

Sectoral Variations in ESG Adoption in Indian Corporations: A Quantitative Assessment and Strategic Policy Implications

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Abstract

This study investigates sector-wise disparities in Environmental, Social, and Governance (ESG) adoption among Indian corporates using a dataset of over 2,500 firm-level observations across eleven sectors. Employing the Kruskal-Wallis H-test to address non-normal data distribution, the analysis reveals statistically significant variations in ESG performance. Sectors such as Oil & Mining and Automobiles demonstrate strong ESG integration, driven by regulatory oversight and investor scrutiny, whereas Textiles and Consumer Durables lag considerably. Governance emerges as the most mature pillar across sectors, while Environmental and Social dimensions exhibit uneven development. The findings emphasize the need for sector-specific ESG policies, enhanced regulatory mechanisms, and greater stakeholder engagement, especially among MSMEs. This paper contributes empirical insights for investors, policymakers, and business leaders to foster inclusive ESG integration in India.

Keywords: ESG, India, Sectoral Analysis, Kruskal-Wallis Test, Corporate Sustainability, BRSR, Environmental Performance, Social Responsibility, Stakeholder Engagement

1. Introduction

1.1 ESG in Global and Indian Context

Environmental, Social, and Governance (ESG) frameworks have emerged as a critical metric of corporate performance, evolving from a reputational tool into a strategic imperative for long-term risk mitigation and value creation. Globally, researchers have documented a shift from traditional financial analysis to a more integrated approach that includes non-financial parameters like climate risk, labor practices, and board independence (Chatterji, Levine, & Toffel, 2021; Ionescu et al., 2019). Studies such as Rao et al. (2023) have found strong correlations between ESG scores and firm valuation, while others highlight the role of ESG in reducing capital costs and improving crisis resilience. However, global literature still tends to treat ESG as a homogeneous construct, often overlooking contextual and sectoral differences in adoption patterns. In India, ESG adoption is at a transitional phase, shaped by evolving regulatory mandates and increased investor scrutiny. The Securities and Exchange Board of India (SEBI) introduced the Business Responsibility and Sustainability Report (BRSR) in 2021, mandating top-listed firms to disclose ESG data in alignment with global frameworks like the Task Force on Climate-Related Financial Disclosures (TCFD). While this policy shift has brought greater uniformity, the landscape remains heterogeneous. Many disclosures are still narrative-driven, lack third-party assurance, and fail to adequately reflect sector-specific ESG risks (Motwani & Gupta, 2023; Faruq & Chowdhury, 2025).

1.2 Sectoral Challenges and Research Gaps

The sectoral dimension of ESG remains underexplored in both global and Indian contexts. Prior studies often generalize ESG adoption at the firm or country level, neglecting industry-specific factors—such as regulatory pressure, stakeholder expectations, and operational externalities—that shape ESG performance. Indian studies such as Srivastava (2024) and Mulchandani & Jain (2023) focus on the financial implications of ESG in specific sectors like banking or FMCG but do not compare ESG performance across a broad set of industries. Similarly, governance scores are often emphasized due to regulatory clarity, while the environmental and especially social dimensions are inconsistently reported or inadequately measured (Vishali & MK, 2024; Narain & Subramaniam, 2023). This study addresses these gaps by conducting a non-parametric, sector-wise statistical analysis of ESG scores among Indian corporates—a methodological approach that remains rare in the literature. Using Kruskal-Wallis tests and post-hoc comparisons, the study systematically examines disparities in Environmental, Social, and Governance dimensions across 11 major sectors. By triangulating statistical outputs with contextual insights, the

paper provides an original, data-driven contribution to understanding the drivers and constraints of ESG integration in India's corporate ecosystem.

2. Literature Review

2.1 ESG as a Strategic Corporate Performance Metric

Environmental, Social, and Governance (ESG) frameworks have evolved from peripheral reputational tools into central elements of strategic corporate management. Globally, ESG integration is increasingly recognized for its role in enhancing long-term value creation, risk mitigation, and investor trust. For instance, Ionescu et al. (2019) and Chatterji, Levine, and Toffel (2021) illustrate how non-financial metrics—such as climate risk, labor conditions, and governance structures—complement financial indicators to offer a holistic view of firm performance. Empirical evidence indicates strong correlations between ESG adoption and improved cost of capital, firm valuation, and crisis resilience (Rao et al., 2023).

2.2 ESG Adoption in India: Regulatory and Institutional Developments

The Indian ESG ecosystem has been significantly shaped by regulatory milestones. Initial adoption was characterized by voluntary disclosures aligned with global frameworks such as the Global Reporting Initiative (GRI) and the UN Global Compact (Banerjee & Prasad, 2019). However, the introduction of SEBI's Business Responsibility and Sustainability Report (BRSR) in 2021 marked a pivotal shift toward structured, quantitative disclosures. This framework aligns with international norms like the TCFD and ISSB and mandates disclosure from the top 1000 listed companies in India (Motwani & Gupta, 2023). These regulatory changes have substantially enhanced transparency and comparability in ESG reporting.

2.3 ESG and Firm Performance in the Indian Context

A growing body of Indian scholarship examines the link between ESG metrics and financial performance. Srivastava (2024) found a positive relationship between ESG disclosure and market valuation in the banking sector, while Mulchandani and Jain (2023) observed increasing institutional investor reliance on ESG indicators, particularly in ESG-sensitive sectors such as IT, FMCG, and Renewable Energy. These studies collectively reinforce ESG's materiality in capital access, investor sentiment, and competitive advantage.

2.4 Sectoral Disparities in ESG Adoption

Several researchers highlight wide inter-sectoral differences in ESG maturity. Sectors with direct environmental and social externalities—such as Oil & Mining, Automobiles, and Textiles—face heightened scrutiny and typically report higher ESG engagement levels (Kaleeswari & Chaudhuri, 2024; Nandan & Sinku, 2024). However, adoption within these sectors is often limited to large-cap or multinational firms. Conversely, sectors perceived to have low ESG exposure, such as Services or Consumer Durables, often deprioritize integration despite significant indirect impacts (Gupta & Sharma, 2023). This unevenness underscores the need for sector-specific ESG frameworks and regulatory calibration.

2.5 Component-Wise Analysis of ESG Dimensions

Governance is the most mature pillar within ESG in India, bolstered by SEBI mandates on board composition, audit committee standards, and whistleblower policies. Studies by Chatterji et al. (2021) and Srivastava (2024) highlight higher governance scores in sectors with public shareholding and global engagement. However, Charan (2025) warns of superficial compliance, where firms meet minimum requirements without internalizing a good governance culture.

In contrast, the social pillar remains the least institutionalized. Scholars such as Vishali and MK (2024) argue for greater attention to diversity, labor practices, and supply chain ethics, especially given India's demographic diversity and labor-intensive economy. Yet, most firms continue to treat social responsibility as philanthropy, rather than embedding it within operations (Narain & Subramaniam, 2023).

Environmental performance is highly sector performance. While high-impact sectors report more on emissions, energy use, and waste management, low-emission industries often ignore Scope 3 emissions and broader environmental footprints (Kanhaiya, 2023). This selective engagement contributes to fragmented environmental reporting quality across sectors.

2.6 ESG Data Challenges and Rating Inconsistencies

A major constraint to effective ESG integration lies in data quality and rating transparency. Globally and in India, ESG ratings differ significantly across providers due to varied methodologies, which can lead to greenwashing and investor skepticism (Ionescu et al., 2019). The problem is exacerbated by the absence of mandatory third-party assurance for ESG disclosures in India (Faruq & Chowdhury, 2025). As a result, comparability and trust in reported ESG data remain limited.

2.7 Financial Instruments and Market Incentives for ESG

Recent literature calls for the expansion of ESG-linked financial instruments in India. Dua and Pratham (2025) argue that green bonds, sustainability-linked loans, and ESG-based indices can incentivize corporate ESG performance. The proliferation of ESG mutual funds (e.g., ICICI Prudential ESG Fund, SBI ESG Fund) reflects growing investor interest, though studies by Ghosh and Paul (2023) and Rohilla (2023) note persistent gaps in performance measurement and impact verification.

2.8 Role of State and Civil Society in ESG Norm Formation

Beyond corporate and regulatory actors, civil society plays a vital role in ESG standard-setting. The Ministry of Corporate Affairs has mainstreamed sustainability into the National Guidelines for Responsible Business Conduct (NGRBC), while the Reserve Bank of India

has begun integrating climate risks into financial stability assessments (Reuters, 2025). NGOs and advocacy groups have also pressed for inclusive and transparent ESG norms, particularly on labor rights, environmental justice, and gender equity.

3. Conceptual Framework

To guide this study, a conceptual framework (Figure 2) is developed to illustrate the theoretical linkages between ESG Drivers, Sectoral Factors, and ESG Outcomes. ESG drivers include regulatory mandates, stakeholder pressures, and global exposure, which interact with sectoral attributes such as operational externalities, industry norms, and capacity for disclosure. These interactions collectively shape ESG outcomes, measured here as combined and disaggregated E, S, and G scores. The framework integrates insights from institutional theory and stakeholder theory, emphasizing that ESG adoption is not uniform but mediated by sectoral context.



Fig. 1: Conceptual Framework

Source (Authors)

This framework maps ESG drivers (regulation, stakeholder pressure, global exposure) against sectoral factors (environmental intensity, value chain complexity) to explain variations in E, S, and G outcomes. It serves as the analytical basis for empirical results and recommendations.

4. Research Objectives

This study aims to:

1. Analyze sector-wise ESG performance in the Indian corporate context using the Kruskal-Wallis test.
2. Compare environmental, social, and governance scores across 11 sectors to identify patterns of ESG maturity and lag.
3. Examine the role of industry-specific characteristics, regulatory exposure, and stakeholder pressure in shaping ESG behavior.
4. Provide policy and managerial recommendations for sector-specific ESG strategies.

5. Methodology

5.1 Data Source and Sector Classification

The dataset comprises ESG scores—both overall and component-wise (Environmental, Social, and Governance)—for 2500+ observations from 2014-2023 across eleven key sectors of the Indian economy: Healthcare, Capital Goods, Services, FMCG, Automobile, IT, Oil & Mining, Textile, Consumer Durables, Power, and Media & Entertainment. The data were sourced from firm-level disclosures aligned with BRSR and Bloomberg.

5.2 Statistical Method

The Kruskal-Wallis H-test, a non-parametric statistical test, was employed to assess whether ESG scores differ significantly across sectors. This method is appropriate given the non-normal distribution of ESG data and the ordinal nature of ranks.

5.3 Metrics Used

- **Combined ESG Score:** Aggregated metric capturing environmental, social, and governance dimensions.
- **Component Scores:** Individual E, S, and G scores analyzed separately.
- **Mean and Median Scores:** Indicators of central tendency for sectoral performance.

A significance threshold of $p < 0.05$ was used for hypothesis testing.

6. Results and Analysis

6.1 ESG Combined Scores Across Sectors

The Kruskal-Wallis test reveals a statistically significant difference in ESG combined scores across sectors ($\chi^2 = 110.78$, $df = 10$, $p = 0.0001$). This confirms that ESG engagement in India is not homogeneous and is influenced by sector-specific operational risks, regulatory environments, and stakeholder expectations.

Table 1: Kruskal-Wallis Rank Sums for ESG Combined Scores by Sector

Sector	Observations	Rank Sum
Capital Goods	440	445,431.50
Healthcare	329	330,371.50
Oil & Mining	250	328,301.50
FMCG	210	222,005.00
Automobile	197	240,423.50
IT	129	148,864.00
Services	210	190,634.50
Consumer Durables	170	144,497.00
Power	90	107,695.00
Media & Entertainment	60	54,893.50
Textile	30	24,553.50

Source (Authors)

Key Observations:

- **Capital Goods** and **Healthcare** emerged as high-ranking sectors, potentially due to robust institutional oversight and structured value chains.
- **Oil & Mining** demonstrates strong ESG scores despite environmental exposure, reflecting regulatory alignment and investor pressure.
- **Textile** and **Consumer Durables** show the lowest ESG integration, highlighting systemic challenges in sustainability adoption.

Table 2: Mean and Median ESG Combined Scores by Sector

Sector	Mean ESG	Median ESG
Oil & Mining	41.87	41.45
Automobile	38.95	38.68
IT	38.68	35.03
Power	38.67	35.93
FMCG	35.65	35.06
Healthcare	35.38	33.36
Capital Goods	35.11	33.65
Services	32.73	31.86
Media & Entertainment	33.08	32.22
Consumer Durables	31.37	31.57
Textile	31.65	29.34

Source (Authors)

Interpretation:

- **Oil & Mining** and **Automobile** sectors reflect proactive ESG strategy, likely due to high environmental exposure and reputational sensitivities.
- **FMCG** shows consistent performance, aligned with regulatory mandates on packaging and waste.
- **Textile** and **Consumer Durables** sectors display persistent underperformance, as indicated by their low median scores.

6.2 Environmental Scores Across Sectors

The Kruskal-Wallis test for environmental scores ($\chi^2 = 140.225$, $df = 10$, $p = 0.0001$) confirms substantial inter-sectoral variation in environmental practices and disclosures.

Top Environmental Performers:

- Oil & Mining: Mean = 25.15; Median = 20.77
- Automobile: Mean = 21.17; Median = 16.46
- IT: Mean = 19.71; Median = 2.41

Environmental Laggards:

- Power: Mean = 8.54; Median = 1.25
- Services: Mean = 8.82; Median = 2.08
- Textile: Mean = 10.61; Median = 5.36

Insights:

- The skew in IT's distribution, with a high mean but low median, suggests that ESG leadership is concentrated in a few large firms.
- Low median scores in the **Textile** and **Power** sectors highlight a pressing need for regulation and operational investment in sustainability.

6.3 Social Scores Across Sectors

The Kruskal-Wallis test for social scores ($\chi^2 = 113.19$, $df = 10$, $p = 0.0001$) confirms significant variance in social ESG performance across sectors.

Table 3: Sectoral Social Score Metrics

Sector	Mean Score	Median Score
Oil & Mining	27.37	25.98
Media & Entertainment	21.43	22.96
IT	19.71	21.76
Consumer Durables	19.46	18.56
Capital Goods	19.49	17.99
Automobile	18.81	18.68
Services	17.29	18.22
FMCG	17.15	17.74
Healthcare	17.03	16.93
Power	15.26	16.02
Textile	12.87	10.06

Source (Authors)

Insights:

- **Oil & Mining** leads to social performance, likely influenced by CSR mandates and high community visibility.
- **IT** and **Media & Entertainment** exhibit progressive social policies, reflecting global investor expectations.
- **Textile** sector significantly underperforms, mirroring persistent issues in labor rights and informal employment.

6.4 Governance Scores Across Sectors

The analysis of governance scores reveals relatively uniform performance across sectors, suggesting widespread adherence to regulatory standards. Median values for most sectors cluster tightly around 78.6, indicating a ceiling effect.

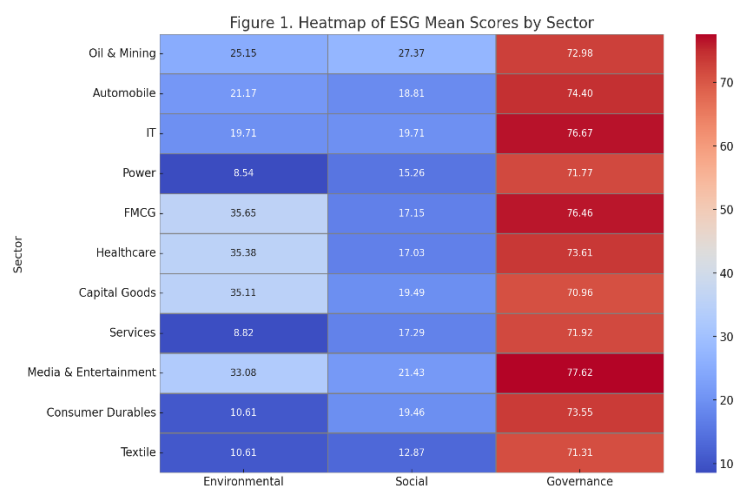
Table 4: Governance Mean and Median Scores by Sector

Sector	Mean Score	Median Score
Media & Entertainment	77.62	78.60
IT	76.67	78.60
FMCG	76.46	78.60
Automobile	74.40	78.60
Healthcare	73.61	78.60
Consumer Durables	73.55	76.10
Oil & Mining	72.98	78.60
Power	71.77	78.60
Services	71.92	76.10
Textile	71.31	75.65
Capital Goods	70.96	78.31

Source (Authors)

Interpretation:

- Most sectors show high governance scores due to SEBI's strong regulatory framework, particularly around board independence, audit committees, and disclosure practices.
- The minimal variability in median scores suggests compliance is widespread but may be superficial, driven more by regulation than voluntary governance innovation.
- Sectors such as **Textile**, **Services**, and **Capital Goods** slightly underperform, pointing to the need for governance reforms beyond compliance-driven frameworks.

**Fig. 2:** Heatmap of ESG Mean Scores by Sector

Source (Authors)

It presents a heatmap of mean Environmental, Social, and Governance (ESG) scores across 11 major sectors. Darker shades represent higher scores. It visually emphasizes governance uniformity and environmental/social disparities, highlighting sectors needing targeted

interventions. The color gradients reveal distinct sectoral disparities: governance scores are uniformly high across sectors, reflecting SEBI's strong regulatory oversight, while environmental and social scores show more variability. Sectors such as **Oil & Mining**, **IT**, and **FMCG** stand out with relatively balanced ESG performance, likely due to global exposure and reputational risks. In contrast, **Textile**, **Power**, and **Services** demonstrate lower environmental and social scores, indicating limited sustainability integration and fragmented ESG practices. The heatmap visually underscores the heterogeneity in ESG adoption, reinforcing the need for sector-specific regulatory and strategic interventions.

7. Discussion

This section synthesizes the empirical findings and situates them within the broader theoretical and policy context. The observed sectoral disparities in ESG performance underscore the complex interplay between regulatory frameworks, institutional pressures, and firm-specific strategies. The following four themes emerge prominently from the analysis:

7.1 ESG Maturity and Foreign Exposure

The findings reveal that sectors with higher levels of foreign investment and global market integration—such as IT, Oil & Mining, and Automobile—tend to report superior ESG performance. This is particularly evident in their governance and social scores, aligning with prior research (Rao et al., 2023; Mulchandani & Jain, 2023) that links global investor scrutiny with improved ESG disclosures. These sectors are often subject to international benchmarking, third-party audits, and shareholder activism, which collectively raise the bar for ESG maturity. The result validates the hypothesis that foreign exposure acts as a catalyst for ESG alignment and institutional accountability.

7.2 CSR Legacy vs. Strategic ESG Integration

The sectoral analysis highlights a continuing dichotomy between legacy Corporate Social Responsibility (CSR) approaches and integrated ESG strategies. While sectors like Oil & Mining and Capital Goods report high ESG scores, qualitative indicators suggest that many initiatives remain compliance-oriented and philanthropy-driven. This supports the concern raised by Charan (2025) and Narain & Subramaniam (2023) that Indian firms often conflate CSR with ESG, leading to checkbox-style disclosures without deep integration into core business strategy. The hypothesis that ESG remains reactive and reputational in many sectors—especially those with legacy CSR cultures—is thus substantiated.

7.3 The Persistent Weakness of the Social Pillar

Despite India's urgent socio-economic challenges—ranging from labor rights to gender equity—the Social dimension of ESG remains its weakest pillar across most sectors. This is reflected in low median scores, particularly in Textiles, Services, and Consumer Durables. The pattern corroborates Vishali and MK (2024), who argue that social ESG is underreported due to measurement difficulties, lack of stakeholder pressure, and historical neglect. The disproportionate focus on Environment and Governance reinforces the need for a more balanced ESG framework that prioritizes human capital, inclusivity, and supply chain ethics. Challenges in measurement include underreporting of migrant labor conditions, informal employment, and supply chain ethics. Solutions could involve standardized KPIs, mandatory social audits, and integration with labor law compliance databases.

7.4 Policy Gaps and the Limits of Voluntary Compliance

While governance scores are generally high, the convergence around similar median values suggests a compliance plateau rather than strategic differentiation. The analysis supports the argument by Faruq & Chowdhury (2025) that India's ESG ecosystem is over-reliant on voluntary disclosures and lacks mandatory audit or assurance mechanisms. Even sectors with high ESG visibility, such as FMCG and Healthcare, show limited variance, indicating a risk of standardization without substance. This finding highlights the urgent need for regulatory strengthening—such as sector-specific ESG audits, mandatory impact reporting, and alignment with international standards like TCFD and ISSB. Overall, the analysis confirms that ESG adoption in India is uneven, sector-sensitive, and shaped by a mix of institutional pressure, global exposure, and compliance culture. Strategic ESG integration is still emerging, especially outside governance domains. These insights provide a strong foundation for the policy recommendations outlined in the next section.

8. Conclusion

8.1 Key Findings

This study investigates sector-wise disparities in ESG adoption among Indian corporates using a Kruskal-Wallis framework supported by descriptive and visual analytics. The results show statistically significant variations across sectors in combined ESG scores and individual pillar scores (E, S, and G). Sectors with high foreign exposure—such as Oil & Mining, IT, and Automobile—consistently outperform others, especially in governance and social dimensions (Bandna et al., 2025). Conversely, sectors like Textile and Consumer Durables reflect weak ESG maturity, particularly in environmental and social performance. Governance, though uniformly high across sectors, appears to be driven more by regulatory compliance than strategic innovation. The Social pillar remains the weakest, underscoring the misalignment between India's social development priorities and corporate ESG strategies.

8.2 Theoretical and Practical Contributions

Theoretically, this study contributes to the ESG discourse by integrating institutional theory and stakeholder theory to explain sectoral disparities in ESG adoption. It reinforces the proposition that the regulatory environment, global integration, and stakeholder salience critically shape ESG outcomes. Practically, the study highlights the need for industry-specific ESG strategies, moving beyond voluntary

disclosures to measurable, assured practices. The findings offer actionable insights for regulators, investors, and corporate strategists. Specifically, it supports the case for:

- Sectoral tailoring of ESG benchmarks
- Strengthening the ‘S’ pillar through clearer metrics
- Incorporating ESG audits and third-party assurance mechanisms

8.3 Limitations and Future Research

While the study offers significant insights, it is constrained by its reliance on secondary ESG score data, which may vary across providers and lack uniform audit standards. The sample is limited to publicly listed firms, potentially excluding small and mid-cap entities with different ESG dynamics. ESG data from providers such as Bloomberg and BRSR can vary due to differing scoring methodologies, disclosure completeness, and the absence of uniform audit standards. Such inconsistencies may introduce measurement bias, especially in cross-sector comparisons. Future research could build on this by:

- Conducting longitudinal analyses to capture ESG evolution over time
- Expanding to unlisted or MSME sectors
- Unlisted firms and MSMEs, largely absent from this dataset, may display different ESG adoption patterns due to resource constraints, informal governance structures, and localized stakeholder pressures.
- Exploring causal relationships through structural modeling or mixed-method approaches
- Assessing the impact of ESG on financial performance metrics, such as ROE, stock volatility, and credit ratings

In sum, this study provides a foundational sector-level analysis of ESG performance in India, offering both a diagnostic and strategic lens for future ESG transformation.

9. Recommendations

Based on the findings of this study, several actionable recommendations are proposed to strengthen ESG adoption and bridge the sectoral disparities observed across Indian industries:

1) Develop Sector-Specific ESG Frameworks

One of the key insights from the analysis is that ESG risks and opportunities are not evenly distributed across sectors. A universal framework fails to account for sectoral nuances. Regulators such as SEBI, in collaboration with industry associations (e.g., FICCI, CII), should develop sector-specific materiality maps and disclosure templates. For instance, the environmental priorities of the Oil & Mining sector differ vastly from those of the IT or Financial Services sector. Tailoring ESG indicators will help firms focus on what truly matters and improve relevance and comparability across peers. For instance, renewable energy subsidies could target the Power sector, while textile exporters could receive tax rebates for adopting green supply chains.

2) Strengthening ESG Capacity Among MSMEs

Micro, Small, and Medium Enterprises (MSMEs) form the backbone of the Indian economy but are largely excluded from ESG discourse due to limited resources and regulatory reach. Targeted capacity-building programs—offered through public-private partnerships—can help these enterprises understand ESG basics, set up internal systems, and participate in simplified disclosure regimes like BRSR Lite. Financial institutions should also link ESG performance to credit risk and create “green financing” windows for compliant MSMEs.

3) Enhance Regulatory Oversight and Assurance Mechanisms

Currently, ESG disclosures in India lack consistency and third-party assurance. SEBI and the Ministry of Corporate Affairs should mandate independent audits or certifications for ESG data, just as they do for financial statements. A standardized ESG rating system or central database for disclosures would significantly enhance trust among investors and stakeholders.

4) Promote ESG-Linked Incentives

To encourage proactive ESG adoption, government and regulatory bodies could offer tax incentives, public procurement preferences, or faster clearances for ESG-compliant firms. Additionally, ESG-linked financial instruments—such as green bonds, sustainability-linked loans, and ESG-based equity indices—should be promoted and regulated with transparency and impact metrics.

5) Embed ESG in Corporate Strategy

ESG should not remain the sole responsibility of CSR departments or compliance teams. Instead, it must be embedded in the core business strategy. Linking executive compensation to ESG KPIs, integrating ESG goals into performance reviews, and ensuring board-level oversight of sustainability initiatives are critical steps toward mainstreaming ESG into corporate DNA. By implementing these multi-level, sector-sensitive, and accountability-driven recommendations, India can accelerate a more inclusive, credible, and high-impact ESG transformation across its corporate landscape.

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