

The Gap between ESG Disclosure and Actual Performance: Evidence from India's BRSR Core Reporting

Kanika Jindal

kanikajindal1989@gmail.com

Aryabhata College, University of Delhi

Research Article

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Abstract

Purpose

This paper examines whether disclosure quality under India's mandatory, assured BRSR Core regime tracks firms' actual ESG performance, how large the disclosure–performance gap is and where it is concentrated.

Methodology

Using the XBRL BRSR filings of the NIFTY 50 companies for FY 2023-24 and FY 2024-25 (99 firm-years), disclosure quality is assessed on 55 items that examine completeness, comparability, accuracy and voluntary-depth of information provided by the companies. It measures sector-adjusted performance on 23 indicators across the nine BRSR Core attributes. Gaps are estimated with correlations and composite-based structural models. Bootstrap and permutation are used to check the statistical significance of the results.

Findings

Disclosure quality is high and converging (mean 0.92 on a 0–1 scale) but uninformative about performance. In eight out of nine attributes, the gap is as large as random pairing would produce, and no attribute shows positive coupling. In aggregate, disclosure quality is inversely related to performance ($\beta = -0.38$, permutation $p = 0.002$). Gaps are not large for environmental attributes or environmentally sensitive firms.

Research limitations

The study covers two years and 50 firms; associations are not causal.

Practical implications

Regulators and assurers should add machine-readable consistency checks; investors should not read completeness as performance.

Originality/value

This is the first attribute-level gap measure built entirely from mandated KPIs. It shows that mandated transparency yields convergence in form without coupling to performance.

1. Introduction

Mandatory sustainability reporting has spread faster than evidence on what it achieves. Regulators increasingly require listed firms to report standardised environmental, social and governance (ESG) indicators, on the premise that transparency will discipline performance. Yet the accumulated evidence

suggests that mandated reporting often remains ceremonial rather than substantive (Haji et al., 2023), and that its capital-market and real effects depend heavily on enforcement and verification (Christensen et al., 2021; Krueger et al., 2024). Whether mandated disclosure tracks what firms actually do, or comes apart from it, is therefore an open empirical question.

Since FY 2022-23 the Securities and Exchange Board of India (SEBI) has required the 1,000 largest listed companies to file a Business Responsibility and Sustainability Report (BRSR). In July 2023 SEBI carved out *BRSR Core*: nine ESG attributes with prescribed key performance indicators (KPIs), including emission, energy, water and waste intensities, which the top 1,000 companies have disclosed since FY 2023-24 and because every large company now reports the same KPIs in the same format, BRSR Core makes it possible to compare what each firm discloses with how it performs on the very attributes it discloses about.

Early BRSR studies describe disclosure rates and data quality (Sharma, 2024), compare the framework with international standards (Bhowmick & Mahindrakar, 2026), or model the determinants of disclosure quality (Khalid & Rawat, 2025). Indian studies of greenwashing, in turn, measure it as the difference between a commercial disclosure score and a commercial performance rating for NIFTY 50 firms (Sensharma et al., 2022; Gidage et al., 2025). Such measures inherit the opacity of proprietary scores, and ratings partly reward disclosure itself (Christensen et al., 2022), which contaminates the very gap they are meant to capture. However, the disclosure–performance gap from the mandated BRSR Core KPIs, attribute by attribute remains underexplored.

This paper addresses that gap with the following research questions:

- **RQ1.** How large is the disclosure–performance gap in BRSR Core reporting?
- **RQ2.** Where across the nine BRSR Core attributes, and across sectors, is the gap concentrated?
- **RQ3.** Under the mandate, does disclosure quality track actual ESG performance, or does it come apart from it?

The paper includes NIFTY 50 companies over the first two BRSR Core years, FY 2023-24 and FY 2024-25. For each firm-year and attribute, score disclosure quality from the BRSR filing and measure performance from the reported KPIs, has been adjusted for sector. The gap is the standardised difference between the two. Whether performance and disclosure quality are coupled is tested using correlation and permutation tests at the attribute level and composite-based structural models, including partial least squares structural equation modelling (PLS-SEM) with formative composites, at the aggregate level. This paper also examines where the gap concentrates across attributes and sectors.

The paper makes three contributions. First, it offers a transparent, attribute-aligned measure of the disclosure–performance gap built entirely from mandated, standardized KPIs to measure greenwashing at the level where disclosure and performance can be matched (Delmas & Burbano, 2011; Lyon & Maxwell, 2011). Second, it brings neo-institutional decoupling (Meyer & Rowan, 1977; Bromley & Powell, 2012), legitimacy theory and signalling theory to bear on a mandatory, partly assured regime, and shows

which of their competing predictions holds for India's largest firms. Third, it gives SEBI, assurance providers and investors evidence on which attributes and sectors carry the largest gaps, at a time when SEBI has introduced a lighter assessment alternative to reasonable assurance.

2. Institutional Background: From BRR to BRSR Core

India moved from voluntary, principle-based reporting to a standardized, verified KPI set. Table 1 summarizes the milestones that define the setting of this study.

Table 1
Milestones in India's sustainability reporting mandate

Date	Instrument	What it required
2012	SEBI listing requirement	Business Responsibility Report (BRR) for the top 100 listed entities by market capitalisation
2015-16	Extension	BRR extended to the top 500 listed entities
December 2019	Extension	BRR extended to the top 1,000 listed entities from 2019-20
10 May 2021	Circular SEBI/HO/CFD/CMD-2/P/CIR/2021/562	BRSR replaces BRR; voluntary for FY 2021-22, mandatory for the top 1,000 from FY 2022-23
12 July 2023	Circular SEBI/HO/CFD/CFD-SEC-2/P/CIR/2023/122	BRSR Core: nine attributes with prescribed KPIs, disclosed by the top 1,000 from FY 2023-24; reasonable assurance phased in by size
17 May 2024	LODR (Amendment) Regulations, 2024	Size rankings to use average market capitalisation from 1 July to 31 December, effective 31 December 2024
20 December 2024	Circular SEBI/HO/CFD/CFD-PoD-1/P/CIR/2024/177	Industry Standards Forum (ASSOCHAM, CII, FICCI) standards for reporting BRSR Core, from FY 2024-25
28 March 2025	Circular SEBI/HO/CFD/CFD-PoD-1/P/CIR/2025/42	Third-party <i>assessment or assurance</i> of BRSR Core; value-chain disclosure voluntary; green-credit disclosure added

Sources: Government of India (2021, 2024); SEBI (2021, 2023, 2024, 2025); KPMG (2023).

2.1 From BRR to BRSR

The BRR asked firms to report against the National Voluntary Guidelines, largely in narrative form. Its successor, the BRSR, is organised around the nine principles of the National Guidelines on Responsible Business Conduct. It has three parts: general disclosures (Section A), management and process disclosures (Section B), and principle-wise performance (Section C), the last split into mandatory essential indicators and voluntary leadership indicators (SEBI, 2021). The shift made disclosure largely quantitative, but it did not by itself make the numbers comparable or verified.

2.2 BRSR Core

BRSR Core selects a subset of BRSR indicators that SEBI judged material and verifiable, grouped into nine attributes: greenhouse gas (GHG) footprint; water footprint; energy footprint; embracing circularity (waste); employee well-being and safety; gender diversity; inclusive development; fairness in engaging with customers and suppliers; and openness of business (SEBI, 2023). It adds new KPIs, such as gross wages paid to women, job creation in smaller towns and concentration of purchases and sales, and expresses environmental footprints as intensities on revenue adjusted for purchasing power parity (PPP).

All top 1,000 companies have disclosed the BRSR Core KPIs since FY 2023-24; what is phased in is reasonable assurance. It applied to the top 150 companies in FY 2023-24, the top 250 in FY 2024-25, the top 500 in FY 2025-26 and the top 1,000 in FY 2026-27 (SEBI, 2023; KPMG, 2023).

2.3 Standardisation and relaxation, 2024–2025

Two later changes matter for interpreting the data. First, industry standards for reporting BRSR Core apply from FY 2024-25, so some KPI definitions differ between the two years of the study (SEBI, 2024). Second, the March 2025 circular allowed companies to obtain a third-party *assessment*, carried out under the industry standards, instead of reasonable assurance, and made value-chain disclosures voluntary; it restated the glide path unchanged (SEBI, 2025). In practice the largest firms have rarely used the lighter route: all 94 NIFTY 100 companies covered in one review obtained reasonable assurance for FY 2024-25 (KPMG, 2026), although two FY 2024-25 filings in our sample record an assessment (Section 4.1).

2.4 Why the NIFTY 50 over FY 2023-24 and FY 2024-25

The NIFTY 50 companies are among India's largest listed companies and sit inside the first assurance cohort. The sample therefore holds the verification regime at its strongest. Any decoupling found among these firms is unlikely to be an artefact of unverified data, and is likely to be at least as pronounced among smaller companies that entered assurance later or have not yet entered it. Each firm's assurance status from its filing is confirmed (Section 4).

3. Theory, prior evidence and hypotheses

Three theories make three different predictions about how mandated disclosure should relate to performance. Signalling theory predicts coupling, legitimacy theory predicts an inverse relation, and neo-institutional theory predicts that the two come apart. Formed hypotheses set these predictions against each other.

3.1 Three lenses on mandated disclosure

Neo-institutional theory. Organisations adopt formal structures that their institutional environment expects, partly to secure legitimacy rather than efficiency, and buffer their technical core from those structures when the two conflict (Meyer & Rowan, 1977). Regulation is a coercive source of isomorphism that makes organisations look alike in form (DiMaggio & Powell, 1983). Bromley and Powell (2012) distinguish *policy–practice* decoupling, where adopted rules are not implemented, from *means–ends* decoupling, where rules are implemented but are only loosely connected to the outcomes they are meant to produce. Monitoring narrows the first but can widen the second. BRSR Core is a coercive template: every large firm must report the same KPIs in the same way, and the largest firms must have them assured. The theory therefore expects disclosure quality to converge across firms while performance continues to vary, so that disclosure quality carries little information about performance.

Legitimacy theory. Firms seek congruence between their activities and the values of the society that grants them legitimacy (Suchman, 1995), and use disclosure to manage perceptions when that congruence is threatened (Deegan, 2002). Symbolic legitimation, changing what is said rather than what is done, is cheaper and faster than substantive change (Ashforth & Gibbs, 1990). Firms whose performance exposes them to the greatest threat therefore have the strongest reason to disclose extensively. Patten (2002) and Cho and Patten (2007) find exactly this pattern for environmental disclosure in the United States. Applied to BRSR Core, legitimacy theory predicts a negative relation between performance and disclosure quality.

Signalling theory. Disclosure conveys information about otherwise unobservable quality, and it is credible only when it is costly for low-quality firms to imitate (Spence, 1973; Connelly et al., 2011). Good performers therefore disclose more, and more precisely, to separate themselves from poor performers (Clarkson et al., 2008). Quantified, comparable and assured KPIs are hard to imitate, so signalling theory predicts that under BRSR Core disclosure quality and performance move together.

3.2 Greenwashing and how the gap has been measured

Greenwashing is the combination of poor environmental performance with positive communication about it (Delmas & Burbano, 2011). It can take the form of selective disclosure of favourable information (Lyon & Maxwell, 2011; Marquis et al., 2016) and has a mirror image, "brownwashing", in which firms understate their achievements (Kim & Lyon, 2015). Table 2 summarises how prior studies have measured the distance between disclosure and performance.

Table 2
Prior measures of the disclosure–performance gap

Study	Setting	Disclosure side	Performance side	Main finding
Patten (2002)	United States	Content of annual-report environmental disclosure	Toxic releases (TRI)	Poorer performers disclose more
Clarkson et al. (2008)	United States, polluting industries	GRI-based index of hard and soft disclosure	Pollution propensity (TRI)	Better performers disclose more, consistent with signalling
Kim & Lyon (2015)	United States electric utilities	Claims in a voluntary GHG registry	Actual emission changes	Both exaggeration (greenwash) and undue modesty (brownwash) occur
Hummel & Schlick (2016)	European firms	Quality of sustainability disclosure	Sustainability performance rating	Good performers choose high-quality disclosure; poor performers choose low-quality disclosure
Marquis et al. (2016)	Firms in 45 countries	Disclosed environmental impacts	Estimated environmental impacts	Scrutiny and strong norms reduce selective disclosure
Yu et al. (2020)	Large firms across many countries	Bloomberg ESG disclosure score	Asset4 ESG performance score	Greenwashing measured as the standardised difference
Sensharma et al. (2022)	NIFTY 50, FY 2019-20	Bloomberg ESG disclosure score	Refinitiv ESG performance score	54% of firms classed as greenwashers
Gidage et al. (2025)	NIFTY 50, FY 2022-23	Commercial ESG disclosure data	Commercial ESG performance data	47% of firms show greenwashing characteristics

Two limitations run through these measures. First, the Indian studies, like Yu et al. (2020), compare two proprietary aggregate scores whose construction is opaque. Second, ratings partly reward disclosure itself (Christensen et al., 2022), so a rating-based "performance" score is contaminated by the disclosure it is compared with. BRSR Core removes both problems: disclosure and performance can be read from the same mandated KPIs, attribute by attribute, without any proprietary score.

3.3 Hypotheses

Coupling. Signalling theory and legitimacy theory make opposite directional predictions, and neo-institutional theory predicts no systematic relation. This study states the two directional predictions as competing hypotheses and treats a precisely estimated null as evidence for institutional decoupling.

- **H1a.** Under BRSR Core, a firm's disclosure quality is positively associated with its actual ESG performance.
- **H1b.** Under BRSR Core, a firm's disclosure quality is negatively associated with its actual ESG performance.

Concentration across attributes. Environmental footprints are capital-intensive and slow to change, whereas their disclosure is quick to improve: a firm can add PPP-adjusted intensities, prior-year figures or physical-output ratios within one reporting cycle. Environmental attributes also attract the most investor and public scrutiny, which raises the legitimacy payoff of polished disclosure. Both theories of symbolic response therefore expect the gap to concentrate in the environmental attributes.

- **H2.** Disclosure quality is less closely coupled with performance, and decoupled firm-attributes are more frequent, for the four environmental attributes than for the five social and governance attributes.

Concentration across sectors. Firms in environmentally sensitive industries face concentrated regulatory and public pressure and have long used disclosure to defend their legitimacy (Patten, 2002; Cho & Patten, 2007).

- **H3.** The disclosure–performance gap is larger for firms in environmentally sensitive sectors than for other firms.

4. Research design

4.1 Sample and data

The sample comprises the 50 constituents of the NIFTY 50 index on 31 March 2025 and their BRSR filings for FY 2023-24 and FY 2024-25, the first two years in which BRSR Core applied. The machine-readable XBRL instance documents that companies file with the National Stock Exchange (NSE) rather than the PDF reports are used. The XBRL filing is the version that regulators, data vendors and investors' systems ingest, and every value in it is tagged with an element, a unit and a reporting period, so each number used can be traced to its source. The instance documents from the NSE archive in October 2026 through the exchange's index of BRSR filings, which lists all 100 filings was retrieved. One of them, Mahindra & Mahindra's FY 2023-24 filing, is listed but could not be retrieved, which leaves 99 firm-years: 49 for FY 2023-24 and 50 for FY 2024-25. The FY 2023-24 filings use the 30 April 2024 taxonomy; 49 of the 50 FY 2024-25 filings use the 31 May 2025 taxonomy and one uses the earlier version. Table 3 describes the sample.

Table 3
Sample composition

Peer group	NSE sectors (number of firms)	Firms	Firm-years	Environmentally sensitive firms
Financial services (FIN)	Banks, non-bank lenders and insurers (12)	12	24	0
Services (SERV)	Information technology (5), telecommunication (1), healthcare services (1), consumer services (2)	9	18	0
Manufacturing (MFG)	FMCG (4), automobiles (6), pharmaceuticals (3), consumer durables (2), capital goods (1)	16	31	4
Heavy industry (HEAVY)	Oil, gas and consumable fuels (3), power (2), metals and mining (4), construction materials (2), construction (1), ports (1)	13	26	11
Total		50	99	15
Notes: Sector classification follows the NSE industry classification used in NIFTY index factsheets. Environmentally sensitive firms operate in oil and gas, mining, metals, power utilities, cement and chemicals including pharmaceuticals and paints (Section 4.5).				

Three features of the filings matter for what follows. First, every one of the 99 filings reports third-party assurance or assessment of BRSR Core. The whole report was within the assurance scope for 20% of filings in FY 2023-24 and 28% in FY 2024-25. Two FY 2024-25 filings, Asian Paints and Power Grid, record an *assessment* rather than assurance. Verification is therefore close to universal in this sample, and it is reported descriptively rather than as part of disclosure quality. Second, 31% of filings in FY 2023-24 and 34% in FY 2024-25 are prepared on a consolidated basis, and four firms (NTPC, Power Grid, Tata Consumer Products and Wipro) changed their reporting boundary between the two years. Third, the median filing came 103 days after the financial year-end in FY 2023-24 and 97 days in FY 2024-25.

4.2 Measuring disclosure quality

Under a mandate, *what* to disclose is fixed; the variation lies in *how* completely, comparably and accurately the prescribed KPIs are reported, and in whether firms go beyond them. Therefore, disclosure quality against the reporting principles of GRI 1 (Global Reporting Initiative, 2021): completeness, comparability, accuracy and verifiability are measured in this study. Because assurance is near universal in the sample, verifiability does not discriminate between firms and is excluded from the index. One item of voluntary depth is added.

For each attribute we code binary items from the XBRL filing, 55 in all (Appendix A):

- **Completeness (24 items).** Each mandated KPI is reported with a substantive value. A zero counts as reported where the quantity can legitimately be zero (fatalities, complaints, data breaches) but

not where no operating firm can report zero (energy use, water withdrawal, waste generated, the wage bill). Physical-output intensities are required "where applicable" and are scored only for manufacturing and heavy-industry firms.

- **Comparability (15 items).** Prior-year comparatives are reported for each KPI, and environmental intensities are also reported per rupee of turnover adjusted for purchasing power parity (PPP), as BRSR Core requires.
- **Accuracy (15 items).** The reported figures are internally consistent. The central test asks whether the reported intensity per rupee of turnover reconciles with the firm's own absolute KPI and its own revenue in the unit the taxonomy declares. We allow a factor of $10^{0.2}$ (about 1.6) either way, which tolerates differences in the denominator, such as standalone versus consolidated revenue or total income versus revenue from operations, but not unit errors. The other checks are that components sum to their totals, that water consumption and renewable energy do not exceed withdrawal and total energy respectively, and that shares are reported as fractions, as the taxonomy's unit requires (Appendix A).
- **Voluntary depth (1 item).** Scope 3 emissions are reported. BRSR Core does not require them.

The disclosure quality score for firm i and attribute k , DQ_{ik} , is the mean of the applicable items and ranges from 0 to 1. Items are weighed equally because there is no defensible basis for unequal weights, and equal weights are robust in small samples (Dana & Dawes, 2004). Disclosure quality is not adjusted for sector, because the requirement is identical for every firm.

4.3 Measuring performance

Two design choices shape the performance measures. The first is that every indicator must be invariant to the unit in which a firm reports. During data validation it was found that filings report emissions in million tonnes, energy in terajoules or megajoules and water in lakh kilolitres, while tagging these values as tonnes, gigajoules and kilolitres (Appendix B). Comparing absolute or intensity *levels* across firms would therefore require adjudicating each firm's units against outside sources. Instead, environmental performance is measured with changes and ratios computed within each filing. These do not depend on the unit as long as the firm uses it consistently within its own report:

- the log change in intensity (the KPI per rupee of revenue in the current year relative to the previous year, both taken from the same filing);
- the log change in the absolute footprint;
- the share of energy from renewable sources;
- the share of waste recovered rather than disposed of.

This follows Kim and Lyon (2015), who judge environmental performance by actual changes in emissions. Year-on-year changes larger than tenfold, which arise from reporting errors or from changes in the reporting entity, are set to missing (six indicator values in five firm-years; Appendix B).

For the five social and governance attributes, performance is measured with rates and shares:

- well-being spending as a share of revenue;
- the lost-time injury frequency rate, weighted by headcount across employees and workers;
- fatalities per 10,000 workforces;
- the female share of gross wages and of headcount;
- the share of inputs sourced from MSMEs and small producers;
- the share of wages paid in rural and semi-urban locations;
- days payable outstanding;
- the incidence of customer data breaches;
- six concentration ratios for openness: purchases from trading houses and from related parties, sales to dealers and to related parties, and loans and investments to related parties.

The share of inputs sourced locally was excluded, because its definition changed between the two years from the district and neighbouring districts to "within India", and some firms' reported values changed accordingly.

The second design choice is sector adjustment. Each of the 23 indicators (Table 5) is converted into a percentile rank within peer group and year, computed as $(\text{rank} - 0.5)/n$ with average ranks for ties, and oriented so that higher always means better performance. $PERF_{ik}$ is the mean of the available percentiles for attribute k . The four peer groups (Table 3) group firms with similar environmental profiles, and ranking within group and year removes both sector and year effects.

4.4 The disclosure–performance gap

Following Yu et al. (2020) and Sensharma et al. (2022), the gap is the standardised difference

$$G_{ik} = z(DQ_{ik}) - z(PERF_{ik}),$$

where each component is standardised over all 99 firm-years. A positive gap means that a firm's disclosure quality ranks above its sector-relative performance; a negative gap means the reverse. We summarise its magnitude in three ways.

1. **Mean absolute gap.** This is the average of $|G_{ik}|$ across firm-years.
2. **Decoupling index (DI).** This is the observed mean absolute gap divided by its expected value when disclosure quality and performance are paired at random, estimated from 5,000 random re-pairings. For two standardised variables with correlation r , the expected squared gap is $2(1 - r)$. A DI of 1 therefore means that disclosure quality carries no information about performance, a DI below 1 indicates coupling, and a DI above 1 indicates an inverse relation.
3. **Quadrant classification.** Following Delmas and Burbano (2011), each firm-attribute is classified as:
 - *symbolic*: disclosure quality at or above the mean and performance below it;

- *understated*: disclosure quality below the mean and performance at or above it;
- *aligned leader or aligned laggard*: both components on the same side of the mean.

Under a mandate the symbolic quadrant also captures compliant laggards, that is, firms that report everything required while performing below their peers. Difference scores also conflate their components and can mislead when interpreted alone (Edwards & Parry, 1993; Edwards, 2001). We therefore read the quadrants together with direct tests of coupling.

4.5 Testing coupling, concentration and robustness

At the attribute level, coupling is the Spearman correlation between DQ_{ik} and $PERF_{ik}$. Inference from two procedures is:

- A firm-cluster bootstrap with 5,000 resamples, which respects the two observations per firm;
- A permutation test that re-pairs whole firms' performance with other firms' disclosure within year, with 2,000 permutations.

At the aggregate level, Model 1 regresses an equally weighted disclosure quality index on an equally weighted performance index:

$$DQ_INDEX_i = \beta PERF_INDEX_i + \gamma_1 SIZE_i + \gamma_2 FIN_i + \gamma_3 ESS_i + \gamma_4 FY25_i + \epsilon_i$$

The variables are defined as follows:

- **DQ_INDEX** and **PERF_INDEX** are the means of the nine attribute scores.
- **SIZE** is the log of revenue.
- **FIN** marks financial firms.
- **ESS** marks environmentally sensitive firms. Following the industries used in prior environmental-disclosure research (Patten, 2002; Cho & Patten, 2007), these are mining, oil and gas, chemicals, metals and utilities, to which we add cement. This gives 15 firms.
- **FY25** marks the second year.

The model is estimated as a composite-based path model in which each index enters as a single-indicator construct (Hair et al., 2022). With single-indicator constructs, the path coefficients equal standardised regression coefficients. Inference uses percentile confidence intervals from 5,000 bootstrap resamples, as in standard PLS-SEM practice, together with the firm-cluster bootstrap and the permutation test.

Model 2 tests H2 by estimating the same equation separately for the environmental pillar (four attributes) and the social and governance pillar (five attributes). It compares the two coefficients with a paired bootstrap of their difference.

Model 3 re-estimates Model 1 as a PLS-SEM model with formative composites. Disclosure quality and performance are each formed by their nine attribute scores, and the model uses Mode B weights, the path weighting scheme and the same controls (Lohmöller, 1989; Hair et al., 2022). With 18 formative indicators and 99 observations, estimated weights can capitalise on chance and inflate the path coefficient even when no relation exists. We therefore assess Model 3's path coefficient against its permutation distribution as well as its bootstrap distribution, and we report collinearity (VIF) and outer-weight significance for both composites.

For H3, each firm's gaps are averaged over the two years ($n = 50$), and environmentally sensitive firms are compared with the rest using Mann–Whitney tests; differences across the four peer groups are tested with the Kruskal–Wallis test. The robustness checks are as follows:

- excluding financial firms;
- estimating each year separately;
- removing the accuracy items from disclosure quality;
- using a narrower definition of environmental sensitivity that excludes chemicals and pharmaceuticals;
- dropping the controls.

All estimation was carried out in Python (NumPy and SciPy). The PLS algorithm follows Lohmöller (1989) and was validated against two benchmarks: with two Mode B blocks it reproduces the first canonical correlation, and with single-indicator constructs it reproduces ordinary least squares.

5. Results

5.1 Disclosure quality under the mandate

Disclosure quality is high and converging. The disclosure quality index averages 0.924 on its 0–1 scale (SD 0.065; range 0.696–1.000) and rises from 0.911 in FY 2023-24 to 0.937 in FY 2024-25. Table 4 reports the attribute scores.

Table 4
Disclosure quality by attribute and dimension

Attribute or dimension	FY 2023-24	FY 2024-25	Pooled mean (SD)	At maximum (%)
GHG footprint	0.878	0.905	0.891 (0.125)	48.5
Water footprint	0.892	0.932	0.912 (0.124)	55.6
Energy footprint	0.919	0.944	0.932 (0.100)	63.6
Embracing circularity (waste)	0.917	0.948	0.933 (0.093)	60.6
Employee well-being and safety	0.970	0.984	0.977 (0.084)	91.9
Gender diversity	0.964	0.985	0.975 (0.088)	90.9
Inclusive development	0.936	0.959	0.947 (0.090)	70.7
Fairness with customers and suppliers	0.939	0.970	0.955 (0.144)	90.9
Openness of business	0.788	0.808	0.798 (0.222)	29.3
Disclosure quality index	0.911	0.937	0.924 (0.065)	–
Completeness (24 items)	0.946	0.956	0.951	–
Comparability (15 items)	0.911	0.958	0.935	–
Accuracy (15 items)	0.895	0.925	0.910	–
Voluntary depth: Scope 3 reported (1 item)	0.735	0.740	0.737	–
Notes: $n = 49$ (FY 2023-24) and 50 (FY 2024-25). "At maximum" is the share of firm-years scoring 1.0.				

The pattern across attributes is one of ceiling compliance in the social attributes and residual variation in the environmental ones and in openness:

- **Social attributes.** Nine in ten firm-years score the maximum on well-being and safety, gender diversity and fairness.
- **Environmental attributes.** Fewer than two-thirds score the maximum on the four environmental attributes.
- **Openness.** This is the weakest attribute: on average, only 73% of its six concentration ratios are reported.

Comparability improved most between the two years. The share of firm-years reporting PPP-adjusted intensities rose from 88–92% to 94–98% across the four environmental attributes. Voluntary depth did not change: about three-quarters of firms report Scope 3 emissions in both years.

Accuracy is the dimension most open to error, and the most revealing:

- **Scale of the problem.** In 25 firm-years (15 in FY 2023-24 and 10 in FY 2024-25), at least one reported intensity per rupee of turnover does not reconcile with the firm's own absolute figure and revenue. These involve 17 firms, eight of them in both years.
- **Nature of the discrepancies.** The discrepancies are not rounding, and in every case, they affect all four environmental intensities at once, which points to a reporting convention rather than a slip:
 - in 18 firm-years the reported intensities are 10^7 times their implied values (to the nearest power of ten), which means they were calculated per crore of rupees but tagged as per rupee;
 - in five they are 10^6 times larger, i.e. calculated per million rupees;
 - in two they are ten times larger because the revenue figure itself was mis-keyed by a factor of ten.
- **Persistence.** Six of the firms that reported per crore in FY 2023-24 corrected the practice in FY 2024-25, but six others repeated it.

Every one of these filings reports third-party assurance or assessment of BRSR Core.

5.2 Performance

Table 5 summarises the performance indicators before ranking. The median firm reduced the intensity of its Scope 1 and 2 emissions by 9.3% in FY 2023-24 and 3.4% in FY 2024-25, while its absolute emissions rose by about 1.5% a year. Energy and water intensity also fell, but absolute water consumption grew. Renewable energy remained a small share of the median firm's consumption (6.6% in FY 2023-24 and 8.1% in FY 2024-25). Women received about 15% of gross wages and made up 14–15% of the workforce. At least one work-related fatality was reported in 35% of firm-years in FY 2023-24 and 42% in FY 2024-25.

Table 5
Performance indicators before sector adjustment

Attribute	Indicator	Better when	<i>n</i>	FY 2023-24	FY 2024-25
GHG footprint	Change in Scope 1 + 2 intensity (per rupee of revenue)	Lower	97	-9.3%	-3.4%
	Change in absolute Scope 1 + 2 emissions	Lower	98	+ 1.6%	+ 1.5%
Water footprint	Change in water consumption intensity	Lower	92	-3.9%	-4.4%
	Change in absolute water consumption	Lower	93	+ 3.4%	+ 3.9%
Energy footprint	Change in energy intensity	Lower	95	-3.9%	-3.6%
	Renewable share of total energy	Higher	99	6.6%	8.1%
Embracing circularity	Change in waste intensity	Lower	95	+ 18.0%	+ 2.7%
	Waste recovered / (recovered + disposed)	Higher	96	93.6%	94.2%
Well-being and safety	Well-being spending as a share of revenue	Higher	95	0.20%	0.28%
	LTIFR per million person-hours, headcount-weighted across employees and workers	Lower	99	0.066	0.044
	Fatalities per 10,000 employees and workers	Lower	99	34.7%	42.0%
Gender diversity	Female share of gross wages	Higher	97	14.9%	15.3%
	Female share of employees and workers	Higher	99	13.6%	14.9%
Inclusive development	Share of inputs from MSMEs and small producers	Higher	98	11.0%	11.5%
	Share of wages paid in rural and semi-urban locations	Higher	97	13.3%	14.2%
Fairness	Days payable outstanding	Lower	90	57	56
	Customer data breach (1 = yes)	Lower	99	6.1%	16.0%

Notes: Changes are computed within each filing (current year against the prior-year comparative) and shown as percentage changes. Each indicator is ranked within peer group and year (Section 4.3); *n* is the number of firm-years with a value. Values are medians, except for fatalities and data breaches, whose medians are zero: for these the share of firm-years with at least one event is shown.

Attribute	Indicator	Better when	<i>n</i>	FY 2023-24	FY 2024-25
Openness	Purchases from trading houses / total purchases	Lower	45	10.7%	5.8%
	Sales to dealers and distributors / total sales	Lower	48	65.7%	59.4%
	Purchases from related parties / total purchases	Lower	89	5.1%	5.8%
	Sales to related parties / total sales	Lower	89	1.8%	2.2%
	Loans and advances to related parties / total loans and advances	Lower	73	11.0%	16.3%
	Investments in related parties / total investments	Lower	88	31.7%	34.1%

Notes: Changes are computed within each filing (current year against the prior-year comparative) and shown as percentage changes. Each indicator is ranked within peer group and year (Section 4.3); *n* is the number of firm-years with a value. Values are medians, except for fatalities and data breaches, whose medians are zero: for these the share of firm-years with at least one event is shown.

5.3 How large is the gap? (RQ1)

The gap is large in every attribute (Table 6). The mean absolute standardised gap ranges from 0.93 (openness) to 1.28 (energy) standard deviations. More telling is the decoupling index: it lies between 0.90 and 1.14, so in every attribute the gaps are about as large as they would be if firms' disclosure quality and performance were paired at random. In no attribute is the index significantly below one. For the nine attributes together, the index is 1.14: the aggregate gap is larger than under random pairing.

Table 6
The disclosure–performance gap and coupling by attribute

Attribute	Mean G	Decoupling index	Spearman ρ [95% CI]	Permutation p	Symbolic (%)	Understated (%)
GHG footprint	1.17	1.03	−0.07 [−0.29, 0.16]	0.534	23.5	24.5
Water footprint	1.08	0.97	0.02 [−0.20, 0.25]	0.850	25.8	21.5
Energy footprint	1.28	1.14	−0.27 [−0.46, −0.07]	0.015	36.4	21.2
Embracing circularity	1.15	1.02	−0.07 [−0.30, 0.17]	0.543	31.6	19.4
Well-being and safety	1.03	1.02	−0.05 [−0.24, 0.13]	0.658	47.5	4.0
Gender diversity	1.11	1.04	−0.02 [−0.18, 0.16]	0.884	46.5	6.1
Inclusive development	1.02	0.90	0.14 [−0.13, 0.40]	0.247	34.3	12.1
Fairness	1.14	1.07	−0.08 [−0.22, 0.05]	0.464	51.5	5.1
Openness	0.93	0.96	0.09 [−0.20, 0.37]	0.536	24.2	21.1
Environmental pillar	1.19	1.07	−0.10 [−0.30, 0.11]	0.365	27.3	24.2
Social and governance pillar	1.16	1.12	−0.23 [−0.44, −0.00]	0.064	34.3	21.2
All nine attributes	1.27	1.14	−0.31 [−0.51, −0.06]	0.006	39.4	24.2
Notes: $G = z(DQ) - z(PERF)$. Decoupling index = mean G divided by its mean under 5,000 random re-pairings. Confidence intervals are from a firm-cluster bootstrap (5,000 resamples). Permutation p -values are from 2,000 re-pairings of whole firms within year. Symbolic = disclosure quality at or above the mean with performance below it; understated = the reverse. $n = 93$ – 99 firm-years by attribute.						

At the aggregate level:

- **Symbolic.** 39% of firm-years combine above-average disclosure quality with below-average performance.
- **Understated.** 24% show the reverse.

The symbolic share is highest where disclosure quality is at its ceiling: fairness (52%), well-being and safety (48%) and gender diversity (47%). In these attributes almost every firm is in the upper half of disclosure quality, so the symbolic quadrant mostly holds firms that comply fully while performing below their peers. Because the mandate fixes what firms report, the classic greenwashing quadrant is filled by compliant laggards rather than by firms that embellish. Figure 1 shows this composition.

Computed from the XBRL BRSR filings of the NIFTY 50 constituents, FY 2023-24 and FY 2024-25 (99 firm-years); values as in Tables 4 and 6

5.4 Where is the gap concentrated? (RQ2)

Across attributes, energy stands out. It is the only attribute whose decoupling index is significantly above one, because firms with better energy performance (falling energy intensity and a higher renewable share) file *lower*-quality energy disclosures ($\rho = -0.27$, permutation $p = 0.015$). The gap is smallest, though still close to the random benchmark, for inclusive development (0.90) and openness (0.96).

The environmental pillar is not more decoupled than the social and governance pillar:

- **Off-diagonal share.** Averaged by firm, 51.8% of environmental and 50.5% of social and governance firm-attributes fall in an off-diagonal quadrant (Wilcoxon signed-rank $p = 0.705$, $n = 50$ firms).
- **Symbolic share.** The symbolic share is *lower* for the environmental attributes (30.7%) than for the social and governance attributes (40.7%; $p = 0.036$). This runs opposite to H2 and reflects the ceiling in social disclosure quality.

Gaps are not concentrated in particular sectors either (Table 7). The mean absolute gap ranges from 1.08 in services to 1.44 in manufacturing, but the differences across the four peer groups are not significant (Kruskal–Wallis $p = 0.926$ for the absolute gap and 0.995 for the signed gap). Environmentally sensitive firms have somewhat higher disclosure quality and a positive average signed gap (0.28 against -0.12 for other firms), but neither difference is significant at the firm level:

- signed gap: Mann–Whitney $p = 0.459$;
- absolute gap: $p = 0.783$;
- environmental pillar alone: $p = 0.916$ for the absolute gap;
- narrow definition of environmental sensitivity: $p = 0.797$.

Table 7
The gap by peer group and environmental sensitivity

Group	Firm-years	DQ index	PERF index	Mean signed gap	Mean gap
Financial services	24	0.937	0.502	0.18	1.12
Services	18	0.929	0.499	0.08	1.08
Manufacturing	31	0.913	0.503	-0.20	1.44
Heavy industry	26	0.923	0.498	0.02	1.33
Environmentally sensitive	30	0.940	0.497	0.28	1.34
Other firms	69	0.918	0.502	-0.12	1.24
Notes: Gaps are for the nine-attribute aggregate. Tests use firm-level averages ($n = 50$ firms) and are reported in the text. PERF is centred on 0.5 within each peer group by construction.					

5.5 Does disclosure quality track performance? (RQ3)

Figure 2 shows the coupling coefficients. None is positive and significant, and eight of the nine attribute-level confidence intervals include zero. The exception is energy, where the association is negative.

Computed from the XBRL BRSR filings of the NIFTY 50 constituents, FY 2023-24 and FY 2024-25 (99 firm-years); values as in Table 6

The aggregate models tell a consistent story (Table 8). In Model 1, the equally weighted performance index is negatively associated with the disclosure quality index:

- **Size of the association.** $\beta = -0.375$, with a bootstrap 95% CI of $[-0.521, -0.213]$ and a firm-cluster CI of $[-0.541, -0.185]$.
- **Significance.** Permutation $p = 0.002$.
- **Effect size.** $f^2 = 0.18$ and $R^2 = 0.240$.

Larger firms, financial firms and FY 2024-25 filings have somewhat higher disclosure quality.

In Model 2 the association is negative in both pillars:

- **Environmental pillar.** $\beta = -0.273$ $[-0.451, -0.069]$, permutation $p = 0.013$.
- **Social and governance pillar.** $\beta = -0.234$ $[-0.353, -0.124]$, permutation $p = 0.085$.
- **Difference.** The difference between the two coefficients is small and not significant $(-0.039$ $[-0.255, 0.210]$, $p = 0.846$).

Two controls are pillar-specific: size predicts environmental disclosure quality ($\beta = 0.295$), and environmental sensitivity predicts social and governance disclosure quality ($\beta = 0.266$).

Table 8
Structural models of disclosure quality

Path	Model 1: equal-weight composites	Model 2E: environmental pillar	Model 2S: social and governance pillar	Model 3: formative PLS-SEM (Mode B)
Performance → disclosure quality	-0.375 [- 0.521, - 0.213]	-0.273 [- 0.451, - 0.069]	-0.234 [- 0.353, - 0.124]	-0.298 [- 0.712, - 0.196]
Permutation <i>p</i> (performance path)	0.002	0.013	0.085	0.304
SIZE	0.145 [- 0.008, 0.287]	0.295 [0.128, 0.443]	-0.084 [- 0.218, 0.033]	0.056 [- 0.329, 0.347]
FIN	0.182 [0.025, 0.333]	0.095 [- 0.082, 0.266]	0.164 [0.003, 0.300]	0.704 [- 0.591, 0.788]
ESS	0.197 [- 0.022, 0.418]	0.011 [- 0.206, 0.248]	0.266 [0.092, 0.418]	0.213 [- 0.217, 0.406]
FY25	0.190 [0.018, 0.368]	0.152 [- 0.035, 0.326]	0.130 [- 0.054, 0.343]	0.019 [- 0.161, 0.238]
f ² (performance path)	0.179	0.079	0.063	0.196
R ²	0.240	0.154	0.135	0.555
Notes: Standardised path coefficients with 95% percentile bootstrap confidence intervals (5,000 resamples). <i>n</i> = 99. Models 1 and 2 use equally weighted composites entered as single-indicator constructs. Model 3 forms both constructs from the nine attribute scores with Mode B weights and the path weighting scheme. Permutation <i>p</i> -values come from 2,000 re-pairings of whole firms' performance with other firms' disclosure within year.				

Model 3, the formative PLS-SEM specification, also yields a negative path ($\beta = -0.298$). Its bootstrap interval excludes zero (bootstrap $p = 0.023$; firm-cluster $p = 0.060$), but the estimate is unremarkable against its permutation distribution:

- **Permutation test.** When firms' performance is randomly re-paired with other firms' disclosure, the estimated composite weights produce paths at least this large in absolute value 30% of the time ($p = 0.304$; the 95th percentile of the null is 0.40). The same holds with Mode A weights ($\beta = -0.417$, permutation $p = 0.209$).
- **Measurement model.** The disclosure quality composite shows collinearity among the environmental indicators (VIF of 5.01 for energy, 3.62 for waste and 3.06 for GHG). No outer weight in either composite is significant, and the weights change sign across indicators.

The bootstrap therefore overstates the precision of the formative estimate. With 99 observations and 18 formative indicators, estimated weights fit noise, so the stable evidence comes from the equally weighted composites.

5.6 Robustness

The aggregate association survives every check (Table 9). It is stronger when financial firms are excluded ($\beta = -0.440$) and in FY 2023-24 (-0.508) than in FY 2024-25 (-0.306), which suggests some convergence in the second year. Removing the accuracy items weakens it to -0.269 , but it remains significant (permutation $p = 0.021$). Part of the inverse relation therefore runs through reporting accuracy. The 25 firm-years with non-conforming intensities, 21 of them in manufacturing or heavy industry, outperform the other filings on GHG (mean percentile 0.64 against 0.45; Mann–Whitney $p = 0.003$), energy (0.62 against 0.46; $p = 0.002$) and waste (0.60 against 0.47; $p = 0.015$). Finally, the association does not depend on the controls or on how environmental sensitivity is defined.

Table 9
Robustness of the aggregate coupling estimate (Model 1)

Specification	<i>n</i>	β (performance → disclosure quality)	95% CI	Permutation <i>p</i>
Baseline (Model 1)	99	-0.375	[- 0.521, - 0.213]	0.002
Excluding financial firms	75	-0.440	[- 0.596, - 0.241]	< 0.001
FY 2023-24 only	49	-0.508	[- 0.723, - 0.258]	< 0.001
FY 2024-25 only	50	-0.306	[- 0.511, - 0.053]	0.030
Disclosure quality without accuracy items	99	-0.269	[- 0.431, - 0.073]	0.021
Narrow definition of environmental sensitivity	99	-0.381	[- 0.540, - 0.210]	< 0.001
No controls	99	-0.356	[- 0.508, - 0.185]	0.003
Formative composites, Mode B (Model 3)	99	-0.298	[- 0.712, - 0.196]	0.304
Formative composites, Mode A	99	-0.417	[- 0.615, - 0.332]	0.209
Notes: 95% percentile bootstrap confidence intervals (5,000 resamples for the baseline and Model 3; 2,000 otherwise). Permutation tests use 2,000 re-pairings of whole firms within year; $p < 0.001$ means that at most one of the 2,000 permutations produced a coefficient as large in absolute value.				

Table 10 summarises the tests of the hypotheses.

Table 10
Summary of hypothesis tests

Hypothesis	Prediction	Evidence	Verdict
H1a (signalling)	Disclosure quality is positively associated with performance	No positive association in any attribute, pillar or aggregate model	Not supported
H1b (legitimacy)	Disclosure quality is negatively associated with performance	Negative in the aggregate ($\beta = -0.375, p = 0.002$) and for energy ($\rho = -0.27, p = 0.015$); null in the other eight attributes; not distinguishable from chance with estimated formative weights	Partially supported
H2	Coupling weaker, and decoupling more frequent, for environmental attributes	Decoupled shares 51.8% versus 50.5%; pillar coefficients differ by -0.039 ($p = 0.846$); symbolic share higher for social attributes	Not supported
H3	Gap larger for environmentally sensitive firms	No difference in absolute or signed gaps ($p \geq 0.459$)	Not supported

6. Discussion

6.1 Convergence in form, decoupling in substance

The central finding is that BRSR Core has made disclosure uniform without making it informative about performance. India's largest firms report the mandated KPIs almost completely, increasingly in comparable form, and under third-party assurance. Yet their disclosure quality tells an observer almost nothing about how they perform on the attributes they disclose about: in eight of nine attributes the gap is as large as random pairing would produce.

This is the pattern neo-institutional theory predicts for a coercive template. Regulation makes organisations alike in form (DiMaggio & Powell, 1983), and conformity to the template secures legitimacy whether or not it changes the technical core (Meyer & Rowan, 1977). In Bromley and Powell's (2012) terms, the mandate has largely closed the *policy–practice* gap: firms do what the rule requires, and an assurer checks that they have. What remains is *means–ends* decoupling. The practice is implemented but only loosely connected to the outcome it is meant to serve, namely making performance differences visible.

The ceiling in social disclosure quality makes the point sharply. When nine in ten firms score full marks on well-being, gender and fairness disclosure, disclosure quality cannot rank them, and any gap between disclosure and performance is mostly a performance gap among firms that all comply.

This finding qualifies how greenwashing should be measured under a mandate. Indian studies that compare commercial disclosure and performance scores classify about half of the NIFTY 50 as

greenwashers: 54% in Sensharma et al. (2022) and 47% in Gidage et al. (2025). Our symbolic quadrant is somewhat smaller, at 39% of firm-years. Its composition, however, shows that under a mandate this quadrant is filled mainly by compliant laggards, not by firms that embellish their disclosures.

Where disclosure content is prescribed, a large gap between disclosure and performance indicates decoupling rather than deception.

6.2 Why signalling fails under a mandate

Signalling theory expected the KPIs' quantification, comparability and assurance to make disclosure a costly, credible signal that better performers would use to separate themselves (Spence, 1973; Connelly et al., 2011). We find no positive coupling in any attribute, any pillar or the aggregate.

The mandate removes the variation a signal needs. In voluntary settings, better performers choose to disclose more, and more precisely (Clarkson et al., 2008; Hummel & Schlick, 2016). Under BRSR Core every large firm must disclose the same items, so disclosure stops separating good performers from poor ones. The extra precision that remains, such as Scope 3 reporting or full reconciliation of the reported intensities, is cheap for large firms with assurance budgets and is not taken up selectively by better performers.

A mandate can thus raise the floor of disclosure while flattening the disclosure–performance gradient that voluntary regimes produce. This is consistent with evidence that the effects of mandatory reporting depend on what it adds beyond standardised compliance (Christensen et al., 2021; Haji et al., 2023).

6.3 A legitimacy tilt, and what drives it

Where disclosure quality and performance are related, the relation is inverse. Firms with weaker sector-relative performance file slightly higher-quality BRSR Core disclosures, and the association survives every change of sample and specification as long as the composites are weighted equally. This is the direction legitimacy theory predicts (Patten, 2002; Cho & Patten, 2007). Firms whose performance exposes them have more reason to perfect the form of what they report, because a polished, complete and assured filing is a low-cost legitimating device (Ashforth & Gibbs, 1990; Deegan, 2002).

Two features of the evidence counsel caution, however:

- **It is confined to energy at the attribute level.** No attribute other than energy shows a significant inverse relation, so the aggregate association comes from many weak cross-attribute links rather than from a strong one.
- **Part of it runs through accuracy.** The firm-years with non-conforming intensities perform better on emissions, energy and waste than the rest. Removing the accuracy items reduces the coefficient by about 30%.

The second feature admits a less strategic reading than impression management. Several better-performing manufacturers and heavy-industry firms appear to report intensities per crore of rupees, a

convention that suits human readers, in a machine-readable field defined per rupee. Their filings score lower on accuracy, not because they hide anything but because the format was not built for them.

The legitimacy tilt is therefore real but modest. It is better described as the absence of a performance premium in disclosure quality than as systematic embellishment by poor performers. That H1b is only partially supported fits Cho et al.'s (2015) view that sustainability reporting under institutional pressure combines façade and substance, and that the two can coexist within the same report.

6.4 Environmental attributes and sensitive sectors are not special

We expected the gap to concentrate in the environmental attributes and in environmentally sensitive sectors, where the legitimacy payoff of polished disclosure is greatest. Neither expectation holds: decoupling is as frequent in the social and governance attributes, where the symbolic quadrant is in fact larger, and environmentally sensitive firms' gaps differ little from those of other firms.

A plausible explanation is that BRSR Core's uniform template and assurance requirement have levelled the field. Sector-specific legitimacy pressure, which shaped disclosure in voluntary regimes (Patten, 2002; Cho & Patten, 2007), has less room to act when every firm must report the same KPIs to the same assurance standard. The one environmental exception, energy, reflects the accuracy channel described in Section 6.3 rather than a sector effect.

6.5 Assured, yet inconsistent

A quarter of filings report environmental intensities that do not reconcile with their own data, and every one of these filings carries third-party assurance or assessment. Two explanations are possible:

- **Assurance scope.** The assurance may cover the human-readable report rather than the XBRL filing.
- **Assurance practice.** Assurers may check data provenance rather than the internal consistency of reported ratios.

7. Implications

The study makes three contributions to theory and method.

1. **Decoupling under a mandate takes a particular form.** Once a coercive template fixes the content of disclosure and assurance verifies its completion, policy–practice decoupling recedes. The residual question becomes whether the practice connects to outcomes, which is means–ends decoupling (Bromley & Powell, 2012). Theories of disclosure that were developed for voluntary regimes need this distinction: signalling and legitimacy predictions about *how much* firms disclose lose their purchase when the quantity is prescribed, and only predictions about *how well* survive.
2. **Greenwashing measures need rethinking in mandatory regimes.** The standard gap between standardised disclosure and performance scores, and the quadrants built from it, conflate

compliance with symbolism once everyone discloses. Researchers working with BRSR, the Corporate Sustainability Reporting Directive (CSRD) or other mandates should test coupling directly and examine the composition of the symbolic quadrant before labelling it greenwashing.

3. **Estimated composite weights capitalise on chance in small samples.** With many formative indicators, composite-based models can report significant paths that a permutation test does not support. Fixed-weight composites, together with permutation inference, give a sturdier test of whether two composites are related.

8. Limitations, future research and conclusion

8.1 Limitations

The study has six limitations.

1. **Short panel and selective sample.** It covers two years and the 50 largest listed firms, all already inside the first assurance cohort. The results describe the regime at its strongest and may not carry over to smaller firms. We expect less complete disclosure among smaller firms, but whether it is also less coupled to performance is an open question.
2. **Machine-readable data only.** We use the XBRL filings, not the PDF reports. Some inconsistencies we classify as inaccuracies may be absent from the human-readable report, although the XBRL filing is the regulatory record.
3. **A conformance-based measure of disclosure quality.** Disclosure quality captures completeness, comparability, accuracy and one voluntary item. It does not capture narrative quality, balance or the credibility of forward-looking statements.
4. **Change-based environmental performance.** Environmental performance is measured through changes and ratios, because levels could not be compared reliably across firms. Firms with high but falling footprints therefore score well, and the measure rewards improvement rather than position.
5. **Coarse peer groups and missing data.** Peer groups are broad, and percentile ranks within small groups are coarse. One firm-year is missing.
6. **Association, not causation.** The associations we report are not causal estimates.

8.2 Future research

Four extensions follow from these limitations:

- **Causal effects of assurance.** SEBI's assurance glide path offers a natural experiment. Reasonable assurance reaches the top 500 firms in FY 2025-26 and the top 1,000 in FY 2026-27, so comparing coupling before and after a firm enters the assurance cohort would identify the causal effect of assurance on whether disclosure tracks performance.
- **Textual analysis.** Analysing BRSR narratives could show whether poor performers compensate for prescribed KPIs with more favourable narrative framing.

- **Levels as well as changes.** Unit-validated KPI datasets would allow performance levels, not only changes, to enter the gap measure.
- **Market consequences.** Linking coupling to investor responses would show whether markets price the difference between compliant disclosure and informative disclosure.

8.3 Conclusion

India's BRSR Core asks the country's largest firms to disclose the same nine attributes in the same format, and to have them verified. This study measured how far what these firms disclose tracks how they perform, using the mandated KPIs themselves rather than proprietary scores. The answer for the NIFTY 50 in the first two years of the regime is that it hardly does.

Disclosure quality is high and converging, and in its form, transparency has largely been achieved. Yet disclosure quality carries no positive information about sector-relative performance in any attribute, and in the aggregate, it is weakly inverse to it. A quarter of the filings, all of them assured or assessed, also contain intensities that do not reconcile with their own data.

Mandated transparency has delivered uniform disclosure, not disclosure that reveals performance. Making it reveal performance will require attention to the substance of the data as well as their completion, through machine validation, a common denominator, assurance of the filing actually submitted and reporting that connects KPIs to targets.

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Appendices

Appendix A. Disclosure quality items

Each item is scored 1 or 0 from the XBRL filing, except the first two openness items, which are shares between 0 and 1. Items marked MFG/HEAVY apply only to manufacturing and heavy-industry firms (Table 3). n is the number of firm-years for which the item is applicable.

Attribute	Dimension	Item (scored 1 when ...)	Mean (%)	n
GHG footprint	Completeness	Scope 1 and Scope 2 emissions both reported; total above zero	100.0	99
	Comparability	Prior-year Scope 1 + 2 reported	100.0	98
	Completeness	Scope 1 + 2 intensity per rupee of turnover reported	98.0	99
	Comparability	PPP-adjusted Scope 1 + 2 intensity reported	92.9	99
	Accuracy	Per-rupee intensity within $\times 1.6$ of (Scope 1 + 2)/revenue	74.0	96
	Completeness	Physical-output intensity reported (MFG/HEAVY)	78.9	57
	Voluntary depth	Scope 3 emissions reported (voluntary)	73.7	99
Water footprint	Completeness	Water withdrawal and consumption reported	94.9	99
	Comparability	Prior-year withdrawal and consumption reported	90.8	98
	Completeness	Water intensity per rupee of turnover reported	100.0	99
	Comparability	PPP-adjusted water intensity reported	94.9	99
	Accuracy	Per-rupee intensity within $\times 1.6$ of consumption/revenue	74.7	99
	Completeness	Physical-output water intensity reported (MFG/HEAVY)	77.2	57
	Accuracy	Consumption does not exceed withdrawal	91.9	99
Energy footprint	Accuracy	Discharge with and without treatment sums to total discharge ($\pm 1\%$)	99.0	99
	Completeness	Total energy and renewable energy reported	100.0	99
	Comparability	Prior-year total energy reported	100.0	98
	Completeness	Energy intensity per rupee of turnover reported	100.0	99
	Comparability	PPP-adjusted energy intensity reported	90.9	99
	Accuracy	Per-rupee intensity within $\times 1.6$ of energy/revenue	74.7	99
	Completeness	Physical-output energy intensity reported (MFG/HEAVY)	78.9	57
	Accuracy	Renewable energy does not exceed total energy	100.0	99

Attribute	Dimension	Item (scored 1 when ...)	Mean (%)	n
Embracing circularity	Completeness	Total waste generated reported	100.0	99
	Comparability	Prior-year waste generated reported	100.0	98
	Completeness	Waste intensity per rupee of turnover reported	98.0	99
	Comparability	PPP-adjusted waste intensity reported	91.9	99
	Accuracy	Per-rupee intensity within $\times 1.6$ of waste/revenue	69.1	81
	Completeness	Physical-output waste intensity reported (MFG/HEAVY)	78.9	57
	Accuracy	Eight waste categories sum to total waste generated ($\pm 2\%$)	100.0	99
	Completeness	Waste recovered and waste disposed reported	97.0	99
Well-being and safety	Completeness	Well-being spending as a share of revenue reported	96.0	99
	Comparability	Prior-year well-being spending reported	92.9	98
	Accuracy	Well-being share reported as a fraction (≤ 0.10)	98.9	95
	Completeness	LTIFR reported for employees (and workers where the firm has workers)	100.0	99
	Comparability	Prior-year LTIFR reported	100.0	98
	Completeness	Fatalities and high-consequence injuries reported (employees and workers)	100.0	99
Gender diversity	Completeness	Female share of gross wages reported	96.0	99
	Comparability	Prior-year female share of gross wages reported	93.9	98
	Accuracy	Female wage share ≤ 1 and within 1 percentage point of female wages/total wages	100.0	95
	Completeness	POSH complaints reported for current and prior year	100.0	99
	Accuracy	POSH complaints upheld reported and not above complaints filed	99.0	99
Inclusive development	Completeness	Share of inputs from MSMEs and small producers reported	99.0	99
	Comparability	Prior-year MSME share reported	98.0	98

Attribute	Dimension	Item (scored 1 when ...)	Mean (%)	<i>n</i>
	Completeness	Share of inputs sourced locally reported	97.0	99
	Completeness	Wages by town category reported	98.0	99
	Comparability	Prior-year wages by town category reported	92.9	98
	Accuracy	Wages by town category sum to total wage cost ($\pm 5\%$)	80.4	97
	Accuracy	Sourcing shares reported as fractions (≤ 1)	99.0	98
Fairness	Completeness	Days payable outstanding reported	90.9	99
	Comparability	Prior-year days payable outstanding reported	90.8	98
	Completeness	Number of customer data breaches reported	100.0	99
	Accuracy	Share of breaches involving customer data reported, ≤ 1 , and zero when there are no breaches	100.0	99
Openness	Completeness	Share of the six concentration ratios reported (scored 0–1)	72.7	99
	Comparability	Share of the six prior-year ratios reported (scored 0–1)	71.6	98
	Accuracy	All reported ratios ≤ 1	98.9	95

Figures

The symbolic quadrant fills where disclosure quality hits its ceiling

Where almost every filing scores full disclosure quality, about half are classed as symbolic: compliant laggards

■ Symbolic share: disclosure quality at or above the mean, performance below it (% of firm-years)

◆ Share of firm-years at full disclosure quality (%)

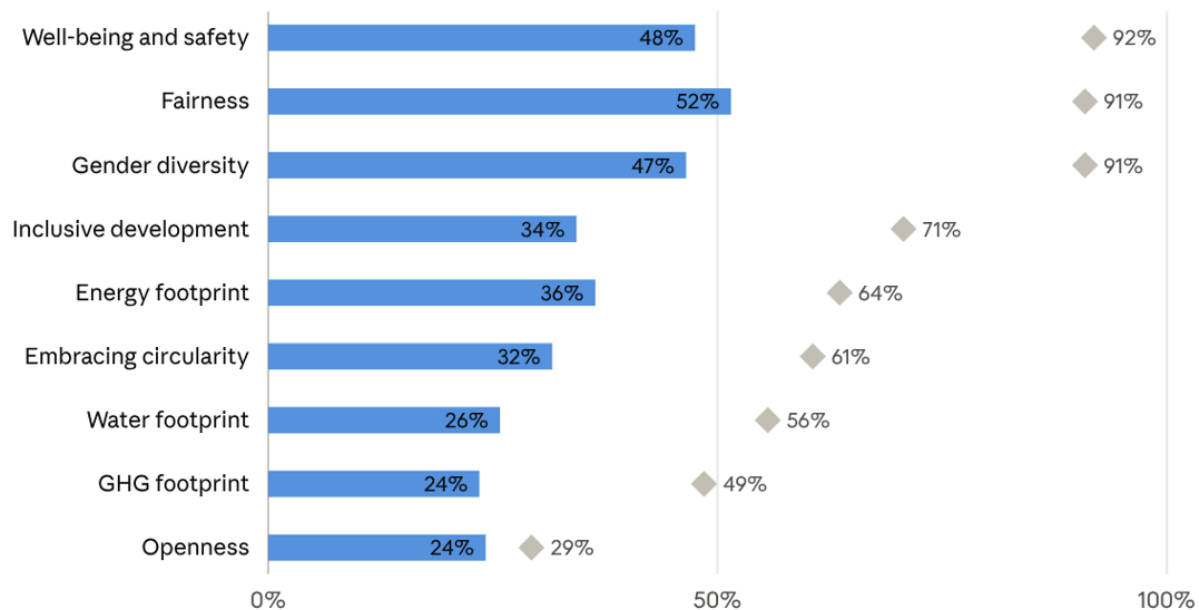


Figure 1

Symbolic share and ceiling compliance by attribute

Disclosure quality never rises with performance

Only energy and the nine-attribute aggregate pass the permutation test, and both are negative

Spearman correlation with 95% firm-cluster bootstrap interval; blue = permutation p < 0.05; n = 93–99 firm-years

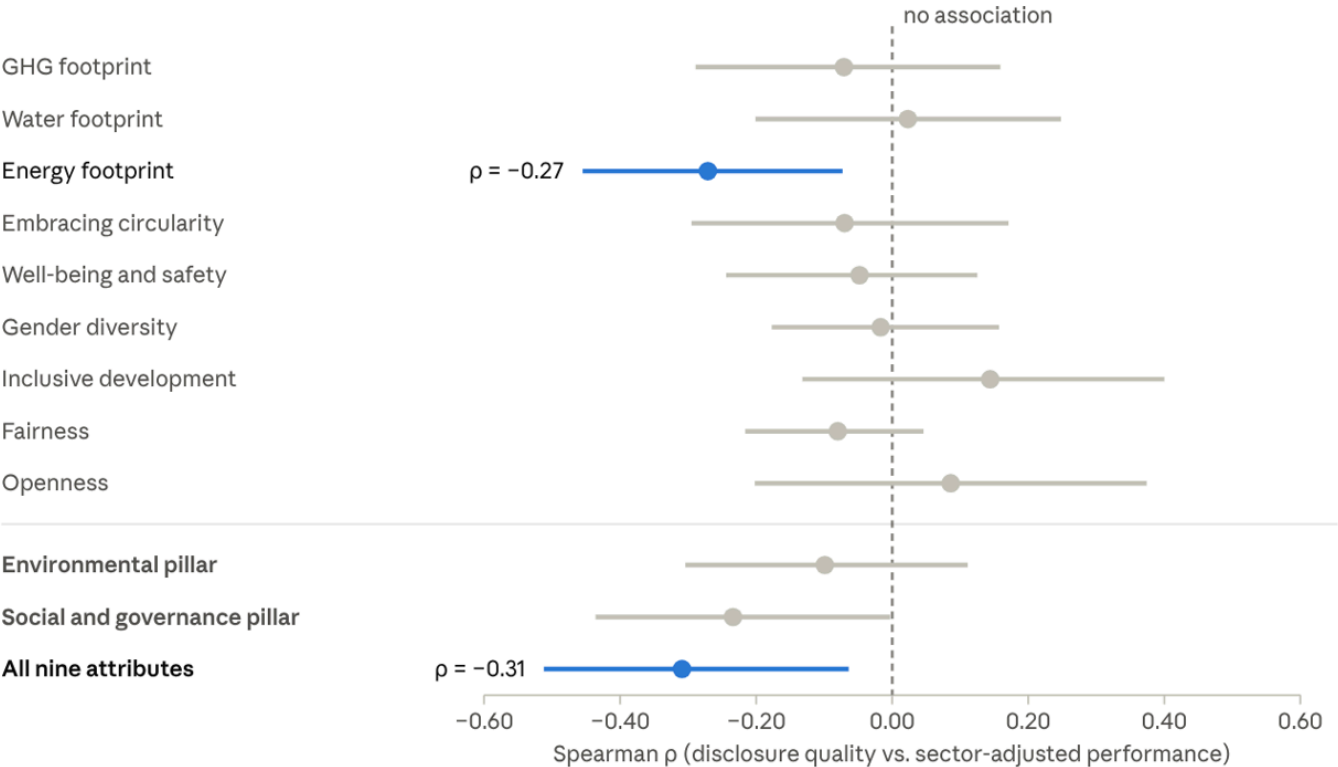


Figure 2

Coupling between disclosure quality and performance by attribute