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Research Article

Keywords: BRSR Disclosure Score, ESG disclosure, Indian food industry, BRSR, NGRBC, disclosure index, sustainability reporting, longitudinal analysis

Posted Date: November 13th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11331943/v1

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Additional Declarations: No competing interests reported.

Mapping corporate sustainability disclosures in the Indian food industry

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Abstract

Mandatory sustainability disclosure frameworks produce uneven compliance outcomes whose nature and drivers remain poorly understood in sector-specific contexts. This study applies a BRSR Disclosure Score - an equally-weighted, indicator-level index across 140 items drawn from India's Business Responsibility and Sustainability Reporting (BRSR) framework - to a longitudinal panel of twenty listed food and beverage companies over 5 fiscal years (FY 2020-21 to FY 2024-25). The food and beverage sector is particularly relevant due to its high environmental footprint, supply-chain complexity, and direct public health implications, making sustainability disclosure especially critical. Average disclosure scores rose from 19.3% of the maximum in FY21 to 86.7% in FY25, with over 60% of the gain concentrated in the single year coinciding with mandatory BRSR adoption. General and Process indicators converged to near-perfect coverage, while Leadership indicators - capturing voluntary, forward-looking commitments - remained persistently under-disclosed at 0.56 out of 1.0 in FY25. The Leadership gap was most acute for smaller mid-cap firms and subsections associated with policy advocacy and inclusive growth principles. These findings suggest that regulatory compulsion drives coverage breadth but does not generate values-driven disclosure depth, with implications for SEBI's phased adoption of Leadership indicators and for ESG-based investment screening in the Indian food sector.

Keywords: *BRSR Disclosure Score, ESG disclosure, Indian food industry, BRSR, NGRBC, disclosure index, sustainability reporting, longitudinal analysis*

1. Introduction

Corporate sustainability reporting has emerged as one of the most consequential institutional developments in global business governance over the past two decades. Amid growing investor scrutiny, regulatory tightening, and mounting societal pressure, the quality and consistency of Environmental, Social, and Governance (ESG) disclosures have become a primary lens through which the non-financial performance of firms is assessed (Eccles & Klimenko, 2019; De Villiers et al., 2017). In India, this shift was formalised through the introduction of the Business Responsibility and Sustainability Report (BRSR) framework by the Securities and Exchange Board of India (SEBI) in May 2021, replacing the earlier Business Responsibility Report (BRR) regime (SEBI, 2021).

The BRSR is rooted in the National Guidelines on Responsible Business Conduct (NGRBC) articulated by the Ministry of Corporate Affairs, GoI, which identifies nine principles of responsible business behaviour spanning governance, environmental stewardship, employee welfare, human rights, stakeholder engagement, policy advocacy, inclusive growth, and consumer value creation. For the top 1000 listed companies by market capitalisation, BRSR disclosure became mandatory from FY 2022-23 onwards, marking a paradigm shift from voluntary narrative reporting to structured, quantitative, and auditable sustainability disclosure.

The literature on sustainability reporting in emerging markets has grown substantially since the mid-2010s. Fifka (2013) conducted a cross-country review and found that the extent of CSR reporting was positively correlated with firm size, sector visibility, and regulatory pressure. In the Indian context, Narwal and Sharma (2014) analysed voluntary CSR disclosures pre-Companies Act 2013, finding wide heterogeneity across sectors. Sharma and Mani (2013) examined the transition from BRR to BRSR and argued that the structured, principle-wise format of BRSR significantly reduces comparability problems inherent in

narrative CSR disclosures. On the food industry specifically, Chen and Mussalli (2020) found that food multinationals tend to prioritise product safety and supply chain disclosures while under-reporting labour and human rights metrics - a pattern this study examines in the Indian listed space. Prasad et al. (2020) studied Indian FMCG firms and identified regulatory compliance and reputational risk management as the dominant motivators for sustainability disclosure, rather than genuine stakeholder engagement.

The voluntary versus mandatory reporting debate is directly relevant here. Studies by Ioannou & Serafeim (2017) and Aureli et al. (2020) demonstrate that mandatory reporting regimes produce measurable improvements in disclosure coverage but do not automatically translate into improvements in disclosure quality or underlying sustainability practices. This tension - between the form and substance of disclosure - frames the interpretive lens adopted in this study. The determinants of sustainability disclosure have attracted considerable attention in the empirical accounting literature, specifically the three theoretical frameworks. First, *agency theory* (Jensen & Meckling, 1976; Watts & Zimmerman, 1986) predicts that firms facing greater monitoring demands from dispersed investors will voluntarily disclose more to reduce information asymmetry and agency costs. This produces a firm-size prediction: larger firms, subject to greater institutional investor scrutiny, should exhibit systematically higher disclosure scores. Second, *legitimacy theory* (Suchman, 1995; Dowling & Pfeffer, 1975) holds that firms engage in disclosure strategically to maintain their licence to operate, implying that disclosure responses to regulatory mandates will be compliance-driven rather than substance-driven. Third, *institutional isomorphism* (DiMaggio & Powell, 1983) predicts that coercive regulatory pressure produces rapid homogenisation of disclosure behaviour across firms, irrespective of their underlying heterogeneity in size, ownership, and sustainability practices.

The empirical relationship between firm size and sustainability disclosure has been documented across multiple contexts. Cormier and Magnan (2003) demonstrated that environmental reporting quality was systematically higher for larger firms in continental European markets. In the Indian context, Narwal and Sharma (2014) identified firm size as a significant predictor of CSR disclosure extent.

The Indian food and beverage sector represents a particularly salient context for examining BRSR compliance. As one of the largest employers in the country, a major consumer of natural resources (land, water, energy), and a sector with direct public health implications, food systems account for significant environmental and socio-economic externalities globally (Food and Agriculture Organization, 2021, UN Environment Programme, 2020). Yet the extent to which listed Indian food companies have adapted to the BRSR framework, and whether disclosure quality reflects substantive practice rather than compliance, remains underexplored in sector-specific academic literature (KPMG, 2023, Ernst & Young, 2022). The present study extends this literature by testing size effects in the specific context of India's BRSR mandatory reporting regime, distinguishing between pre-mandate periods (where voluntary disclosure incentives operate) and post-mandate periods (where coercive compliance dominates), and by disaggregating the overall disclosure score into its 'Essential and Leadership' tiers to identify whether size effects persist differentially across the voluntary and mandatory dimensions of the framework.

Based on this, the objective of the work is to systematically quantify BRSR disclosure levels across twenty listed Indian food companies over a five-year panel (FY 2020-21 to FY 2024-25). Specific objectives are:

1. To identify which BRSR dimensions - General, Process, Essential, or Leadership - are most and least comprehensively disclosed, and how this pattern evolves over time.

2. To examine whether, and to what extent, the mandatory adoption of BRSR in FY 2022-23 catalysed a structural shift in disclosure behaviour.
3. To identify which firm-level structural characteristics - revenue, market capitalisation, MNC status, business type, and headquarters location - are significant predictors of disclosure depth through correlation analysis, and to establish whether these relationships differ between pre-mandate and post-mandate periods.

The contribution of the paper is three-fold. Methodologically, it demonstrates a replicable, indicator-level scoring protocol that maps directly onto the BRSR framework and can be updated as new annual reports become available. Substantively, it provides a pre-to-post mandatory-BRSR benchmark that documents the scale of the compliance-induced disclosure jump and highlights the enduring weaknesses in leadership-level voluntary disclosures. Analytically, it presents the first empirical correlation analysis linking firm-level structural characteristics to BRSR disclosure performance in the Indian food sector, testing firm-size, MNC ownership, and sector-type hypotheses derived from agency theory, legitimacy theory, and institutional isomorphism.

2. Data Sources

2.1 Primary Source: Annual Reports and BRSR Filings

The study covers 20 BSE/NSE-listed food and beverage companies including large-cap multinationals (Hindustan Unilever, Nestlé India, ITC), established Indian conglomerates (Britannia, Dabur), and mid-cap and emerging players (Bikaji Foods, Prataap Snacks, Varun Beverages, KRBL, Avanti Feeds, among others) as shown in Table 1. These were top twenty listed Indian food and beverage companies by market capitalisation as of FY 2025-26. All these companies are listed on BSE and/or NSE; classified under the Food, Beverages, and Tobacco sector per SEBI or NIC codes; and availability of annual reports covering all five study years.

The primary data for this study is drawn from the Annual Reports published by each of the twenty sample companies for the financial years FY 2020-21, FY 2021-22, FY 2022-23, FY 2023-24, and FY 2024-25. Prior to the mandatory BRSR format (i.e., for FY 2020-21 and FY 2021-22), companies filed Business Responsibility Reports (BRR) as part of their annual reports in accordance with SEBI's Listing Obligations and Disclosure Requirements (LODR) Regulations. From FY 2022-23 onwards, the structured BRSR template, as notified by SEBI Circular dated 10th May 2021, became the applicable framework.

All annual reports were sourced from official company websites or exchange filings platforms (NSE/BSE). The BRSR filings were cross-verified with the SEBI BRSR database to ensure consistency and completeness. Each report was reviewed in its entirety, with particular attention to the sections corresponding to the 140 indicators defined in the coding framework.

Table 1 profiles the final sample across five dimensions relevant to the study. Headquarters identifies the city of the company's registered principal office. Revenue reports the approximate consolidated turnover for FY 2024-25 (in ~INR crore). Business type characterises the primary product category. Market cap category follows NSE's classification into Large-cap, Mid-cap, and Small-cap segments, used as a proxy for firm size, investor scrutiny, and ESG reporting resources. The MNC column flags whether the company has material international operations or is a subsidiary of a global parent.

2.2 Regulatory Context

The BRSR framework mandated by SEBI is structured around the nine principles of the NGRBC. Each principle is further bifurcated into Essential Indicators (which are mandatory and comparable across firms) and Leadership Indicators (which are voluntary, aspirational, and capture advanced or innovative sustainability practices). General and Process disclosures, which constitute Section A and Section B of the BRSR respectively, capture

entity-level information and management-system disclosures. Section C contains the principle-wise indicators. This three-part, four-type architecture directly shapes the indicator framework used in this study.

Table 1. Sample characteristics of 20 listed Indian food and beverage companies.

Ticker	Company	HQ City	Business Type	Rev FY25 (₹ Cr.)
ITC [Lc]	ITC Ltd	Kolkata	Diversified FMCG	73,000
AWL [Lc]	Adani Wilmar Ltd	Ahmedabad	Edible Oils & Agri	63,672
HUL [Δ, Lc]	Hindustan Unilever Ltd	Mumbai	Diversified FMCG	61,000
PATANJALI [Mc]	Patanjali Foods Ltd	Noida	Edible Oils & Agri	34,157
NESTLE [Δ, Lc]	Nestlé India Ltd	Gurugram	Packaged Foods	20,202
VBL [Δ, Lc]	Varun Beverages Ltd	Gurugram	Beverages	20,008
BRITANNIA [Lc]	Britannia Industries Ltd	Bengaluru	Packaged Foods	17,943
DABUR [Lc]	Dabur India Ltd	Gurugram	Diversified FMCG	13,201
MARICO [Lc]	Marico Ltd	Mumbai	Edible Oils & Agri	10,100
LTFOOD [Sc]	LT Foods Ltd	Gurugram	Rice & Staples	8,770
HATSUN [Sc]	Hatsun Agro Product Ltd	Chennai	Dairy & Pack. Foods	8,200
JUBLIENTFOODS [Δ, Mc]	Jubilant FoodWorks Ltd	Noida	QSR	8,142
AVANTIFEEDS [Sc]	Avanti Feeds Ltd	Hyderabad	Poultry & Seafood	5,981
BALCHINI [Sc]	Balrampur Chini Mills Ltd	Kolkata	Sugar & Ethanol	5,600
KRBL [Sc]	KRBL Ltd	New Delhi	Rice & Staples	5,594
VENKYS [Sc]	Venky's (India) Ltd	Pune	Poultry & Seafood	5,500
BIKAJI [Sc]	Bikaji Foods International Ltd	Bikaner	Packaged Foods	2,700
PRATAAP [Sc]	Prataap Snacks Ltd	Indore	Packaged Foods	1,700
AGROTECH [Δ, Sc]	Agro Tech Foods Ltd	Secunderabad	Edible Oils & Agri	830
TCP [Δ, Sc]	Tasty Bite Eatables Ltd	Pune	Packaged Foods	554

Note. Revenue figures are approximate consolidated turnover for FY 2024-25 (INR crore), sourced from company annual reports. Market cap category follows NSE classification as of FY 2025-26. MNC = Yes indicates material international operations or a listed multinational parent.

[Δ] Indicates MNC companies; [Lc, Mc, Sc] Indicates Large, Medium, and Small Market Cap, respectively.

3. Methodology and Data Analysis

3.1 Indicator Framework Design

A bespoke coding instrument of 140 BRSR indicators was developed, drawing directly from the SEBI BRSR template and the NGRBC guidelines. Each indicator was assigned to:

i. Indicator type: General (24 indicators), Process (12), Essential (65), or Leadership (39);
ii. Section type: Section A (24 indicators covering entity identity and general disclosures), Section B (12 indicators covering policy and governance processes), or Section C (102 indicators covering the nine principles); and
iii. Subsection type: one of 19 thematic sub-categories (e.g., *P3 - Employee Well-being*, *P6 - Environment*, *Policy and Management Processes*).

The distribution of indicators across dimensions is shown in Table 2.

Table 2. Distribution of 140 BRSR indicators by type and section

Section	General	Process	Essential	Leadership
A - General Disclosures	24	0	0	0
B - Management & Process	0	12	0	0
C - Principle-wise	0	0	65	39
Total	24	12	65	39

3.2 Coding Protocol

For each company-year combination, the relevant section of the annual report was reviewed and each of the 140 indicators was coded using a three-point disclosure scale (Table 3).

The coding was carried out by reviewing the Disclosure Status column (Yes/No) and the Information Status column (Partial) in the structured data instrument. The operational rule applied was:

i. Disclosure = *Yes* and Information Status = *Partial* $\Rightarrow$ Score = 0.5

ii. Disclosure = *Yes* and Information Status = blank/null ⇒ Score = 1.0

iii. Disclosure = *No* ⇒ Score = 0.0

This yields a continuous indicator-level score $s_{i,c,t} \in \{0, 0.5, 1\}$ for each indicator *i*, company *c*, and year *t*.

Table 3. Three-point disclosure coding scale

Code	Label	Definition
Yes	Full Disclosure	The company explicitly addresses the indicator with sufficient quantitative or qualitative information as required by the BRSR template.
Partial	Partial Disclosure	The indicator is mentioned or partially addressed, but the disclosure is incomplete, non-specific, or lacks required data fields.
No	Non-disclosure	The indicator is absent, unanswered, or explicitly stated as not applicable.

3.3 Construction and Aggregation of the BRSR Disclosure Score

3.3.1 Contextualising the Disclosure Score

The construct of a disclosure score - a single, comparable, numerical index summarising the extent to which a firm has disclosed across a structured reporting framework - has a well-established precedent in the empirical corporate transparency literature. Seminal work by Botosan (1997) operationalised disclosure quality for annual reports using an additive index of specific informational items, demonstrating that such indices could meaningfully capture variation in voluntary disclosure behaviour across firms. Cooke (1989) formalised the disclosure index method, in which each item in a pre-defined checklist is assessed for its presence or absence, and the resulting count (or weighted sum) constitutes the disclosure score for a firm. This approach has since been adopted widely in sustainability and CSR reporting research, including in Indian contexts (Prasad et al., 2020; Narwal & Sharma, 2014).

The present study introduces the BRSR Disclosure Score as a formal construct defined over the SEBI BRSR framework. To the authors' knowledge, this is the first study to operationalise a structured, indicator-level, longitudinal disclosure score specifically anchored to the BRSR template and applied systematically across a panel of listed Indian food companies. The BRSR Disclosure Score serves three analytical functions: (i) it provides a comparable, scalar summary of a company's BRSR compliance coverage in a given year; (ii) it enables longitudinal tracking of disclosure improvement across the five-year study window; and (iii) it supports cross-sectional ranking and clustering of firms by disclosure performance, including decomposition by indicator type, section, and subsection.

3.3.2 Score Aggregation and BRSR Disclosure Score Construction

Company-level annual scores were computed as the sum of individual indicator scores:

$$S_{c,t} = \sum_{i=1}^{140} s_{i,c,t}, \quad S_{c,t} \in [0, 140] \tag{1}$$

Dimension-level scores were computed by restricting the summation to indicators belonging to a given type, section, or subsection:

$$S_{c,t}^{d} = \sum_{i \in D_d} s_{i,c,t} \tag{2}$$

where D^d is the set of indicators belonging to dimension d. For cross-company comparisons, average scores were normalised as percentages of the respective maximum possible score.

The BRSR Disclosure Score for company c in financial year t is defined as the sum of scores across all 140 indicators in the coding instrument as shown in equation (3):

$$DS_{c,t} = \sum_{i=1}^{140} s_{i,c,t}, \quad DS_{c,t} \in [0, 140] \tag{3}$$

where $s_{i,c,t} \in \{0, 0.5, 1\}$ is the indicator-level score assigned for indicator i, company c, and year t per the coding protocol described in Section 3.2. The score of 1 denotes full disclosure,

0.5 denotes partial disclosure, and 0 denotes non-disclosure. For cross-company and cross-year comparisons, the score is normalised as a percentage of the maximum possible score:

$$DS_{c,t\,\%} = \frac{DS_{c,t}}{140} \times 100 \quad (4)$$

Dimension-level disclosure scores are similarly defined by restricting the summation to indicators belonging to a given type d (e.g., General, Leadership), section (A, B, C), or subsection (e.g., P6 - Environment):

$$DS_{c,t}^{d} = \sum_{i \in D_d} s_{i,c,t}, \quad DS_{c,t}^{d,\%} = \frac{DS_{c,t}^{d}}{|D_d|} \times 100 \quad (5)$$

where $|D^d|$ is the number of indicators in dimension d. This normalisation ensures that dimension-level scores are comparable across types and sections that differ in their total indicator counts (e.g., 24 General indicators versus 39 Leadership indicators).

3.3.3 Justification for Equal Weighting

The BRSR Disclosure Score assigns an equal weight of 1 to each indicator at full disclosure and 0.5 at partial disclosure, irrespective of the substantive importance or complexity of the individual indicator. This choice of equal weighting is deliberate and is supported by four converging arguments from the disclosure measurement literature.

First, equal weighting is the prevailing standard in disclosure index research. Since the foundational work of Cooke (1989), the overwhelming majority of empirical disclosure indices in the CSR and ESG literature adopt equal item weights (Botosan, 1997; Clarkson et al., 2008). Beattie et al. (2004) reviewed disclosure index methodologies across 29 studies and found that equal weighting was the most common approach, with no systematic evidence that differentially-weighted indices outperformed equal-weighted ones in terms of construct validity or predictive power.

Second, the BRSR framework itself treats indicators as structurally equivalent within their type. The SEBI BRSR template does not assign differential importance weights across indicators within the Essential or Leadership tiers. Each indicator represents a discrete, self-contained disclosure requirement - a specific question or data field that a company either answers or does not. Imposing differential weights on top of this flat regulatory structure would introduce an analytical judgment layer not endorsed by the framework's architects and would risk privileging the researcher's values over the regulator's intent (MCA, 2019).

Third, in a context where BRSR adoption is still maturing, coverage breadth is arguably more informative than weighted depth. An equal-weighted score is well-suited to measuring coverage breadth, since every indicator contributes equally to whether a company has achieved comprehensive disclosure (Fifka, 2013). Differential weighting, by contrast, would be more appropriate in a context where the primary interest is in the depth or quality of a subset of high-priority indicators - a research design better suited to a qualitative or mixed-methods study.

Fourth, equal weighting avoids the arbitrariness and non-replicability of researcher-assigned differential weights. Equal weighting is transparent, replicable, and verifiable: any researcher applying the same 140-indicator instrument to the same annual reports will arrive at the same score. This property of methodological transparency is particularly important for a study that proposes the BRSR Disclosure Score as a replicable benchmark for future research and regulatory monitoring (Clarkson et al., 2008). In the FMCG and food sector context, sustainability impacts are multi-dimensional and distributed across environmental, labour, and consumer-facing dimensions. Assigning differential weights could bias the index toward specific themes (e.g., emissions or governance), whereas equal weighting ensures a balanced representation of sector-wide sustainability expectations, unlike extractive industries where environmental indicators may dominate.

The partial-disclosure credit of 0.5 assigned to indicators coded as Partial is consistent with the treatment used by Botosan (1997) and subsequent studies that distinguish between full and incomplete informational responses. It acknowledges that partial disclosure carries information value while avoiding the inflation of scores that would result from treating partial as equivalent to full disclosure.

3.4 Analytical Framework

The scored panel of 14,000 data points (140 indicators × 20 companies × 5 years) was analysed along four complementary dimensions, each designed to address a distinct aspect of the research questions. Together, these dimensions constitute a progressively granular decomposition of BRSR disclosure behaviour - from the company-year aggregate down to the individual subsection-company cell.

3.4.1 Company-Wise Analysis

The first dimension examines disclosure patterns at the level of individual companies across the five-year panel. Total scores per company per FY were normalised as a percentage of the maximum possible score of 140. A cross-sectional heat-map was constructed with companies sorted in descending order of FY 2024-25 performance, and augmented with an additional column reporting the absolute percentage-point gain from FY21 to FY25 for each company.

3.4.2 Indicator Type-Wise Analysis

The second dimension disaggregates disclosure performance by indicator type - General, Process, Essential, and Leadership. For each type and financial year, the mean disclosure score was computed across all 20 companies, with standard deviations calculated to quantify cross-company spread. Time-series plots with ±1 SD error bars were produced for each type in separate panels. A stacked area chart was additionally constructed to visualise the

compositional contribution of each type to the total cross-company disclosure mass per year. Finally, a company-type heat-map was produced by averaging each company's scores for a given type across all five years.

3.4.3 Section-Wise Analysis

The third dimension organises disclosure performance by the three structural sections of the BRSR framework. Two complementary heat-maps were produced: one showing the average score per section per financial year (Section × Year), and one showing the average score per section per company aggregated over all five years (Section × Company). These were supplemented by a grouped bar chart presenting year-on-year section-level averages.

3.4.4 Subsection-Wise Analysis

The fourth and most granular dimension disaggregates disclosure performance across the 19 thematic subsections. An average score heat-map was constructed across all subsections and financial years, revealing which principle-wise subsections have converged to high disclosure and which remain structurally lagged. This was complemented by a Subsection × Company heat-map aggregating scores over the full five-year window.

4. Results and Discussion

4.1 Company-Wise Disclosure Trends

Most companies recorded approximately 20% disclosure scores in FY 2020-21, with Bikaji Foods and AWL showing near-zero values. Except for Dabur, ITC, and AWL, no company showed any improvement from FY 2020-21 to FY 2021-2022 (Figure 1). A step-change is evident in FY 2022-23 (Figure 1), the first mandatory reporting year, with scores rising sharply. By FY 2024-25, the interquartile range has compressed dramatically, indicating convergence toward the upper boundary of the BRSR framework. Bikaji Foods and HUL

recorded the largest absolute improvements (>95 % points), while ITC and Britannia showed one of the smallest gain, consistent with its pre-existing disclosure strength.

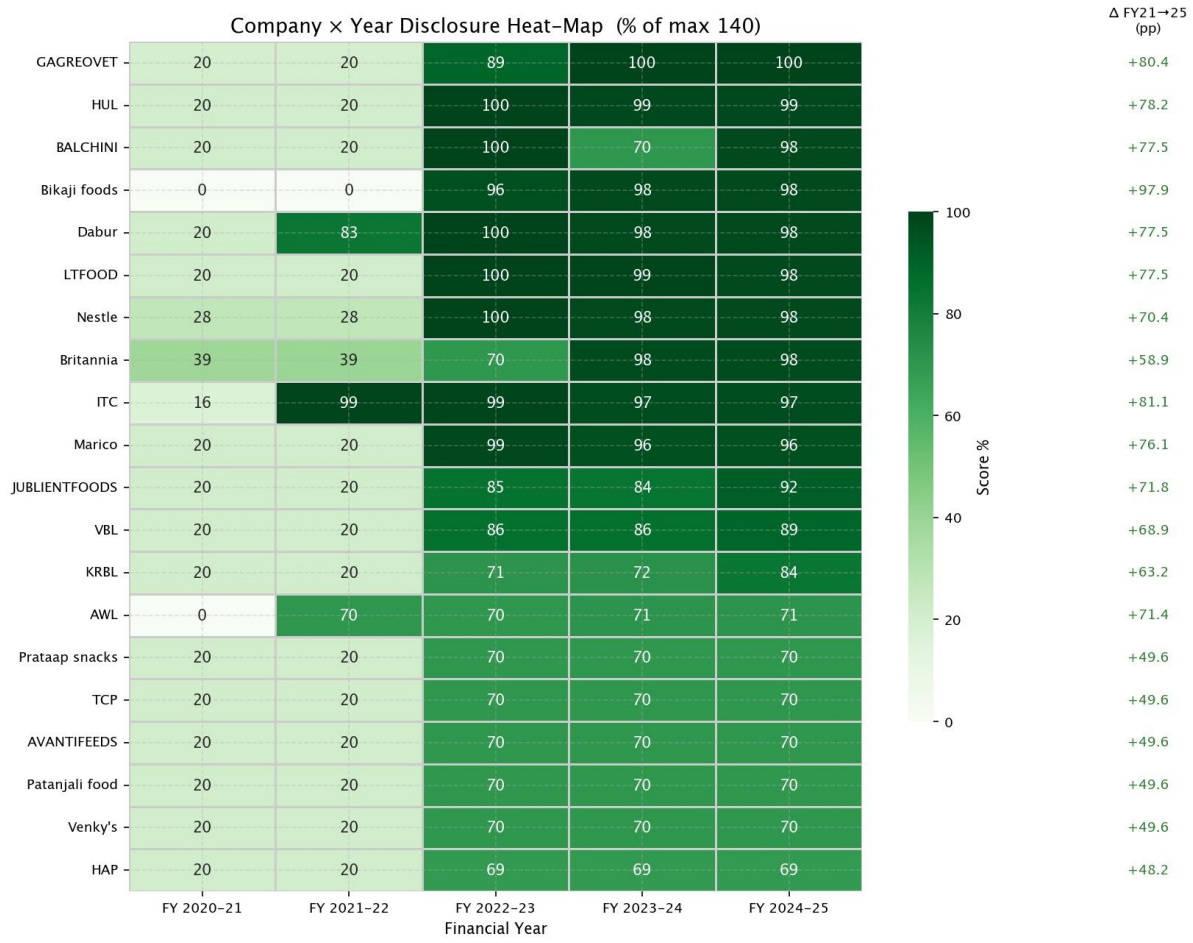


Figure 1. Company-level BRSR disclosure scores (% of maximum) across FY21-FY25, sorted by FY25 performance, with absolute percentage-point gain (FY21 to FY25).

4.2 Indicator Type-Wise Analysis

We observed a clear hierarchy in disclosure completeness across indicator types as shown in Figure 2a. General indicators achieved a near-perfect average score of 1.00 by FY 2022-23. Process indicators followed a similar trajectory, reaching 0.99 in FY23. Essential indicators rose sharply from 0.12 in FY21 to 0.99 in FY23, demonstrating the power of the mandatory compliance trigger. Leadership indicators, however, showed large variation in the disclosure scores across 20 companies with Bikaji Foods and ITC among the high leadership disclosure scores (Figure 2b).

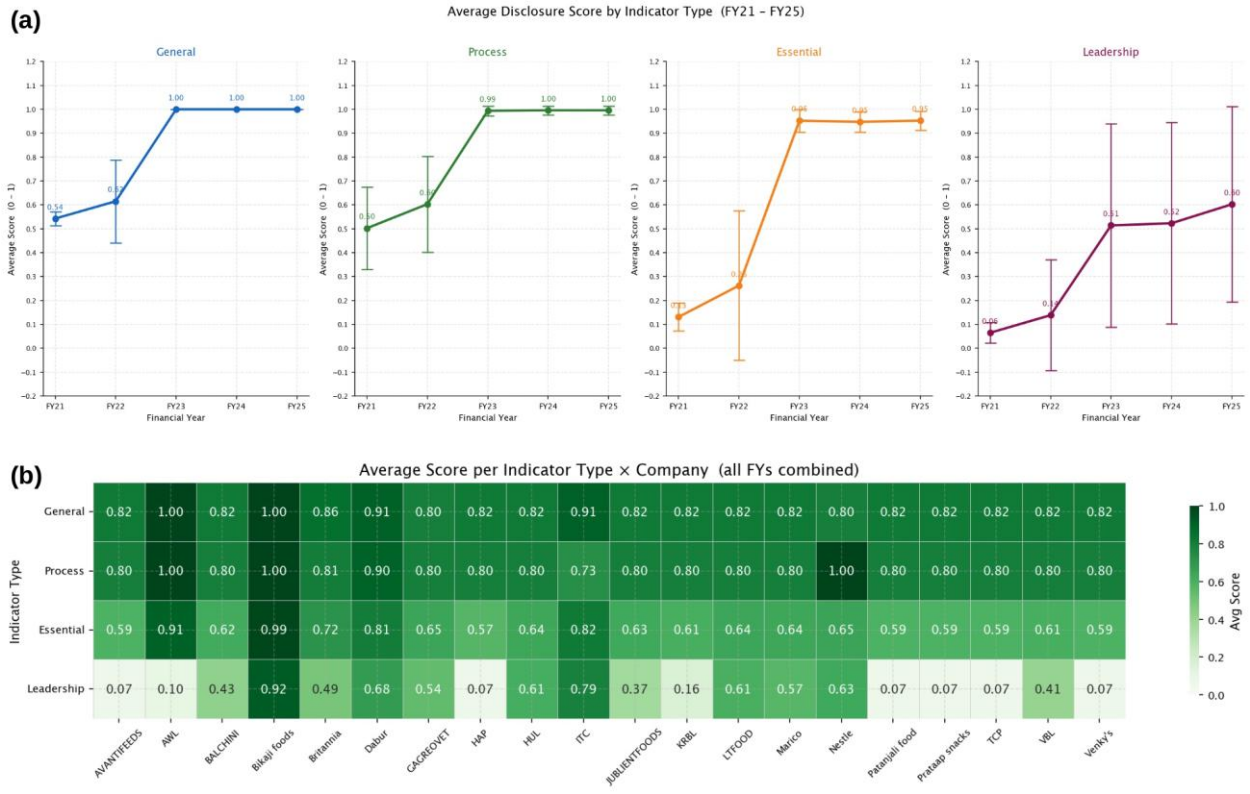


Figure 2. Average BRSR disclosure scores by indicator type across FY21-FY25. (a) Time-series trends by type; (b) per-company average scores by type (all FYs combined).

4.3 Section- and Subsection-wise Analysis

Our results confirms that Section A and Section B disclosure scores are near-uniformly high and similar (varying between 0.8 - 1) across the sample (Figure 3), while Section C shows greater cross-company variation (varying between 0.39 – 0.96) as shown in Figure 3c. The year-on-year growth of each section clearly highlighted the step-change in Section C between FY22 and FY23 (Figure 3b).

Further subsection-wise inspection of disclosure scores highlighted several important patterns. The Policy and Management Processes and Governance, Leadership & Oversight subsections (Section B) converge rapidly to ~1.0, confirming that the formal governance architecture of BRSR is well-adopted across the sample (Figure 4). Except for P7 - Public Advocacy, all the subsection indicators of Section C showed large improvement in disclosure scores from FY 2022-2023 onwards. We observed that P1 - Governance, P3 - Employee Well-being, P5 – Human Rights, and P7 – Public Advocacy were among the

highest-scoring subsections within Section C from FY23 onwards. The P3 - Employee Well-being and P6 - Environment, which together account for 42 of the 65 Essential indicators, also show strong increase in disclosures post-FY23 (Figure 4).

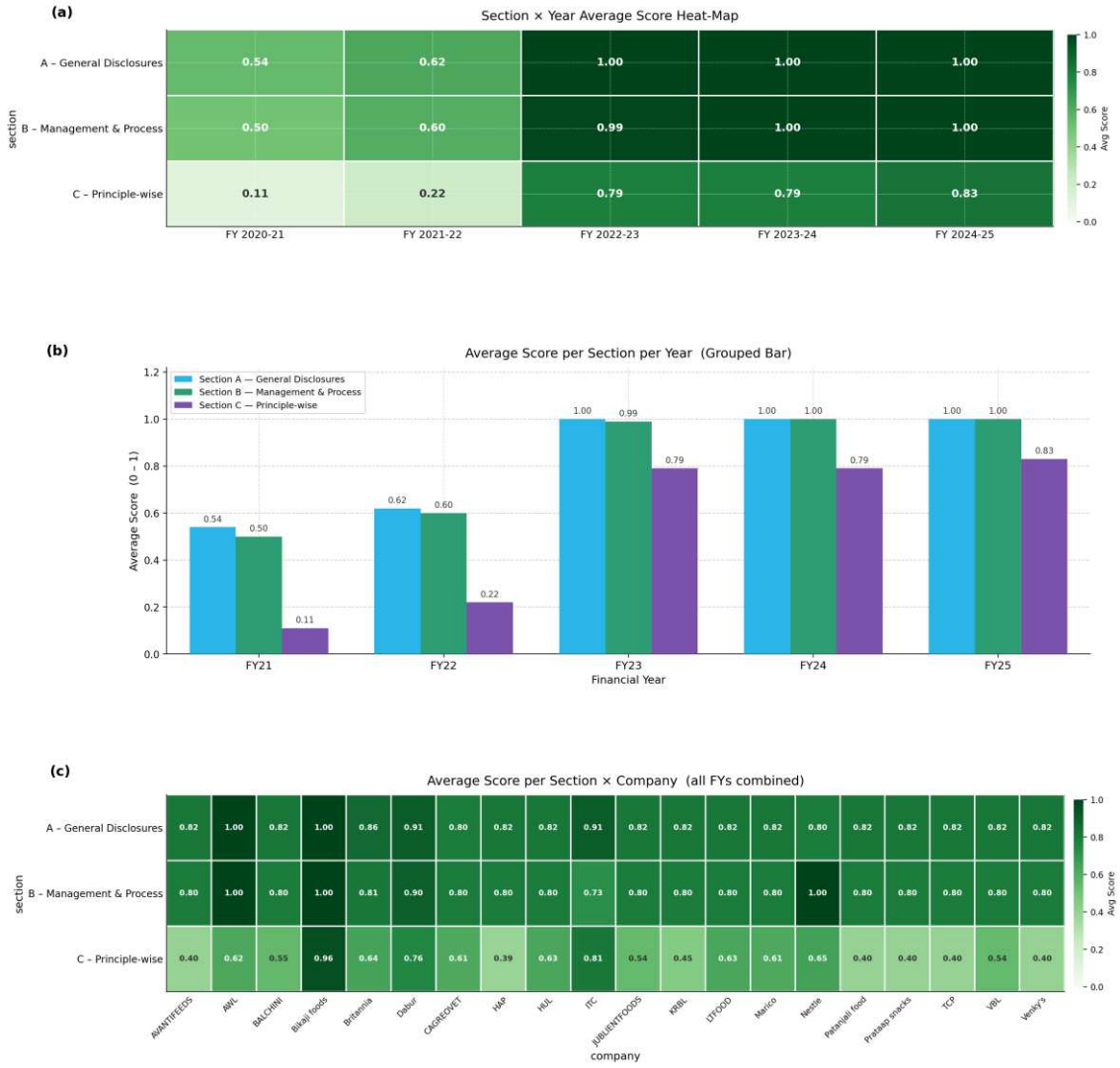


Figure 3. Section-wise BRSR disclosure scores across FY21-FY25. (a) Section x Year average scores; (b) year-on-year grouped bar chart by section; (c) per-company average scores by section (all FYs combined).

The P6 – Environment and P2 – Product Safety showed one of the highest improvement in disclosure scores from FY21 to FY25, consistent with the food sector's regulatory focus on product quality and compliance governance (Figure 4). Nevertheless, the P6 - Environment, P8 - Inclusive Growth, P2 - Product Safety, and P9 - Consumer Value were the weakest

subsections in term of disclosures throughout, as these contain the highest proportion of Leadership indicators.



Figure 4. Average BRSR disclosure scores across 19 subsections and 5 financial years (FY21-FY25).

Figure 5 presents the most comprehensive cross-view in the study: average scores for each subsection-company pair aggregated over all five years. The heat-map reveals that the weakest cells are concentrated at the intersection of Leadership-heavy subsections (P7, P8, P9) and the smaller mid-cap companies (HATSUN, TCP, Venky's, Prataap Snacks). This pattern is consistent with a resource-availability explanation, i.e., developing robust voluntary sustainability disclosures requires dedicated ESG functions that smaller companies may lack.

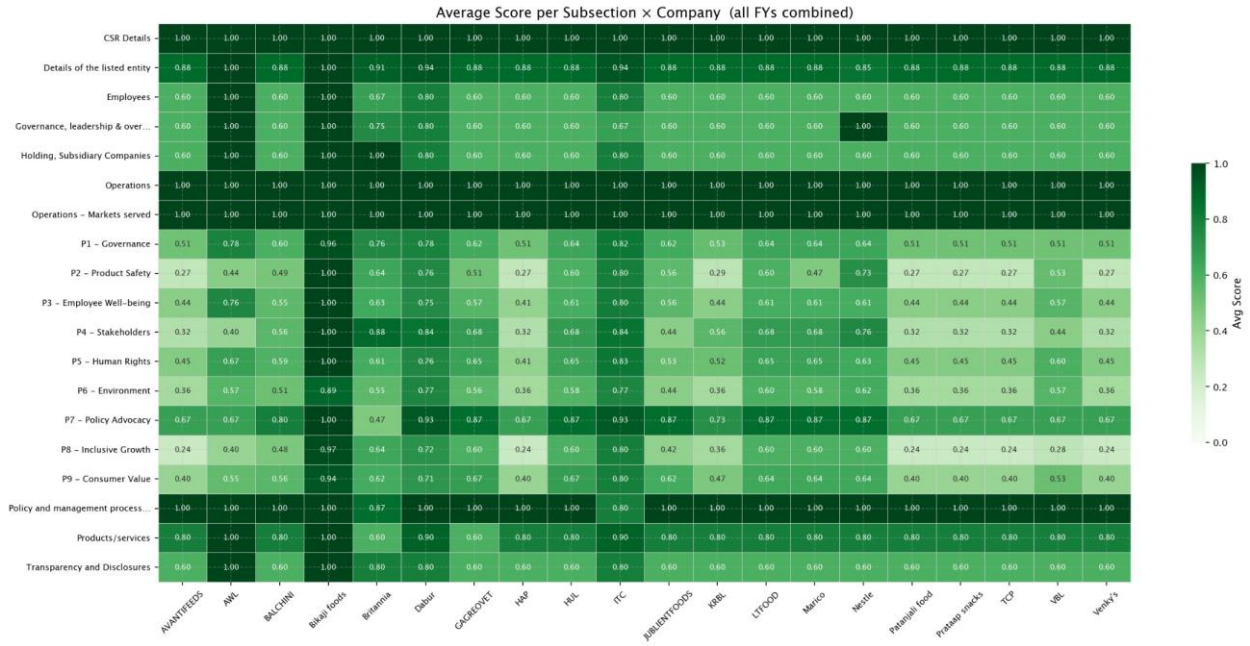


Figure 5. Average BRSR disclosure scores per subsection per company (all FYs averaged).

4.4 Determinants of Disclosure: Correlation Analysis

4.4.1 Firm-Size Effects and the Pre-mandate Window

The correlation analysis reveals a clear and theoretically coherent pattern: firm-size proxies are significant predictors of disclosure performance in the pre-mandate period (FY 2021-22) but not in the post-mandate period (FY 2024-25). Specifically, ln(Revenue) is positively correlated with the FY22 disclosure score (Pearson $r = 0.54$, $p = 0.022$; Spearman $\rho = 0.67$, $p = 0.002$), and Market Capitalisation ordinal shows a stronger relationship (Pearson $r = 0.62$, $p = 0.007$; Spearman $\rho = 0.72$, $p = 0.001$). Both findings are statistically significant at the 5% level with consistent sign and magnitude across both parametric and non-parametric estimators, providing confidence that the result is not an artefact of distributional assumptions. These results are directly consistent with the agency-theory prediction that larger firms, facing more dispersed institutional investor bases and higher analyst coverage, voluntarily disclose more in the absence of a mandated reporting structure (Jensen & Meckling, 1976; Watts & Zimmerman, 1986; Fifka, 2013).

The Kruskal-Wallis test for the pre-mandate FY22 score by market cap class yields H = 9.39, p = 0.009 (**), confirming that the size-disclosure gradient observed in the bivariate correlation translates into statistically significant between-group differences: large-cap companies averaged a pre-mandate score of 51.4% compared with 20.4% for mid-caps and 18.0% for small-caps. The dominant contributor to this large-cap advantage is ITC, which filed a substantively complete BRR in FY22 that mapped comprehensively onto the subsequent BRSR template, recording a score of 99.3% in FY22, a full year before mandatory adoption. This confirms the broader literature finding that firms with mature ESG reporting infrastructure - often large conglomerates with dedicated sustainability teams and long-standing GRI reporting histories - translate voluntarily into the mandatory reporting architecture more rapidly and completely (Ioannou & Serafeim, 2017; Prasad et al., 2020).

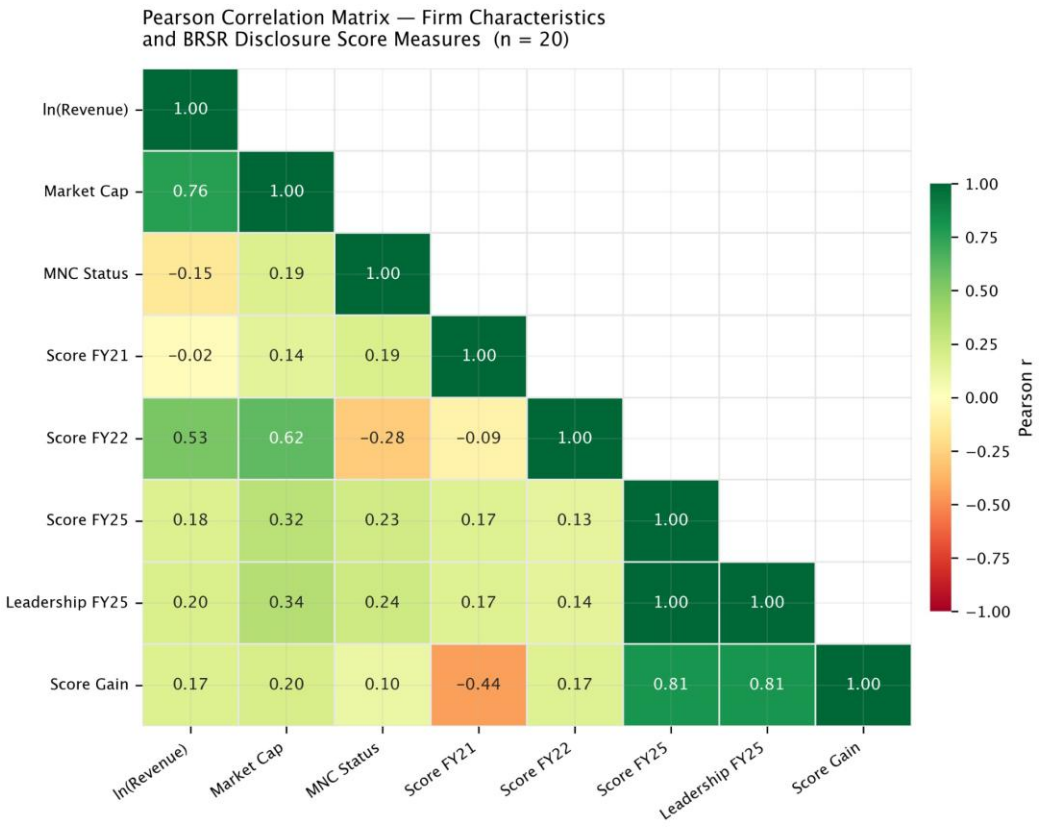


Figure 6. Pearson correlation matrix: firm characteristics and BRSR disclosure scores (n = 20).

4.4.2 Post-mandate Ceiling Effect and the Disappearance of Size Differences

In sharp contrast to the pre-mandate window, none of the three firm-level predictors show statistically significant correlations with FY25 Total Score (ln(Revenue): $r = 0.18$, $p = 0.48$; Market Cap: $r = 0.32$, $p = 0.20$; MNC: $r = 0.23$, $p = 0.35$). This result is not a failure of the analysis but a substantively important finding in its own right. By FY25, 16 of 20 companies score between 68% and 100% of the maximum, a range of only 32 percentage points. The compressed variance of the post-mandate score leaves insufficient statistical space for firm characteristics to explain cross-sectional variation - all companies, regardless of size or ownership type, have converged to a high compliance floor. This is precisely the prediction of DiMaggio and Powell's (1983) coercive isomorphism: a mandatory regulatory standard produces rapid, uniform homogenisation of reported behaviour across a field, erasing the firm-heterogeneity that characterised voluntary disclosure. The Kruskal-Wallis test for FY25 Total Score by market cap class yields $H = 2.63$, $p = 0.269$ (ns), confirming that large-cap, mid-cap, and small-cap firms are no longer statistically distinguishable on this measure.

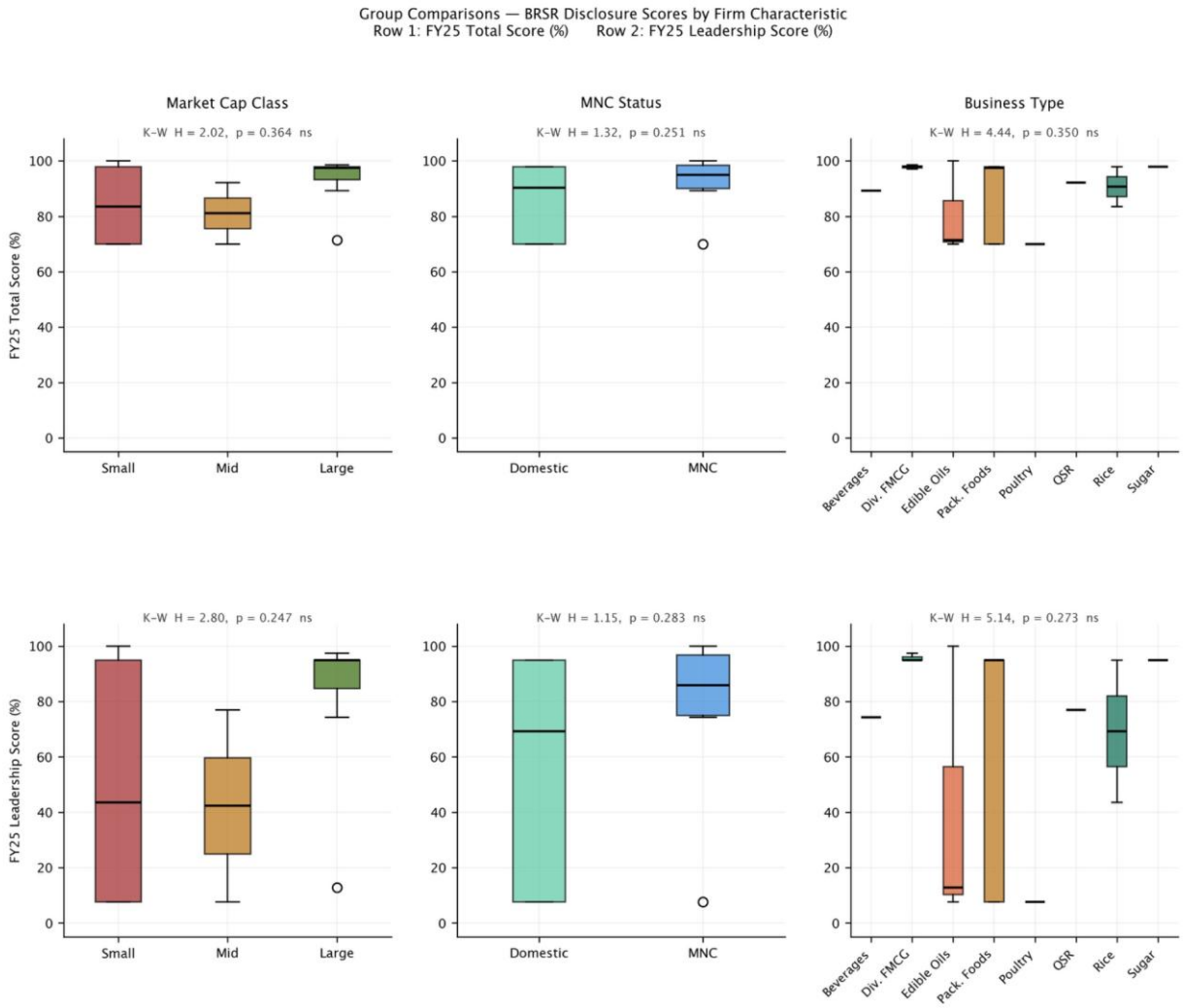


Figure 7. Group comparisons of BRSR disclosure scores by firm characteristic (FY25 Total Score and FY25 Leadership Score).

4.4.3 Leadership Score and Persistent Firm-Size Gradients

While firm characteristics lose explanatory power for the post-mandate total score, they retain greater explanatory relevance for the FY25 Leadership score, which captures voluntary disclosure beyond the mandatory Essential tier. The Spearman rank correlation between Market Cap and FY25 Leadership Score is $\rho = 0.39$, $p = 0.086$ (*), indicating marginal significance at the 10% threshold. The Kruskal-Wallis test by cap class yields $H = 2.98$, $p = 0.225$ for Leadership score - technically non-significant at conventional thresholds, but the effect size is substantively meaningful: large-cap companies averaged an FY25 Leadership score of 80.1% compared with 46.7% for mid-caps and 48.7% for small-caps, a

gap of over 30 percentage points. The group-mean contrast for MNC status is similarly directional: MNC firms averaged 75.2% on Leadership compared with 53.8% for domestic firms (Kruskal-Wallis H = 1.33, p = 0.249 ns). These results - statistically insignificant but directionally consistent - reflect the resource-availability explanation: building robust voluntary disclosure infrastructure requires dedicated ESG functions, multi-year reporting experience, and parent-level accountability mechanisms that large-cap and MNC firms are more likely to possess (Cormier & Magnan, 2003; Chen & Mussalli, 2020).

The business type analysis reveals the most pronounced variation in Leadership scores. Diversified FMCG companies (ITC, HUL, Dabur) average 95.7% on Leadership indicators, while Poultry & Seafood companies (Hatsun Agro, Venky's, Avanti Feeds) average only 7.7% - a gap of 88 percentage points on the voluntary disclosure tier. This reflects not merely a resource difference but a fundamental difference in the stakeholder exposure profile of these sub-sectors: consumer-facing conglomerates with branded products and global supply chains face ESG scrutiny from retail investors, international buyers, and consumer advocacy groups that poultry processors and seafood feed manufacturers do not. The Kruskal-Wallis test for business type on Leadership score yields H = 6.83, p = 0.145, non-significant at the 5% level but reflective of the small sample sizes within each business-type group (most have only 2-4 companies).

4.4.4 Disclosure Trajectories and the Structural Break at FY23

Figure 12 provides the most direct visualisation of the mandate's causal impact by plotting disclosure score trajectories separately for large-cap, mid-cap, and small-cap companies. All three panels display a step-change at FY23 that dwarfs any year-on-year improvement in the pre-mandate period. The group mean for large-cap companies rose from 47.5% in FY22 to 88.0% in FY23, a gain of 40.5 percentage points in a single year; for mid-caps (n = 2), the jump was from 18.2% to 81.0% (62.8 pp). The shaded ±1 SD bands are substantially wider

in the pre-mandate period, confirming that firm heterogeneity was high before the mandate and collapsed rapidly afterwards - a visual signature of coercive isomorphism (DiMaggio & Powell, 1983). ITC's exceptional trajectory is clearly visible in the large-cap panel, where one firm's line already sits at approximately 99% in FY22, having pre-adopted the BRSR format ahead of the mandatory deadline.

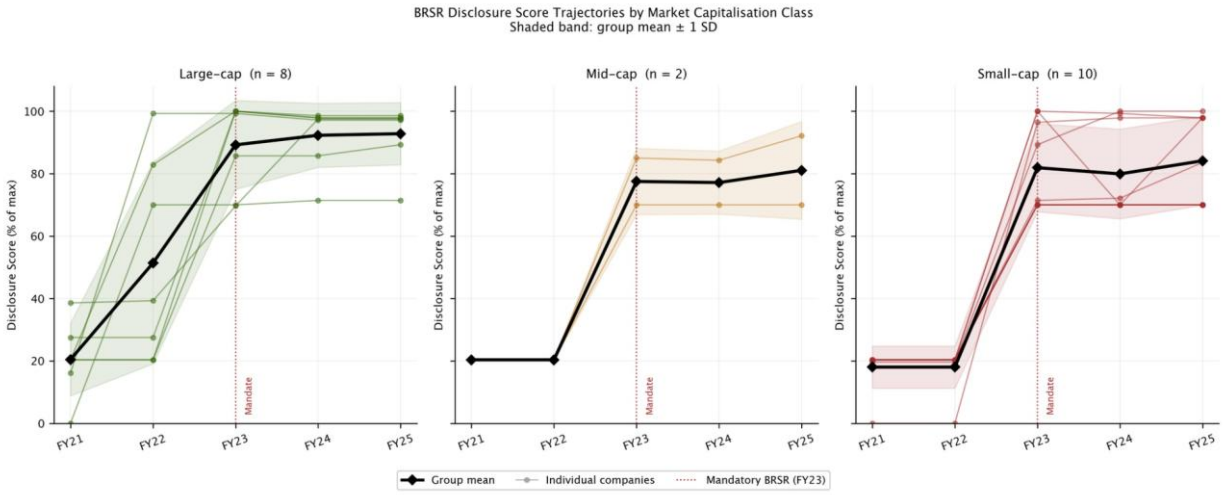


Figure 8. BRSR disclosure score trajectories by market capitalisation class (FY21-FY25). Thin lines: individual companies; thick line with shaded band: group mean +/- 1 SD; dotted vertical line: FY23 mandatory adoption.

4.4.5 Leadership-versus-Total Disclosure Profile

Figure 13 provides a cross-sectional view of each company's FY25 disclosure profile by plotting the FY25 Leadership Score against the FY25 Total Score. The two-dimensional scatter reveals a structural bimodality in the dataset. A dense cluster of 11 companies sits in the lower-left region, with total scores in the range 68-72% and Leadership scores below 15%; these are predominantly mid-cap and small-cap companies for which compliance with the mandatory Essential tier has been achieved but voluntary Leadership disclosures remain negligible. A second cluster of 8-9 companies sits in the upper-right quadrant with total scores above 92% and Leadership scores above 75%; these are large-cap companies (ITC, HUL, Nestlé, Britannia, Dabur) plus two mid-cap outperformers (AGROTECH/Agro Tech Foods, which achieved a perfect Leadership score of 100%). BALCHINI (Balrampur Chini),

VBL (Varun Beverages), JUBLIENTFOODS (Jubilant FoodWorks), and KRBL occupy intermediate positions, scoring moderately well on total disclosures but failing to achieve Leadership tier parity with the large-cap cluster.

The pattern in Figure 13 is analytically important because it demonstrates that the Leadership indicator gap is not distributed uniformly across the sample - it is structurally concentrated in the lower-compliance cluster, which coincides almost exactly with the mid-cap and small-cap segment. This has direct implications for SEBI's phased adoption strategy: applying a uniform Leadership mandate across all 1,000 listed companies would disproportionately burden the firms with the fewest disclosure resources, while the firms best positioned to comply (large-caps) have largely already done so voluntarily. A differentiated compliance calendar, or a tiered Leadership mandate calibrated by market capitalisation, would better match regulatory expectations with firm-level capacity.

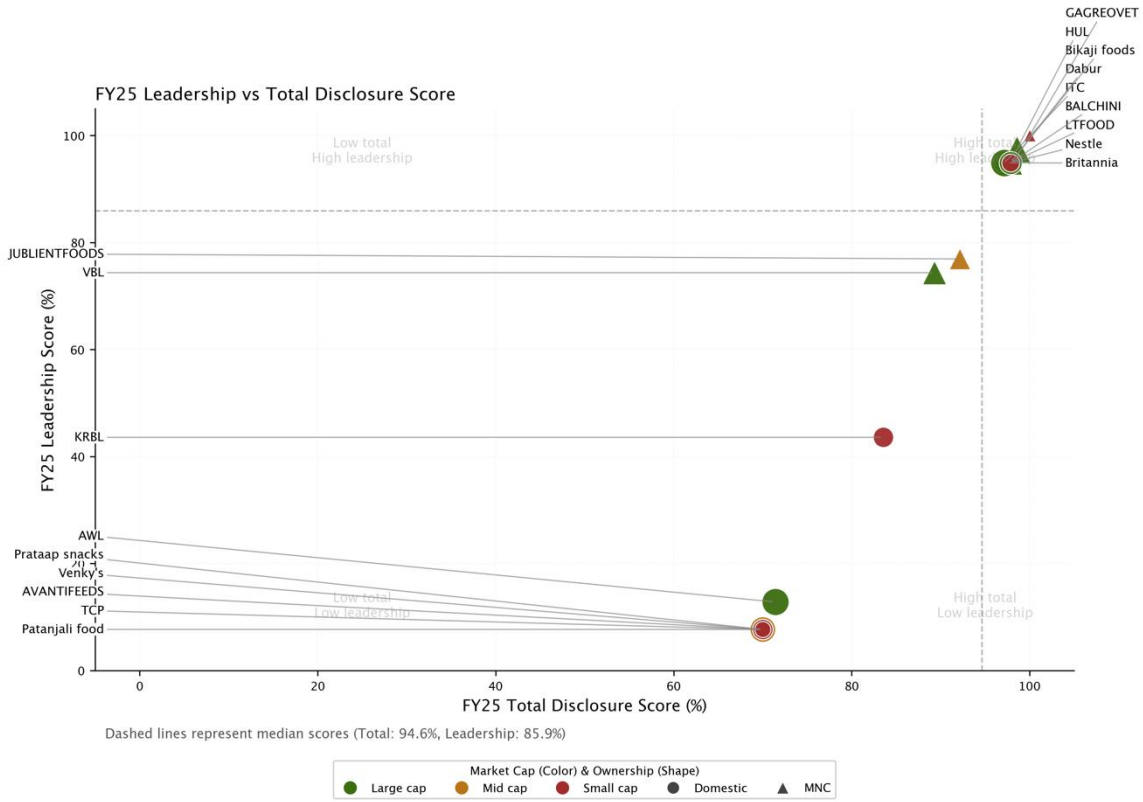


Figure 9. FY25 Leadership Score vs. FY25 Total Disclosure Score by market capitalisation class (n = 20). Dashed lines at sample medians.

5. Conclusions

This study has conducted a systematic, indicator-level analysis of BRSR disclosure behaviour across twenty listed Indian food companies over five financial years (FY 2020-21 to FY 2024-25), complemented by a correlation analysis of the determinants of disclosure performance, producing the following key findings:

1. Mandatory BRSR adoption produced a structural break in disclosure levels. The average disclosure score increased from 19.3% in FY 2020-21 to 86.7% in FY 2024-25. More than 60% of this gain was concentrated in the single transition year between FY 2021-22 and FY 2022-23, confirming that regulatory compulsion - not voluntary evolution - was the primary driver.
2. General and Process disclosures have effectively converged to the maximum. Section A and Section B indicators reached near-perfect average scores within one year of mandatory BRSR adoption and have remained stable, suggesting that entity-level and governance-system dimensions present relatively low compliance barriers.
3. Leadership indicators remain persistently and substantially under-disclosed. Despite five years of observation, Leadership indicators achieved an average score of only 0.56 out of 1.0 in FY 2024-25. Leadership indicators associated with principles P7 (Policy Advocacy), P8 (Inclusive Growth), and P9 (Consumer Value) are particularly weak across the sample.
4. Company-size and reporting heritage are meaningful moderators. Large-cap MNCs with established ESG functions (HUL, Nestlé, ITC, Dabur) demonstrate not only higher absolute scores but also higher Leadership indicator coverage. Smaller mid-cap companies exhibit structural gaps on voluntary dimensions.

5. Environmental (P6) and Labour (P3) disclosures are the strongest principle-wise categories. Within Section C Essential indicators, principles P3 (Employee Well-being) and P6 (Environment) show the highest and most consistent coverage, reflecting the regulatory and reputational salience of labour and environmental compliance in food manufacturing.

6. Firm-size effects on disclosure are significant in the pre-mandate period but not post-mandate. Revenue and market capitalisation are significant positive predictors of FY22 pre-mandate disclosure scores (Pearson $r = 0.54$ and 0.62 respectively, $p = 0.022$ and 0.007), consistent with agency theory. In the post-mandate FY25 period, these relationships disappear entirely ($r = 0.18$ and 0.32, both $p > 0.10$), confirming that coercive regulatory compulsion homogenises disclosure coverage across firms of different sizes.

5.1 Theoretical Implications

The empirical findings of this study provide clear evidence on the applicability of agency theory, legitimacy theory, and institutional isomorphism in explaining sustainability disclosure behaviour under the BRSR framework.

The pre-mandate results are consistent with Agency Theory. Firm size, proxied by revenue and market capitalisation, shows a statistically significant positive relationship with disclosure scores in FY 2021-22. This supports the prediction that larger firms disclose more information to reduce information asymmetry and agency costs (Jensen & Meckling, 1976; Watts & Zimmerman, 1986). The presence of firms with high disclosure levels prior to mandatory adoption further indicates that voluntary transparency is driven by investor scrutiny and internal governance incentives.

The post-mandate results align with Legitimacy Theory. The sharp increase in disclosure scores across all firms following the introduction of mandatory BRSR reporting indicates that disclosure behaviour is primarily compliance-driven. Firms appear to respond to regulatory requirements to maintain legitimacy rather than to reflect underlying improvements in sustainability practices (Dowling & Pfeffer, 1975, Suchman, 1995). The persistence of lower scores in Leadership indicators reinforces this interpretation, as voluntary disclosures remain limited despite near-complete compliance in mandatory dimensions.

The findings also provide strong support for Institutional Isomorphism, particularly the role of coercive pressures. The disappearance of firm-size effects and the convergence of disclosure scores in FY 2024-25 indicate that mandatory regulation has standardised reporting behaviour across firms (DiMaggio & Powell, 1983). The reduction in cross-sectional variance further confirms that firms with differing characteristics have adopted similar disclosure practices under regulatory pressure.

At the same time, variation in Leadership indicator scores suggests that convergence is incomplete in voluntary dimensions. Larger firms continue to exhibit higher Leadership scores, indicating that firm-level characteristics retain explanatory power where disclosure is not mandated. This pattern is consistent with the coexistence of agency-driven incentives and institutional pressures within the same reporting framework.

Overall, the results indicate that the introduction of mandatory BRSR reporting shifts the dominant driver of disclosure behaviour from firm-level incentives to regulatory compliance, while voluntary disclosure remains influenced by firm characteristics.

5.2 Implications for Practice and Policy

For regulators, the findings suggest that the BRSR mandatory framework has been highly effective at driving minimum-compliance disclosure but has not yet created incentives for firms to go beyond the Essential tier. SEBI may consider phased adoption of Leadership indicators into the mandatory fold - beginning with sectors such as food and beverage where environmental and social externalities are most significant.

For companies, the persistent Leadership indicator gap represents both a risk and an opportunity. As institutional investors increasingly apply ESG screens that weight voluntary disclosures, companies with low Leadership scores may face a cost-of-capital disadvantage. Building internal ESG capability - particularly in areas of value chain transparency, human rights due diligence, and environmental innovation - is a strategic priority.

For investors and analysts, this study provides a granular, time-series benchmark for assessing BRSR quality in the Indian food sector. The indicator-level scoring framework can be directly integrated into ESG rating models to distinguish between compliance-grade and best-practice-grade disclosures. The correlation analysis presented in Section 4.5 further demonstrates that composite BRSR scores - including those produced by commercial ESG data providers - should be disaggregated by indicator tier. Investors applying ESG screens should weight Leadership indicator performance separately, and should explicitly account for the firm-size confound - controlling for market capitalisation before interpreting raw disclosure scores.

5.3 Limitations and Future Research

Several limitations qualify the findings of this study. First, the coding exercise assesses the existence and completeness of disclosures rather than their accuracy or underlying substantive quality. Additionally, the study does not assess the potential for greenwashing, where firms may disclose selectively or symbolically without substantive sustainability improvements. Second, the sample of twenty companies, while representative of listed food

companies, does not cover unlisted firms, cooperatives, or the vast informal food processing sector, which limits generalisability. Third, the pre-FY23 BRR data were coded by mapping BRR disclosures onto the BRSR template, which may introduce some comparability noise.

Future research could extend this framework along several dimensions: (i) comparison with non-food sectors to establish whether both the Leadership indicator gap and the firm-size effects documented here are sector-specific or universal; (ii) qualitative content analysis of the substance of disclosures to assess whether reported figures are decision-useful or merely template-compliant; (iii) formal panel regression linking disclosure scores with actual ESG performance outcomes (emissions, water intensity, employee safety rates); and (iv) a stakeholder-engagement analysis to understand whether BRSR disclosures are influencing investor decision-making in the Indian context.

Conflict of Interest

All authors declare no conflict of interest.

Funding

No funding was provided for this research.

Ethics Declarations

Ethics, Consent to Participate, and Consent to Publish declarations: not applicable

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APPENDIX A

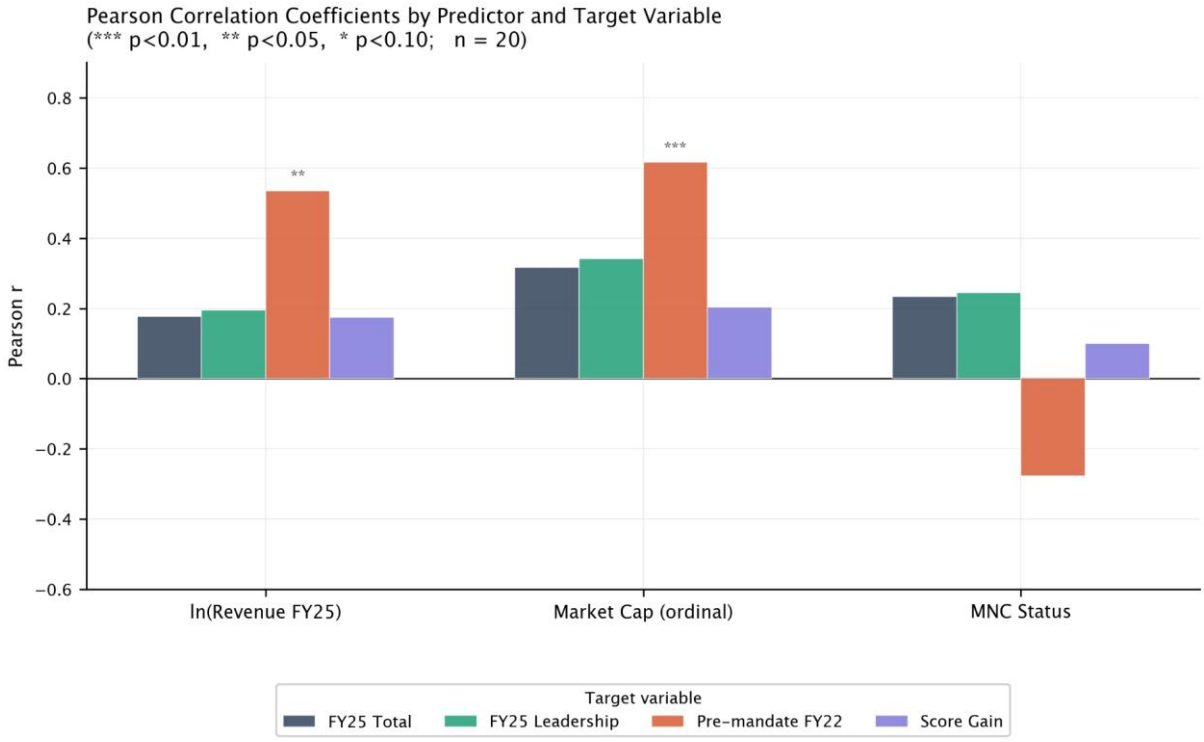


Figure A1. Pearson correlation coefficients by predictor and target variable (n = 20). ** denotes $p < 0.05$.