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A Study of Relationship Between International Performance and ESG Rating of Pharmaceutical Companies in India

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Abstract
This study examines how international performance shapes sustainability accounting outcomes in Indian pharmaceutical companies by conceptualizing ESG ratings as proxies for firms' sustainability accounting practices. Drawing on stakeholder theory, legitimacy theory, and institutional theory, the study explains how international exposure alters disclosure pressures and legitimacy demands, thereby influencing ESG accounting dimensions differently. Using CRISIL ESG ratings for 45 Indian pharmaceutical companies for March 2025, the study empirically tests theory-driven propositions linking export intensity, international market reach, and geographic dispersion of operations to ESG, environmental, social, and governance accounting outcomes. The findings indicate that international performance is significantly associated with overall ESG ratings and environmental accounting outcomes, while social and governance dimensions remain largely unaffected. These results suggest that environmental accounting practices are more responsive to transnational legitimacy pressures, whereas social and governance accounting practices remain institutionally embedded within the domestic regulatory context. By positioning ESG ratings as secondary sustainability accounting information systems, this study advances sustainability accounting theory by explaining how internationalization reshapes disclosure in emerging-market firms beyond financial performance considerations.
Key words: ESG rating, sustainability accounting, international performance, pharmaceutical industry, emerging markets

Introduction

Environmental, social, and governance (ESG) considerations have become an integral part of contemporary corporate reporting and sustainability accounting, influencing how firms disclose non-financial information and demonstrate accountability to external stakeholders. Prior research has extensively examined the relationship between ESG performance and financial outcomes, reporting mixed and context-specific evidence. Several studies document a positive association between ESG performance and firm financial performance in India (Chelawat & Trivedi, 2016; Maji & Lohia, 2023; Ray & Goel, 2023; Kumar & Firoz, 2022), while evidence from the pharmaceutical sector similarly indicates varied relationships across ESG dimensions (López-Toro et al., 2021). Contrasting findings suggest negative or non-linear relationships between ESG ratings and revenue or market performance, particularly in the Indian context (Huralikoppi, 2024; Agarwala et al., 2024; Rao et al., 2023). Further, comparative evidence shows that healthcare firms in developed countries often exhibit a positive ESG–financial performance relationship, whereas firms in developing countries display weaker or negative associations (Kalia & Aggarwal, 2023).

While this literature provides important empirical insights, it largely treats ESG metrics as performance indicators or predictors of financial outcomes. Consequently, limited attention has been given to ESG ratings as accounting constructs that reflect firms' sustainability disclosure practices and accountability mechanisms. From a sustainability accounting perspective, ESG outcomes are shaped not only by firm performance but also by external pressures arising from regulatory environments, stakeholder expectations, and legitimacy considerations. Understanding these mechanisms is particularly important in emerging economies, where institutional structures and disclosure practices continue to evolve.

International performance represents one such organizational characteristic that may influence sustainability accounting outcomes. Firms with greater international exposure operate under diverse regulatory regimes and face heightened scrutiny from global stakeholders. Existing studies primarily examine how ESG performance affects export performance, suggesting that stronger ESG practices enhance international competitiveness (Guo, 2024; Wu et al., 2025). However, the reverse relationship how international performance and cross-border presence influence ESG outcomes remains underexplored, especially within the Indian pharmaceutical industry. Evidence indicating that sound corporate governance and sustainability practices enhance firm reputation and investor confidence in pharmaceutical companies (Das & Sarkar, 2023) further suggests that international exposure may indirectly shape ESG accounting behaviour.

A meta-analysis by Li and Li (2023) highlights the need for further research exploring the bidirectional relationship between ESG performance and export activity. Industry-specific studies also indicate that different ESG pillars play distinct roles across contexts; for example, governance has been identified as a key driver of marketing performance in European pharmaceutical firms (Paolone et al., 2022), while governance and social dimensions appear more prominent than environmental factors in Indian companies (Maji, 2022). Despite these insights, direct empirical examination of the relationship between international performance and ESG ratings in Indian pharmaceutical companies remains limited.

Against this backdrop, the present study examines the relationship between international performance and ESG accounting outcomes in Indian pharmaceutical companies. ESG ratings are viewed as aggregated representations of firms' sustainability disclosure and accountability practices rather than purely operational performance measures. The study investigates whether and how international performance relates to overall ESG ratings as well as to environmental, social, and governance scores individually. The specific objectives of the study are:

i. To examine the relationship between international performance and ESG Rating of an Indian pharmaceutical company.
ii. To analyse the relationship between international performance and Environment Score of an Indian pharmaceutical company.
iii. To assess the relationship between international performance and Social Score of an Indian pharmaceutical company.
iv. To evaluate the relationship between international performance and Governance Score of an Indian pharmaceutical company.

Consistent with prior studies, international performance has traditionally been operationalized using export measures and visibility in international markets (López-Toro et al., 2021). Building on this approach, the present study introduces export intensity, number of international markets served, number of international operational locations, and number of national operational locations as indicators of international performance. These variables collectively capture firms' degree of international exposure and presence. By examining how these dimensions relate to ESG ratings and their individual components, the study seeks to advance understanding of how internationalization shapes sustainability accounting outcomes within the Indian pharmaceutical sector.

Drawing on stakeholder theory, legitimacy theory, and institutional theory, this study proposes the following hypotheses:

H1: International performance is positively associated with the overall ESG accounting outcomes of Indian pharmaceutical companies, as reflected in ESG ratings.

H2: International performance is positively associated with environmental accounting outcomes of Indian pharmaceutical companies, as reflected in environmental scores, due to heightened transnational legitimacy pressures.

H3: International performance is not significantly associated with social accounting outcomes of Indian pharmaceutical companies, as social disclosure practices are largely shaped by domestic institutional arrangements.

H4: International performance is not significantly associated with governance accounting outcomes of Indian pharmaceutical companies, as governance practices are primarily influenced by national regulatory and institutional frameworks.

Theoretical Framework

ESG Ratings as Sustainability Accounting Proxies

Within sustainability accounting literature, ESG ratings are increasingly conceptualized as secondary accounting information systems that synthesize firms' sustainability-related disclosures, governance arrangements, and environmental accountability practices into standardized metrics. Although ESG ratings are produced by external rating agencies, they are fundamentally derived from firm-level accounting disclosures, sustainability reports, and regulatory filings. Consequently, ESG ratings function as proxies for sustainability accounting practices rather than independent performance outcomes.

From an accounting perspective, variations in ESG ratings reflect differences in how firms measure, disclose, and legitimize sustainability-related activities in response to external accountability pressures. Accordingly, ESG scores are interpreted in this study as accounting constructs that capture firms' sustainability disclosure within institutionalized reporting frameworks, rather than as purely operational or financial indicators.

Stakeholder Theory and International Performance

Stakeholder theory posits that firms adapt their accounting and disclosure practices to address the expectations of stakeholders who possess the ability to influence organizational legitimacy, reputation, and access to critical resources. As firms expand internationally, they become accountable to a more diverse and powerful set of stakeholders, including foreign regulators, global investors, international customers, and transnational civil society organizations. International performance manifested through export intensity, geographic market diversification, and operational dispersion heightens firm visibility and increases exposure to heterogeneous stakeholder demands. These stakeholders often impose higher expectations regarding transparency and sustainability accountability, thereby influencing firms' sustainability accounting practices. ESG ratings capture the extent to which firms respond to these pressures through structured disclosure and reporting mechanisms. From a stakeholder perspective, internationalization therefore acts as a catalyst for enhanced sustainability accounting outcomes.

Legitimacy Theory and Environmental Accounting Responsiveness

Legitimacy theory suggests that organizations seek to align their actions and disclosures with prevailing social norms and expectations in order to maintain social acceptance and operational continuity. Environmental accounting practices are particularly sensitive to legitimacy pressures due to the global salience of environmental issues and the existence of internationally recognized environmental standards.

In the pharmaceutical sector, environmental concerns such as emissions, waste management, regulatory compliance, and ecological impact attract heightened scrutiny in international markets. Firms with greater international exposure are therefore more likely to strengthen environmental accounting disclosures to demonstrate conformity with global sustainability norms and to mitigate legitimacy risks. This theoretical lens explains why environmental components of ESG ratings are expected to respond more strongly to international performance compared to social or governance dimensions.

Institutional Theory and the Stability of Social and Governance Accounting

Institutional theory emphasizes that organizational practices are shaped by deeply embedded regulatory, normative, and cognitive structures within national contexts. In emerging economies such as India, social and governance accounting practices are strongly influenced by domestic regulatory frameworks, labour laws, corporate governance codes, and mandatory disclosure requirements.

These institutional arrangements promote homogeneity in social and governance accounting practices across firms, regardless of their level of international exposure. Consequently, internationalization may exert limited incremental influence on social and governance accounting outcomes, as these dimensions are already institutionally standardized at the national level. ESG ratings reflecting social and governance disclosures are therefore expected to exhibit relative stability across firms with varying degrees of international presence.

Conceptual Model: Internationalization and ESG Accounting Outcomes

Integrating stakeholder, legitimacy, and institutional theories, this study conceptualizes international performance as a mechanism that reshapes sustainability accounting outcomes by altering stakeholder scrutiny and legitimacy demands while interacting with existing institutional constraints. International performance captured through export intensity, international market reach, and geographic dispersion of operations represents the degree to which firms are embedded within transnational accountability environments. Under this framework:

- **Overall ESG ratings** reflect aggregate sustainability accounting responses to international stakeholder pressures.
- **Environmental accounting outcomes** are expected to be more sensitive to internationalization due to heightened global legitimacy demands.
- **Social and governance accounting outcomes** are expected to remain relatively stable due to strong domestic institutional embeddedness.
- This theoretical framework positions ESG ratings as accounting constructs that reveal how firms adapt sustainability accounting practices in response to international exposure, thereby advancing theoretical understanding of sustainability accounting in emerging-market contexts.

Materials and Methods

Consistent with the sustainability accounting perspective adopted in this study, ESG ratings are treated as secondary accounting information systems that aggregate firm-level sustainability disclosures and governance practices into standardized metrics. Although produced by external rating agencies, these ratings are derived from firms' publicly disclosed accounting and non-financial information. Accordingly, the empirical models employed in this study are designed to test theory-driven propositions regarding how international performance influences sustainability accounting outcomes, rather than to develop predictive or forecasting models. The use of multiple regression analysis enables examination of the explanatory association between international performance indicators and ESG accounting dimensions within the proposed theoretical framework.

The study adopts a quantitative empirical approach. Following steps were adopted:

i. Obtained CRISIL ESG Rating, Environment Score, Social Score and Governance Score of March 2025 for 45 Indian Pharmaceutical companies.
ii. Obtained the values for independent variables from Business Responsibility and Sustainability Report (BRSR) of each company for the financial year 2024-25.
iii. Verified normality, linearity, continuity, correlation and outliers to prepare multiple regression models.
iv. Performed Multiple Regression analysis to understand relationship between ESG Rating and International performance, Environment Score and International performance, Social Score and International performance, Governance Score and international performance.
v. Verified the validity of the models by using data of 13 pharmaceutical companies (which accounts to nearly 22% of the total companies) that were kept aside in preparing models

Statistical Analysis

Data Set

This study includes 58 Indian pharmaceutical companies out of which 45 have been taken for

regression model and 13 have been taken for validity test. Mean and Standard deviation were calculated.

Table 1 Characteristics of the study population

Variables	Regression model data	Validity test data
	Total (n = 45)	Total (n = 13)
Export intensity (%)	48 ± 32	53 ± 34
No. of International markets served	52.76 ± 35.89	65 ± 33.97
No. of International locations where operations/offices are situated	6.60 ± 15.33	7.31 ± 8.77
No. of National locations where operations/offices are situated	15.18 ± 20.11	11.08 ± 10.56
ESG Rating	56.64 ± 4.01	54.08 ± 5.31
Environment Score	45.47 ± 7.32	42.23 ± 9.69
Social Score	54.29 ± 4.41	52.15 ± 6.39
Governance Score	67.69 ± 3.83	65.46 ± 3.57

Values are expressed as mean ± SD.

Normality - Normality of all dependent variables was inspected visually and additionally, Shapiro-Wilk normality test was performed (Ghasemi & Zahedias, 2012; Das & Imon, 2016). Histograms were prepared for the dependent variables to understand normality.

Collinearity and Correlation – Collinearity of independent variables was checked. Correlation matrix was prepared to understand linearity.

Squared R – Squared R was calculated to understand the explanatory power of independent variables collectively.

Regression model – Regression models were developed where P- values <0.05.

Outliers – Box plots and $\mu \pm 3\sigma$ limits were used to identify outliers for improved regression model.

Validating regression model - The validity test was performed by calculating predicted values using regression models. Then, mean error and standard error of estimation (SEE) were calculated. The measured and predicted values were correlated (Sung-Woo et al., 2021). Formulae used for mean error and standard error of estimation (SEE) are given below:

Figure 1 - Formula to calculate mean error (%)

$$Mean\ error\ (\%) = \frac{\sum \frac{Measured\ value - Predicted\ value}{Measured\ value} * 100}{N}$$

Figure 2 - Formula to calculate standard error of estimation (%)

$$Standard\ errors\ of\ estimation = \frac{\sum (Mesured\ value - Predicted\ value)^2}{N-2}$$

Results

Normality

For ESG rating (P-value = 0.8963), Environment Score (P-value = 0.3302), Social Score (P-value = 0.1486), and Governance Score (P-value = 0.6323), the P-values are all greater than 0.05, indicating that the data for all dependent variables are normally distributed. The test results support the graphical normality observed in Figures 3, 4, 5, and 6.

Figure 3 Histogram of ESG rating

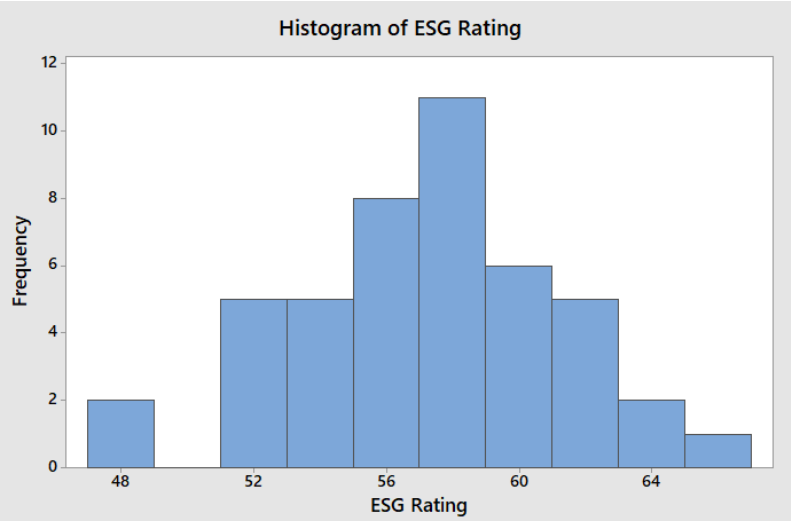


Figure 4 Histogram of Environment Score

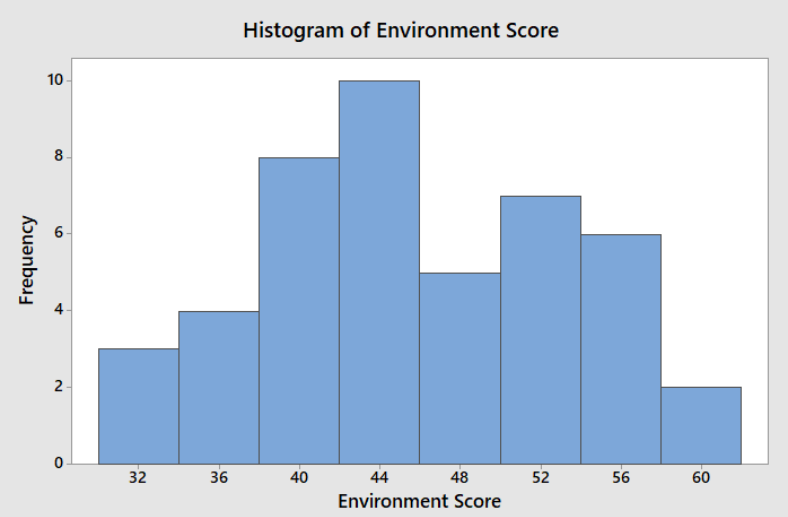


Figure 5 Histogram of Social Score

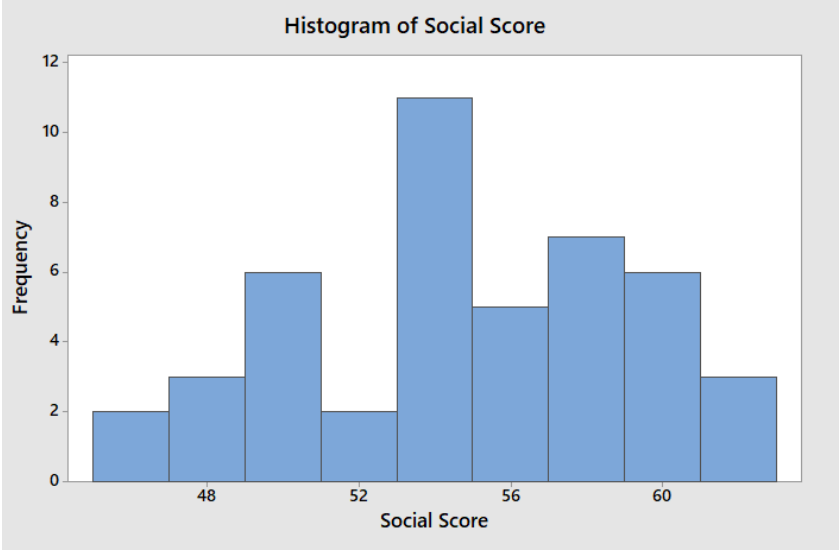
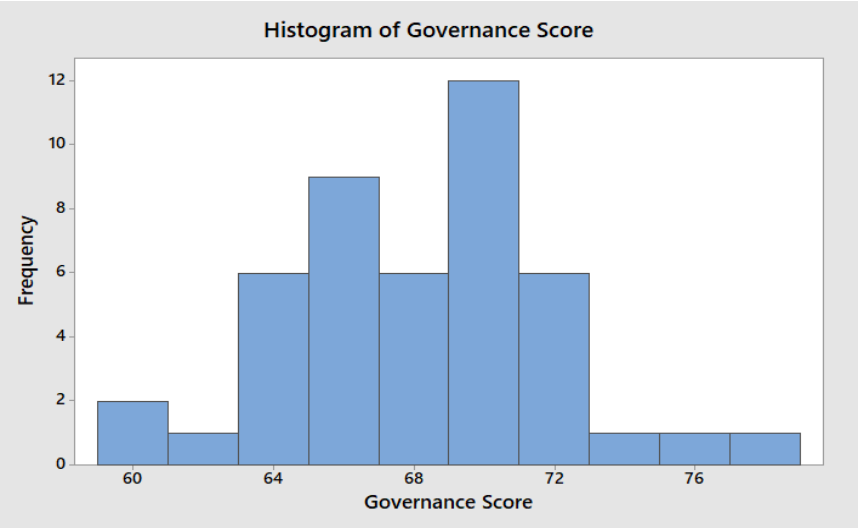


Figure 6 Histogram for Governance Score



Collinearity and Correlation

Table 2: Correlation coefficients between international performance parameters for estimating Regression model

Independent variables		Expointense	Intmarket	Intoffice
Intmarket	R P	0.511* 0.000		
Intoffice	R P	0.230 0.128	0.444* 0.002	
Natoffice	R P	-0.049 0.749	0.200 0.189	0.464* 0.001

International performance parameters: Expointense, Intmarket, Intoffice, Natoffice *P-Value< 0.05

As the independent variables exhibit moderate to strong correlations among themselves, isolating individual effects using simple linear regression may be inappropriate. Therefore, multiple regression analysis is employed to examine the collective explanatory association between international performance indicators and ESG accounting outcomes.

Table 3: Correlation coefficients between dependent variables and International performance parameters for estimating Regression model

Dependent variables		International performance parameters			
		Expo-intense	Int-market	Int-office	Nat-office
ESG Rating	R P	-0.062 0.686	0.159 0.295	0.421* 0.004	0.340* 0.022
Environment Score	R P	-0.212 0.163	0.026 0.863	0.460* 0.001	0.399 0.007
Social Score	R P	0.058 0.706	0.168 0.271	0.063 0.683	-0.084 0.581
Governance Score	R P	0.188 0.215	0.281 0.061	0.303* 0.043	0.305* 0.042

Significant correlations are observed between:

a. International performance parameters Intoffice and dependent variables, except for Social Score (*P < 0.05).

b. International performance parameters Natoffice and dependent variables, except for Social Score (*P < 0.05).

No statistically significant correlations are observed between:

a. Export intensity and dependent variables (P > 0.05).

b. Number of international markets served and dependent variables (P > 0.05).

Given the observed correlation patterns, multiple regression analysis is conducted to examine the explanatory association between international performance and ESG accounting outcomes.

Multiple Regression Model

The summary results of the multiple regression analysis are shown in Table 4.

Table 4: Multiple Regression Analysis

Regression model	*R*	R^2	Adjusted R^2	*P* value
ESG rating = 56.236 - (2.038* Export intensity) + (0.006 * International markets served) + (0.096 * Number of International offices) + (0.030 * Number of National offices)	0.473	0.224	0.146	0.034
Environment Score = 46.784 - (6.079 * Export intensity) - (0.017 * International markets served) + (0.226 * Number of International offices) + (0.066 * Number of National offices)	0.588	0.346	0.280	0.002
No significant equation/relationship	0.219	0.048	-0.047	0.734
No significant equation/relationship	0.402	0.162	0.078	0.125

a. ESG Rating

The ESG Rating regression model indicates a correlation of 0.473 between international performance parameters collectively and ESG rating. As the P-value is less than 0.05, the association is statistically significant. The explanatory power of the model, as indicated by R^2, is 22.4%. The regression equation is:

ESG Rating = 56.236 − (2.038 × Export intensity) + (0.006 × International markets served) + (0.096 × Number of international offices) + (0.030 × Number of national offices)

These findings indicate a statistically significant association between international performance and ESG accounting outcomes in the pharmaceutical industry. Accordingly, Hypothesis H1 is supported.

b. Environment Score

The Environment Score regression model exhibits a correlation of 0.588 between international performance parameters collectively and environmental scores. The association is statistically significant (P-value < 0.05), with an explanatory power of 34.6%. The regression equation is:

Environment Score = 46.784 − (6.079 × Export intensity) − (0.017 × International markets served) + (0.226 × Number of international offices) + (0.066 × Number of national offices)

These results indicate that international performance is significantly associated with environmental accounting outcomes of pharmaceutical companies. Accordingly, Hypothesis H2 is supported.

c. Social Score

The Social Score regression model could not be developed, as the correlation between international performance parameters collectively and Social Score is 0.219 and statistically non-significant (P-value > 0.05). The explanatory power of the model is 4.78%.

These results indicate no statistically significant association between international performance and social accounting outcomes in the pharmaceutical industry. Accordingly, Hypothesis H3 is supported, suggesting that social accounting practices remain largely unaffected by international performance.

d. Governance Score

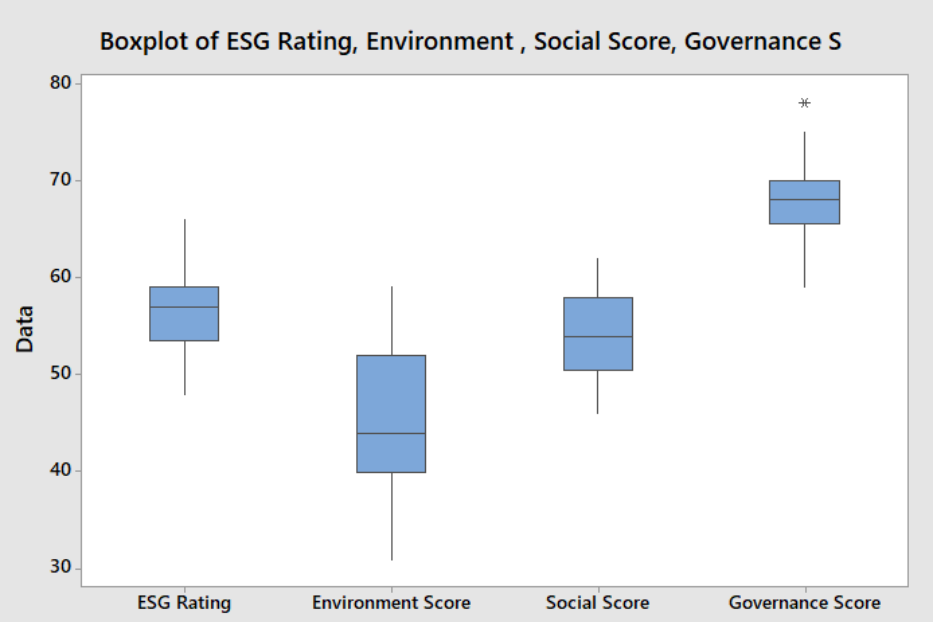
The Governance Score regression model could not be developed, as the correlation between international performance parameters collectively and Governance Score is 0.402 and statistically non-significant (P-value > 0.05). The explanatory power of the model is 16.15%.

These findings indicate that international performance does not exhibit a statistically significant association with governance accounting outcomes in the pharmaceutical industry. Accordingly, Hypothesis H4 is supported, suggesting that governance practices remain relatively stable irrespective of firms' international exposure.

Outliers

Box plot was made to identify outliers. No outlier was identified. However, outlier identified in Governance Score was within $\mu \pm 3\sigma$ limits. Hence, it was taken in regression model.

Figure 1 Box plot of ESG Rating, Environment Score, Social Score, Governance Score



Regression Model Validity

Table 5 Validity of estimating the regression model

	ESG Rating	Environment Score
Mean error (%)	-5.97	-11.91
Standard error of estimation	31.14 Rating	87.35 Score

The ESG Rating model exhibits lower mean error and standard error of estimation compared to the Environment Score model, indicating stronger empirical consistency in explaining ESG accounting outcomes. The Environment Score model, while directionally consistent, demonstrates comparatively higher estimation error.

Table 6 Relationship between Measured and Predicted

	R	P- value
ESG Rating	0.628	0.022
Environment Score	0.499	0.083

A statistically significant positive association is observed between measured and estimated ESG ratings (P-value < 0.05), indicating empirical alignment between observed ESG accounting outcomes and model estimates. The association between measured and estimated Environment Scores is moderate and statistically non-significant, indicating weaker empirical alignment.

Limitations and Prospects of Research

This study has certain limitations that should be acknowledged from a sustainability accounting perspective. First, ESG ratings are used as proxies for firms' sustainability accounting practices. As secondary accounting information systems, ESG ratings aggregate disclosed information but may not fully capture the qualitative depth, intent, or internal processes underlying sustainability accounting and reporting practices.

Second, the study relies on a quantitative approach using secondary data, which limits insight into managerial motivations, organizational decision-making, and the distinction between symbolic and substantive sustainability disclosures. Accordingly, the findings reflect observable accounting outcomes rather than the full scope of sustainability practices within firms.

Third, the focus on Indian pharmaceutical companies may constrain the generalizability of the findings to other industries or institutional contexts, as sustainability accounting practices are shaped by industry-specific and national regulatory environments.

Future research may extend this study through conceptual and normative work that further theorizes ESG ratings as accounting constructs. Qualitative approaches, such as case studies or interviews, could provide deeper insights into how international stakeholder pressures are translated into sustainability accounting practices. Comparative studies across industries or emerging-market contexts may also enhance understanding of how institutional settings mediate ESG accounting outcomes.

Discussion

This study examined how international performance relates to ESG accounting outcomes in Indian pharmaceutical companies by conceptualizing ESG ratings as representations of sustainability accounting

practices. Anchored in stakeholder theory, legitimacy theory, and institutional theory, the findings provide insight into why international exposure influences certain ESG dimensions while leaving others relatively unaffected in an emerging-market context.

The significant association between international performance and overall ESG ratings suggests that firms with greater international exposure tend to demonstrate stronger sustainability accounting outcomes. Prior research has largely focused on ESG performance as a determinant of financial outcomes (Chelawat & Trivedi, 2016), whereas the present findings indicate that international performance itself can function as a source of external accountability. As firms expand across borders, they face increased scrutiny from international stakeholders, which may encourage more comprehensive sustainability disclosures reflected in ESG ratings.

The results further indicate that environmental accounting outcomes are particularly responsive to international performance. Environmental issues attract heightened global attention, especially in the pharmaceutical industry where manufacturing processes and regulatory compliance are closely monitored. Firms operating internationally may therefore place greater emphasis on environmental disclosures to align with global norms and expectations. This finding is consistent with evidence suggesting that environmental investments and disclosures yield long-term strategic value despite short-term trade-offs (Agarwala et al., 2024).

In contrast, the absence of a significant relationship between international performance and social accounting outcomes suggests that social disclosures remain relatively stable regardless of firms' international presence. Social accounting practices in Indian pharmaceutical companies are strongly influenced by domestic labour regulations, social norms, and stakeholder expectations within the national context. As a result, international exposure may have limited incremental influence on these practices. This observation aligns with prior findings indicating the prominence of social dimensions within Indian corporate sustainability frameworks (Maji, 2022).

Similarly, governance accounting outcomes were not found to be significantly associated with international performance. Governance practices in Indian pharmaceutical companies are largely shaped by national regulatory frameworks and corporate governance codes, which promote uniformity across firms. This institutional embedding may reduce the scope for international exposure to materially alter governance disclosures. Prior research has emphasized the importance of governance within corporate performance frameworks, yet the present findings suggest that governance accounting outcomes remain relatively insulated from transnational pressures in the Indian context (Paolone et al., 2022).

Taken together, these findings advance sustainability accounting theory by demonstrating that internationalization does not exert a uniform influence across ESG dimensions. Instead, international performance selectively affects sustainability accounting outcomes depending on the degree of global standardization and institutional flexibility associated with each dimension. By viewing ESG ratings as secondary accounting information systems rather than purely performance metrics, this study contributes to a more nuanced understanding of how sustainability accounting practices evolve in response to international exposure.

Beyond the pharmaceutical sector, the findings have implications for sustainability accounting research in emerging economies. Prior studies have documented differences in ESG-related outcomes between developed and developing markets (Kalia & Aggarwal, 2023), and the present results suggest that such differences may also extend to the determinants of ESG accounting outcomes. This highlights the importance of institutional context in shaping sustainability accounting practices and underscores the need for theory-driven examination of ESG dynamics in emerging-market settings.

Conclusion

It can be concluded that the variability of ESG rating and Environment Score can be explained collectively by newly introduced parameters: Export intensity, international markets served, number of international offices and number of national offices for an Indian pharmaceutical company. International performance impacts the ESG rating and Environment score of pharmaceutical companies in India. India's environmental sustainability performance norms for pharmaceutical companies could be lenient than that abroad. Hence, companies having wider international presence have a higher Environment score. In order to have a better international presence, the pharmaceutical companies can comply with better environmental sustainability standards as strategic environmental investments create value in long run as well (Agarwala et al., 2024). Adhering to international performance standards improves ESG disclosure (Dayanandan et al., 2023). This paper ideates to enhance the focus on environmental pillar of sustainability to improve overall ESG performance in pharmaceutical industry. This research paper supports the findings of previous studies made by Guo (2024) and Wu et al. (2025) which state that improved exports will lead to improved ESG performance. Social score and Governance score of a pharma company are less impacted by the company's international performance and presence. This result supports the previous study done by Maji (2022) who stated that governance and social parameters are more important than environmental parameters in Indian companies. The findings of this paper and regression models developed will facilitate pharmaceutical companies, researchers, consultants, sustainability experts to predict ESG performance, especially, ESG rating of the companies based on their international

performance and pave path for further research on how different dimensions of ESG perform nationally and internationally.

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