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Nisha Bamel, Komal Khatri, Umesh Bamel, Satish Kumar

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Authors Details:

Nisha Bamel
Orchid: 0000-0001-7732-380X
Assistant Professor, Strategy Area
BIMTECH Greater Noida,
India 201306
nishabamel@gmail.com

Komal Khatri
Research Scholar, Sustainability Reporting, Corporate Finance
O.P. Jindal Global University, Sonepat
India 131001
komal.khatri.861@gmail.com

Umesh Bamel
ORCID 0000-0001-8722-3028
Associate Professor HRM and OB Area,
International Management Institute New Delhi, New Delhi
India 110016
umesh.bamel@imi.edu

Satish Kumar*** (Corresponding author)**
Professor of Finance
Indian Institute of Management Nagpur
satish@iimnagpur.ac.in

ESG Disclosure and Firm Performance in Global South Economy: Does Industry Profile and Board Independence Moderate the Relationship

Abstract

Our paper explores the connection between ESG disclosure and firm performance (operational performance, accounting performance, financial performance, and market performance) in the context of the global south. Specifically, we investigated this relationship by gathering data from 237 firms listed on the Bombay Stock Exchange index, comprising 139 observations from heavy industries and 98 from light industries. Additionally, we examine the conditional effect of industry profile (heavy industry vs. light industry) and percentage of board independence. We employed panel regression method for data analysis. Our results indicate a positive and significant relationship between ESG disclosure and firm performance. Overall, we found that a higher ESG disclosure score is associated with improved firm performance across all four performance indicators. When considering individual components of ESG disclosure, we observed that governance disclosure score exhibited a positive and significant relationship with all four indicators of firm performance. On the other hand, environment and social disclosure scores showed a positive and significant relationship only with operational performance and market performance. Furthermore, our analysis revealed that industry profile moderates the relationship between ESG disclosure score and firm performance indicators. Specifically, it affects operational performance, and market performance. The moderating effect of board independence also significantly moderated the relationship. Specifically, board independence influences the relationship with operational, accounting and market performance concerning governance disclosure score, whereas for environment and social disclosure scores, it only influenced accounting and financial performance. Our findings offer a comprehensive analysis of the relationship between ESG disclosure and firm performance, considering various performance indicators and the influence of industry profile and board independence. These insights contribute significantly to both theoretical understanding and practical applications in this field.

Keywords: Firm performance; ESG disclosure score; Industry profile, Heavy industry, Light industry, Board Independence, Global south.

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1. Introduction

Various reports have stated that corporates contributes significantly in climate change through carbon emissions, global greenhouse gas (GHG) emissions, water pollution, air pollution, and so on (CDP, 2021; PwC, 2023). As per the Carbon Disclosure Protocol (CDP), only 100 companies emitted the 71% of GHG emissions between 1998-2015 (CDP, 2021). Therefore, efforts have been made to control and regulate firms' behaviour for protection of environment and society. Global Reporting Framework (GRF), Sustainable Finance Disclosures Regulation (SFDR), Task Force on Climate-Related Financial Disclosures (TCFD), Carbon Disclosure Project (CDP) are some of guidelines those regulate firms' sustainable behaviour.

Government and regulators in global south countries such as India has also framed rules to safeguard environment and society such as National Guidelines on Responsible Business Conduct (NVRGBC) corporate social responsibility (CSR) spending, etc. These structural and regulatory interventions also encouraged stakeholders to take initiatives to safeguard environment. For example, an increase is recorded in the sustainability investments (PwC report). The increasing concern of the stakeholders towards sustainable investments has forced the corporates to take initiatives towards the protection of the environment and reports those initiatives as part of voluntary and mandatory reporting (Chung et al., 2023).

ESG disclosure is among those reporting and it is increasingly becoming a global phenomenon (Xu et al., 2021). The increasing ESG reporting may owe to many reasons including investors demand for high quality, transparency and so on. Firms reports their ESG compliances and rating agencies use this information to rate and index ESG disclosure score of the firms. The rating agencies rate the corporate organization on AAA to CCC scale depending on the set criteria while the ESG disclosure score ranges between 0-100. There are various ESG rating agencies worldwide namely, Bloomberg, MSCI, Thompson Reuters, CRISIL, CSRHUB, etc. These rating agencies follow a regressive process in scoring the companies based on the ESG-related disclosure information (Berg, Kölbel and Rigobon, 2022). Research suggests ESG disclosure and reporting information affects investors' decisions (Aldieri, Amendola and Candila, 2023; Bissoondoyal-Bheenick, Brooks and Do, 2023).

Evidence suggests that ESG rating/score of a company affects its stock prices (Behl et al., 2022; Blanes et al., 2021; Brandon et al., 2021; Xie et al., 2019). For example: Tesla, which

underperforms in financial statements for many years and not able to make profits outperforms the capital market as it has designed its manufacturing process in an energy-efficient manner that harms environment less comparatively. Many Indian companies such as Godrej Consumer Products, Grasim Industries, and ITC etc. who outperforms ESG parameters also outperforms the capital market.

Although, ESG disclosure score and firm performance relationship is measured, the literature doesn't provide any conclusive evidence about nature of ESG disclosure score and firm performance relationship and there are certain gaps those call for further research in this domain. For example: few recent research reports a negative association between ESG and firm performance (Jha and Rangarajan, 2020; Behl *et al.*, 2022) while other authors state that there a positive association between ESG and firm performance (Yawika and Handayani, 2019; Landau *et al.*, 2020; Alfalih, 2022; Helena Naffa, 2022; Naeem and Cankaya, 2022). This inconclusiveness motivated us to examine the relationship between ESG disclosure score and firm performance. Second, most of the academic literature in this domain is from global north (Garcia and Orsato, 2020; Caporale et al., 2022), and nations from global south are behind in terms of ESG disclosure and financial performance arena (Nemoto and Liu, 2020; Grisales and Caracuel, 2021). Countries such as India, China, Brazil etc are among fastest growing and largest GDPs and offers the huge potential for international investments. Third, emerging countries contribute a significant share of the world's carbon emissions, and GHG emissions (CDP, 2021). Apart from this, companies in emerging countries face more problems related to emissions and social inequality. Studying ESG in these countries' context is timely and relevant.

Thus, referring to these gaps in the current literature, we aim to answer following two research question:

RQ1: How does ESG disclosure score relate to firm performance in global south context?

RQ2: Does the industry profile moderate the relationship between ESG disclosure and firm performance in global south context?

RQ3: Does the Board Independence moderate the relationship between ESG disclosure and firm performance in global south context?

We address these questions by examining the data of Top 500 Bombay Stock Exchange (BSE) listed companies from a global south country i.e. India. India is the fifth largest economy in the world, and one of the world's favourable destinations for cheaper production costs. India is ranked 110th in the social progress index, and 8th in the climate change index. It is most populated country in the world having huge natural resources. While addressing these questions, this paper makes significant contribution both in theory and practice.

This paper contributes to the stakeholder perspective, as outlined by Freeman (1984) and further developed by Parmar et al. (2010). Stakeholder perspective is heavily employed to elucidate the relationship between ESG disclosure and firm performance. Parmar et al. (2010) put forth several researchable propositions based on the stakeholder perspective across various domains of business and management. Our research specifically focuses on two domains: firm strategy and economic rent, and accounting practices. Through our analysis, we aim to provide evidence to address a classical management problem: how to add value to various stakeholders while maintaining a balance between ethics and capitalism. Furthermore, our study aims to contribute to clarifying the relationship between ESG disclosure and firm performance by considering a comprehensive measure of firm performance. Moreover, our analysis extends the existing literature by examining industry and board independence type as a conditional variable, thereby exploring the moderating role of industry profile and board independence on the relationship between ESG and firm performance. Consequently, this study enriches the academic literature on ESG and firm performance. Additionally, our analysis yields important implications for regulators and practitioners, offering insights into how ESG disclosure practices can impact firm performance across different industries. This can guide regulatory frameworks and strategic decision-making within organizations, enhancing sustainability efforts and stakeholder value creation.

2. Literature and Study Hypotheses

2.1. Theoretical perspective

Literature in the past, stated that firm's ESG disclosure targeting different stakeholders have a heterogeneous impact on the firm performance (Wook and Park, 2022). This effect has been drawn on the premises of various theories such as stakeholder theory, shareholder's theory (1970); signalling theory (1973); legitimacy theory (1975); agency theory (1976); and resource dependence theory (1978) over a time. Shareholders' theory states that firm's engagement in sustainability practices puts an extra burden of cost on the firms. Legitimacy theory by Dowling

and Pfeffer in 1975 proposed that firms operate under a prevailing social system, and they often engage in sustainability practices to uphold the public image and ensure that secondary shareholders group perceives their adoption of sustainability practices as legitimate to ensure firm informativeness. Signalling theory by Spence in 1973, states that firms 'can elevate the information asymmetry problem by disclosing financial and non-financial information's into their annual disclosure. Agency theory proposed by Jensen and Meckling in 1976, states that managers engage themselves in sustainability practices to mitigate the conflicts with the outside stakeholders. Resource dependence theory (Pfeffer and Salanick, 1978), proposed that long-run survival and success of a firm depends on its acquire and hold funds from external parties.

Our review of existing research on this topic suggest that stakeholder theory offers a support to ESG disclosure score and firm performance relationship. The stakeholder theory states that a firm has wider responsibilities of towards all its stakeholders (Freeman 1984). According to this theory, stakeholders include "any group or individual who can affect or affected by the achievement of firm objective" and all these stakeholders have expectations from the organizations that it would act in the best of their interests. The collective objective of satisfying stakeholders' expectations encourages the corporations to adopt sustainable practices in their functioning and generate value in the long term (Malik & Kashiramka, 2024). The origin of stakeholder framework was in response to three classical problems of the business (i) the problem of value creation and trade (ii) the problem of the ethics and capitalism and (iii) the problem of managerial mindset i.e. how managers can create value and how to connect business and ethics (Freeman, 1984).

Stakeholder perspective-based reasons sufficiently explained that how value can be created for all the stakeholders while maintaining a mutual beneficial relationship among them. For example: Post et al., (2002) argued that mutually beneficial relationships contribute to a firms' ability to generate wealth. Another argument is that maintaining a mutually beneficial relationships would generate trust among stakeholders and that would reduce the transaction cost of the business (Post et al., 2002). Trust among stakeholders would also promote sharing of valuable information and that would lead to economies of the scale subsequently (Harrison et al., 2010). Another supporting argument is 'normative stakeholder view of corporate reporting' which emanates from corporate governance practices and suggests that implicit claims of a firm related to its market value (Parmar et al., 2010).

Following this view, ESG reporting is a tool that ensures the firm behaviour in accordance with larger stakeholders' interests. The disclosure of environmental, social and governance practices will lead to enhancement in returns, increased profitability margin, and creation of long-term value and so on (Zhou, 2019). Therefore, building on the proposition of stakeholder's theory, this study would investigate how does ESG disclosure affects the various aspects of firm performance.

2.2. ESG disclosure and firm performance

During recent years, non-financial and integrated reporting such as CSR reporting, ESG reporting etc. gained a momentum and research has addressed topic such as ESG disclosure, ESG performance, and ESG investments (Buallay, 2020; Gregory, 2022; Helliar, Petracci and Tantisantiwong, 2022); ESG disclosure and firm performance (Bodhanwala & Bodhanwala, 2022; Sharma et al., 2020b); ESG disclosure and credit ratings (Maji and Lohia, 2023); ESG and corporate governance (Minutolo, Kristjanpoller and Stakeley, 2019)); ESG rating disagreement (Berg, Kölbel and Rigobon, 2022) and so on. One important observation here is that majority of ESG related research is coming from developed economy perspective (Widyawati, 2020; Senadheera *et al.*, 2022; Nyantakyi *et al.*, 2023).

ESG disclosure and firm performance is one among these topics and attracted significant attention from practitioners and academics as well (Bodhanwala & Bodhanwala, 2022; Sharma et al., 2020b). Several studies state a significant positive relationship between ESG disclosure and firm performance (Ball, 2020; Landau et al., 2020; Sharma et al., 2020) and posits that a high ESG disclosure score promotes firm performance. Similarly, Alfalih, (2022) indicates that ESG disclosure is associated with firms' financial performance in a linear and non-linear passion. Similarly, ESG performance found to exert a positive impact on corporate financial performance measured as Tobin's Q and return on equity (Naeem & Cankaya, 2022). These evidence suggest a positive relationship however, (Ball, 2020; Sharma et al., 2020; Yawika & Handayani, 2019) explored the mixed relationship between ESG disclosure and firm performance proxies.

Although, multiple evidence to support this notion, interestingly, existing research does not offer conclusive evidence on the relationship between ESG disclosure and firm performance. While earlier we mentioned the research that suggests a positive relationship, some research also suggest the opposite, i.e. weak and negative association between ESG disclosure and firm performance (Behl et al., 2022; Habib & Mourad, 2023; Jha & Rangarajan, 2020; Sharma et

al., 2020). Few studies also claim that there is a neutral relationship between ESG Disclosure and firm performance, and few more suggests the existence of the bi-directional relationship between ESG Disclosure and firm performance (Sharma et al., 2020a). Similarly, Jha & Rangarajan, (2020) found a negative relationship between the ESG disclosure and firm performance of Indian listed companies.

Our review suggests that the connection between ESG disclosure and firm performance is unclear. There is no solid evidence to confirm it definitively(Sharma et al., 2022; Yawika & Handayani, 2019). Discrepancies in findings may arise due to various factors such as differences in research methods, how ESG disclosure scores are measured, variations in ESG ratings from different agencies, and the use of different analytical models to study the relationship, each with its own assumptions and performance measures (Dorfleitner, Kreuzer and Sparrer, 2020; Berg, Kölbel and Rigobon, 2022). Although on basis of available evidence, we postulate that ESG disclosure has an association with the firm performance. Therefore, we hypotheses as follows.

Hypothesis 1: Overall ESG Disclosure score positively drives the firm performance.

Hypothesis 2: ESG Disclosure components (Environment (*H2a*), Social (*H2b*) and Governance (*H2c*) positively drives the firm's performance.

2.3. The moderating effect industry profile

Literature suggests that the ESG disclosure and firm performance relationship depends on various factors, including economic development of a country, industry classification, industry sensitivity, foreign shareholding, firm age, firm size, firm ownership, board independence, board diversity, assurance services, country-level institutional differences, employee board representations and so on. These factors affects the strength of ESG disclosure and firm performance relationship (Alshammari, 2015; Nekhili, Boukadhaba and Nagati, 2021; Abdi, Li and Càmara-Turull, 2022; Alam *et al.*, 2022; Bilyay-Erdogan, 2022; Kim and Park, 2022; Zaiane and Ellouze, 2022; Zarefar, Agustia and Soewarno, 2022; Ahmad, Mobarek and Raid, 2023). For instance, Naeem and Cankaya (2022) examined this relationship in both developed and emerging nations and found a stronger association between ESG disclosure and firm performance in developed nations compared to emerging ones. The explanation is, in developed nations, where technology is abundant and regulations are strict, there's greater emphasis on corporations to prioritize environmental and social concerns while ensuring governance compliance. As a result, firms in developed economies tend to outperform those in

developing economies in terms of ESG disclosure scores, which is reflected in their overall performance. This evidence suggests that contextual factors moderate ESG disclosure and firm performance relationship dynamics (Naeem and Cankaya, 2022).

2.4.1 The Moderating effect of Industry profile

Borrowing our argument from this evidence, we are motivated to examine the moderating effect of industry profile on ESG disclosure score and firm performance. Industry profile is an important contextual factor and has a potential to moderate the relationship between ESG disclosure score and firm performance. For example: contested (the contested firms are considered in the presence of organization legitimacy and uncontested industries (these firms are considered engaged in alcohol, gambling, firearms, oil industries, and tobacco) (Godfrey et.al., 2009, Gong 2020; Koh et.al. 2014; Hudson,2008; Balen et.al. 2015). Our paper extend this line of inquire and tests the moderating effect of industry type (heavy and light industry) from an emerging country perspective (Garcia and Orsato, 2020; Ahmad, Mobarek and Raid, 2023). Firms operating in oil, gas, mining, steel, metals, and extraction are considered as heavy industry and firm operating in information technology, consumer goods, services pharmaceuticals, health and tourism are considered as light industries. On basis of ongoing discussion, we propose our third and fourth hypotheses-

Hypothesis 3: Industry profile moderates the relationship between Overall ESG Disclosure score and firm performance.

Hypothesis 4: Industry profile positively moderates the relationship between ESG Disclosure components scores (Environment (*H3a*), Social (*H3b*) and Governance (*H3c*) and firm performance.

2.4.2 The moderating effect of Board Independence

Literature has shown that corporate governance practices influence ESG disclosure and firm performance relationship. Such as (Nekhili et al., 2021) found that employees representation on the board has more influence on their ESG disclosure score. (Zarefar, Agustia and Soewarno, 2022) proposed that family ownership significantly strengths the ESG disclosure and firm performance. Moreover, (Albitar et al., 2020) found the influence of board gender diversity, board size and ownership concentration on ESG disclosure and firm performance relationship. However, (Fuadah et al., 2022) found that the audit committee presence strengthens the ESG and firm value relationship but do not strengthens ESG and firm performance relationship. Taking the evidence from literature, the board independence

significant component of governance practices has a significant influence on the corporate strategic decision making but missing in the existing literature. Therefore, this study would investigate the moderating effect conditional effect of board independence on the ESG disclosure and firm performance relationship. Based on our above proposition, we purpose our fifth and sixth hypothesis:

Hypothesis 5: Industry profile moderates the relationship between Overall ESG Disclosure score and firm performance.

Hypothesis 6: Industry profile positively moderates the relationship between ESG Disclosure components scores (Environment (H6a), Social (H6b) and Governance (H6c) and firm performance.

3. Methodology

In our study, we focused on the companies listed in the BSE 500 index for the financial year 2016 -2022. We treated ESG disclosure score as the independent variable and firm performance as the dependent variable. Table 1 provides the detailed description of variables undertaken in this study. The data for ESG Disclosure has been obtained from Bloomberg Database (Bhattacharya and Sharma, 2019; Maji and Lohia, 2023). The data for firm performance (operational, accounting, financial and market) has been extracted from Prowess IQ database. The initial sample contains 500 companies but due to the non-availability of ESG Disclosure and missing values of financial performance, few companies were removed, and the final sample contains 237 firms. These 237 firms were categorized on basis industry profile i.e. heavy and light industry (135 firms belong to heavy industries and 98 firms belong to light industries). These 237 firms are spread over sectors (figure 1) such as chemical, services, consumer goods, airlines, construction, cement, hospitality, infrastructure, pharmaceuticals, and so on.

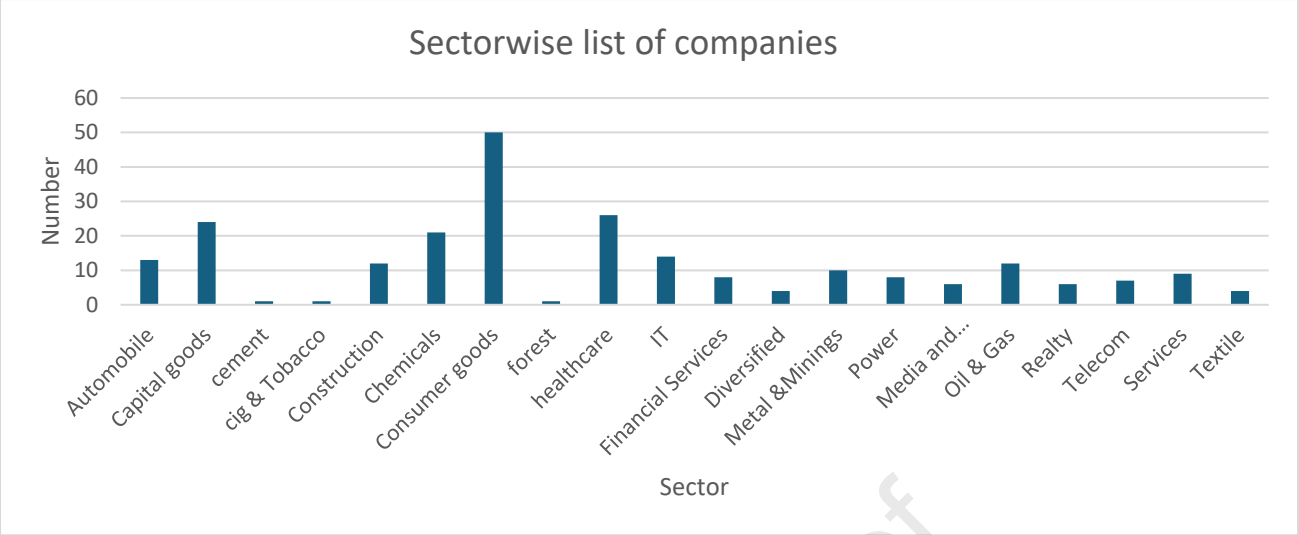


Figure 1: Sector-wise Sample Distribution

Table 1: Variables Description

Variable Type	Variable Name	Variable Description	Source and References
Independent Variables	ESG score	ESG Disclosure Score	Bloomberg Database
	E score	Environmental Disclosure Score	
	S score	Social Disclosure Score	
	G score	Governance Disclosure Score	
Dependent Variables (Firm Performance)	Operational Performance	Natural Logarithm of Cost of goods sold (COGS)	Prowess IQ (Buallay, 2022)
	Accounting Performance	Return on total assets.	
	Financial Performance	Return on Net worth	
	Market Performance	Natural Logarithm of Market value per share* number of shares in the market	
Moderating Variable	Industry Profile	Heavy Industries and Light Industries	(Dye, Mckinnon and Byl, 2021)
	Board Independence	Percentage of board independence above and below fifty percent of board size.	(Chakrabarty, 2018)
Control Variables	Firm Age	Natural Logarithm of Firm Age (lnTA)	Abdi et al., (2022)
	Firm Size	Natural Logarithm of Total Assets (lnAge)	Prowess I.Q. Aggarwal and Singh, (2019)

	Firm Leverage	Total Debt to Total Equity Ratio (DER)	Adeneye & Kammoun, (2022)
	Firm Liquidity	Current Assets / Current Liabilities (CR)	Galani, Alexandridis and Stavropoulos, (2011)

Independent Variable: ESG Disclosure score

In our study, we considered both the overall ESG Disclosure score and the individual components of ESG Disclosure (Environmental, Social, and Governance scores) as independent variables. These scores were sourced from Bloomberg database, a widely used source in previous research (Bhattacharya and Sharma, 2019; Yu and Luu, 2021). The Bloomberg provides scores for each ESG component on a scale of 0 to 100, and these are combined to generate an overall ESG Disclosure score based on Bloomberg regress methodology criteria. A higher score indicates greater disclosure by companies regarding their sustainable practices.

3.2 Dependent Variable: Firm performance

In our study, firm performance was assessed using multiple aspects:

i) operational performance, measured by natural logarithm of total cost of goods sold.

ii) accounting performance, evaluated through the return on assets.

iii) financial performance, gauged by the return on net worth.

iv) market performance, determined by the market capitalization of the firm.

3.3 Moderating Variable:

Industry profile

We examined industry profile as a moderating variable. We categorized industries into two conditions: heavy industries and light industries.

Heavy industries encompass sectors that heavily consume natural resources and have a significant impact on the environment. Examples include metal & mining, construction, manufacturing, airlines, automobile, oil & gas, etc. (Zhang et al., 2023).

On the contrary, light industries comprise sectors that consume fewer natural resources and have a lesser effect on the environment. These industries include IT, services, etc. (Zhang et al., 2023).

Board Independence

We examined board independence as a moderating variable. We categorized board independence into two conditions: percentage of board independence above fifty percent and percentage of board independence below fifty percent of board size.

3.4 Control Variables

We considered firm size, firm age, financial leverage, and firm liquidity as control variables. Where firm size and age has been measured as the natural logarithm of total assets and the natural logarithm of age, respectively (Alfalih, 2022). Financial leverage describes the risk of the firm and is calculated dividing the total debt by the total assets of the firm and firm liquidity describes the firm's ability to meet its short-term requirement of funds and is calculated dividing the total current assets by total current liabilities at the end of the financial year.

Estimation Models

To analyse the effect of ESG disclosure and its components score on the firm performance following regression equations are calculated:

Model 1: Direct relationship between ESG score and Firm Performance

Model1.1: Firm Performance = $\beta_0+\beta_1 ESG\ score_i+ \beta_2\ CR_i+ \beta_3\ lnAge_i+ \beta_4\ lnTA_i + \beta_5\ DER_i + \varepsilon_i$

Model 1.2: Firm Performance = $\beta_0+\beta_1\ E\ score_i+ \beta_2\ CR_i + \beta_3\ lnAge_i+ \beta_4\ lnTA_i + \beta_5\ \ DER_i + \varepsilon_i$

Model 1.3: Firm Performance = $\beta_0+\beta_1\ S\ score_i+ \beta_2\ CR_i + \beta_3\ lnAge_i+ \beta_4\ lnTA_i + \beta_5\ \ DER_i + \varepsilon_i$

Model 1.4: Firm Performance = $\beta_0+\beta_1\ G\ score_i+ \beta_2\ CR_i + \beta_3\ lnAge_i+ \beta_4\ lnTA_i + \beta_5\ \ DER_i + \varepsilon_i$

Model 2: Moderating effect of Industry profile

Model 2.1: Firm Performance = $\beta_0+\beta_1\ ESG\ score_i+ \beta_2\ Firm\ Profile(\ heavy\ or\ light)_i + \beta_3$
$ESG\ score * Firm\ profile(heavy\ or\ light)_i+ \beta_4\ CR_i\ + \beta_5\ \ DER_i + \beta_6 lnAge_i\ + \beta_7 LnTA_i + \varepsilon_i$

Model 2.2: Firm Performance = $\beta_0+\beta_1\ E\ score_i+ \beta_2\ Firm\ Profile(\ heavy\ or\ light)_i + \beta_3$
$E\ score * Firm\ profile\ (heavy\ or\ light)_i+ \beta_4\ CR_i\ + \beta_5\ \ DER_i + \beta_6 lnAge_i\ + \beta_7 LnTA_i + \varepsilon_i$

Model 2.3: Firm Performance = $\beta_0+\beta_1\ S\ score_i+ \beta_2\ Firm\ Profile(\ heavy\ or\ light)_i + \beta_3$
$S\ score * Firm\ profile(heavy\ or\ light)_i+ \beta_4\ CR_i\ + \beta_5\ \ DER_i + \beta_6 lnAge_i\ + \beta_7 LnTA_i + \varepsilon_i$

Model 2.4: Firm Performance = $\beta_0+\beta_1\ G\ score_i+ \beta_2\ Firm\ Profile(\ heavy\ or\ light)_i + \beta_3$
$G\ score * Firm\ profile(heavy\ or\ light)_i+ \beta_4\ CR_i\ + \beta_5\ \ DER_i + \beta_6 lnAge_i\ + \beta_7 LnTA_i + \varepsilon_i$

Model 3: Moderating effect of Board Independence

Model 3.1: Firm Performance = $\beta_0+\beta_1\ ESG\ score_i+ \beta_2$
$Board\ Independence\ (\ above\ or\ beloow\ fifty\ percent)_i + \beta_3\ ESG\ score *$
$Firm\ profile(heavy\ or\ light)_i+ \beta_4\ CR_i\ + \beta_5\ \ DER_i + \beta_6 lnAge_i\ + \beta_7 LnTA_i + \varepsilon_i$

Model 3.2: Firm Performance = β_0+β_1 $E\ score_i$+ β_2
$Foard\ Independence\ (\ above\ or\ beloow\ fifty\ percent)_{i_i}$ + β_3 $E\ score$ ∗
$Firm\ profile\ (heavy\ or\ light)_i$+ β_4 CR_i + β_5 DER_i + $\beta_6 lnAge_i$ + $\beta_7 LnTA_i$ + ε_i

Model 3.3: Firm Performance = β_0+β_1 $S\ score_i$+ β_2
$oard\ Independence\ (\ above\ or\ beloow\ fifty\ percent)_i$ + β_3 $S\ score$ ∗
$Firm\ profile(heavy\ or\ light)_i$+ β_4 CR_i + β_5 DER_i + $\beta_6 lnAge_i$ + $\beta_7 LnTA_i$ + ε_i

Model 3.4: Firm Performance = β_0+β_1 $G\ score_{i,t}$+ β_2
$oard\ Independence\ (\ above\ or\ beloow\ fifty\ percent)_{i,t}$ + β_3 $G\ score$ ∗
$Firm\ profile(heavy\ or\ light)_{i,t}$+ β_4 $CR_{i,t}$ + β_5 $DER_{i,t}$ + $\beta_6 lnAge_{i,t}$ + $\beta_7 LnTA_{i,t}$ + $\varepsilon_{i,t}$

3.6 Description of the model

This study tested the above 3 models for the stated hypotheses. Where model 1 is associated with hypotheses 1 and 2 (direct relationship) and model 2 is associated with the hypotheses 3 and 4 i.e. the moderating role of industry profile and model 3 is associated with hypothesis 5 and 6 i.e. the moderating role of board independence.

In the above models, on right hand side, independent variables, ESG score (overall ESG disclosure score), E score (environmental disclosure score), S score (social disclosure score) and G score (governance disclosure). Control variables i.e. firm age has been measured as the number of years since their incorporation; firm size has been measured as the natural logarithm of total assets, firm leverage (DER) is measured as total debt to total equity ratio and firm liquidity as a current ratio. Firm performance (left side) which is dependent variable is measured using four aspects i.e. operational, accounting, financial and market performance.

4. Data analysis

4.1 Descriptive Analysis

In this study, firstly, we tested for descriptive statistics collectively for whole data set and separately for heavy and light industries. Table 2 and figure 2 portrays the descriptive statistics and Table 3 presents the observations across the two moderating variables. Table 4 portrays the correlation matrix among all dependent and independent variables undertaken in this study. As per the approach outlined in the study by (Naeem and Cankaya, 2022), a multiple-variable regression analysis was applied to all equations. After applying the model, its fitness and validity were assessed through a series of tests. Therefore, we have conducted a variance inflation test for multicollinearity between independent variables; Hausman Test for fixed and random effect; Breusch- Pagan test for cross-sectional heteroskedasticity.

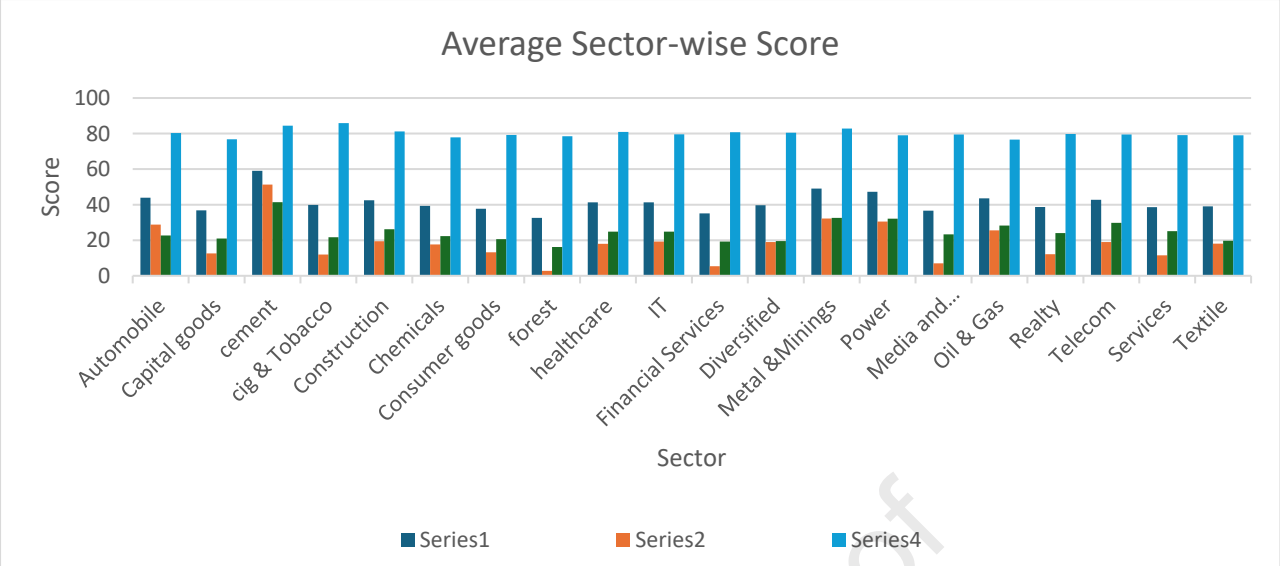
Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
ESGSCORE	1,422	40.318	10.590	21.004	76.904
EScore	1,422	17.574	18.862	0.000	77.288
SScore	1,422	23.835	11.474	0.000	69.891
GScore	1,422	79.414	6.233	51.776	98.615
lncogs	1,411	9.861	2.287	0.554	15.491
ROA	1,422	7.924	10.650	-121.070	78.880
ROI	1,419	13.608	25.703	-534.170	170.770
LogMcap	1,422	11.832	1.382	3.217	16.696
lnTA	1,422	11.163	1.487	2.528	16.090
LnAGE	1,421	3.680	0.529	1.609	5.069
CR	1,422	2.336	10.651	0.000	358.000
DER	1,420	0.568	1.695	-17.010	22.720
ID%	1,422	0.512	0.108	0.000	1.000
BS	1,422	9.637	2.457	4.000	22.000

Table 3: Moderator description

Variable	Number of companies/Observations
Light Industries	98
Heavy Industries	237
Above fifty Percent Independent Board	1131
Below fifty Percent Independent Board	291

Figure 2: Sectorwise Average Disclosure Score



This section summarizes (figure 2) the various characteristics and directions of relationship among all dependent and independent variables undertaken in this study. Table 2 presents that the average governance score is highest among all the independent variables while it is lowest in the case of environmental score with 79.414 **and** 17.574 respectively. The highest average value of governance score represents that an organization focuses more on compliance with regulatory guidelines and the lower value of environmental score that organizations are putting less effort towards environmental concerns. Similarly, in the case of variation, the least variation (6.233) is present again in the case of governance score and the highest variation (18.862) in the case of environmental score. Further, figure 2 depicts the sector-wise average disclosure score, where it can be observed that metal & mining sector firms are top performers and firms in oil and gas sector are least performance in case of overall ESG disclosure and its components disclosure score.

Table 4: Correlation Matrix

	ESG SCORE	ES core	SS core	GS core	lncogs	ROTA	ROI	Log Mcap	lnTA	LnAGE	CR	DER	PER_ID	BS
ESG SCORE	1													
EScore	0.944	1.000												
SScore	0.887	0.740	1.000											
GScore	0.612	0.428	0.447	1.000										

lncogs	0.394	0.386	0.323	0.247	1.000									
ROA	0.014	0.024	0.024	-0.045	0.000	1.000								
ROI	0.016	0.025	0.016	-0.024	0.001	0.509	1.000							
Log Mcap	0.538	0.515	0.489	0.288	0.364	0.240	0.146	1.000						
lnTA	0.519	0.487	0.478	0.301	0.367	-0.144	-0.091	0.584	1.000					
LnAGE	0.078	0.096	0.008	0.096	0.123	0.040	0.033	-0.002	-0.033	1.000				
CR	-0.089	-0.066	-0.089	-0.092	-0.162	0.135	0.044	-0.022	-0.128	-0.006	1.000			
DER	0.014	-0.014	0.053	0.021	-0.020	-0.154	-0.152	-0.024	0.169	-0.060	-0.090	1.000		
ID%	-0.045	-0.054	-0.099	0.102	-0.030	0.044	-0.006	-0.093	-0.128	-0.011	0.012	-0.032	1.000	
BS	0.218	0.235	0.155	0.115	0.229	0.074	-0.011	0.287	0.287	0.121	-0.057	0.008	0.010	1.000

Table 5: Multicollinearity

Variable Name	VIF
ESG score	1.40
Firm age	1.02
Firm size	1.44
CR	1.01
DER	1.04

Note: VIF: variance inflation factor

It can be observed from Table 5 that value of variance inflation test(VIF) is below 10, standard criterion (Damodar and Porter, 2013), hence it can deduced that there is no presence of multicollinearity among the independent variables.

Hypotheses testing

Results model 1

As explained in the methods section model 1 tests the direct relationships between ESG disclosure score (overall), and ESG components score with firm performance. To test this, we

used panel linear regression as per the equations explained in the method section. Table 6, 7, 8 and 9 presents the results of our analysis corresponding to model 1.1, 1.2, 1.3 and 1.4.

Our analysis suggests that ESG disclosure score has a positive relationship with all the four measures of firm performance except accounting performance i.e. operational performance, financial performance, and market performance (table 6), thus hypothesis 1 of the study is accepted.

Further, to get a deep insight of ESG disclosure component wise relationship with firm performance, we run the regression equation for each dimension of ESG i.e. environment, social and governance. Our analysis ascertains that environment (H2a) dimension of ESG has a positive relationship with only operational performance and market performance, and significant in with market performance only (table 7). However, social dimension (H2b) and governance dimensions(H2c) of ESG has a positive relationship with all variables of firm performance but it has a significant relationship only with operational performance and market performance (table 8 and 9). Moreover, likewise other dimensions of ESG only operational and market performance have a significant relationship (table 9) and hence hypothesis H2c is accepted.

Table 6: Regression results of Overall ESG disclosure score and firm performance

Variables Name	Operational Performance	Accounting Performance	Financial Performance	Market Performance
	COGS	*Return on Assets Worth*	*Return on Net worth*	*Market Capitalisation*
ESG Disclosure Score	0.366*** (0.090)	-0.566 (2.193)	5.307 (4.853)	0.967*** (0.195)
CR	-0.015*** (0.004)	0.003 (0.006)	-0.001 (0.006)	-0.0002 (0.0007)
DER	0.0033 (0.012)	-0.007 (0.262)	-0.555 (3.502)	-0.016 (0.017)
Firm age	0.981 (0.242) ***	-3.331 (5.163)	-11.239 (14.071)	1.708*** (0.481)
Firm size	0.210 (0.101) **	0.623 (0.617)	-1.775 (2.280)	-0.132* (0.078)

*Note: Standard error in parenthesis, p-value (*** significance at 0.01%, ** significance at 0.05%, * significant at 1%)*

Table 7: Regression results of environmental disclosure score and firm performance

Variable Name	Operational Performance	Accounting Performance	Financial Performance	Market Performance
	COGS	ROA	Return on Net worth	Market Capitalisation
E score	0.022 (0.014)	-0.159 (0.524)	1.588 (1.098)	0.154*** (0.031)
CR	-0.015*** (0.004)	0.004 (0.007)	-0.003 (0.006)	-0.0000 (0.001)
DER	0.003 (0.012)	-0.004 (0.259)	-0.591 (3.490)	-0.018 (0.017)
Firm age	1.159*** (0.259)	0.689 (1.635)	-14.436 (12.929)	1.797*** (0.499)
Firm size	0.221* (0.105)	-3.500 (4.496)	-1.824 (2.315)	0143* (0.082)

*Note: Standard error in parenthesis, p-value (*** significance at 0.01%, ** significance at 0.05%, * significant at 1%)*

Table 8: Regression results of social disclosure score and firm performance

Variable Name	Operational Performance	Accounting Performance	Financial Performance	Market Performance
	COGS	ROA	Return on Net worth	Market Capitalisation
S score	0.112** (0.039)	0.130 (0.901)	5.008 (4.742)	0.548*** (0.094)
CR	-0.015*** (0.004)	0.003 (0.006)	-0.001 (0.007)	0.000 (0.000)
DER	0.003 (0.012)	0.008 (0.261)	-0.565 (3.477)	-0.017 (0.016)
Firm age	1.092*** (0.251)	-4.034 (5.489)	-15.274 (12.005)	1.541*** (0.411)
Firm size	0.215* (0.103)	0.591 (1.594)	-1.973 (2.515)	0.126* (0.075)

*Standard error in parenthesis, p-value (*** significance at 0.01%, ** significance at 0.05%, * significant at 1%)*

Table 9: Regression results of Governance disclosure score and firm performance

Variable Name	Operational Performance	Accounting Performance	Financial Performance	Market Performance
	Net Profit Margin	ROA	Return on Net worth	Market Capitalisation
G score	0.819*** (0.205)	0.819 (0.435)	1.806 (12.467)	0.042** (0.464)
CR	-0.013** (0.004)	0.003 (0.006)	-0.001 (0.006)	0.000 (0.000)
DER	0.004 (0.012)	-0.008 (0.263)	-0.544 (3.504)	0.000*** (0.000)
Firm age	1.088*** (0.262)	-3.790 (0.595)	-7.636 (14.560)	0.052 (0.116)
Firm size	0.218* (0.103)	0.597 (1.580)	-1.569 (2.153)	-0.141*** (0.033)

Standard error in parenthesis, p-value (*** significance at 0.01%, ** significance at 0.05%, * significant at 1%

Model 2: Moderating effect of industry profile

Next to check the moderating effect of industry profile, we run the regression on model 2 equations, and the results of this analysis are presented in table 10, 11, 12, and 13 corresponding to regression equations 2.1, 2.2, 2.3 and 2.4.

Our analysis suggests that Industry profile significantly moderates the relationship between overall ESG disclosure score and three dimensions of firm performance i.e. accounting performance, financial performance, and market performance (table 10). In case of light and heavy industries all these relationships are positive except in case of accounting performance but relationship in case of heavy industry is found more significant. Thus, proves industry type as a significant moderator.

Further, similar to hypotheses 2a to 2c, we tested the moderating effect of industry profile for each ESG dimension independently. Our results suggest that industry type again moderates the relationship between all three dimensions of ESG independently i.e. environment (H4a), society (H4b) and governance (H4c) dimension of ESG and three firm performance indicators i.e. accounting performance, financial performance and market performance (table 11, 12 and 13 respectively).

Model 3: Moderating effect of Board independence

Moreover, in case of moderating effect of board independence (Table 11,12 and 13), the effect of board independence has been found mixed in all equations. Surprisingly, the effect is found more significant among all dimensions, if the board independence is less than fifty percent. The effect of ESG dimensions is found positive and significant in case if the board

independence is less than fifty percent of the total board size. However, in case of firms having board independence above fifty percent the relationship is found positive except in case of accounting performance. Thus, hypothesis 3a,3b and 3c accepted.

Table 10: Regression results of moderating role of industry profile (Overall ESG disclosure score)

Variable Name	Light Industry				Heavy Industry				Above median BS				Below median BS			
	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance
	COGS	ROA	Return on Net worth	Market Capitalisation	COGS	ROA	Return on Net worth	Market Capitalisation	COGS	ROA	Return on Net worth	Market Capitalisation	COGS	ROA	Return on Net worth	Market Capitalisation
ESG score	0.005* (0.003)	-0.077 (0.123)	0.481* (0.245)	0.028*** (0.008)	0.009*** (0.002)	-0.015 (0.038)	0.003 (0.059)	0.203*** (0.005)	0.017** (0.006)	-0.014 (0.064)	0.034 (0.126)	0.025*** (0.005)	0.054*** (0.016)	0.109* (0.058)	0.214 (0.146)	0.038** (0.014)
CR	-0.015*** (0.004)	-0.005* (0.003)	-0.009 (0.008)	-.000 (0.001)	-0.007 (0.013)	1.128*** (0.405)	1.246*** (0.367)	0.040 (0.047)	-0.015 (0.007)	0.010 (0.011)	0.008 (0.009)	0.001 (0.001)	-0.151** (0.070)	2.314 (0.771)	1.969* (1.138)	0.103* (0.057)
DER	-0.012* (0.006)	-0.043 (0.358)	0.895 (4.453)	-0.020 (0.019)	0.038*** (0.151)	0.115 (0.421)	-3.474*** (0.615)	-0.003 (0.031)	-0.037 (0.030)	*0.122 (0.297)	-0.417 (3.393)	-0.027 (0.021)	-0.412*** (0.091)	-0.421 (0.540)	-0.003 (1.482)	-0.162** (0.065)
Firm age	0.444* (0.223)	-20.142 (16.508)	-23.651 (28.163)	1.529** (0.648)	1.204*** (0.173)	4.371 (3.152)	-3.839* (1.957)	1.681*** (0.634)	0.948** (0.313)	1.864 (0.622)	4.578 (3.088)	1.005*** (0.241)	0.961*** (0.305)	1.538 (1.082)	4.757* (2.729)	1.063*** (0.271)
Firm size	0.475*** (0.048)	5.584 (6.474)	-10.446* (7.839)	0.436* (0.177)	0.141*** (0.026)	-543 (0.477)	-0.346 (0.488)	0.072 (0.069)	0.518*** (0.109)	0.155 (0.622)	-0.404 (1.535)	0.629*** (0.078)	0.427*** (0.126)	-0.596 (0.434)	-1.568 (1.179)	0.552*** (0.123)

Standard error in parenthesis, p-value (*** significance at 0.01%, ** significance at 0.05%, * significant at 1%)

Table 11: Regression results of moderating role of industry profile (environmental disclosure score)

Variable Name	Light Industry				Heavy Industry				Above median BS				Above median BS			
	Operational Performance	Accounting Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance
	COGS	ROA	Return on Net worth	Market Capitalisation	COGS	ROA	Return on Net worth (RE)	Market Capitalisation	COGS	ROA	Return on Net worth	Market Capitalisation	COGS	ROA	Return on Net worth	Market Capitalisation
E score	0.002 (0.002)	-0.049 (0.062)	0.222 (0.135)	0.014*** (0.003)	0.003** (0.001)	0.001 (0.021)	0.18 (0.035)	0.011*** (0.002)	0.008** (0.004)	-0.010 (0.027)	0.001 (0.058)	0.009*** (0.002)	0.024** (0.010)	0.0169 (0.616)	0.085 (0.081)	0.012 (0.007)
CR	-0.015*** (0.004)	-0.005* (0.002)	-0.010 (0.009)	-0.000 (0.001)	-0.004 (0.013)	1.114*** (0.402)	1.238*** (0.368)	0.040 (0.047)	-0.010 (0.007)	0.010 (0.011)	0.008 (0.009)	0.001 (0.001)	-0.146** (0.066)	2.313***	1.984* (1.147)	0.105* (0.058)
DER	-0.012 (0.009)	-0.041 (0.358)	0.891 (4.439)	-0.02 (0.013)	0.039*** (0.011)	0.111 (0.419)	-3.475*** (0.618)	-0.002 (0.029)	-0.037 (0.030)	-0.122 (0.297)	-0.473 (3.392)	-0.027 (0.022)	-0.421*** (0.105)	-0.518 (0.566)	-0.064 (1.489)	-0.182* (0.075)
Firm age	0.517 (0.437)	-20.460 (17.050)	-18.309 (28.599)	1.808*** (0.444)	1.358*** (0.169)	3.847 (3.097)	-3.916* (1.980)	1.828*** (0.661)	1.012*** (0.315)	1.795 (1.502)	4.644 (3.442)	1.091*** (0.245)	1.171*** (0.339)	1.816 (0.1.129)	5.538* (2.833)	1.186*** (0.332)
Firm size	0.474*** (0.117)	5.629 (6.493)	-10.516 (7.859)	0.339*** (0.101)	0.150*** (0.026)	-0.575 (0.486)	-0.455 (0.479)	0.078 (0.072)	0.546*** (0.107)	0.141 (0.532)	-0.304 (1.351)	0.677*** (0.077)	0.514*** (0.121)	-0.313 (0.420)	-1.191 (1.097)	0.632*** (0.117)
*Standard error in parenthesis, p-value (*** significance at 0.01%, ** significance at 0.05%, * significant at 1%)*																

Table 12: Regression results of moderating role of industry profile (Social disclosure score)

	Light Industry								ian BS				Below median BS			
	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance
Variable Name	COGS	ROA	Return on Net worth	Market Capitalisation	Net Profit Margin	ROA	Return on Net worth	Market Capitalisation(re)	COGS	ROA	Return on Net worth	Market Capitalisation	COGS	ROA	Return on Net worth	Market Capitalisation
S score	0.005 (0.003)	-0.009 (0.074)	0.432* (0.243)	0.026*** (0.006)	0.006*** (0.002)	-0.038 (0.035)	0.013 (0.059)	0.026*** (0.005)	0.009* (0.004)	-0.011 (0.049)	0.049 (0.121)	0.018*** (0.004)	0.034*** (0.012)	0.129** (0.051)	0.204* (0.107)	0.027** (0.013)
CR	-0.015*** (-0.004)	-0.005* (0.003)	-0.008 (0.009)	0.000 (0.001)	-0.004 (0.013)	1.138*** (0.397)	1.245*** (0.358)	0.046 (0.032)	-0.009 (0.007)	0.009 (0.011)	0.009 (0.009)	0.001 (0.001)	-0.156* (0.082)	2.299*** (0.723)	1.943* (1.062)	0.099* (0.052)
DER	-0.012 (0.009)	-0.044 (0.355)	0.884 (4.440)	-0.021 (0.019)	0.038** (0.015)	0.121 (0.419)	-3.475*** (0.612)	-0.026 (0.036)	-.038 (0.031)	-0.121 (0.295)	-0.474 (3.387)	-0.028 (0.022)	-0.453*** (0.106)	-0.451 (0.519)	-0.105 (1.408)	-0.188** (0.069)
Firm e	0.432 (0.445)	-22.120 (17.415)	-24.316 (24.538)	1.444** (0.667)	1.281*** (0.209)	5.129 (3.118)	-3.844* (1.962)	0.135 (0.128)	0.986** (0.312)	1.827 (1.461)	4.692 (3.353)	1.068*** (0.243)	1.112*** (0.334)	1.932* (1.078)	5.454* (2.775)	1.174*** (0.309)

Firm size	0.477*** (0.117)	5.509 (6.439)	-10.167 (7.743)	0.362** (0.179)	0.147 (0.092)	-0.506 (0.468)	-0.382 (0.419)	0.322*** (0.094)	0.547*** (0.106)	0.139 (0.551)	-0.424 (1.468)	0.661*** (0.077)	0.503*** (0.126)	-0613 (0.401)	-1.46 (1.104)	0.597*** (0.118)
*Standard error in parenthesis, p-value (*** significance at 0.01%, ** significance at 0.05%, * significant at 1%)*																

Table 13: Regression results of moderating role of industry profile (Governance disclosure score)

	Light Industry												Below median BS			
	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance	Operational Performance	Accounting Performance	Financial Performance	Market Performance
Variable Name	COGS	ROA	Return on Net worth	Market Capitalisation	COGS	ROA	Return on Net worth (re)	Market Capitalisation	COGS	ROA	Return on Net worth	Market Capitalisation	COGS	ROA	Return on Net worth	Market Capitalisation
G score	0.002 (0.004)	-0.069 (0.121)	0.134 (0.243)	0.003 (0.009)	0.016*** (0.003)	-0.001 (0.059)	-0.143 (0.130)	0.002 (0.009)	0.018* (0.009	0.005* (0.098)	0.048 (0.142)	0.028*** (0.007)	0.041** (0.015)	0.103 (0.081)	0.106 (0.172)	0.042** (0.014)
CR	-0.014*** (0.005)	-0.006* (0.003)	-0.007 (0.008)	0.000 (0.001)	-0.007 (0.010)	1.116*** (0.411)	1.280*** (0.366)	0.055 (0.049)	-0.009 (0.007)	0.009 (0.010)	0.008 (0.009)	0.001 (0.001)	-0.159** (0.067)	2.295** (0.709)	1.943* (1.154)	0.096* (0.056)
DER	-0.012 (0.009)	-0.048 (0.358)	0.916 (4.451)	-0.019 (0.020)	0.039*** (0.014)	0.111 (0.419)	-3.471*** (0.624)	0.002 (0.031)	-0.036 (0.031)	-0.121 (0.296)	-0.468 (3.388)	-0.025 (0.022)	-0.461*** (0.091)	-0.506 (0.523)	-0.222 (1.423)	-0.189*** (0.054)
Firm age	0.573 (0.443)	-21.486 (17.981)	-11.140 (30.065)	2.336*** (0.707)	1.214*** (0.209)	3.896 (3.217)	-3.473* (1.823)	2.284*** (0.837)	0.782** (0.315)	1.779 (1.261)	4.122 (3.109)	0.746** (0.249)	0.597* (0.327)	0.574 (1.367)	3.951 (3.469)	0.653** (0.286)
Firm size	0.481*** (0.118)	5.501 (6.398)	-9.945 (7.669)	0.375** (0.186)	0.142*** (0.092)	-0.571 (0.491)	-0.123 (0.497)	0.109* (0.085)	0.507*** (0.116)	0.090 (0.728)	-0.469 (1.425)	0.607*** (0.077)	0.463*** (0.138)	-0.592	-1.248 (1.108)	0.533*** (0.117)

														(0.448)		
*Standard error in parenthesis, p-value (*** significance at 0.01%, ** significance at 0.05%, * significant at 1%)*																

Table 14: Hypotheses testing

Variables	H	Operational Performance	Accounting Performance	Financial Performance	Market Performance
		Net Profit Margin	ROA	Return on Net worth	Market Capitalisation
ESG Overall	H1	Supported	**Not Supported**	**Not supported**	Supported
Environment	H2a	**Not supported**	**Not supported**	**Not supported**	Supported
Social	H2b	Supported	**Not supported**	**Not supported**	Supported
Governance	H2c	Supported	**Not supported**	**Not supported**	Supported
ESG Overall	H3	**Not supported**	**Not supported**	**Not supported**	**Not supported**
Environment	H4a	Supported	**Not Supported**	**Not Supported**	**Not Supported**
Social	H4b	**Supported**	**Not supported**	**Not Supported**	**Not supported**
Governance	H4c	Supported	**Not Supported**	**Not supported**	**Not supported**
ESG Overall	H5	**Not supported**	**Not supported**	**Not supported**	Supported
Environment	H6a	**Not supported**	**Not supported**	**Not supported**	Supported
Social	H6b	**Not supported**	**Not supported**	**Not supported**	Supported
Governance	H6c	**Not supported**	**Not supported**	**Not supported**	**Not supported**

Note: H: hypotheses, LI: Light industry, HI: Heavy industry

5. Discussion

This study examined the relationship between ESG disclosure scores and firm performance, while also examining the moderating influence of industry profiles and board independence on this relationship. The study focused on companies listed in the BSE 500 for the fiscal year 2022. Firm performance was assessed using four key measures: (i) operational performance, as indicated by the net profit margin; (ii) accounting performance, measured by return on assets; (iii) financial performance, evaluated through return on net worth; and (iv) market performance, measured by the firm's market capitalization.

To achieve these objectives, we run two regression models as detailed in the methodology section. The findings of model 1 indicates a positive and statistically significant relationship between aggregate ESG disclosure score and operating and market performance measures of firm performance (H1). This finding goes in hands with existing relevant research that suggest that sustainable reporting adds to firm outcomes such as engagement in sustainability practices reduces operational cost and enhances their market value. Moreover, it is argued that ESG reporting could add significantly into firm performance by enhancing reputation and brand value, attracting capital, mitigating risks, driving innovation, and achieving operational efficiency (Malik & Kashiramka, 2024). In addition, ESG disclosure score ensures that firms achieve regulatory compliances, and this too would promote firm's value.

Moving forward, our study delved into the relationship between each dimension of ESG disclosure and firm performance independently. Our analysis indicates a noteworthy finding: only the social and governance disclosure score exhibits a positive and significant correlation

with all the considered measures of firm performance (H2c). This discovery closely mirrors the findings of Narula et al. (2024), who utilized operating performance, financial performance, and market performance as indicators of firm performance.

Regarding the environmental disclosure score, our results suggest a positive association with the operational performance and marketing performance of the firm. However, no significant relationship was found with the accounting and financial performance of the firm. But, regarding social and governance disclosure score, our findings indicate a positive relationship with all performance measures. This suggests that firms' adoption and disclosure of sustainability practices can enhance their operational performance, and financial performance by increasing their sales potential and strengthening the return on investments and market value of the corporation through gaining stakeholders' trust. Contrary to a recent examination of 225 Indian companies from 2018-2020 by Narula et al. (2024), which suggests that the environmental and social dimensions of ESG are either negatively related to firm performance indicators or show no significant relationships, our results portray a slightly different dynamic.

Next, model 2 tested the moderating role of industry profile- heavy and light industry on the ESG disclosure and firm performance relationship. The results indicate that industry profile serves as a moderator for the overall ESG disclosure score and three firm performance measures: operational performance, financial performance, and market performance. Specifically, in light industries, these relationships are positive and significant, whereas in heavy industries, they are positive and significant among operational, financial and market performance but negative on accounting performance. This suggests that industry type significantly moderates the relationship between ESG disclosure score and firm performance.

Furthermore, we examined the moderating effect of industry profile on the disclosure score of individual dimensions of ESG (i.e., environmental disclosure score, social disclosure score, and governance disclosure score) and firm performance relationships. Our findings reveal that industry profile also significantly moderates these relationships with accounting performance, financial performance, and market performance. In light industries, the relationships are positive but not significant, while in heavy industries, they are positive and significant. These results suggest a possible moderation effect of industry profile on the relationship between ESG disclosure score and firm performance.

Furthermore, model 3 tested the moderating role of board independence on the ESG disclosure and firm performance relationship. The results indicate that board independence serves as a moderator for the overall ESG disclosure score and three firm performance measures: operational performance, financial performance, and market performance. Specifically, in

board size is less than fifty percent, these relationships are positive and significant among all measures of performance, whereas in case where board independence is more than fifty percent, they are positive significant among operational, financial and market performance but negative on accounting performance. This suggests that board independence significantly moderates the relationship between ESG disclosure score and firm performance.

Furthermore, we examined the moderating effect of board independence on the disclosure score of individual dimensions of ESG (i.e., environmental disclosure score, social disclosure score, and governance disclosure score) and firm performance relationships. Our findings reveal that board independence also significantly moderates these relationships with accounting performance, financial performance, and market performance. In below fifty percent board independence, the relationships are positive and significant, while in above fifty percent board independence, they are positive but not significant. These results suggest a possible moderation effect of board independence on the relationship between ESG disclosure score and firm performance.

5.1 Theoretical implications

It is evident from literature that past studies present the mixed evidence of ESG disclosure score influence on the firm performance (Widyawati, 2020; Díaz-Peña, Castillo Delgadillo and Mario Iván, 2022). Moreover, most of the literature has been conducted in the western regions such as Europe and America and only few studies focusing on global south are available (Alfalih, 2022; Landrum & Ohsowski, 2018; Narual et al., 2024). Hence, this study contributes to the literature in context of world's fastest growing economy from global south region i.e., India and makes several contributions in the research. First, although overall ESG disclosure score and firm performance relationship is established, the relationships between disclosure score of individual ESG dimensions and firm performance is not clear and conclusive except governance disclosure score. Our study is enhancing this clarity and suggests that environment and social disclosure score is also related positively and significantly at least with operational and market performance. Second, our findings strengthen the stakeholder perspective the stakeholder perspective (Freeman, 1984, Parmar et al., 2010). Parmar et al. (2010) put forth several researchable propositions based on the stakeholder perspective. Present analysis focuses on two domains i.e., firm strategy for yielding economic rent, and accounting practices.

Through our analysis, we confirmed that stakeholder perspective can address a classical management problem: how to add value to various stakeholders while maintaining a balance

between ethics and capitalism. Sustainable accounting practices such as integrated reporting, ESG disclosure etc. would add more transparency in firm's behaviour, and this would boost stakeholders' confidence in the firm's action and behaviour. Firm's commitment to sustainability, ethics and governance would directly and indirectly adds to its reputation & brand value, provide access to broader pool of capital, mitigates the risk of fraud, corruption, conflict of interest etc., promotes innovative work behaviour and resource optimization, reduces the chances of regulatory and public scrutiny and so on. All this would promote firm's rent yielding mechanism and adds to its performance. Third, by identifying industry type as an important moderator or condition, this paper adds to the legitimacy of the assumption that certain factor promotes adoption of sustainable practices and certain conditions would discourage adoption of sustainable practices, hence mechanism can be devised to mitigate the negative effect of certain factors such as industry type. Fourthly, by identifying board independence as a prominent moderator, this paper contributes to regulatory provisions related to the percent of outside board encourages the adoptions of sustainability practices. Surprisingly, as per the findings, having upto fifty percent of board as independent or outside, significantly drives the adoption of ESG practices but after reaching above the fifty percent of board independence, it does not provide the significant influence on the adoption of ESG practices.

Finally, this study contributes to the literature on ESG disclosure in case of emerging economy from global south region. It noteworthy to examine sustainable practices in Indian context considering India's noteworthy contribution to worlds gross domestic product and its share in the world's total carbon emissions. India shares a third position after US and China in the world carbon emission as per PwC, 2023.

5.2 Practical and Social implications

Our findings suggest important implications for executives, practitioners, policy makers and regulators. Since, our argument and analysis are based in the stakeholder framework perspective and tries to address the classical business problem that how to add value to and maintain a balance between capitalism and ethics. Our findings suggest that firms can exceed their performance by incorporating and disclosing sustainability practices. For example: investors may consider the firms sustainability performance while measuring their long-term financial PERFORMANCE, hence, they may choose their investment portfolio accordingly.

For government and regulatory bodies, as it is evident that sustainable reporting maintains a balance between capitalism and ethics, these bodies could frame mandatory guidelines and

regulations for business to follow these practices. For example: in majority of developed economies such guidelines exist and developing economies too started following the suit considering the benefits of sustainable practices. Security and Exchange Board of India has already framed mandatory guideline for top 1000 companies to report on sustainability parameters undertaken from financial year 2022-2023. Lastly, our findings contribute towards the UNDP' sustainable development goal number 12 and 13 directly. For example, one of the major agenda in SDG 12 is to "encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle". Our findings strongly support this. Similarly,

6. Conclusion

Objective of this paper is to test the relationship between ESG disclosure score and firm performance from a global south context. In addition, we also tested the moderating effect of industry profile (i.e. light industry and heavy industry) and Board independence (More than fifty percent and less than fifty percent). The findings of the multivariate regression models investigate the relationships between ESG disclosure score on the various measures of firm performance such as operational performance, accounting performance, financial performance and market performance and concludes following:

- Overall ESG disclosure score of a firm is positively and significantly related to all four measures of firm performance.
- Governance disclosure score is also positively and significantly related to all four measures of firm performance.
- Environment and social disclosure score of a firm are related positively only with operational and market performance and not found to be significantly related with accounting and financial performance of firm.
- ESG disclosure score positively and significantly drives the firm's accounting, financial and market performance in case of firms operating in heavy industries and positively but not significantly drives in case of firm operating in light industries.
- In moderating effect of Board independence: ESG disclosure score is positively and significantly related with all four measures of performance in case of board independence is less than fifty percent. While in case board independence is more than fifty percent, it is positively related but with operational, financial and market performance but negatively related with accounting performance.

- The effect of board independence has been found significant among firms having less than fifty percent of the independent board in case of all dimensions of ESG disclosure.

Considering the relevance of sustainability disclosure research and limitations of this study, we suggest that future research should consider first, varied indicators of firm performance. We endeavoured to examine the firm performance using four dimensions i.e. operational, accounting, financial and market performance, hence future research should consider other performance measures too. Second, majority of the existing examination employed a linear regression analysis while testing this relationship, we suggest that employing a non-linear regression analysis would provide interesting understanding of this dynamics. Third, a there is scope of for future research on large sample and panel data (Narula et al., 2024).

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