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A Novel Approach to ESG Scoring: Applications in Energy-Intensive Industries and SMEs

Ms. Piyali Sengupta[1], Prof. (Dr.) Binoy Krishna Choudhury[2]

[1]Assistant Professor and Coordinator (GM), Indian Institute of Social Welfare and Business Management (IISWBM), Management House, College Square (West), Kolkata 700073, India.
[2]Professor, IISWBM.

Abstract
The growing emphasis on Environmental, Social and Governance (ESG) performance and mandatory Business Responsibility and Sustainability Reporting (BRSR) in India highlights the need for accessible and cost-effective sustainability assessment tools. This study proposes a Sustainability Disclosure Index (SDI) for energy-intensive industries, particularly coal-based thermal power generation and iron and steel manufacturing, with potential applicability to Small and Medium Enterprises (SMEs). The research adopts a mixed-method approach, integrating literature review, questionnaire surveys, expert consultation, content analysis and qualitative document analysis. Drawing upon internationally recognised sustainability reporting frameworks, particularly the Global Reporting Initiative (GRI), the proposed index incorporates 69 indicators across four dimensions: Environmental (29), Social (20), Governance (9) and Economic (11). Individual indicators are scored from zero to three and aggregated into a composite index. The study covers FY 2019–20 to FY 2021–22. Application to eight iron and steel manufacturing companies reveals substantial variations in sustainability disclosure performance, with index scores ranging from 38% to 81%. The framework offers a practical and scalable mechanism for preliminary assessment, corporate benchmarking and identification of improvement opportunities, particularly for SMEs seeking to strengthen sustainability practices and reporting preparedness.

Keywords: ESG scoring; Sustainability Disclosure Index; energy-intensive industries; SMEs; BRSR; corporate sustainability.

1. Introduction

The growing prominence of Environmental, Social and Governance (ESG) considerations has reshaped the corporate approach to Corporate Social Responsibility (CSR). In India, Section 135 of the Companies Act, 2013 requires eligible companies to spend at least 2% of their average net profits over the preceding three financial years on CSR activities.

CSR encourages enterprises to extend their responsibilities beyond profit generation and contribute to societal development, thereby reinforcing responsible corporate citizenship. Traditionally associated with social initiatives, CSR became a statutory spending obligation in India through the Companies Act, 2013 (India Briefing, 2014). Mura et al. (2018) examined relationships between CSR expenditure,

corporate performance and the communication of CSR practices, identifying significant associations among these variables.

Corporate sustainability has traditionally encompassed organisational survival and sustained long-term growth (Garg, 2017). Elkington's (1998) Triple Bottom Line (TBL) approach integrates environmental, social and economic considerations. Dyllick and Hockerts (2002) subsequently emphasised the importance of economic, natural and social capital in corporate sustainability.

Dyllick and Hockerts (2002) defined corporate sustainable development in terms of meeting the needs of direct and indirect stakeholders without compromising the ability to meet future stakeholders' needs. Elkington (2018) revisited the TBL concept, highlighting the need for transformative approaches to sustainability. More recently, sustainable finance and the integration of ESG considerations into institutional investment decisions have further shaped corporate sustainability.

Based on the National Guidelines on Responsible Business Conduct (NGRBC), the Securities and Exchange Board of India (SEBI) mandated Business Responsibility and Sustainability Reporting (BRSR) for the top 1,000 listed companies by market capitalisation from FY 2022–23. This development reflects the increasing regulatory emphasis on responsible business practices. Many leading Indian companies already report under international frameworks such as the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB) and Integrated Reporting (IR). Sector-specific disclosures are increasingly important because sustainability priorities differ across industries, including power, mining, pharmaceuticals, automobiles, textiles and consumer goods. Transparent reporting can strengthen stakeholder confidence and support an enterprise's social licence to operate. Businesses must therefore embed responsible practices throughout their value chains rather than merely showcase CSR initiatives. Figure 1 presents an overview of ESG standards, frameworks and rating systems.

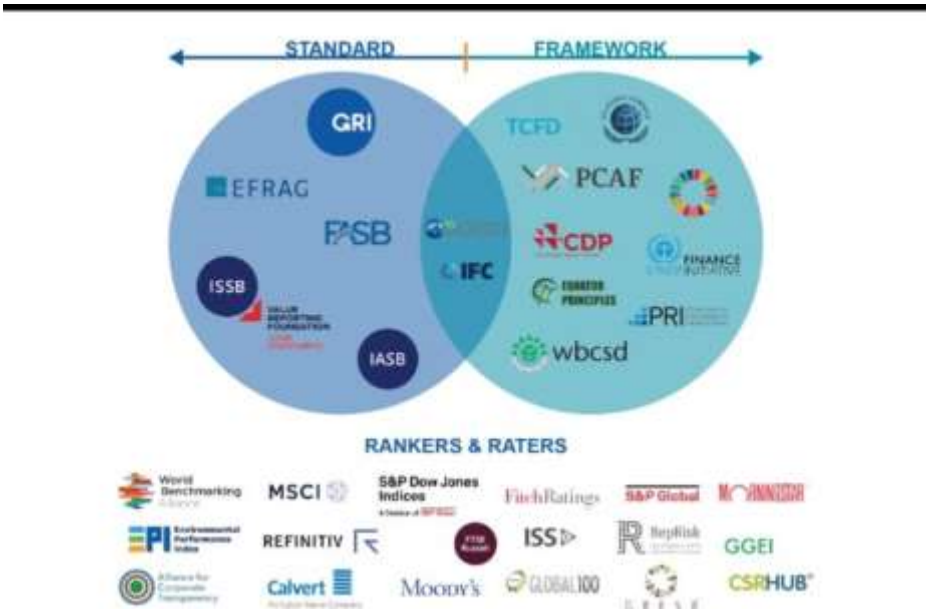


Figure 1. ESG standards, frameworks, rankings and rating systems

(Source :https://www.3blmedia.com/news/credibility-through-accountability-gri-sets-standard accessed on 10th Nov, 2023)

For leading companies with established sustainability reporting practices, BRSR represents an additional reporting requirement. However, extending comparable disclosure expectations to smaller enterprises, particularly SMEs, presents significant challenges.

Several tools and frameworks have been developed to address these challenges. Although Indian businesses have adopted global frameworks and indices such as the Dow Jones Sustainability Index, limitations remain, particularly in their accessibility and suitability for smaller enterprises. These issues have attracted considerable scholarly attention.

1.1 Corporate Sustainability and SMEs

Small and medium enterprises (SMEs) play a pivotal role in advancing sustainable development within the private sector. However, assessing their sustainability performance is challenging because of limited reliable data, inconsistent disclosure mechanisms and relatively low adoption of formal sustainability reporting practices.

For SMEs and other companies outside the top 1,000 listed entities, the cost and complexity of sustainability ratings undertaken by third-party agencies may be prohibitive.

The literature highlights substantial disparities between the sustainability disclosures of large enterprises and SMEs in India. Singh et al. (2020) found that SME disclosures are often descriptive and lack quantified performance data, underscoring the need for stronger reporting practices and policy support. Inconsistent disclosure across SMEs continues to constrain comprehensive assessment.

2. Objectives

The study seeks to achieve the following objectives:

- Develop a comprehensive tool for preliminary sustainability assessment in two energy-intensive industries: (a) coal-based thermal power generation and (b) iron and steel manufacturing.
- Rank and categorise selected enterprises using the proposed framework through cross-sectional assessment within the study period, FY 2019–20 to FY 2021–22.
- Develop a simplified version of the framework for preliminary sustainability assessment by SMEs.

2.1 Study Area, Data Collection and Sample

Energy-intensive manufacturing industries account for a substantial share of India's energy consumption. The study focuses on enterprises in energy-intensive sectors designated under the Energy Conservation Act, 2001.

A structured questionnaire was distributed to approximately 30 enterprises, including SMEs, large corporations and conglomerates, to examine the applicability of the Sustainability Disclosure Index (SDI). Secondary data were drawn from sustainability reports, business responsibility reports, annual reports and integrated reports for the study period, FY 2019–20 to FY 2021–22, and examined using content analysis.

3. Research Methodology and Development of the Proposed Index

A preliminary Sustainability Disclosure Index (SDI) was developed using corporate non-financial disclosures as indicators of organisational commitment to addressing sustainability challenges.

Many indicators were derived from the GRI Standards because of their comprehensive coverage and widespread adoption among Indian corporations. The GRI framework also encourages organisations to use sustainability reporting to support improved sustainability practices and broader sustainable development objectives.

Existing research on corporate sustainability has focused extensively on defining sustainability and identifying appropriate assessment parameters. Büyüközkan and Karabulut (2018) describe sustainability performance evaluation as the quantification of organisational performance through indicators reflecting policies, decisions and actions with economic, social and environmental outcomes.

3.1 Research Design

The study adopts a mixed-method research design combining exploratory and descriptive approaches. A pilot survey was conducted using a structured questionnaire, which was subsequently refined in response to feedback.

Both primary and secondary data were used. Where feasible, primary data were obtained from representatives of corporate sustainability and responsibility divisions. Primary surveys were particularly important for SMEs, which often do not publish detailed sustainability information.

For large corporations, secondary data were obtained from annual reports, business responsibility reports, sustainability reports, CSR reports and official websites. These disclosures provide an accessible source of corporate information and may be subject to external assurance. Pilot survey feedback also indicated that listed companies were unlikely to provide substantial additional information beyond publicly available disclosures.

To broaden the scope of assessment, an economic dimension was incorporated alongside the conventional environmental, social and governance dimensions.

3.2 Development of the Sustainability Index

The initial environmental, social and economic dimensions were divided into sub-dimensions to facilitate systematic assessment. Environmental sub-dimensions included:

- Energy Use and Efficiency
- Waste Management Practices
- Identification and Assessment of Pollution Types and Levels
- Other environmental management practices, including recyclability and biodiversity conservation.

Social sub-dimensions included:

- Employee welfare, including diversity, benefits and absenteeism.
- Health and Safety Measures
- Community Engagement, including rural development and local community issues.

The economic dimension focused primarily on income and expenditure, with expenditure classified into revenue and capital categories.

Quantitative parameters were identified through a review of peer-reviewed literature, primarily from Scopus-indexed journals, supplemented by indicators from international sustainability indices, frameworks and standards.

Recognising that SMEs may not formally monitor or disclose sustainability metrics, selected subjective indicators were assessed using a seven-point Likert scale. This approach was intended to accommodate enterprises with limited reporting capacity.

The questionnaire was circulated among representatives of listed companies, SMEs and academia to collect information and obtain expert feedback on the structure and content of the index.

The initial exercise identified 77 indicators:

- 21 Environmental indicators
- 14 Social indicators

- 42 Economic indicators

Following document analysis and refinement, the final set comprised 69 indicators across four dimensions:

- Environmental – 29 indicators
- Social – 20 indicators
- Governance – 9 indicators
- Economic – 11 indicators

The resulting index integrates indicators across the four dimensions and their associated sub-dimensions. Table 1 summarises the questionnaire structure for SMEs.

Table 1. Dimensions and sub-dimensions of the SME questionnaire

Dimension	Sub-dimensions
Environmental	Policy, committee and management systems; materials; emissions; water; waste; biodiversity; climate change; compliance; transportation
Social	Policy and committee; employee gender participation, diversity, collective bargaining, training and performance review; human rights; CSR; health and safety; local community
Governance	Policy and committee; code of conduct and ethics; stakeholder engagement; grievance redressal; customer satisfaction; supply chain management
Economic	Economic value addition; local employment

Expert feedback supported the relevance of the proposed assessment and informed the refinement of the indicator framework.

4. Analysis and Scoring

The Sustainability Disclosure Index was applied using content analysis and qualitative document analysis of corporate sustainability reports, business responsibility reports, annual reports, integrated reports and official websites. The study period covers FY 2019–20, FY 2020–21 and FY 2021–22.

For the cross-sectional assessment, disclosures relating to predefined indicators were examined and assigned scores ranging from 0 to 3 according to the scoring methodology.

4.1 Index Score

The overall index score was calculated as follows:

Index score (%) = $(\Sigma p_i / TS) \times 100$

Where:

p_i = Score assigned to indicator i (0–3).

Σp_i = Sum of individual indicator scores across all dimensions.

TS = Maximum achievable total score.

TS = 3n, where n is the number of indicators.

The same approach was used to calculate dimension-specific scores for individual companies and industry categories.

Indicators from different frameworks were consolidated to eliminate duplication, and substantially similar disclosures were combined.

Table 2 presents the scores obtained from the analysis of corporate disclosures for FY 2021–22 for eight iron and steel manufacturing companies.

Table 2. Dimension-wise scores and overall sustainability index for iron and steel manufacturing companies (FY 2021–22)

Dimension	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8
Environmental	53	44	40	45	66	67	32	45
Social	47	42	20	37	51	53	24	54
Economic	19	13	6	11	23	23	8	18
Governance	21	23	19	20	19	24	15	23
Overall score	140	122	85	113	159	167	79	140
Maximum score	207	207	207	207	207	207	207	207
Index score (%)	68	59	41	55	77	81	38	68

The proposed index consolidates recognised sustainability indicators into a single measure, facilitating corporate benchmarking and cross-sectional comparisons. As shown in Table 2, the eight companies recorded index scores ranging from 38% to 81%, indicating substantial differences in disclosure performance. The index combines environmental, social, governance and economic parameters. As a disclosure-based measure, it should be interpreted as a preliminary assessment rather than definitive evidence of operational sustainability performance.

The study contributes to the literature on sustainability assessment in energy-intensive industries, where high carbon footprints, social responsibilities, exposure to global energy markets and governance requirements make systematic assessment particularly important. The proposed tool can support BRSR preparedness and help enterprises identify improvement opportunities before undertaking more comprehensive and costly third-party assessments.

5. Conclusion and Recommendations

Index-based sustainability assessment offers considerable scope for further research. Future studies could incorporate multi-criteria decision analysis (MCDA), including the Analytic Hierarchy Process (AHP), to establish differentiated indicator weights and develop more comprehensive composite measures. Further refinement of criteria and assessment guidelines could improve the ability of such indices to capture the multidimensional nature of corporate sustainability.

Experts also highlighted growing interest in ESG-based investment in India and recommended exploring additional dimensions, including technology and organisational culture. The proposed framework provides a foundation for preliminary self-assessment and benchmarking, particularly for enterprises with limited resources. Further empirical testing across industries and SMEs would help establish its wider applicability.

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