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Board Capital as a Determinant of Corporate Sustainability: A New Paradigm in Corporate Governance

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Abstract

The study explores the nexus of board capital and sustainability reporting. Panel data regression was employed on a sample of 80 Indian companies from FY 2016-17 to FY 2021-22. The results revealed that board education, experience, expertise and social connections positively impact sustainability reporting quality. This study expands the literature on the measurement of board attributes in terms of board capital to identify the director's characteristics relevant to enhancing sustainability reporting quality in Indian companies. This would provide implications for practitioners and future researchers, especially in the context of emerging economies like India where institutional and regulatory environments are transitioning to inculcate sustainability in companies.

Keywords: Board Capital, Corporate Sustainability, Human Capital, Social Capital, Sustainability Reporting Quality

JEL Classification: I0, J2, J3, M14

1. Introduction

The globalised world is posing new challenges for businesses today. The recent pandemic, climate change and the dwindling resource base accompanied by corporate scandals like Enron's financial scam, Volkswagen's emission scandal and the recent claims of Hindenburg's report on the Adani group are causing constant tribulations in the business environment. Ironically, businesses play a major role in this, as they are at the core of activities that not only provide for the community but also threaten their sole existence. This has escalated the pressure on corporations to assume responsibility and address these issues expeditiously (Amran *et al.*, 2014; Bae *et al.*, 2018; Jamil *et al.*, 2020; Qian *et al.*, 2020; Llorens *et al.*, 2018; Kumar *et al.*, 2022).

Consequently, sustainability seems to take the pedestal in the corporate world with 75 per cent of the global executives increasing sustainability investments in their organisations (Deloitte 2023 CXO Sustainability Report). Sustainability means organising and managing human actions in a way that they accomplish societal needs without jeopardising the environmental, social and economic foundation (Elkington, 1998). It has become imperative for companies today to publish non-financial reports like Environmental Social Governance (ESG) reports, Corporate Social Responsibility (CSR) reports or Sustainability Reports (SRs) to enhance the transparency of their business operations and gain legitimacy among stakeholders (Correa-Garcia *et al.*, 2020; Qian *et al.*, 2020).

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Sustainability reports are an effective way to demonstrate an organisation's commitment towards social and environmental issues as 96 per cent of the Global Fortune Top 250 companies have adopted it (KPMG Survey of Sustainability Reporting 2022). Sustainability reporting is being popularly adopted worldwide as it encompasses various indicators of environmental, social and economic dimensions like Green House Gas (GHG) emissions and biodiversity impact of company operations; reporting on incidents of child labour, human rights violations and corruption and economic value added and distributed by companies respectively. Sustainability reporting extends beyond ESG and CSR reports with various frameworks available for measuring its indicators like the Sustainability Accounting Standards Board (SASB), International Sustainability Standards Board (ISSB) and Global Reporting Initiative (GRI).

Despite its wide popularity, it is still a voluntary practice in developing economies like India and is trying to gain momentum amongst Indian companies with gradual awareness among stakeholders. The concerned literature is also brimming with studies that delve into the factors responsible for sustainability reporting by companies. The academia has primarily highlighted the role of the board in the incorporation of sustainability by companies and the preparation of sustainability reports to display their commitment to the public (Dienes *et al.*, 2016; Qian *et al.*, 2020; Kumar *et al.*, 2022). As insinuated by Ngu and Amran (2019) and Michelon and Parbonetti (2012), corporate sustainability emanates from board attributes. Thus, the literature investigating drivers of sustainability reporting and its quality is dominated by studies examining board characteristics like board size, board independence, board gender diversity, board tenure, etc (Hahn & Kuhnen, 2013; Amran *et al.*, 2014; Wang 2017; Bhatia & Tuli, 2017; Bae *et al.*, 2018; Correa-Garcia *et al.*, 2020; Fellegara *et al.*, 2021; Makri *et al.*, 2024).

However, another strand in the literature criticises these board-related variables for being used as a proxy for the ability of directors. The studies posited that board attributes like board size and independence are structural and fail to capture the ability of the directors to perform their functions (Haynes & Hillman, 2010; Chen, 2014; Pérez-Calero *et al.*, 2016; Yousaf *et al*, 2022). For instance, if a company has three directors supposedly, Mr Ratan Tata, Mr Mukesh Ambani and Mr Naveen Jindal, the board size will be three as compared to a company with a greater board size of say, twelve. However, the quality of decisions taken by the former three members as compared to twelve on the latter board cannot be measured just by the board size. Thus, the recent strand in literature has put forth the concept of board capital that profoundly captures the ability of the directors to provide resources to the firm.

The concept of board capital which is composed of human capital and social capital is propounded by Hillman and Dalziel (2003). Human capital refers to the knowledge, skills and expertise of the directors whereas social capital refers to their networks and connections internally and externally (Hillman & Dalziel, 2003; Haynes & Hillman, 2010; Pérez-*Calero et al.*, 2016). Studies are exploring this concept in relation to firm performance (Jermias & Gani, 2014; Yousaf *et al.*, 2022), innovation (Chen, 2014), strategic change (Haynes & Hillman, 2010) and CSR disclosure (Muttakin *et al.*, 2016; Maswadi & Amran, 2022).

This provides a pedestal to explore the relationship of board capital and sustainability reporting in the context of a developing economy like India where the institutional and regulatory environments are still transitioning to keep pace with global inclination towards sustainability. The Indian sub-continent provides an interesting avenue for this research as the institutional and regulatory environment has been going through continual reforms during the last two decades. Implementing corporate governance, the Ministry of Corporate Affairs and the Indian Companies Act 2013 have made it mandatory to form a board of directors with at least three directors for a public company and two for a private company. Furthermore, at least one-woman director and a reasonable proportion of independent directors must exist on the board. However, there are no regulations regarding minimum educational qualifications or experience of the directors. Simultaneously, the New Companies Act in 2013 mandated CSR expenditure, being the first country in the world to recognise such social practices for business. In 2021, Securities and Exchange Board of India (SEBI) introduced the Business Responsibility and Sustainability Report (BRSR) framework based on the GRI framework and made it mandatory for the top 1000 listed companies starting with fiscal year 2022-2023 (Aggarwal & Singh, 2018; Kumar, 2020; Kumar *et al.*, 2021). These monumental reforms in Indian regulatory environment are considerably improving the scenario of

non-financial reporting thereby, providing motivation to conduct this study.

The study is organised as follows. The next section consists of the review of extant literature concerning sustainability reporting and corporate governance to ascertain the research gap. Further, the paper provides a theoretical background of the study followed by hypotheses development. The research methodology section describes the sample, time period and the sources of data collection. Then it explains the variables as well as their measurement and the proposed research model followed by the results and their discussion. The paper is concluded by providing suggestions for future research.

2. Literature Review

Over the past two decades, there has been extensive research on sustainability reporting. However, the formative part of that research has been on the drivers of corporate sustainability as it is still a voluntary practice in most countries. A vast number of studies substantiate that board attributes like board size, board diversity, board independence, board tenure, etc. induce an organisation towards sustainability and impact the disclosure level of their non-financial performance (Amran *et al.*, 2014; Hahn & Kuhnen, 2013; Bhatia & Tuli, 2017; Shamil *et al.*, 2014; Mahmood & Orazalin, 2017; Wang, 2017; Bae *et al.*, 2018; Henry *et al.*, 2018; Jamil *et al.*, 2020; Kumar *et al.*, 2022; Makri *et al.*, 2024). However, all these attributes under consideration are structural and are incapable of quantifying the ability of the board to make decisions.

This is a significant limitation in the extant literature where board attributes are used as a proxy for the knowledge, ability and connections of the directors which enables them to make better decisions (Haynes & Hillman, 2010; Chen, 2014; Pérez-Calero *et al.*, 2016; Llorens *et al.*, 2018; Yousaf *et al*, 2022).

As suggested by Ngu and Amran (2019) and Michelon and Parbonetti (2012) non-financial reporting emanates from board governance, asserting that disclosure in such reports can be conditioned by board attributes. In this light, a prominent study by Hillman and Dalziel (2003) advocates the concept of board capital that captures the essence of corporate governance better than the widely examined board attributes. This proposition postulates that each director brings a different set of experience, expertise and network to the organisation that affect the board's ability to make decisions and provide resources. This implies that the board capital as a whole affects the directors' ability to perform their functions.

Further, exploring the literature concerning board capital it was found that academically this concept is in its nascent stage. Few studies that exist, have examined it in relation to various aspects of decision making like strategic change, innovation investment and firm performance (Yousaf *et al.*, 2022; Haynes & Hillman, 2010; Chen, 2014; Jermias & Gani, 2013; Pérez-Calero *et al.*, 2016). Most of the literature on board capital converges around the decision-making of directors asserting that higher board capital leads to better decision-making and ultimately better firm performance (Fernandez & Lehrer, 2019).

However, some studies have tested this relation of board capital with the decision to engage in voluntary non-financial reporting practices like CSR reporting. Muttakin *et al.*, (2016) studied directors' experience and expertise as a proxy for board capital and found a positive association with CSR disclosure. Llorens *et al.*, (2018) analysed board capital with CSR, building the premise that higher board capital will lead to environmentally conscious and socially responsible decisions by the directors and promote such non-financial reporting in companies. Similarly, Maswadi and Amran (2022) established that the director's experience and external connections enhance the disclosure quality of CSR reports. Thus, this lays down a strong premise for exploring the relation of board capital with a more recent form of non-financial reporting called sustainability reporting. Also, it is the first study to investigate the nexus of board capital and corporate sustainability in the Indian context which would facilitate industrialists, investors, policymakers and regulators to comprehend the effects of recent developments in corporate governance on the sustainability reporting of companies.

3. Theoretical Background

Previous literature concerning sustainability reporting and corporate governance stands on diverse theories like agency theory, stakeholder theory, legitimacy theory and resource dependence theory (Hussain *et al.* 2018; Qian *et al.*, 2020). The concepts under study have a very complex construct, thus multiple theories are needed to explore their relationship (Kumar *et al.*, 2022). The present study

delves into the legitimacy theory (Deegan *et al.*, 2002) and the amalgamation of agency and resource dependence theory (Hillman & Dalziel, 2003; Jensen & Meckling, 1976; Salancik & Pfeffer, 1978) postulating that board attributes influence decision making which subsequently impacts the decision to take up voluntary non-financial reporting. Grounded on these theories, the study intends to explore how corporate governance mechanisms in terms of board capital influence sustainability reporting in companies.

The legitimacy theory conceives the notion that a social contract exists between the organisation and the society and the organisation seeks legitimacy from the society by continuously trying to meet their expectations (Shamil *et al.*, 2014; Kumar *et al.*, 2022). Thus, the directors try to align the organisational activities with the stakeholder's expectations and continually monitor the managers to ensure this. Hence, it can be insinuated that managers' performance is influenced by the pressure exerted by directors. This is the agency theory that states that a principal-agent relationship exists between the owners and managers of a company wherein, the managers perform to respond to the stringent internal monitoring by the company directors (Jensen & Mekling, 1976). Further, the resource dependence theory advocates that it is the directors that provide an organisation access to all the information and resources relevant to it (Salancik & Pfeffer, 1978). This theory argues that the inherent uncertainty in the business environment can be mitigated by the resources, expertise and experience provided by the directors. These theories are widely used in extant literature. However, this study uses the view of Hillman and Dalziel (2003), which integrates the premises of these theories to advocate the concept of board capital that captures the essence of corporate governance better than the widely examined board attributes (Yousaf *et al.*, 2022). The foundation of this integrated theory is that each board member brings a different experience, expertise and network that affect the board's ability to monitor as well as bring resources to the organisation. This implies that the board capital as a whole affects the directors' ability to perform the functions laid down in the agency theory and resource dependence theory. Therefore, these theories provide a sound basis for the various hypotheses that will be formulated to conduct the study.

4. Hypotheses Development

Board capital encapsulates the ability of the board to monitor organisational activities and provide relevant resources to perform those activities effectively (Hillman & Dalziel, 2003). Higher board capital leads to higher firm performance. Therefore, higher human capital implies a higher level of education, experience and expertise of the directors will lead to better decision-making. Higher social capital implies greater internal and external connections of the directors which would enhance their accessibility of resources and information. Besides, higher board capital will also lead to greater stakeholder validation as such directors would continually strive to attain legitimacy and thus promote greater disclosure in their non-financial reports. By formulating the following hypotheses, the study tries to assess the impact of board capital on sustainability reporting.

Human capital comprises of education, experience and expertise of the board of directors (Pérez-Calero *et al.*, 2016; Hillman & Dalziel, 2003). There is sufficient literature that has examined the components of human capital with various organisational outcomes like strategic change, innovation, firm performance etc. (Chen, 2014; Yousaf *et al.*, 2022; Khanna *et al.*, 2014).

(i) Board Education: The education level of the directors positively affects the innovation capacity and firm performance. Directors' education level determines the capacity with which they comprehend information and make effective decisions. A greater number of years in education enhances the ability to analyse complex information and find creative solutions to business problems (Wincent *et al.*, 2010; Pérez-Calero *et al.*, 2016; Khanna *et al.*, 2014; Yousaf *et al.*, 2022). Thus, it helps in better understanding of the varied expectations of different types of stakeholders leading to better sustainability reporting in companies. Thus, the study hypothesises that, **H1: Board education positively affects sustainability reporting quality.**

(ii) Board Experience: The directors attain a diverse set of knowledge from their present and prior professional experiences as well as their personal experience in the company as a director. The directors who have been working in the same industry as the firm would organically develop a concrete understanding of that industry's internal and external environment. This makes them the right advisor and counsel regarding the organisation's financial and non-financial performance (Chen, 2014).

Thus, it can be hypothesised that, **H2: Board experience positively affects sustainability reporting quality**

(iii) Board Expertise: Previous studies show that directors who are accredited with some recognition or certification in their area of work are considered experts (Pérez-Calero *et al*., 2016; Jermias & Gani, 2014; Yousaf *et al.*, 2022). Such directors are considered highly capable as they not only provide expert advice but also bring value and prestige to the firm they are associated with. The literature shows firms with government officials on their board or legal experts, accountants, politicians and CEOs improve companies' financial and non-financial performance (Hillman & Haynes, 2010; Jermias & Gani, 2014; Llorens *et al.*, 2018; Yousaf *et al.*, 2022). Therefore, **H3: Board expertise positively affects sustainability reporting quality.**

Social capital denotes the social connections that a director has with various stakeholders like investors, government or fellow board members (Hillman & Dalziel, 2003; Wincent *et al.*, 2010). There are various definitions for the board's social capital; some consider the internal ties at the intra-board level while some consider the external ties. However, it is important to distinguish between them both as each type of network would provide a different array of benefits (Pérez-Calero *et al*., 2016).

(iv) Board Density: Board density is a concept that can measure the internal social capital of the directors.

Internal social capital is the intra-board connectedness between the directors that accounts for the cohesiveness among them to pursue goals collectively (Adler & Kwon, 2002; Pérez-Calero *et al*., 2016). This cohesiveness emanates from the regular communication and interaction between the directors which builds trust and familiarity among them (Pérez-Calero *et al*., 2016). When the directors serve together on the board and sit on the same committee, it will forge greater internal connections or ties between those directors. The greater the number of ties, the greater will be the density of these connections. Board density, therefore, refers to the level of cohesiveness among the board of directors (Kim, 2005; Pérez-Calero *et al*., 2016). It is therefore proposed that, **H4. Board density positively affects sustainability reporting quality.**

(v) Board Interlock: The external social capital of the board comprises the connections that directors have with external agents (Chen, 2014; Hillman & Dalziel, 2003). One such type of connection is the director interlock or multiple directorships, where a firm's director builds an inter-organisational network by serving on the board of other firms (Chen, 2014). This concept has been widely explored in board capital research illustrating positive influence on organisational outcomes (Yousaf *et al*., 2022; Pérez-Calero *et al*., 2016; Chen, 2014). By serving on the boards of other firms, directors get exposure to insightful information, events and trends affecting the business environment, thus helpful in mitigating environmental ambiguity (Haynes & Hillman, 2010, Fernandez & Lehrer, 2019). Hence, it can be assumed that board interlocks can play an important role in promoting corporate sustainability. Therefore, **H5: Board interlock positively affects sustainability reporting quality.**

5. Methodology

5.1 Sample

The sample selection began with analysing the top 500 companies listed on the Bombay Stock Exchange (BSE) of India as it is one of the largest and the first ones to join the United Nations Sustainable Stock Exchange Initiative. Out of the 500 listed companies on BSE, 274 companies remained in the BSE 500 from FY 2016-17 to FY 2021-22. At the time of the study, 168 companies were found to be voluntarily reporting on sustainability. However, the study relies on a reporting index based on the GRI framework to measure the disclosure level of reports. Thus, out of the 168 companies, 104 prepared sustainability reports based on GRI, 25 companies based their reports on other frameworks like SASB or International Integrated Reporting Council (IIRC) and the remaining 39 companies had prepared CSR or ESG reports not based on GRI. The sample thus, comprised 104 companies but 24 companies had inadequate data so had to be dropped which left us with the final sample of 80 companies as shown in Table 1.

The sample comprises of the largest companies in India consisting of 13 publically owned and 67 privately owned companies. The capital acquisition of these companies has been either through domestic or foreign sources. 44 of the sample companies like Dalmia Bharat, Glenmark Pharmaceuticals, Tata Motors and Yes Bank run on domestic capital. 36 of the sample companies like Colgate Palmolive, 3M and Prism Johnson Limited have capital of foreign origin. The sample companies are distributed across 13 industries like healthcare, construction, power,

automobile and oil and gas consumable fuels as displayed in Table 2.

The study delves into the boards of these companies. The board structure prevalent in the Indian sub-continent is one-tier, unlike other European countries like Germany and the Netherlands where a two-tier structure prevails with a dual governance system that separates the management and supervisory board. Companies in India have only one-tier board where the directorial roles encompass both management as well as supervision.

Table 1. Sample selection.

Sample Selection Criteria	No. of Companies
Top 500 Listed companies on the Bombay Stock Exchange from FY 2016-17 to FY 2021-22	**274**
Less: Companies not reporting on sustainability	106
Companies reporting on sustainability	**168**
Less: Companies preparing sustainability reports using frameworks other than the GRI	64
Companies preparing sustainability reports using GRI	**104**
Less: Companies with inadequate data regarding variables of the study	24
Final Sample	80

Table 2. Sample distribution by industry type.

Type of Industry	No. of Companies
Healthcare	9
Construction Material	8
Information Technology	8
Financial Services	7
Metals and Mining	6
Power	6
Automobile and Auto Components	5
Capital Goods	5
Chemicals	5
Oil Gas and Consumable Fuels	5
FMCG	4
Consumer Durables	3
Realty and other industries	9
Total	80

The study primarily requires information about the sustainability reports and the board of directors of the companies. The data regarding sustainability was collected from the sustainability reports of the companies that were available on their respective websites. The Indian companies initially prepared standalone reports but after the year 2020, integrated reporting gained popularity and sustainability reports were presented along with the annual financial reports. Thus, the data was collected from the sustainability reports and integrated annual reports. The information on the board of directors was collected from the corporate governance section of the annual reports or from the company websites where they display information about the company leaders and founders. The data regarding the director's education, experience and expertise was also extracted from the annual reports or company websites. However, data for the calculation of board density was obtained from the committees formulated by each company mentioned in the annual reports. Board interlock was calculated from the information of directorships held by each director provided in the annual report. Moreover, the financial data for control variables was obtained from the Prowess database of the Centre for Monitoring of Indian Economy (CMIE).

5.2 Variables

Dependent Variable-Sustainability Reporting Quality (SRQ)

SRQ is the dependent variable in the study. SRQ was calculated using manual content analysis that has been broadly employed in the studies investigating non-financial reports (Amran *et al.*, 2014; Bhatia & Tuli, 2017; Aggarwal & Singh, 2018; Kumar 2020; Kumar *et al.*, 2022). An index was developed based on the GRI guidelines that included 70 indicators across economic, environmental and social dimensions (given in detail in the Appendix). This index was used to assess the content of sustainability reports and the quality of disclosure was measured using a four-point rating scale as given in Table 3. The scale was formulated based on the scoring systems used in previous such studies like Papoutsi, 2020; Yadava and Sinha, 2018; Laskar and Maji, 2018. Thus, a company with the highest disclosure quality would be rated 3 and a company with the lowest disclosure quality would be

rated 1. Thus, the maximum possible score for any company was calculated as follows: $SRQ_j = \frac{\sum_{i=1}^{n} X_{ij}}{n_j}$.

Here, n_j is the maximum expected score for a company which is 1260 (3 rating* 6 years* 70 indicators, 'j' is the company and 'i' is the items. X_{ij} assumes the score from 0 to 3 for measuring the quality of disclosure on each indicator. SRQj is the score for each company.

Independent Variables

The study employs the variables of board capital in terms of human and social capital as independent variables. Since these variables need information about each of the directors, the names of the board of directors present on the board at the end of each financial year were identified from the annual reports. The information regarding each director was obtained from the profile of directors available on the company website or from the brief resume of directors provided in the annual reports or corporate governance reports.

(i) Human Capital: The components of human capital include director education, experience and expertise. The education level of directors is codified as 1 if the director has attained any degree after graduation and 0 if the director is just a graduate (Pérez-Calero *et al.*, 2016). Since the sample includes a lot of older companies and older directors who had less or no education, it seemed imperative to take graduation as a benchmark. Moreover, data availability constraints have also limited the measurement of this variable. Thus, the education level of the board is operationalised as the ratio of directors with education beyond graduation (Wincent *et al.*, 2010; Pérez-Calero *et al.*, 2016).

Table 3. Four-point rating scale for content analysis.

Rating	Description
0	is assigned when there is no disclosure regarding the indicator.
1	is assigned when the indicator is partially disclosed with a descriptive statement.
2	is assigned when the indicator is partially disclosed with a descriptive statement along with some numerical support.
3	is assigned when the indicator is fully disclosed with a descriptive statement and numerical support.

The industry-specific experience of the directors is calculated as 1 if the director has held two or more posts in the same industry as the firm and 0 if not so. The industry-specific experience of the board is measured as the ratio of directors who are highly experienced in a specific industry divided by the total number of directors on the board (Chen 2014; Pérez-Calero *et al.*, 2016).

The last component of human capital is the expertise of the directors. Hillman *et al.* (2000) classified directors into four categories, namely, insiders who have been part of the company or industry in different roles; business experts who are active or retired senior officials of an organisation and have been integral decision-makers for it; support specialists including people with professional expertise like lawyers, bankers, chartered accountants, doctors etc.; community influentials including political leaders, actors, academicians, saints or religious leaders who impart significant influence on communities. Amongst all these categories of experts, community influentials seem to drive a company towards sustainability the most, especially in the Indian context. India is a diversely religious country of different faiths, thus people strongly believe in leaders, who represent their culture, be they actors, politicians or 'gurus'. The presence of such a community influential on the board brings their reputation at stake and bounds them to behave in a socially responsible manner. Thus, this study considers the presence of community influentials as a proxy for the expertise of the directors. It is taken to be 1 if a community influential is present on the board and 0 if not (Hillman *et al.*, 2000; Haynes *et al.*, 2010; Yousaf *et al.*, 2022).

(ii) Social Capital: It comprises of the internal and external social capital. Internal social capital is measured using board density that computes the degree of cohesiveness of the board members. Board density is calculated by dividing the total number of ties existing among the directors by the potential number of ties that would exist if all the directors were connected. The study considers that ties exist between directors when they sit together on the board as well as on the committees (Pérez-Calero *et al.*, 2016). For uniformity in data collection, the study considers only five of the committees mandated by SEBI Listing Regulations and the Indian Companies Act 2013 namely, audit committee, stakeholder relationship committee, nomination and remuneration committee, CSR committee and risk management committee. The information regarding the names of directors sitting

together on the board and these five committees was extracted from the corporate governance reports or annual reports of each financial year. Finally, board density was computed using the UCINET6 network software.

External social capital is measured using interlocks which means the connections or network that a director builds by sitting on the board of other companies. Board interlocks are computed by adding the total number of directorships held by each of the directors divided by the board size to know the average number of interlocks per board (Wincent *et al.*, 2010; Haynes and Hillman, 2010; Pérez-Calero *et al.*, 2016; Chen 2014; Yousaf *et al.*, 2022). The number of directorships held by each director is provided in the annual reports of the listed companies in compliance with Regulation 26 of the SEBI Listing Regulations which states that total numbers of directorships (Board Positions) exclude directorships in the Company, Foreign Companies, Private Limited Companies, Companies formed under Section 25 of the erstwhile Companies Act, 1956 and under Section 8 of the Act.

Control Variables

The variables that have the potential to influence the outcome of this study are presence of sustainability committee or sustainability officer and firm size. These variables have been selected based on the literature review that reflects that a specialised committee or officer for supervising the sustainability reports enhances the quality of disclosure of sustainability reports (Michelon and Parbonetti, 2012; Amran *et al.*, 2014). Moreover, as per the findings of prior studies, the most influential driver for sustainability in companies is their size, larger companies are more prone to reputational hazards, thus for good public image they engage in socially acceptable and popular practices like sustainability reporting (Jamil *et al.*, 2020; Shamil *et al.*, 2014; Llorens *et al.*, 2018).

5.3 Research Model

This study employs the panel data regression model using the STATA 14.2 software to investigate the effect of board capital on the sustainability reporting of companies. The following regression equation is estimated:

$$SRQ_{it} = \beta_0 + \beta_1 * BED_{it} + \beta_2 * BEXP_{it} + \beta_3 * BEXPRT_{it} + \beta_4 * BIL_{it} + \beta_5 * SG_{it} + \beta_6 * FS_{it} + \mu_{it}$$

As the study is being done on panel data, it is important to consider the firm-specific effect and time effect that is represented with i and t respectively in the equation. Moreover, the error term μ_{it} is also made to account for errors varying across time and firms simultaneously. The other variables in the equation are explained in detail in Table 4.

The panel data used in the study is large and balanced with a sample of 80 companies over six years comprising 480 observations. First, the Breusch and Pagan Lagrangian multiplier test was run to check whether to use the Ordinary Least Square (OLS) model or the random effects model. The test showed a significant result (p=0.000) which proves that OLS is not an appropriate test given the heterogeneous nature of the data set. Then, the Hausman test was run to choose between the fixed effects model and the random effects model. The significant result (p=0.000) showed that the fixed effects model would provide a better estimation of results. The data was then checked for heteroskedasticity and autocorrelation. Woolridge's test for autocorrelation rendered a p-value of 0.000 implying that the data suffered from the problem of autocorrelation. Breusch Pagan's test for heteroskedasticity showed that the data did not suffer from this problem as the p-value was more than the significant value (p-value= 0.4595). Next, multicollinearity was checked using Variance Inflation Factor (VIF) which confirmed that data does not have a multicollinearity problem as all the VIF values were within the acceptable limit of 10 (Kutner *et al.*, 2005).

6. Results and Discussion

Table 5 gives the descriptive statistics of all the variables used in the study. SRQ ranges between 0 and 0.886 with a mean value of 0.286. Board education varies between 0.143 and 1 with a standard deviation of 0.145. Board experience ranges between 0.154 and 1. Board expertise has a mean value of 0.703. Board density averages at 0.407 and board interlocks at 2.677 with a standard deviation of 1.353.

Table 6 presents the correlation matrix of all the eight variables. The association between the dependent variable SRQ and all the independent variables is depicted along with the significance level. Firm size and sustainability governance have highly significant positive associations with SRQ. This provides support to the findings of the previous literature enabling them to be treated as control variables for the regression analysis. Moreover, board education, experience and interlocks also show a positive

Table 4. **Variables used in the study.**

Variables	Acronym	Operationalization	Source
Dependent Variable			
Sustainability Reporting Quality	SRQ	It is calculated as the ratio of the total score of the company for each year divided by the maximum possible score	Papoutsi(2020); Yadava and Sinha (2018); Laskar and Maji (2018)
Independent Variables			
Board Education	BED	The ratio ofdirectors with education beyond graduation divided by the total directors on the board	Wincent *et al.* (2010); Pérez-*Calero et al.*, 2016
Board Experience	BEXP	The ratio of directors who have heldmore than two positions in the same industry as the firm divided by the total directors on the board	Chen (2014); Pérez-*Calero et al.*, 2016
Board Expertise	BEXPRT	The presence of community influence on the board is measured as one otherwise zero	Hillman *et al.* (2000); Haynes and Hillman (2010); Yousaf *et al.* (2022)
Board Density	BD	The ratio of existing ties tothe total number of potential ties	Pérez-*Calero et al.*, 2016
Board Interlocks	BIL	Ratio oftotal interlocks divided by board size	Wincent *et al.* (2010); Haynes and Hillman (2010); Pérez-*Calero et al.*, 2016; Chen (2014); Yousaf *et al.* (2022)
Control Variables			
Sustainability Governance	SG	The presence of a Sustainability Committee or Sustainability Officer in the company is measured as one otherwise zero	Michelon and Parbonetti (2012); Amran *et al.* (2014);
Firm Size	FS	Natural logarithm of total assets	Jamil *et al.* (2020); Shamil *et al.* (2014); Llorens *et al.* (2019)

Table 5. **Descriptive statistics of variables.**

Variable	Obs	Mean	Std. Dev.	Min	Max
SRQ	480	0.286	0.269	0	0.886
BED	480	0.846	0.145	0.143	1
BEXP	480	0.508	0.153	0.154	1
BEXPRT	480	0.703	0.153	0.222	1
BD	480	0.407	0.166	0	1
BIL	480	2.677	1.353	0.077	6.625
FS	480	12.083	1.433	8.964	15.273
SG	480	.369	.483	0	1

association with SRQ at a 5 per cent level of significance. This implies that a well-educated and experienced board with many directorships affects the tendency of companies to engage with stakeholders and satisfy them by reporting eloquently even on non-financial aspects. Board expertise that is a proxy for the presence of community influence on the board reveals a positive association at a 10 per cent significance level. Lastly, board density does not reveal any significant association with SRQ which shows that the internal connections of the board members have no relation with the reporting quality in sustainability reports of the company. Board education has a significantly positive association with experience, expertise, sustainability governance and density. Board expertise has a highly significant association with board interlocks and firm size.

6.1 Results of Hypotheses Testing

Table 7 shows the summary of results obtained from regression analysis. Based on the Breusch Pagan Lagrangian multiplier test and Hausman test, the fixed effects model was the best suited. However, the

Table 6. Matrix of correlation coefficients.

Variables	SRQ	BED	BEXP	BEXPRT	BD	BIL	FS	SG
SRQ	1.000							
BED	0.01** (0.041)	1.000						
BEXP	0.01** (0.037)	-0.21*** (0.000)	1.000					
BEXPRT	0.018* (0.071)	0.15*** (0.001)	-0.058 (0.206)	1.000				
BD	0.019 (0.459)	0.16*** (0.000)	0.073 (0.111)	0.083* (0.069)	1.000			
BIL	0.041** (0.066)	-0.057 (0.214)	-0.037 (0.424)	0.15*** (0.001)	-0.002 (0.965)	1.000		
FS	0.25*** (0.000)	0.078* (0.088)	-0.022 (0.626)	0.25*** (0.000)	-0.009 (0.844)	0.027 (0.554)	1.000	
SG	0.20*** (0.000)	0.12*** (0.008)	-0.015 (0.750)	0.085* (0.064)	0.108** (0.018)	0.082* (0.073)	0.24*** (0.000)	1.000

Note: ***, **, * indicate significant at 1 per cent, 5 per cent and 10 per cent level of significance respectively.

autocorrelation problem revealed by the Woolridge test needed to be addressed. Thus, a robust fixed effect model was employed finally as it would render better estimates after tackling the problem of autocorrelation (Wu, 2016). The regression results show that board education positively impacts SRQ at a 1 per cent level of significance and has a regression coefficient of 0.615. Board experience positively impacts SRQ having a regression coefficient of 0.303 with a p-value of 0.027. Board expertise and board interlocks also affect SRQ positively but at a 10 per cent level of significance with p-values of 0.065 and 0.073 respectively. The whole regression model is well fitted as the p-value of the F-test is significant at 0.000. Moreover, the R-squared value of 0.642 shows that the proposed model explains 64 per cent of the change in SRQ. Firm size and sustainability governance also play a significantly positive role in enhancing SRQ but their impact has been controlled for in the regression model of this study.

Lastly, Table 8 provides a summary of the results of the study that will help in concluding this study. The first hypothesis (H1) is not rejected as board education positively impacts SRQ at a 1 per cent significance level (p=0). This shows that a more highly educated board positively impacts the sustainability reporting in Indian companies and this result is consistent with other studies that assess board education's impact on innovation and firm performance (Chen, 2014; Yousaf *et al.*, 2022). The second hypothesis (H2) is also not rejected at 5 per cent

Table 7. Results of regression.

Variable	Coefficient
BED	0.615*** (0.164)
BEXP	0.303** (0.134)
BEXPRT	0.406* (0.148)
BIL	0.035* (0.019)
Firm Size	0.084* (0.045)
Sustainability Governance	0.071** (0.031)
Constant	1.512
Observations	480
R-squared	0.642
F Statistic	4.794

Note: Standard errors are given in parantheses. ***, **, * indicate significant at 1 per cent, 5 per cent and 10 per cent level of significance respectively.

significance level (p=0.027). This implies that industry-specific experience of the board encourages the company towards sustainability like in other studies where high industry experience promotes research and development, strategic change and firm performance (Haynes &

Hillman, 2010; Chen, 2014). The third hypothesis of the study is also not rejected as the analysis shows that board expertise positively affects SRQ at a 10 per cent level of significance (p=0.065). This result supports the notion of other studies where board expertise positively affects firm performance (Jermias & Gani, 2014; Yousaf *et al.*, 2022). Thus, it can be implied that human capital positively impacts upon sustainability reporting quality of Indian companies. Further, investigating the social capital, the fourth hypothesis is rejected as the correlation analysis revealed that no association exists between board density and SRQ. Board density has not been explored much in prior studies, although Pérez-*Calero et al.*, 2016 analysed its impact on firm performance and found a significantly positive relationship. This study could not establish a significant relationship between board density and sustainability reporting quality. Further, the fifth hypothesis is not rejected at 10 per cent significance level (p=0.073) which proves that board interlocks positively impact the sustainability reporting quality which extends the view of prior studies corroborating its positive impact on firm performance (Haynes & Hillman, 2010; Chen, 2014; Pérez-Calero *et al.*, 2016; Yousaf *et al.*, 2022). This confirms that boards with multiple directorships lead to enhanced external connections, thus encouraging companies to align with the upcoming changes and initiate sustainability reporting. This means that directors who sit on other boards gain exposure and information from the outside environment which subsequently influences the decision to prepare such non-financial reports. Thus, four out of the five components of board capital positively and significantly impact upon the sustainability reporting of Indian companies which confirms the underpinnings of legitimacy, agency and resource dependence theories.

7. Conclusion and Policy Implications

This study endeavors to discover a new paradigm in the literature of sustainability reporting especially in the Indian context. Prior studies have explored the relationship between corporate governance and voluntary non-financial reporting. However, a recently coined term called board capital moves beyond the structural board attributes like board size and independence and encapsulates the directors' knowledge, ability and connections. Thus, it provides a deeper insight into what kind of acumen is required in governance to incorporate such voluntary non-financial reporting as sustainability. The findings of the study support the various propositions made regarding the human and social capital of the board. Board education, experience, expertise and interlocks are significantly and positively associated with sustainability reporting. Thus, the study establishes that a board with higher qualifications, considerable experience in a specific industry and the presence of a community influential on the board significantly impacts the sustainability reporting quality. Similarly, the external social connections of the directors who hold directorships on other boards also affect the SRQ positively. These attributes make the directors more aware and responsive to the changes in the business environment, as their human capital and social capital are higher. Moreover, the concept of board density that delves into the internal social capital of the directors has been scarcely examined. This study attempted to explore this but could not establish a significant association as internal connections of the board could not influence the sustainability reporting decisions of the company.

This study contributes to the existing literature on sustainability reporting. Previous literature focused on indirect board attributes like board size and independence for understanding the factors enhancing sustainability reporting. This study delved deeper into the board attributes by analysing the attributes of each director's human and social capital to better comprehend the ability and skills required in the top management to enhance the sustainability reporting quality. The literature concerning board capital had been scarcely explored in relation to sustainability reporting, especially in the context of developing countries. This study adds to the recent stream of board capital by adding another dimension that can be affected by board capital apart from firm performance, innovation, investment etc. This establishes that higher board capital enhances the director's ability to cope with ongoing developments in the business environment. This presents practical implications for executives, practitioners and policymakers, as the findings can guide them in the future selection of board members and in designing governance structures for better incorporation of sustainability in Indian companies.

Despite the contributions made by the findings, certain limitations that hindered the study should be considered. Firstly, the study analysed top-listed companies in India which implies that the sample was dominated by large

companies which impede the generalisation of results. Further, the variables of board capital used in the study were limited by the data availability, as only those variables could be included which could be measured using the information communicated publicly by the company. Future studies can include small and medium-sized firms in their study. Moreover, future studies might use more direct measures of board capital or alternative data collection techniques that can more intricately capture the quality of guidance given by the directors. Studies can expand the sample to include international companies or smaller companies that have different governance structures. More variables of board capital can be included in future studies like director's age, inside and outside directors and further breaking down the individual components of human and social capital. Lastly, the concept of board capital provides future implications for scholars as there are many perspectives to this concept that have not been explored like the classification given by Hillman *et al.* (2000) and the board capital depth and breadth propounded by Haynes and Hillman (2010) and also, board capital as a sum of human and social capital (Hillman & Dalziel, 2003). Further, the relation of board capital should be investigated upon financial as well as non-financial performance of the companies especially in the context of emerging economies like India. India, China, Malaysia, Indonesia and other such emerging economies have a concrete foundation for such studies as reforms related to sustainability and corporate governance are gaining momentum in these countries. Such studies can provide a pedestal for revolutionising the institutional and regulatory environment of these nations and promote corporate sustainability.

8. Declaration

The authors declare that there are no financial or personal relationships with other people or organisations that could inappropriately influence or bias this work.

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10. Appendix

Table A1. Sustainability reporting index.

Category	Indicators	Sub-indicators
Economic	EC1	201-1 Direct economic value generated and distributed
	EC2	201-2 Financial implications and other risks and opportunities due to climate change
	EC3	201-3 Defined benefit plan obligations and other retirement plans
	EC4	201-4 Financial assistance received from government
	EC5	202-1 Ratios of standard entry level wage by gender compared to local minimum wage
	EC6	202-2 Proportion of senior management hired from the local community
	EC7	203-1 Infrastructure investments and services supported
	EC8	203-2 Significant indirect economic impacts
	EC9	204-1 Proportion of spending on local suppliers
Environment	EN1	301-1 Materials used by weight or volume
	EN2	301-2 Recycled input materials used
	EN3	302-1 Energy consumption within the organisation
	EN4	302-2 Energy consumption outside of the organisation
	EN5	302-3 Energy intensity
	EN6	302-4 Reduction of energy consumption
	EN7	302-5 Reductions in energy requirements of products and services

	EN8	303-3 Water withdrawal
	EN11	304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas
	EN12	304-2 Significant impacts of activities, products and services on biodiversity
	EN13	304-3 Habitats protected or restored
	EN14	304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations
	EN15	305-1 Direct (Scope 1) GHG emissions
	EN16	305-2 Energy indirect (Scope 2) GHG emissions
	EN17	305-3 Other indirect (Scope 3) GHG emissions
	EN18	305-4 GHG emissions intensity
	EN19	305-5 Reduction of GHG emissions
	EN20	305-6 Emissions of ozone-depleting substances (ODS)
	EN21	305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions
	EN22	303-4 Water discharge
	EN23	306-5 Waste directed to disposal
	EN28	301-3 Reclaimed products and their packaging materials
	EN29	307-1 Non-compliance with environmental laws and regulations
	EN32	308-1 New suppliers that were screened using environmental criteria
	EN33	308-2 Negative environmental impacts in the supply chain and actions taken
	LA1	401-1 New employee hires and employee turnover
	LA2	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees
	LA3	401-3 Parental leave
	LA4	402-1 Minimum notice periods regarding operational changes
	LA5	403-8 Workers covered by an occupational health and safety management system
	LA6	403-9 Work-related injuries 403-10 Work-related ill health
	LA9	404-1 Average hours of training per year per employee
	LA10	404-2 Programs for upgrading employee skills and transition assistance programs
	LA11	404-3 Percentage of employees receiving regular performance and career development reviews
	LA12	405-1 Diversity of governance bodies and employees
	LA13	405-2 Ratio of basic salary and remuneration of women to men
	HR1	412-3 Investment agreement and contracts with human rights caluses
	HR2	412-2 Employee training on human rights policies and procedures
	HR3	406-1 Incidents of discrimination and corrective actions taken
	HR4	407-1 Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk
	HR5	408-1 Operations and suppliers at significant risk for incidents of child labor
	HR6	409-1 Operations and suppliers at significant risk for incidents of forced or compulsory labor
	HR7	410-1 Security personnel trained in human rights policies or procedures

	HR8	411-1 Incidents of violations involving rights of indigenous peoples
	HR9	412-1 operations subject to human rights review and impact assessment
	SO1	413-1 Operations with local community engagement, impact assessments, and development programs
	SO2	413-2 Operations with significant actual and potential negative impacts on local communities
	SO3	205-1 Operations assessed for risks related to corruption
	SO4	205-2 Communication and training about anti-corruption policies and procedures
	SO5	205-3 Confirmed incidents of corruption and actions taken
	SO6	415-1 Political contributions
	SO7	206-1 Legal actions for anti-competitive behavior, anti-trust, and monopoly practices
	SO8	419-1 Non-compliance with laws and regulations in socio-economic area
	SO9	414-1 New suppliers that were screened using social criteria
	SO10	414-2 Negative social impacts in the supply chain and actions taken
	PR1	416-1 Assessment of the health and safety impacts of product and service categories
	PR2	416-2 Incidents of non-compliance concerning the health and safety impacts of products and services
	PR3	417-1 Requirements for product and service information and labeling
	PR4	417-2 Incidents of non-compliance concerning product and service information and labeling
	PR7	417-3 Incidents of non-compliance concerning marketing communications
	PR8	418-1 Substantiated complaints concerning breaches of customer privacy and losses of customer data

Source: GRI (2013, 2017, 2020, 2021)