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Environmental Disclosure Practices of Indian Manufacturing Industries: An Empirical Analysis

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Abstract

Growing global concerns about climate change and sustainable development have placed increased scrutiny on corporate environmental responsibilities. In India, with its rapid industrialization and significant environmental challenges, the role of manufacturing industries is pivotal. This study empirically examines the environmental disclosure practices of Indian manufacturing industries over the period of 10 years from 2013-14 to 2022-23 using secondary data obtained from Thomson Reuter database. Descriptive statistics are used to assess the overall level of environmental disclosure, while trend regression and growth analysis are used to examine changes in disclosure practices over time. A sample of 268 manufacturing companies listed in Bombay Stock Exchange on the basis of their market capitalisation have been included in the study. The result indicates that the Tobacco industry leads in environmental reporting and disclosure practices, followed by the Aluminium industry. It is further found that 77% of industries have a significant upward trend, suggesting increasing responsiveness to regulatory requirements, stakeholder pressure, and sustainability expectations. In terms of growth, 28 industries exhibit significant growth which indicates there is an increasing corporate awareness and commitment towards environmental accountability and transparency.

Keywords: Environmental disclosure practices, Environmental Disclosure Score (EDS), Indian manufacturing industries, sustainability

1. Introduction

Environmental disclosure has become a vital component of corporate reporting as firms increasingly seek to demonstrate environmental responsibility, transparency, and accountability to a wide range of stakeholders (Gray, Kouhy, & Lavers, 1995). In recent decades, growing environmental degradation, climate change concerns, and societal pressure have compelled corporations, particularly in manufacturing sectors, to disclose information related to their environmental policies, practices, and performance (Bansal & Clelland, 2004). Manufacturing industries are considered environmentally sensitive due to their intensive use of natural resources and significant generation of emissions and waste, making environmental disclosure especially relevant in this sector (Cho & Patten, 2007). From a stakeholder perspective, environmental disclosure serves as a communication tool through which firms respond to the information demands of regulators, investors, customers, and civil society (Freeman, 1984). Similarly, legitimacy theory suggests that firms disclose environmental information to legitimize their operations and align corporate activities with prevailing social norms and expectations (Suchman, 1995).

Despite these developments, prior studies indicate that environmental disclosure in developing countries remains uneven, voluntary in nature, and varies significantly across firms and time periods (Tilt, 2016). Empirical examination of environmental disclosure trends is therefore essential to understand the progress, consistency, and growth of disclosure practices within the Indian manufacturing sector (Jaggi & Freedman, 2002). Against this backdrop, the present study provides empirical evidence on environmental disclosure practices of Indian manufacturing industries using descriptive statistics, trend regression, and growth analysis to capture their evolution over time (Guthrie & Parker, 1989).

2. Review of Literature

Prior literature on environmental disclosure demonstrates substantial variation in reporting practices across countries, industries, and regulatory environments. Early studies largely focused on evaluating the extent and quality of environmental disclosures and their alignment with actual environmental performance. Wiseman (1982) provided one of the earliest systematic assessments of environmental disclosures in corporate annual reports, revealing that disclosures were generally incomplete and did not accurately reflect firms' true environmental performance. Similarly, Patten (2002) found a significant negative relationship between environmental performance and environmental disclosure among U.S. firms,

suggesting that disclosure may be used strategically to manage legitimacy rather than to reflect actual performance. Subsequent studies extended this line of inquiry by examining the relationship between environmental disclosure and firm performance. Al-Tuwaijri et al. (2004), using a simultaneous equation approach, documented a positive association between environmental performance, environmental disclosure, and economic performance, indicating that firms with superior environmental performance tend to provide more extensive and quantifiable disclosures. More recent evidence from China supports this view, as Agyemang et al. (2021) reported a positive and statistically significant relationship between environmental disclosure and environmental performance for listed mining companies, along with increasing compliance with disclosure requirements over time. A growing body of research has focused on the determinants of environmental disclosure practices. Studies from developed economies reveal that firm size, industry membership, and environmental impact play a significant role in shaping disclosure behavior. Brammer and Pavelin (2006) found that larger firms with lower leverage and dispersed ownership structures were more likely to engage in voluntary environmental disclosure in the UK, with considerable cross-sectoral variation. Similarly, Burgwal and Vieira (2014) reported that firm size and industry type were positively associated with environmental disclosure levels among Dutch listed companies, while profitability was not a significant determinant. In developing and emerging economies, environmental disclosure practices are generally found to be limited, inconsistent, and largely voluntary. Ahmad (2012) observed that Bangladeshi companies failed to disclose environmental information adequately in financial reports, despite the growing relevance of environmental accounting. Consistent findings were reported by Biswas et al. (2019) and Ullah et al. (2014), who documented low levels of disclosure among Bangladeshi firms, although investors expressed strong interest in environmental information. Similar evidence from Nigeria and Jordan suggests that weak regulatory enforcement contributes to poor disclosure quality (Owolabi, 2008; Joudeh et al., 2018).

In the Indian context, empirical evidence indicates gradual improvement in environmental disclosure, albeit with significant variation across firms and sectors. Barman and Gautam (2016) found that Indian companies increasingly engage in voluntary environmental disclosure beyond mandatory requirements, often aligning with international sustainability initiatives. Bhasin et al. (2014) and Kumar (2019) highlighted sectoral differences in disclosure practices, with higher disclosure levels observed in environmentally sensitive and export-oriented industries. Studies by Sen et al. (2011), Swain et al. (2017), and Chavarkar (2020) further revealed a lack of uniformity and consistency in disclosure practices across Indian companies, particularly in adherence to Global Reporting Initiative (GRI) guidelines.

Several studies have examined firm-specific determinants of environmental disclosure in India. Joshi et al. (2011) and Chaklader and Aggarwal Gulati (2015) identified firm size and industry type as significant predictors of disclosure, while profitability and leverage were generally found to be insignificant. Prasad et al. (2016), drawing on legitimacy theory, reported that firm characteristics such as size, age, industry, and foreign customer orientation positively influence both the extent and quality of environmental disclosures. Sector-specific studies, including those by Japee (2018) and Jessop et al. (2019), further demonstrated that disclosure practices vary widely across industries and between multinational and domestic firms.

Despite the extensive literature on environmental disclosure determinants and cross-country comparisons, relatively fewer studies have systematically examined the trend and growth dynamics of environmental disclosure practices over time, particularly within the Indian manufacturing sector. Moreover, existing Indian studies are often limited to short time horizons, small samples, or specific industries. This gap has been fulfilled in the present study using descriptive, trend, and growth analyses to analyse the progress of environmental disclosure practices among Indian manufacturing industries.

3. Research Methodology

This section deals with the sources of data, periodicity of the study, sample size and sampling procedure, sample units, variable and tools and techniques used in the study such as mean and standard deviation, trend regression and semi-log regression to analyse the direction and growth rate of environmental disclosure practices over the study period of 10 years from 2013-14 – 2022-23. Environmental disclosure practices have been measured using Environmental Disclosure Score (EDS), collected from the Thomson Reuter database. Thomson Reuter ranks the companies on the basis of their Environmental Disclosure Score (EDS) from '0' to '100' (Zero to Hundred), with a higher EDS would mean better environmental reporting by the company. Obviously therefore, EPS closer to hundred would mean stronger environmental disclosure practices by the company concerned. A sample of 268 manufacturing companies categorised 34 industries

according to the Thomson Reuter Business classification (TRBC). Furthermore, the number of companies representing each industry and their contribution in terms of percentage to the sample are depicted in Table 1.1.

Table 1.1: Industry-wise distribution of sample companies

Sl. No.	Industry	No. of Companies	Sample Size in %
1.	Agricultural Chemicals	08	2.98
2.	Aluminium	02	0.75
3.	Commodity Chemicals	08	2.98
4.	Construction Materials	12	4.48
5.	Diversified Chemicals	05	1.87
6.	Diversified Mining	03	1.12
7.	Iron & Steel	20	7.46
8.	Paper Products	01	0.37
9.	Specialty Chemicals	11	4.11
10.	Speciality Mining & Metals	01	0.37
11.	Apparel & Accessories	03	1.12
12.	Appliances, Tools & Housewares	03	1.12
13.	Auto, Truck & Motorcycle Parts	25	9.33
14.	Construction Supplies & Fixtures	03	1.12
15.	Footwear	02	0.75
16.	Textiles & Leather Goods	06	2.24
17.	Tires & Rubber Products	06	2.24
18.	Coal	02	0.75
19.	Oil & Gas	09	3.36
20.	Oil & Gas Transportation Services	03	1.12
21.	Renewable Energy Equipment & Services	02	0.75
22.	Pharmaceuticals	33	12.31
23.	Food Processing	12	4.48
24.	Personal Products	07	2.62
25.	Tobacco	02	0.75
26.	Electric Utilities	08	2.98
27.	Independent Power Producers	07	2.61
28.	Natural Gas Utilities	03	1.12
29.	Construction & Engineering	13	4.85
30.	Electrical Components & Equipment	16	5.95

31.	Heavy Electrical Equipment	08	2.98
32.	Industrial Machinery & Equipment	13	4.85
33.	Aerospace & Defence	06	2.24
34.	Heavy Machinery & Vehicles	05	1.87
Total number of companies included in the study		**268**	**100.00**

Sources: Thomoson Reuter Business Classification

4. Results and Discussion

4.1 Descriptive statistics

This study endeavours to make an assessment of the status of environmental disclosure practices of the Indian manufacturing industries based on Environmental Disclosure Score (EDS). The Environmental Disclosure Score (EDS) denotes the quality of Environmental disclosure and is published by 'Thomson Reuter' and the scores are available in the 'Thomson Reuter' database. The aggregate values of Environmental Disclosure Score (EDS) for the sample companies under study across thirty-four industries have been given in Table 1.2.

Table 1.2: Industry wise Environmental disclosure practices as measured by Environmental Disclosure Score

Industry	Mean	SD	Min	Max	Skewness	Kurtosis
Aerospace & Defence	27.97	11.57	7.59	53.75	0.102	-0.450
Agricultural Chemicals	31.21	13.26	11.82	66.13	1.110	0.679
Aluminium	**52.05**	19.14	7.56	81.67	-0.351	-0.214
Apparel & Accessories	47.40	16.04	15.04	75.11	-0.260	-0.514
Appliances, Tools & Housewares	34.56	12.54	15.04	65.52	0.901	0.568
Auto, Truck & Motorcycle Parts	38.23	20.58	10.03	89.34	0.811	-0.335
Coal	34.65	11.95	18.43	52.54	0.054	-1.741
Commodity Chemicals	44.81	12.12	10.90	76.70	-0.723	1.862
Construction & Engineering	26.82	11.71	4.56	67.79	1.159	1.787
Construction Materials	47.14	16.90	8.00	81.77	0.179	-0.695
Construction Supplies & Fixtures	31.70	10.35	12.51	53.17	0.685	-0.343
Diversified Chemicals	37.25	14.73	10.98	66.17	0.155	-1.102
Diversified Mining	**52.48**	27.19	10.98	81.36	-0.525	-1.541
Electric Utilities	33.22	18.29	1.34	71.19	-0.009	0.532
Electrical Components & Equipment	29.42	16.46	7.56	76.48	0.975	0.195
Food Processing	39.17	18.78	9.65	84.37	0.676	-0.449
Footwear	36.37	11.39	21.84	64.15	1.077	0.758
Heavy Electrical Equipment	38.65	12.79	18.72	69.09	0.349	-0.638

Heavy Machinery & Vehicles	28.16	17.42	9.87	73.86	1.629	1.719
Independent Power Producers	40.41	9.80	18.78	58.58	-0.184	-0.863
Industrial Machinery & Equipment	34.20	15.49	9.87	72.37	0.426	-0.634
Iron & Steel	42.16	16.78	6.83	80.58	0.165	-0.518
Natural Gas Utilities	32.17	22.75	2.56	63.77	0.015	-1.676
Oil & Gas	51.11	17.30	12.98	81.89	-0.266	-0.629
Oil & Gas Transportation Services	36.27	10.28	19.87	54.31	0.124	-1.175
Paper Products	37.34	5.58	32.66	49.04	1.338	1.227
Personal Products	50.19	17.88	21.26	84.04	0.246	-1.157
Pharmaceuticals	37.14	18.31	9.29	88.23	0.767	0.310
Renewable Energy Equipment & Services	39.18	16.79	15.78	64.71	0.161	-1.605
Specialty Chemicals	40.43	16.71	10.89	80.58	0.481	-0.324
Specialty Mining & Metals	19.77	4.85	12.89	26.86	0.018	-1.577
Textiles & Leather Goods	34.01	10.55	15.67	60.85	0.603	0.122
Tires & Rubber Products	29.61	14.88	1.98	59.33	-0.162	-0.545
Tobacco	**63.29**	15.35	38.72	87.52	-0.158	-1.348

Source: Compiled and calculated from Thomson database

Table 1.2 exhibits that it is observed that Tobacco industry has done better among all the industries with its average EDS score is 63.29 followed by Diversified Mining and Aluminium industry. Only four industries, namely, Tobacco, Diversified Mining, Aluminium, and Oil & Gas industries having score above 50 which may be termed as 'good'. The findings revealed that the EDS is low in Indian manufacturing industries.

4.2 Trend Analysis of Environmental disclosure Practices

The study used trend analysis to show environmental disclosure practices of Indian manufacturing industries over a period of 10 years from 2013-14 to 2022-23.

Table 1.3: Statistical significance of industry wise trends in Environmental disclosure based on Environmental Disclosure Score (EDS)

Industry	Trend component	Standard error	T stats	F stats	R square
Aerospace & Defence	1.641	0.479	3.428**	11.75**	0.168
Agricultural Chemicals	2.596	0.428	6.061**	36.73**	0.320
Aluminium	0.410	1.528	0.268	0.07	0.004
Apparel & Accessories	2.569	0.918	2.799**	7.83**	0.219
Appliances, Tools & Housewares	**3.444**	0.484	7.109**	50.54**	0.644
Auto, Truck & Motorcycle Parts	2.850	0.416	6.844**	46.84**	0.159

Coal	-0.061	0.956	-0.064	0.004	0.000
Commodity Chemicals	1.977	0.419	4.720**	22.28**	0.222
Construction & Engineering	2.148	0.305	7.052**	49.73**	0.280
Construction Materials	2.650	0.481	5.507**	30.33**	0.204
Construction Supplies & Fixtures	2.837	0.401	7.068**	49.96**	0.641
Diversified Chemicals	2.663	0.624	4.269**	18.23**	0.275
Diversified Mining	1.801	1.726	1.043	1.09	0.037
Electric Utilities	1.704	0.690	2.468**	6.09**	0.072
Electrical Components & Equipment	2.388	0.413	5.782**	33.44**	0.175
Food Processing	2.642	0.548	4.824**	23.27**	0.165
Footwear	3.107	0.542	5.732**	32.85**	0.646
Heavy Electrical Equipment	1.825	0.456	3.998**	15.98**	0.170
Heavy Machinery & Vehicles	2.573	0.783	3.286**	10.79**	0.184
Independent Power Producers	1.388	0.375	3.703**	13.72**	0.168
Industrial Machinery & Equipment	2.402	0.425	5.651**	31.94**	0.200
Iron & Steel	1.318	0.403	3.267**	10.67**	0.051
Natural Gas Utilities	1.694	1.437	1.179	1.39	0.047
Oil & Gas	0.811	0.633	1.282	1.64	0.018
Oil & Gas Transportation Services	1.861	0.564	3.298**	10.87**	0.280
Paper Products	1.584	0.294	5.380**	28.95**	0.805
Personal Products	3.016	0.654	4.611**	21.26**	0.238
Pharmaceuticals	2.735	0.317	8.618**	74.28**	0.185
Renewable Energy Equipment & Services	1.489	1.296	1.149	1.32	0.068
Specialty Chemicals	1.423	0.540	2.635**	6.94**	0.060
Specialty Mining & Metals	1.582	0.092	17.228**	296.81**	0.974
Textiles & Leather Goods	2.462	0.352	6.990**	48.86**	0.457
Tires & Rubber Products	1.364	0.650	2.097**	4.39**	0.070
Tobacco	2.361	1.094	2.158**	4.65**	0.205

It is observed from Table 1.3 that the annual trend component of the Appliances, Tools & Housewares sector is 3.44, indicating that the Environmental Disclosure scores are increasing at an average rate of 3.44 units per year followed by Footwear industry with 3.107 and Personal Products industry with 3.016. The trend component is Aluminium and Oil & Gas industry is 0.410, 0.811 respectively, indicating a lower average increase per year. In the coal sector, there is a negative trend of -0.061 over the study period. Thus, it can be concluded that all sectors exhibit an upward linear trend except for the Coal industry. Further, 77% of industries have a significant positive upward trend in EDS which suggest that Indian manufacturing companies are disclosing environmental information.

4.3 Growth Analysis of Environmental disclosure Practices

Growth analysis helps to assess the growth rate of reporting and disclosure practices of 34 industries over the study period. The result of growth analysis displayed in Table 1.4 indicates that the significant value of 28 industries out of 34 industries are found to be less than 0.05 at the 5% level of significance with regard to EDS.

Table 1.4: Growth in Environmental disclosure practices Indian manufacturing Industries

Industry	Annual growth rate	Standard error	T stats	F stats	R square
Aerospace & Defence	0.065	0.021	3.098**	9.595**	0.142
Agricultural Chemicals	0.075	0.013	5.634**	31.742**	0.289
Aluminium	-0.021	0.042	-0.510	0.260	0.014
Apparel & Accessories	0.066	0.023	2.866**	8.217**	0.227
Appliances, Tools & Housewares	0.102	0.013	8.132**	66.137**	0.703
Auto, Truck & Motorcycle Parts	0.089	0.011	8.405**	70.651**	0.222
Coal	0.006	0.029	0.224	0.050	0.003
Commodity Chemicals	0.051	0.013	3.879**	15.049**	0.162
Construction & Engineering	0.078	0.012	6.578**	43.274**	0.253
Construction Materials	0.066	0.012	5.667**	32.111**	0.214
Construction Supplies & Fixtures	0.091	0.012	7.364**	54.234**	0.660
Diversified Chemicals	0.080	0.018	4.336**	18.799**	0.281
Diversified Mining	0.035	0.047	0.739	0.546	0.019
Electric Utilities	0.086	0.032	2.653**	7.041**	0.083
Electrical Components & Equipment	0.084	0.014	6.105**	37.267**	0.191
Food Processing	0.073	0.015	5.019**	25.186**	0.176
Footwear	0.082	0.013	6.260**	39.193**	0.685
Heavy Electrical Equipment	0.048	0.012	3.925**	15.409**	0.165
Heavy Machinery & Vehicles	0.088	0.022	3.937**	15.502**	0.244
Independent Power Producers	0.038	0.010	3.794**	14.397**	0.175
Industrial Machinery & Equipment	0.074	0.014	5.359**	28.722**	0.183
Iron & Steel	0.046	0.011	4.080**	16.645**	0.078
Natural Gas Utilities	0.116	0.069	1.688	2.848	0.092
Oil & Gas	0.024	0.015	1.604	2.574	0.028
Oil & Gas Transportation Services	0.054	0.016	3.337**	11.134**	0.285
Paper Products	0.040	0.007	5.793**	33.559**	0.827
Personal Products	0.065	0.014	4.787**	22.917**	0.252
Pharmaceuticals	0.080	0.009	8.752**	76.596**	0.189

Renewable Energy Equipment & Services	0.045	0.035	1.285	1.650	0.084
Specialty Chemicals	0.046	0.014	3.176**	10.084**	0.085
Specialty Mining & Metals	0.083	0.005	16.516**	272.774**	0.972
Textiles & Leather Goods	0.071	0.011	6.571**	43.175**	0.427
Tires & Rubber Products	0.066	0.036	1.803	3.252	0.053
Tobacco	0.039	0.018	2.146**	4.605**	0.204

The growth rate of the Appliances, Tools & Housewares industry is 3.44, indicating that the EDS scores are increasing at an average rate of 3.44 units per year, followed by Footwear with 3.107 and Personal Products with 3.016 growth over the study period of 10 years.

5. Conclusion

The study reveals a clear upward trajectory in environmental disclosure among Indian manufacturing industries from 2013-14 to 2022-23. The study found that 77% of industries showing significant positive trend in environmental disclosure practices and 28 industries exhibiting notable growth. While sectors like Tobacco and Aluminium lead in disclosure intensity, overall progress reflects heightened regulatory scrutiny, stakeholder expectations, and a growing commitment to environmental accountability. These findings suggest that Indian manufacturing industries are increasingly integrating sustainability into strategic decision-making, signalling a shift toward greater transparency and accountability in environmental performance.

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