah and Jizi, 2017). However, the percentage of women on the board, the frequency of audit committee meetings, and corporate sustainability meetings had no significant impact on SDS, demonstrating that these characteristics might not influence the level of social disclosures. Notably, the study finds that imparting CSR training to staff has a beneficial impact on SDS. This is consistent with the findings of Lê and De Nanteuil (2015) and Fahad and Rahman (2020).

Upon exploring the interaction between the GDS and major governance attributes, along with the CSR Committee's practices, the study discovered that board size is positively associated with GDS. However, the percentage of independent directors and the participation of women on the board do not show a significant any link with GDS, demonstrating that these variables are unlikely to have a direct influence on the degree of governance disclosures. Furthermore, the regularity of audit committee meetings has a substantial positive relationship with GDS. This validates the findings of Appuhami and Tashakor (2017), who also determined that regular meetings strengthen the AC's ability to adequately monitor and ensure accuracy of CSR disclosures. The frequency of CSR sustainability meetings is positively linked to GDSs, implying that continual sustainability interactions can culminate in more extensive governance disclosures (La Fuente et al., 2017). Moreover, CSR staff training correlates positively with GDSs (Chen and Hung-Baesecke, 2014).

Table 5 Results of Arellano bond dynamic panel data model using two-step estimation (lagged values of EDS, SDS, GDS and ESG)

Independent variables	Two-step estimation							
	EDS				Dependent variables			
	Coefficient	z-stat	Coefficient	z-stat	SDS	GDS	ESG	z-stat
EDS _{it-1}	0.271***	17.99						
SDS _{it-1}			0.167***	4.54		0.187***	0.2289846***	5.16
GDS _{it-1}							0.051*	1.83
ESG _{it-1}							0.041***	3.00
BS	0.366***	5.24	0.067**	2.73		0.264***		
IDP	-0.550***	-4.26	0.035*	1.67		0.013		
WDP	0.051***	3.44	0.026	1.00		-0.259	0.029**	2.12
AC MEETINGS	0.306***	3.89	-0.011	-0.10		0.224***	0.051	0.66
CSR SC MEETINGS	-0.087	-1.02	0.028	0.30		0.258***	0.165***	2.49
EMPLOYEE CSR TRAINING	2.856***	7.55	0.954*	1.85		6.035***	1.824***	4.51
QR	0.778***	3.39	0.512***	2.37		0.119	0.593***	2.82
AGE	0.649***	8.86	0.808***	8.94		0.307***	0.578***	6.65
DE	-0.051***	-4.77	-0.016	-1.35		-0.013	-0.027***	-2.81
TQ	-0.021	-0.34	0.127**	2.10		0.012*	0.004	0.10
Intercept	-15.623***	-5.29	-19.630***	-5.27		45.911***	3.273	1.04
Wald-Chi ²	778.95***		292.32***			986.10***	409.89***	
Sargan test for over-identification	51.108	0.4299	74.141	0.1490		81.949	76.236	0.9800
Arellano bond test for AR (1)	-2.6049* (p = 0.0092)		-2.2771** (p = 0.0022)			-2.4859*** (p = 0.0001)	-1.3198*** (p = 0.0018)	
Arellano bond test for AR (2)	-1.0022 (p = 0.3162)		-0.84891 (p = 0.3959)			-1.1692 (p = 0.2423)	-1.1976 (p = 0.2311)	

Note: ***Significant at 1% level, **significant at 5% level and *significant at 10% level.
Source: Calculated by researchers

The interaction between ESG overall scores and various organisational aspects uncovers intriguing associations. A larger board size is highly associated with greater ESG scores. This view is corroborated by research undertaken by Amin et al. (2021) and Husted and De Sousa Filho (2019), who also shows how expanded boards improve CSR performance. Likewise, the percentage of independent directors on a board has a favourable association with ESG scores, demonstrating their critical role in boosting ethical oversight, as evidenced by research such as Pham and Tran (2019) and Bansal et al. (2018). Furthermore, the inclusion of women on corporate boards is strongly associated with higher ESG scores, emphasising the relevance of gender diversity in improving corporate governance and ESG outcomes. This trend is backed by Le et al. (2023) and Gulzar et al. (2019). Conversely, the number of audit committee meetings does not show a significant relationship with ESG ratings, implying that the frequency of these meetings may not be as crucial for ESG performance. Nevertheless, the frequency of CSR sustainability meetings is positively correlated to overall ESG scores. This association complements the findings of Helfaya and Moussa (2017) and Mahmood et al. (2018), who found that CSR committees are effective tools for enhancing the extent and efficacy of sustainability disclosures. Similarly, CSR training of employees and ESG disclosure has a positive correlation (Jóhannsdóttir and Ólafsson, 2015; Brieger et al., 2019).

5 Results and discussion

The results outline the central role that the activities of the corporate governance and CSR committees have in assuring substantial improvement in the overall performance of the EDS, SDS, GDS, and ESG, which makes them notable in enhancing the scope, clarity, and efficacy of ESG disclosures. The positive linkage between large board sizes and higher levels of EDS, SDS, GDS, and ESG is attributable to the fact that large boards attract members from a more diverse set of occupational and educational backgrounds (Qa'dan and Suwaidan, 2019); hence, they are able to contribute to the board with a broader set of skills and experience (Agyemang et al., 2020). This experience and perspective of varied nature help the board to deal with complex environmental issues more efficiently (De Villiers et al., 2011) and have room to include a diverse set of stakeholder interests (Kaymak and Bektaş, 2017). Moreover, the enriched supply of resources (Hu and Loh, 2018), as well as the heterogeneity of capabilities, allows the board to enhance monitoring of the management activities and operations more effectively (Chebbi and Ammer, 2022), a view supported by resource dependence theory, which emphasises the board's role in providing access to critical external resources and expertise. In addition, the larger size reduces the workload of individual members, as well as their distractions (Jizi et al., 2013), enhancing their capacity to fill information gaps and ensure comprehensive and transparent provision of reports.

The inverse association between board independence and EDS can be explained by agency theory, which argues that although high levels of environmental disclosure are usually desirable, they may seem counterintuitive, as they can lead to greater legal risks since disclosed data may become the object of lawsuits by politically or socially driven organisations (Mallin et al., 2012). In addition, independent directors tend to have a low level of trust in non-financial data disclosure, as the reputational trustworthiness of the

endorser is at stake, and the credibility associated with unjustifiable non-financial data disclosure can compromise the interests of shareholders and the overall integrity of corporate governance (Baalouch et al., 2019; Iatridis, 2013), while affiliation with disreputable reporting systems may also harm shareholder interests and corporate governance integrity (Albitar et al., 2023; Zhang et al., 2023).

The positive association between independent directors and SDS and ESG disclosure can be explained by a variety of factors, starting with agency theory, which states that independent directors are effective in promoting practices that enhance transparency and align with the social responsibility of the organisation, since they are free of any bias (Jizi, 2017). The main motivation of independent directors to uphold their reputation and the reputation of the firm drives them to enforce strict scrutiny (Nicolo et al., 2023), which, in turn, allows them to increase their engagement with community, environmental and other stakeholder groups. This enhanced interaction aids in shaping broader stakeholder relationships, thus conforming to the expectations of stakeholder theory, which places significant emphasis on considering the interests of other stakeholder groups besides shareholders (Husted and De Sousa Filho, 2019). Finally, it will help them to effectively manage and persuade the management to adopt tactics focused on ESG (Kamaludin et al., 2022).

The incorporation of females on boards positively affects EDS and ESG disclosures, partly because of their unique psychological attributes, multiplicity of opinions and leadership styles, professional experience, expertise and business ethics (Issa and Fang, 2019). These directors often exhibit greater prudence and a community-oriented approach (Qureshi et al., 2019) and a nurturing and socially oriented demeanour (Zahid et al., 2020), alongside being cooperative, civil, sympathetic and empathetic (Katmon et al., 2017), which predisposes them to charitable endeavours such as donations (Gulzar et al., 2019). Moreover, their high ethical standards enhance decision-making and eliminate corporate malpractices, thus boosting transparent and full CSR disclosures (Vacca et al., 2020).

The positive relation between frequent audit committee meetings and EDS as well as GDS could be attributed to how the meetings reduce information asymmetry (Namakavarani et al., 2021; Appuhami and Tashakor, 2017) by enhancing monitoring and control capabilities (Al Lawati et al., 2021; Lisic et al., 2016), which is consistent with signalling theory, as such practices reflect positively on stakeholders by indicating high internal governance quality in the business practices of such companies.

Having frequent CSR sustainability meetings is essential in enhancing GDS and ESG reporting by paying close attention to a number of essential areas. Such meetings provide an opportunity to discuss the issues in depth, collaboratively make decisions, and efficiently distribute the workload, which increases the accuracy of sustainability reporting (Fahad and Rahman, 2020). Such consistent cooperation and the verification process can assist in easing any reasonable concerns over a lack of integrity in non-financial data by removing data asymmetry (Adel et al., 2019), thereby supporting both signalling theory and legitimacy theory, as this practice promotes credibility and facilitates organisational legitimacy. Periodic CSR meetings would serve to eliminate false or inaccurate financial reporting, as they would contribute to honesty and accountability (La Fuente et al., 2017).

There are a number of reasons behind the positive correlation between CSR training and all the dependent variables, which are EDS, SDS, GDS and ESG. Training on CSR encourages interest and understanding among the employees of how CSR actions are

performed, and this is essential to promote communication and engagement with the topic (Fahad and Rahman, 2020). Through this enhanced knowledge, the employees can communicate about CSR actions to stakeholders and clients more effectively, making sure that these practices are adequately promoted and understood (Edinger-Schons et al., 2018). This is an indication of signalling theory, since workers are seen as ambassadors of the CSR culture of the business, and this helps to minimise the information gap and creates a reliable image in the minds of the involved stakeholders. Moreover, a well-informed workforce has the capability of enhancing credibility and transparency in CSR operations through proper reporting of the practices (Chen and Hung-Baesecke, 2014). This full-fledged knowledge and skillset in communication eventually lets the employees take greater participation in the CSR programmes of their organisation and develops a more inclusive and committed corporate culture (Brieger et al., 2019). CSR training enhances employee involvement in non-financial disclosure, as it mobilises the principles and culture of the company rather than external factors to make CSR initiatives more authentic and successful (Chen and Hung-Baesecke, 2014). This internalisation of CSR values and practices into the organisational culture mirrors the view of institutional theory, which postulates that socially accepted norms, such as CSR, end up being incorporated into business routines as a means of upholding an acceptable reputation. This increased participation in CSR also has the benefit of enhancing the level of intrinsic motivation through task satisfaction, appreciation, and fulfilment, in addition to strengthening overall dedication to business objectives (Jóhannsdóttir and Ólafsson, 2015).

6 Conclusions and policy recommendations

In this study, the association between different board traits and CSR practices was investigated by considering such aspects as ESG issues, as well as comprehensive ESG indices. Their finding is that the bigger board is strongly correlated with more inclusive CSR disclosure across all of the dimensions examined, most likely because they are more diverse and more scrutinised. Additionally, the independence of the board members had two implications: a high negative correlation with the EDS and a high positive association with the SDS and with the total ESG scores.

This illustrates a complex interrelationship where the independence of board members can foster selective disclosure in the social and governance realm with a likelihood of hampering the environmental reporting. The beneficial impacts of gender diversity on the board, especially with the participation of female board members, are also an interesting outcome of this paper. These results were identified to have an astounding effect on the betterment of the EDS and the overall ESG scores. In addition to this, the rate of audit committee meetings was also found to have a positive connection with better disclosures in environmental and governance aspects, implying that regular check-ups by the audit committee may result in greater accountability and transparency. The research has also identified the importance of a CSR-specific initiative, where employee CSR training had a positive influence on environmental, social, and aggregate ESG disclosure. This also indicates the practical benefits of focused training programmes to facilitate communication with respect to CSR. Along the same lines, the frequency of CSR and sustainability meetings has a positive association with governance and ESG

ratings overall, indicating the efficiency of meetings and internal debate on issues of CSR in organisations.

Among all the dependent variables, EDS and ESG present the best associations, as they can clearly be connected to five out of six independent variables under analysis.

It is an indicator of the critical role EDS and ESG play in the model, as the former and the latter are consistently and remarkably correlated with several independent variables. SDS, in turn, has fewer meaningful relationships, and it is associated with three independent variables. Altogether, this analysis deepens the knowledge of what drives CSR disclosures and underlines the importance of board dynamics and targeted CSR activities in helping generate the effects of transparency and accountability. Altogether, this analysis deepens the knowledge of what drives CSR disclosures and underlines the importance of board dynamics and targeted CSR activities in helping generate the effects of transparency and accountability.

Based on the findings and the gaps identified in the research, the following policy implications can be offered to address these gaps and reinforce institutional practices to improve the overall competence of the available frameworks and diminish the identified weaknesses. If rules for independent and external board reviews are put in place, they will help make boards more accountable. These rules would require regular reviews by a third party to see how well the board is doing, especially how well it follows ESG practices. The establishment of an executive compensation system based on the achievements of their respective ESG performance enables organisations to better ensure that their financial objectives are in line with their long-term sustainability and good corporate governance practices. While gender diversity is mandated in India, other forms of diversity are not. Implementing 'diversity quotas within board composition' would solve this by establishing extra quotas for diverse professional and industrial backgrounds, age, education and ethnicity. This is a provision that expands the understanding of diversity, enhances decision-making quality, and depicts a wider social picture. In spite of the Companies Act of 2013 stipulating the requirement of at least one female independent director, a substantial number of companies still do not have adequate female representation. The mentioned issue can be resolved with the help of various strategic policy interferences in order to successfully enhance gender diversity on corporate boards. To ensure that diversity standards are properly met and regulations effectively introduced, regulatory bodies such as SEBI could establish a regulatory board diversity officer position.

This would be useful in monitoring and ensuring gender diversity requirements; hence, a balanced and diverse board would be achieved. The use of skill-based attributes to fill positions of female director assists in ensuring that the right individuals are selected based on relevant skills that lead to enhanced performance of boards and decision-making as opposed to quotas. There must also be a quorum recruitment policy regarding gender representation. Under this policy, the board would need a certain number of women to legitimise the decisions made and to ensure that women's perspectives are adequately represented and real diversity is introduced into board discussions. Besides, it is important to develop board diversity certification, i.e., EDGE Certification (the certification for workplace diversity, equity and inclusion), which will acknowledge and reward organisations that are successful with gender diversity. By associating these certifications with concrete rewards, e.g., tax exemptions and government contracts, companies will be motivated to achieve and sustain high levels of diversity, and this will set a threshold for excellence in corporate governance. Mandatory quarterly CSR reviews

and the disclosure of CSR sustainability meeting results to the general public would promote the sustenance of CSR pursuits. However, CSR training certifications and the incorporation of CSR training into professional development would result in amplifying employees' interest in CSR practices and their skills. Policymakers need to impose an obligation to use IoT sensors and AI-based technologies to automate the process of gathering ESG data to enhance the credibility of non-financial information disclosures. This policy will also make data collection easier and limit human error, thus making ESG reporting more reliable. It is easier for businesses, particularly small or struggling ones, to invest in appropriate training when government subsidies for CSR training programmes are in place. The government subsidising a part of the cost increases the likelihood that CSR training will be perceived as a form of investment worth undertaking. This assistance motivates companies to teach their staff moral and responsible behaviour, which is advantageous to the business and society. More companies would be able to adopt and maximise their CSR programmes with less cost and stronger motivation. Lastly, an inter-industry exchange of best practices would facilitate the further adoption of the sound CSR practices.

In addition to its significance, the current study has certain deficiencies that can be addressed in follow-up investigations. First, the study has been conducted in the Indian domain. Further research can be conducted on cross-country firms in other business sectors. This research concentrates on corporate board attributes like size, independence, meetings of the audit committee and gender diversity. Future research should examine the impact of other corporate board variables, such as board expertise, director business knowledge, board member qualification and experience, etc., on ESG performance, as well as disclosure practices. Future studies can make an effort to expand the sample size, use a wider array of variables to examine, and consider applying a broader range or greater variation in data collection techniques to further enhance the authenticity and strength of the outcomes. Finally, future research could expand the definition of a CSR sustainability committee, including its size, attendance, non-executive directors, and so on, to aid in an in-depth examination of the association's related to ecological, social and governance disclosure.

Declarations

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