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Greenwashing in the Indian corporate landscape: an empirical assessment of ESG disclosures of NIFTY 50 companies

Mithilesh Gidage[1,2] · **Shilpa Bhide**[1] · **Yuriy Bilan**[3]

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Abstract
This study investigates ESG (Environmental, Social, and Governance) reporting in India, focusing on greenwashing among companies listed on the National Stock Exchange's NIFTY 50 index. Utilizing available ESG scores and assessments, we assess the extent of greenwashing and identify factors influencing this behavior within the Indian corporate environment. Our research employs regression analysis with a comprehensive set of variables, including cross-listing status, inclusion in ESG-focused investment funds, presence of independent directors, and board size, to examine key factors impacting greenwashing scores. Findings reveal that 47% of sampled companies exhibit greenwashing characteristics, with a concentration in manufacturing and energy sectors. Notably, cross-listing status and inclusion in ESG-focused investment funds show an inverse relationship with greenwashing scores. Moreover, the presence of independent directors and board size significantly impacts greenwashing tendencies. This research contributes to the field by offering novel insights into the determinants of greenwashing behavior in India's corporate landscape, with implications for practitioners, policymakers, and academics. Practitioners can utilize these insights to enhance corporate governance practices and promote genuine sustainability efforts, policymakers can refine regulatory frameworks, and academics can further advance research in this field.

Keywords Greenwashing · Environmental, social, and governance (ESG) · NIFTY 50 · Sustainable investing · Cross-listing status · Corporate social responsibility (CSR) · ESG disclosures

1 Introduction

CSR has been a subject of discourse for over fifty years, with Carroll (1998) introducing a pyramid model delineating firms' legal, ethical, and philanthropic responsibilities rooted in economic accountability. Various definitions of CSR in scholarly literature advocate for the harmonious development of the economy, society, and environment by stressing non-

Extended author information available on the last page of the article

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financial performance metrics (Agudelo et al., 2019). Non-financial performance, often characterized as Environmental, Social, and Governance (ESG) factors, comprises criteria and sub-factors evaluating companies' responsible impacts (Li et al., 2021). The contemporary significance of ESG performance is underscored by its positive influence on corporate sustainability, as argued by Taliento et al. (2019), Kluza et al. (2021), and Ye et al. (2022).

Barko et al. (2022) contend that companies neglecting economic, social, and environmental considerations risk unsustainable management practices. Scholars have differentiated CSR and ESG in prior studies. CSR primarily encompasses corporate economic, legal, ethical, and philanthropic duties, encapsulated in Carroll's pyramid model (Carroll, 1991, 1998, 1999). On the other hand, ESG denotes companies' engagements in environmental, social, and governance activities for societal well-being and stakeholders' sustainable long-term interests (Mohammad and Wasiuzzaman, 2021). CSR emphasizes corporate responsibilities and obligations, whereas ESG centers on ESG-related activities for enhancing company, shareholder, and stakeholder performance (Park et al., 2023).

Over the last twenty years, there has been notable expansion in ESG disclosures, often synonymous with CSR. Initially, corporate sustainability primarily centered around good intentions and internal efficiencies in the early 1980s. However, it has since evolved to address intricate strategic issues involving a web of interconnected relationships and operations, as highlighted by Kiron et al. (2015).

ESG disclosures globally tend to be voluntary, inviting research into the motivations driving these disclosures. A central query within this realm revolves around whether these disclosures reflect genuine corporate accountability or serve as part of a broader legitimization process (Van Der Laan, 2009; Lokuwaduge and Heenetigala, 2017). With a heightened global scrutiny of unethical corporate practices and failures, companies are increasingly compelled to address their ESG activities and their repercussions. This shift signifies a move from voluntary disclosure to mandated transparency. Regulatory bodies, ethical investment managers, rating agencies, and other stakeholders are now actively seeking social data from corporations.

In the past decade, investors have increasingly called for the integration of environmental, social, and governance (ESG) factors into their investment decisions. However, this integration becomes challenging when companies engage in "greenwashing," which involves making deceptive ESG disclosures. Exploring strategies to dissuade corporations from indulging in greenwashing propels our inquiry.

Greenwashing is a response to companies' attempt to balance the growing emphasis on environmental compliance with their genuine efforts in this domain (Bernini & Rosa, 2023). Coined from "green" and "brainwashing" within an environmental context (Mitchell & Ramey, 2011), it is a disclosure-centered strategy (Lee & Raschke, 2023; Seele & Schultz, 2022; Seele & Gatti, 2017; Cooper et al., 2018) influenced by external factors and institutional pressures (Zharfpeykan, 2021; Velte, 2022; Marquis et al., 2016; Seele & Schultz, 2022; Li et al., 2023). The institutional context significantly shapes companies' effectiveness in environmental responsibility (Li et al., 2023; Marquis et al., 2016). Greenwashing involves concealing inadequate ESG performance by inundating stakeholders with extensive ESG data, aiming to create a positive impression (Yu et al., 2020). This practice is notable in the corporate landscape as it enables firms to obscure their genuine environmental impact, attract ESG-focused investors, and cater to consumer demand for sustainable offerings (Yu et al., 2020).

Since the advent of the National Voluntary Guidelines (NVGs) in 2011, India has been actively nurturing a corporate ethos focused on social responsibility. These guidelines were subsequently enshrined within the 2013 Companies Act, imposing obligatory CSR expenditure on select Indian corporations. Over the years, the NVGs have metamorphosed into the National Guidelines for Responsible Business Conduct in 2019. At present, regulatory mandates compel the top 500 listed companies of India, as per market cap, to divulge their sustainability endeavors through Business Responsibility Reporting. This reporting framework adheres to global benchmarks for disclosing non-financial data practices, as stipulated by the Ministry of Corporate Affairs in 2020. While Indian enterprises have made notable headway in terms of corporate governance and social accountability, the Morningstar ESG Conclave in 2021 underscored the pressing necessity for bolstering environmental stewardship.

Financial institutions within India have embraced the trend of championing ethical business conduct by offering enhanced interest rates and exclusive investment opportunities to companies that prioritize ethical standards. A significant portion of India's youthful demographic, which constitutes a substantial segment of the workforce, demonstrates a strong preference for sustainable and ethical business practices. This burgeoning interest has fueled the adoption of investment strategies guided by ESG principles (Gupta, 2021). India has emerged as a formidable force in the realm of sustainable finance, riding the wave of surging interest in ESG funds and green investment. Its green bond market now stands proudly as the second largest among emerging economies, signaling a significant shift towards environmentally conscious investing (Pant, 2021).The Indian market has witnessed a significant surge in interest in Environmental, Social, and Governance (ESG)-driven investment decisions in recent years. This trend reflects the evolving landscape of corporate responsibility and sustainable investing practices in India (Stephenson, 2021). Notably, ESG considerations have become increasingly important for investors in India due to factors such as regulatory changes, growing awareness of sustainability issues, and the desire to align investments with broader societal goals (NSE India, 2022).

The existing literature has predominantly focused on best practices for individual ESG dimensions, with limited empirical exploration into the underlying circumstances of greenwashing strategies (Del Bosco & Misani, 2016; Marquis et al., 2016; Van Halderen et al., 2016). This study aims to address this research gap by investigating the prevalence and drivers of greenwashing among Indian companies listed on the National Stock Exchange (NSE), particularly those included in the NIFTY 50 index for the year 2023. The NIFTY 50 index, representing the most prominent companies in terms of market capitalization across major industry sectors in India, serves as a reliable benchmark for the Indian stock market (NSE Indices Methodology Document, 2021). By analyzing greenwashing practices within these index-listed companies, this study seeks to contribute valuable insights and lay the groundwork for further research. Furthermore, the study aims to identify internal, external, and financial factors influencing greenwashing behavior and evaluate the strength and nature of these relationships.

This study aims to address the following research questions:

1. How prevalent is greenwashing behavior among Indian companies, particularly within the NIFTY 50 companies?
2. What are the key factors influencing greenwashing behavior among Indian companies?

This paper adopts the following structure: We commence with a survey of existing literature to establish our theoretical framework. Expanding upon this groundwork, we formulate hypotheses to be tested and verified within the Indian context. Subsequently, we delineate our framework, methods for data collection, sample size, and research instruments. Our ensuing discourse delves into observations, findings, and gleaned insights. Finally, we conclude by elucidating the implications, constraints, and recommendations for future exploration in this domain.

2 Literature review

2.1 Theoretical background

The theoretical background utilized in this study revolves around Institutional Theory, which seeks to elucidate the factors that drive greenwashing practices within emerging markets, particularly in India. Institutional Theory posits that organizations are heavily influenced by societal norms, regulatory frameworks, and institutional pressures, which compel them to adhere to established practices and standards (DiMaggio & Powell, 1983). According to this theory, companies operating in emerging markets may resort to greenwashing as a response to various external pressures, including regulatory demands, investor expectations, and societal norms (Meyer & Rowan, 1977).

In dissecting the phenomenon of greenwashing, contemporary research tends to dissect it through two distinct lenses: the quest for legitimacy and the art of impression crafting. From the legitimacy standpoint, organizations strive to bolster their credibility by accentuating favorable or inconsequential performance metrics, effectively masking their less-than-stellar overall performance (Marquis et al., 2016). According to Reber et al. (2022), companies endeavor to spotlight their Environmental, Social, and Governance (ESG) endeavors, projecting these efforts to demonstrate adherence to sustainability standards, thus safeguarding their societal legitimacy. Conversely, the impression management viewpoint posits that firms strategically unveil favorable details about their environmental or social endeavors to cultivate a positive image among external stakeholders, including investors (Marquis et al., 2016). Within this framework, greenwashing emerges as a strategic ploy, wherein companies leverage impression management tactics to project symbolic gestures rather than effectuating substantial measures to tackle sustainability challenges (Gacek, 2020). Thus, both perspectives converge on the central premise that greenwashing fundamentally revolves around the orchestration of perceptions.

2.2 ESG/CSR report greenwashing

In today's global arena, sustainability stands out as a crucial challenge (Liew et al., 2014). This challenge encompasses a spectrum of environmental and socio-economic issues that either emanate from businesses or significantly impact them (WESS, 2013). As the emphasis on sustainability-driven investments grows and businesses are expected to adopt more sustainable practices, a discernible trend arises—firms proactively report, publish, and market these endeavors as integral to their non-financial disclosures (Vukić et al., 2018). Such communication, spotlighting a company's social and environmental aspects, plays a crucial role in advancing organizational sustainable development goals.

Within contemporary financial arenas, ESG factors are gaining traction, driving investors, stakeholders, institutional shareholders, and financial regulators to methodically factor them into company assessments and investment strategies (European Commission, 2016). While earlier research acknowledged the emerging trend, it also sheds light on the complex hurdles hindering the realization of the full potential of ESG-driven investments and disclosures. One prominent obstacle faced by financial institutions when integrating ESG data into investment models is the abstract nature of ESG and CSR reports (Moniz, 2016). Given the inherent bias associated with self-generated reports, various complexities ensue, including unaudited data, the absence of specific regulations, and the potential for misrepresentation of ESG factors at the organizational level (Fride, 2019; PRI, 2017; Schroders, 2017; State Street Global Advisors, 2017; Khan et al., 2016; PRI, 2015). Within this landscape, the existence of these challenges creates an avenue for companies to strategically engage in a process of selective, protracted, and intricate disclosures. Regrettably, such maneuvers can culminate in the phenomenon known as greenwashing concerning their ESG performance, which multiple studies have recognized as a substantial impediment in fully unleashing the potential of ESG information.

The term 'Greenwashing' gained popularity in the late 1990s within discussions related to environmental concerns and green marketing (Greer & Bruno, 1996). Initially associated with environmental issues, the concept of greenwashing has evolved to encompass social and economic considerations as well (Lyon & Maxwell, 2011).

According to Yu et al. (2020), a greenwashing corporation is characterized by extensive disclosure of ESG data while demonstrating poor actual ESG performance. This study adopts Yu et al. (2020) description of greenwashing and specifically addresses ESG report greenwashing, in which companies disguise relatively weak ESG performance by presenting inaccurate ESG information. When companies release unreliable ESG data, greenwashing can obstruct ESG investment decisions (Yu et al., 2020). The consequences of greenwashing on a corporation's stakeholders can ultimately lead to a decrease in financial performance, which hinders investment attraction (Pizzetti et al., 2021). However, there is still a lack of literature examining the primary drivers of greenwashing behavior.

Distinct patterns of greenwashing behavior have been delineated and classified in prior research. The initial category involves manipulating disclosures to enhance a company's valuation by inflating their actual performance (Marquis et al., 2016; Montgomery & Lyon, 2013; Maxwell & Lyon, 2011). In an attempt to mask their subpar performance, businesses resort to intricate and voluminous non-financial data disclosures that deceive stakeholders and their evaluations. Greenwashing often manifests in the artful presentation of ESG performance, where disclosures are meticulously curated to paint a rosier picture than reality. This manipulation can be dissected into three cunning tactics. Firstly, there's the art of cherry-picking, where only the positive aspects are showcased, conveniently sidestepping any inconvenient truths. Secondly, there's the tactic of selective revelation, where information is disseminated solely to a favored few, keeping the less flattering details under wraps (Kirk & Vincent, 2014). The third and most prominent kind of greenwashing pertains to the product level, unlike the first two types that operate at the company level (Cho & Baskin, 2018; Testa et al., 2015; Majid & Russell, 2015). Research has illustrated how firms utilize this strategy of greenwashing, amplifying the sustainability features and ecological benefits of a product, solely to craft a specific brand perception and boost sales, particularly when appealing to a demographic attuned to these issues.

The concept of ESG report greenwashing differs from that of CSR greenwashing, as discussed by Liu et al. (2024). Numerous research endeavors have explored the interplay between the selective dissemination of a company's nonfinancial data, predominantly encompassing CSR and ESG reports, and the corporation's actual CSR and ESG performance. In an illustrative case study examining mining as well as energy firms and CSR disclosures of those, a positive correlation emerged between CSR performance and the extent of disclosure (Herbohn et al., 2014). This suggests that companies exhibiting higher CSR performance are more inclined to disclose more extensively in terms of CSR. Furthermore, companies demonstrating stronger CSR performance tend to release a greater number of CSR reports (Uyar et al., 2020). Significantly, there exists a clear and positive correlation between CSR performance and the clarity of CSR reports, suggesting that enhanced CSR performance motivates companies to produce more understandable CSR reports (Wang et al., 2018). The bulk of previous literature focusing on the disclosure and performance of non-financial data tends to concentrate on CSR reports, underscoring their positive connection with CSR-driven performance and disclosures, thus reducing the likelihood of greenwashing.

Nonetheless, in the realm of divulging environmental performance alongside social performance, it appears that CSR reports pertaining to social performance tend to exhibit greater readability than those addressing performance related to environment (Wang et al., 2018). Moreover, alternative research posits that firm with stronger ESG-related performance are inclined to engage in lesser greenwashing, given their comparatively fewer concealable shortcomings (Marquis et al., 2016).

Research has also explored the intricate factors that shape a firm's brownwashing or greenwashing behaviors. Certain studies propose that companies may opt to downplay their ESG performance, as green credentials or socially driven initiatives have been associated with potential negative repercussions for a firm's share market performance (Fisher-Vanden & Thorburn, 2011; Khanna & Damon, 1999; Ullmann, 1985). Furthermore, firms subjected to heightened scrutiny from external stakeholders and regulatory bodies, while adhering to global standards, are less inclined to engage in selective disclosures (Marquis et al., 2016).

Analyzing the landscape of the banking and financial sector, it becomes evident that the makeup and scale of the governing body wield significant influence over the management of ESG-related matters. Research within the BFSI realm underscores the critical role played by board composition, diversity, and the establishment of sustainability committees in enhancing the ESG performance of banks (Birindelli et al., 2018). Likewise, studies reveal a positive correlation between the presence of a higher proportion of independent directors on boards and the quality of CSR disclosures within companies (Ben-Amar & Mcllkenny, 2015).

While clear relationship exists between a company's ESG performance and its financial performance (Jyoti & Khanna, 2021), it is predominantly in situations where a company boasts favorable financial performance and capacity that it can proactively embark on ESG-based initiatives.

As the world's fastest-growing economy, India's trajectory is characterized not only by its economic prowess but also by its resolute commitment to inclusive and sustainable policies and business practices. The emergence of this ethos accentuates the demand for sustainable corporate practices over the long term. An extensive examination delves into the willingness and capacity of Indian stakeholders and policymakers to engage in this transformative journey while scrutinizing the conducive environment for such endeavors (Kaur, 2019). Central to this framework is the integration of ESG-based reporting and metrics, serving as a vital tool to streamline and monitor these efforts. Moreover, research highlights the predominant hurdles hindering India's progress in fostering a green financial market, raising apprehensions about the looming specter of greenwashing within this narrative (Freytag, 2020).

Prior investigations and scholarly works regarding this topic have primarily provided analyses either on a global scale or from a limited local vantage point (Gyönyörová et al., 2021; Ruiz-Blanco et al., 2021; Uyar et al., 2020). Inherent subjectivity of this subject, coupled with its varied acceptance on a regional level, prompts inquiry into the applicability of these findings within regional contexts. Furthermore, although examinations have been conducted regarding non-financial data and ESG disclosures within the Indian context, few have explicitly investigated ESG implementation through the lens of greenwashing or applied empirical methodologies to measure the prevalence of greenwashing behaviors exhibited by Indian firms. Some of these inquiries have predominantly focused on the thorough reporting of CSR activities and its readability metrics.

This study endeavors to delve into the rich tapestry of the Indian financial market, weaving together the threads of prior research findings and methodologies. Within the dynamic milieu of India's financial landscape, the burgeoning interest in ESG principles among investors serves as a beacon for exploration. Our aim is to bridge the gap between indigenous corporate practices in India and established global paradigms in ESG disclosures, thereby shedding light on their tangible impact on performance outcomes.

2.3 Research gap and hypothesis development

The current body of literature on greenwashing behavior predominantly concentrates on a global perspective, often overlooking the intricate determinants within the Indian business landscape. This oversight is substantial as it neglects the distinctive governance structures, market dynamics, and regulatory frameworks that define Indian companies and can impact their greenwashing tendencies. Therefore, this study aims to fill this gap by delving into the internal and external factors influencing greenwashing behavior among Indian companies.

2.3.1 Internal governance factors

In our pursuit of a comprehensive understanding of the myriad factors that can prompt and shape a company's inclination toward greenwashing, previous studies have highlighted the potential influence of governance factors at the company level (Ferrell et al., 2016). However, these studies primarily focus on developed countries, neglecting emerging economies like India.

While corporate governance's impact on CSR disclosures has been explored globally, there is limited empirical evidence on how internal governance factors such as board composition and independent oversight specifically impact greenwashing behavior in Indian firms. This gap necessitates a focused inquiry into the role of internal governance mechanisms in shaping sustainability practices among Indian companies.

H1 An increased share of institutional shareholders negatively impacts greenwashing behavior in Indian companies.

This hypothesis directly addresses the research gap by examining how the presence of institutional shareholders, who often have longer-term perspectives and sustainability concerns, can act as a deterrent to greenwashing practices in the Indian context.

H2 Larger board size in Indian companies has a negative effect on greenwashing behavior due to heightened monitoring capabilities.

This hypothesis contributes to bridging the research gap by exploring how board composition and monitoring mechanisms mitigate greenwashing tendencies within Indian firms.

H3 A higher number of independent directors in Indian companies is associated with decreased greenwashing behavior.

This hypothesis further extends the discussion on corporate governance in India and its impact on sustainability disclosures, addressing a key aspect of the research gap regarding the influence of independent oversight on greenwashing practices.

2.3.2 External scrutiny and compliance

The increasing prevalence of ESG-focused investment funds managed by financial institutions corresponds with the rising desire for sustainable business practices. Research indicates that companies striving for inclusion in such investment portfolios are assessed based on ESG principles, data, and evaluations (Curtis et al., 2021). Moreover, companies endeavor to position themselves attractively to appeal to these capital inflows (Gibson et al., 2020). Additionally, listing on international exchanges i.e. cross-listing imposes stricter regulatory requirements on firms, leading to reduced selective disclosures to investors (Bosco & Misani, 2016).

Literature on external oversight and adherence mechanisms, like cross-listing and ESG-focused funds, predominantly stems from Western contexts, with limited insights into their implications for Indian firms. This gap underscores the need to understand how external market pressures and regulatory frameworks impact greenwashing behavior within the Indian business environment.

H4 Cross-listing of Indian firm on any overseas share market adversely affects greenwashing behavior.

By examining the effects of cross-listing on greenwashing behavior, this hypothesis contributes to understanding how external market dynamics and regulatory frameworks influence sustainability practices in Indian companies, thus addressing a significant aspect of the research gap.

H5 The inclusion of an Indian corporation in any ESG Focus Funds or Sustainability Indexes has a detrimental effect on deceptive sustainability practices.

This hypothesis directly relates to the research gap by investigating how inclusion in ESG-focused investment portfolios and sustainability indices affects companies' environmental disclosure practices in the Indian context.

2.3.3 Financial capacity and ESG performance

Lastly, a company's market size and profitability reflect its financial capability to implement ESG improvements, which in turn affects their ESG performance communication (Delmas & Burbano, 2011). While global studies have explored the link between financial resources and ESG performance, there's a dearth of research focusing on Indian companies. This gap is critical as it obstructs a holistic understanding of how financial capacity influences the authenticity of sustainability efforts and mitigates greenwashing tendencies among Indian firms.

H6 Firms in India with substantial profitability and financial bandwidth exhibit reduced tendencies towards greenwashing behavior.

This hypothesis links the financial capacity of Indian companies to their ESG performance, contributing to filling the research gap by exploring the relationship between financial resources and genuine sustainability efforts in the Indian business landscape.

Financial bandwidth refers to the capacity of individuals or entities to manage financial resources effectively, encompassing factors like income, savings, access to credit, and risk tolerance.

By formulating hypotheses that directly tackle the identified research gap and aligning them with specific aspects of the Indian business context, this study aims to offer valuable insights into the drivers of greenwashing behavior in Indian companies.

3 Research methodology

3.1 Sample and data

Our selection of companies from the NIFTY 50 index was based on data from the 2022–2023 financial year. The NIFTY 50 is a key index of the NSE, comprising highly liquid blue chip Indian securities from 50 leading companies by market capitalization. It represents a diverse range of industries and is widely recognized as a reliable gauge of the Indian stock market (NSE Indices Methodology Document, 2021). All data utilized in our examination originate from the identical period. We acquired ESG ratings for the companies in our sample from Thompson Reuters for evaluating performance and from Bloomberg Terminal for assessing disclosure, drawing upon the methodologies employed in prior research (Yu et al., 2020; Beloskar & Rao, 2022). Company-specific information such as net profits, board composition, the presence of independent directors, cross-listing on foreign exchanges, inclusion in sustainability benchmarks, participation in ESG focused vehicles and market capitalization data were sourced from annual report of each company and NSE's official website. Annual reports and the NSE's official website are considered reliable data sources due to their authoritative nature and the rigorous regulatory oversight governing the information they provide. It's important to mention that LTIMindtree Ltd is designated as having incomplete data and is therefore omitted from the sample and any ensuing computations.

3.2 Calculation of greenwashing scores

3.2.1 Step I

In accordance with the existing studies in this field (Ruiz-Blanco et al., 2021; Yu et al., 2020; Sensharma et al., 2022), this research likewise characterizes companies as 'green washers' when they seem to release significant amounts of information, ostensibly demonstrating transparency. However, upon closer assessment of their ESG-based parameters, these companies tend to underperform. The disparity between disclosure and performance, if positively skewed, signifies a heightened propensity for greenwashing behavior within that entity. Hence, we formulate the following equation based on the previous literatures and definitions (Liu et al., 2024; Sensharma et al., 2022; Yu et al., 2020):

$$Greenwashing\,Score = (ESG\,Disclosure\,Score) - (ESG\,Performance\,Score) \quad (1)$$

3.2.2 Step II

To evaluate a company's ESG disclosure, we utilize the Bloomberg ESG disclosure score, as referenced in prior research studies (Liu et al., 2024; Sensharma et al., 2022; Yu et al., 2020; Tamimi & Sebastianelli, 2017; Bosco & Misani, 2016; Hartmann & Uhlenbruck, 2015; Ioannou & Serafeim, 2012). This score measures the extent to which a firm discloses ESG-related information to the public, without assessing its actual ESG performance. It encompasses all ESG data disclosed by the firm, regardless of whether it is positive or negative. The Bloomberg disclosure score is proprietary and is calculated based on over 900 key disclosure indicators such as direct CO2 emissions, total energy consumption, total water use, hazardous waste management, diversity in the workforce, workplace safety incidents, board meeting attendance, and political contributions. These indicators are categorized into separate scores for each ESG dimension, which are then aggregated to form the overall Bloomberg ESG disclosure score for each firm. The score ranges from 0.1 for minimal ESG data disclosure to 100 for comprehensive disclosure across all ESG data points tracked by Bloomberg. A higher Bloomberg ESG disclosure score indicates a greater extent of non-financial information disclosure.

For assessing firms' performance across ESG dimensions, we utilize the Asset4 three pillar scores covering environmental, social, and governance aspects. These scores are widely adopted by scholars as indicators of a company's performance in these dimensions (Liu et al., 2024; Sensharma et al., 2022; Ioannou & Serafeim, 2012; Hartmann & Uhlenbruck, 2015; Rees & Rodionova, 2015; Del Bosco & Misani, 2016). Thomson Reuters provides the Asset4 performance scores, which compare a company's relative performance in E, S, and G aspects with the Asset4 universe. According to Thomson Reuters (2019), these scores encompass a broad range of ESG metrics, from emissions reduction to employment quality. The ESG performance scores range from 0 to 100, with higher scores indicating superior performance. However, to ensure a meaningful comparison between the disclosure and performance scores, we adjust the performance scores using a weighting scheme consistent with the disclosure scores. This adjustment aligns the weights of the E, S, and G components for our ESG disclosure and performance measures.

Therefore, our Eq. 1 will be transformed to:

$$\begin{aligned} Greenwashing\ Score \; = \; & (Bloomberg\, ESG\, Disclosure\, Score) \\ & - \; (Thompson\, Reuters\, ESG\, Performance\, Score) \end{aligned} \tag{2}$$

3.2.3 Step III

Following, researchers convert the ESG disclosure and performance scores into ratios by dividing each by 100, ensuring they are bounded between 0 and 1 Subsequently, we standardize both scores to a uniform scale by subtracting the mean and dividing by the standard deviation. The greenwashing score for a corporation is determined by the difference between its standardized ESG disclosure score and its standardized ESG performance score. In instances where a company does not provide any indicators for one or both types of ratings, we interpret this as a lack of data for computing the comparative greenwashing rating.

In conclusion, to compute greenwashing score for firm:

$$\begin{aligned} Greenwashing\ Score \; = \; & (normalized\, Bloomberg\, ESG\, Disclosure\, Score) \\ & - \; (normalized\, Thompson\, Reuters\, ESG\, Performance\, Score) \end{aligned} \tag{3}$$

Researchers move forward by implementing the greenwashing definition and scoring methodology on Indian companies listed in the NIFTY 50 index for the year 2023. Through this process, we identify companies exhibiting elevated greenwashing scores and assign quantifiable scores to each entity.

A notably elevated greenwashing score suggests a likelihood of the company participating in greenwashing practices, stemming from an asymmetry between ESG disclosures and actual performance, where disclosures overshadow performance. Conversely, a markedly negative score could signify an understatement of the company's ESG accomplishments, driven by an imbalance favoring ESG performance.

3.3 Variables and regression model

The selection of independent variables in this study, namely External Scrutiny and Compliance, Internal Governance, and Financial Bandwidth, is grounded in theoretical frameworks from agency theory, stakeholder theory, and legitimacy theory.

External Scrutiny and Compliance are included as independent variables due to their relevance in agency theory. Agency theory posits that companies may engage in greenwashing behaviors to mitigate agency conflicts and align management interests with shareholders (Jensen & Meckling, 1976). External Scrutiny reflects the level of scrutiny and oversight exerted by external stakeholders, such as regulators, investors, and the public, on a company's environmental claims. Compliance measures the company's adherence to environmental regulations, which can influence its greenwashing practices (Hahn & Kühnen, 2013).

Internal Governance is another independent variable included based on stakeholder theory. Stakeholder theory emphasizes the influence of various stakeholders, including investors, customers, employees, and communities, on a company's environmental behavior (Freeman, 1984). Internal Governance encompasses the company's internal policies, practices, and structures related to environmental responsibility and transparency, which can impact its greenwashing tendencies (Fassin & Gosselin, 2011).

Financial Bandwidth is a crucial independent variable considered in this study, aligning with legitimacy theory. Legitimacy theory suggests that companies strive to maintain legitimacy by conforming to societal expectations, including environmental concerns (Suchman, 1995). Financial Bandwidth assesses the financial resources available to a company for implementing genuine sustainability initiatives versus potentially engaging in greenwashing practices (Salzmann et al., 2005).

Delmas and Burbano (2011) report that attributes of companies such as profitability and firm size could also impact environmentally motivated misleading practices. Hence, the selection of Market Capitalization and Profitability as control variables aligns with prior research in the field of corporate sustainability and greenwashing behavior. Studies have shown that financial factors, such as company size and profitability, can significantly impact companies' environmental performance and reporting practices (Hahn & Kühnen, 2013; Salzmann et al., 2005). Therefore, these variables were chosen to ensure that any observed effects of the independent variables on the Greenwashing Score are not solely attributed to differences in market size or financial performance.

By incorporating these independent variables and their theoretical underpinnings into the analysis of the Greenwashing Score, this study aims to contribute to a deeper understanding of the mechanisms driving greenwashing behavior and the factors that can mitigate or exacerbate it within the context of corporate sustainability practices.

To empirically examine the connection between the hypothesized elements and the Greenwashing Score, researchers employ a panel regression framework. The use of a panel regression model is well-supported by previous research methodologies employed in studying corporate sustainability practices. For instance, Sensharma et al. (2022) utilized a similar panel regression framework in their study on environmental performance and disclosure practices, highlighting its effectiveness in capturing the dynamics and complexities of sustainability-related factors within organizations. This methodological alignment not only facilitates comparability of results but also ensures consistency with established practices in the research domain. The specifications of the regression models are detailed below:

Model 1: Greenwashing Score = Constant + (Listed on Overseas Markets) + (Market Cap and Profitability) + (Size of a Board) + (Number of Independent Directors) + (Number of shares held by Institutional Shareholders).

Model 2: Greenwashing Score = Constant + (Inclusion in Sustainability Benchmark) + (Market Cap and Profitability) + (Size of a Board) + (Number of Independent Directors) + (Number of shares held by Institutional Shareholders).

Model 3: Greenwashing Score = Constant + (Inclusion in ESG-Oriented Investments/funds) + (Market Cap and Profitability) + (Size of a Board) + (Number of Independent Directors) + (Number of shares held by Institutional Shareholders).

Further examination will be conducted to explore the correlations within each set of independent variables, identifying key components within those variables that demonstrate statistical significance.

3.4 Result and analysis

In our dataset of calculated greenwashing scores, we observed that approximately 47% of the companies highlighted showed positive greenwashing scores (see Table 1). Notably, these companies tended to have high disclosure scores but relatively lower performance scores. Yu et al. (2020) examined the relationship between ESG performance scores and ESG disclosure scores across different countries. They classified enterprises based on their respective nations and graphed their ESG achievement ratings on the y-axis against their ESG disclosure ratings on the x-axis. The analysis suggested that corporations situated in nations positioned beneath the regression line could lean towards greenwashing behaviors across various ESG aspects. In their analysis, India was slightly above the regression line, suggesting that Indian firms are relatively less involved in greenwashing compared to countries like Japan, South Korea, Brazil, China, Indonesia, Argentina, Qatar, Egypt, and Thailand. A similar study was conducted by Sensharma et al. (2022) focusing on the period from 2019 to 2020. It's important to note that our study's timeframe might have captured a period with reduced greenwashing prevalence, indicating a shift towards more authentic green practices or better regulatory oversight. Our findings could also be influenced by significant regulatory changes, such as SEBI's introduction of a new ESG reporting framework in May 2021 called 'Business Responsibility and Sustainability Reporting'. This structure necessitates that the leading 1000 publicly traded enterprises, as determined by their market value, divulge their sustainability achievements starting from the financial year 2022 to 2023 and uphold openness with significant parties involved (SEBI, 2021). The impact of such regulatory measures on companies' greenwashing behaviors may be reflected in the disparities observed between our study and Sensharma et al. (2022). Overall, these findings highlight a dynamic landscape regarding greenwashing practices, shaped by regulatory shifts, industry trends, and corporate strategies.

Out of the sampled companies, 47% exhibit some level of greenwashing behavior, with only 7 companies possessing greenwashing scores exceeding 1. Notably, a significant portion of these companies are concentrated in the Automobile and Financial Service sectors. Specifically, Bajaj Auto Ltd. emerges with the highest greenwashing score in the Automobile sector, while Nestle India Ltd. records the lowest greenwashing score in the FMCG sector. The Energy sector stands out with the highest average greenwashing score at 1.03, whereas the FMCG sector exhibits the lowest average greenwashing score at -0.68. Notably, ITC is the sole FMCG company identified with greenwashing behavior, while Tech Mahindra represents the only instance of greenwashing within the IT sector. In contrast, none of the four Tata companies display greenwashing behavior, while all three Bajaj companies do.

In the context of automobile manufacturing companies in the sample, except for Tata Motors, all exhibit greenwashing behavior. Similarly, all companies operating within the Power sector demonstrate positive greenwashing scores. This observation can be attributed to the challenges faced by these companies in reconciling sustainability with their core business processes, many of which are not inherently sustainable by design (Pathak et al., 2016). Operational obstacles such as geographical and community-centric concerns, as well as conventional business practices, contribute to their relatively subdued ESG performance scores (Ghose, 2009). Conversely, the IT sector displays a lower average greenwashing score, possibly attributed to their adoption of contemporary business methodologies that prioritize reduced utilization of tangible resources and limited generation of detrimental waste materi-

Table 1 Calculated Greenwashing scores of NIFTY-50 companies

Sr. No.	Name of company	Sector	Calculated greenwashing score
1	Adani Enterprises Ltd	Metals & Mining	**0.38**
2	Adani Ports & Special Economic Zone Ltd	Services	**0.45**
3	Apollo Hospitals Enterprise Ltd	Healthcare	-1.11
4	Asian Paints Ltd	Consumer Durables	-0.39
5	Axis Bank Ltd	Financial Services	-0.39
6	Bajaj Auto Ltd	Automobile	**1.31**
7	Bajaj Finance Ltd	Financial Services	**0.98**
8	Bajaj Finserv Ltd	Financial Services	**0.78**
9	Bharat Petroleum Corporation Ltd	Oil & Gas	**1.20**
10	Bharti Airtel Ltd	Telecommunication	-0.23
11	Britannia Industries Ltd	FMCG	-0.08
12	Cipla Ltd	Healthcare	-1.25
13	Coal India Ltd	Oil & Gas	**0.58**
14	Divis Laboratories Ltd	Healthcare	-0.41
15	Dr Reddys Laboratories Ltd	Healthcare	-0.37
16	Eicher Motors Ltd	Automobile	**0.01**
17	Grasim Industries Ltd	Construction Materials	**0.82**
18	HCL Technologies Ltd	Information Technology	-1.43
19	HDFC Bank Ltd	Financial Services	-0.55
20	HDFC Life Insurance Company Ltd	Financial Services	-0.09
21	Hero MotoCorp Ltd	Automobile	**0.58**
22	Hindalco Industries Ltd	Metals & Mining	-1.10
23	Hindustan Unilever Ltd	FMCG	-1.48
24	ICICI Bank Ltd	Financial Services	-1.24
25	IndusInd Bank Ltd	Financial Services	**0.58**
26	Infosys Ltd	Information Technology	-1.04
27	ITC Ltd	FMCG	**0.29**
28	JSW Steel Ltd	Metals & Mining	**0.50**
29	Kotak Mahindra Bank Ltd	Financial Services	-1.47
30	Larsen & Toubro Ltd	Construction	**0.75**
31	Mahindra & Mahindra Ltd	Automobile	**1.18**
32	Maruti Suzuki India Ltd	Automobile	**1.22**
33	Nestle India Ltd	FMCG	-1.60
34	NTPC Ltd	Power	**1.10**
35	Oil & Natural Gas Corpn Ltd	Oil & Gas	**1.18**
36	Power Grid Corporation of India Ltd	Power	**0.62**
37	Reliance Industries Ltd	Oil & Gas	-1.45
38	SBI Life Insurance Company Ltd	Financial Services	**0.48**
39	State Bank of India	Financial Services	**0.36**
40	Sun Pharmaceuticals Industries Ltd	Healthcare	-0.38
41	Tata Consultancy Services Ltd	Financial Services	-0.67
42	Tata Consumer Products Ltd	FMCG	-0.83
43	Tata Motors Ltd	Automobile	-0.73
44	Tata Steel Ltd	Metals & Mining	-0.90
45	Tech Mahindra Ltd	Information Technology	**1.05**

Table 1 (continued)

Sr. No.	Name of company	Sector	Calculated greenwashing score
46	Titan Company Ltd	Consumer Durables	-0.91
47	UltraTech Cement Ltd	Construction Materials	**0.80**
48	UPL Ltd	Chemical	-1.04
49	Wipro Ltd	Information Technology	-0.40

Source: Computed by Authors

als (Economic Times, 2020). Within the Fast-Moving Consumer Goods (FMCG) domain, the limited occurrence of greenwashing tendencies can be linked to the sector's extensive engagement in social welfare initiatives (Singh, 2016). While there are slight indications of greenwashing practices within ITC Limited, these can be ascribed to ITC's involvement in the tobacco sector (Manjhi, 2015) and their diverse business portfolio. Furthermore, ITC's ongoing efforts to enhance their ESG performance serve to mitigate and reduce the extent of greenwashing behavior in comparison to other companies in the sector.

The distribution of greenwashing behavior across different sectors provides valuable insights into the varied approaches and challenges faced by companies in integrating sustainability into their business practices. The concentration of greenwashing behavior within certain sectors highlights sector-specific dynamics and contextual factors that influence corporate sustainability performance. The prevalence of greenwashing behavior in the Automobile and Financial Service sectors underscores the need for greater scrutiny and accountability within these industries. Companies operating in these sectors often face pressure to meet short-term financial targets and may resort to greenwashing tactics to enhance their public image without making substantive changes to their practices. The identification of specific companies within these sectors, such as Bajaj Auto Ltd., emphasizes the importance of targeted interventions and industry-specific initiatives to address greenwashing practices effectively. The contrasting performance of companies in the IT sector, characterized by lower average greenwashing scores, underscores the role of industry-specific factors and organizational culture in shaping sustainability outcomes. Companies in the IT sector leverage technology-driven solutions and innovation to minimize environmental impact and prioritize corporate social responsibility initiatives, contributing to a more favorable sustainability profile. Similarly, the limited occurrence of greenwashing behavior in the FMCG sector can be attributed to the sector's proactive engagement in social welfare initiatives and the implementation of robust governance structures. Companies like Nestle India Ltd., with lower greenwashing scores, exemplify the sector's commitment to transparency and accountability in addressing environmental and social challenges.

Overall, the findings highlight the importance of sector-specific strategies and tailored approaches to address greenwashing behavior effectively. By understanding the unique drivers and barriers to sustainability within each sector, policymakers, investors, and other stakeholders can develop targeted interventions and initiatives to promote responsible business practices and enhance corporate sustainability performance.

3.5 ESG Disclosure vs. ESG performance

In our research, we examined the connection between the greenwashing score, which served as our dependent variable, and a set of factors we hypothesized to influence greenwashing behavior. These factors were categorized into three distinct models for regression analysis (see Table 2).

3.6 Model 1

In this model, we found a significant and negative correlation between a corporation's status of being listed on multiple exchanges and its greenwashing score. A previous examination of companies by Jannasari and Rizki (2020) in Indonesia discovered that being listed on any overseas stock market has a significant beneficial impact on CSR efforts. Additionally, further research by Boubakri et al. (2016a, b) has indicated that CSR performance experiences a notable enhancement subsequent to cross-listing on USA markets and a subsequent decline after being delisted from these markets.

The inverse relationship between greenwashing score of a firm and cross-listing status of a firm can be attributed to several factors. Initially, companies listed on multiple exchanges are subjected to more stringent disclosure mandates and heightened external scrutiny, particularly from investors and regulatory entities in foreign jurisdictions. This heightened scrutiny leaves less room and incentive for greenwashing practices, leading to higher-quality disclosure and improved ESG performance. Our results validate our hypothesis and previous literature, suggesting that cross-listed firms face stricter disclosure requirements and external scrutiny, leaving them with less room and incentive for greenwashing (Yu et al., 2020). These conditions lead to higher-quality disclosure and improved ESG performance. The implications of this relationship are significant for companies operating in international markets. Cross-listing can serve as a mechanism for enhancing ESG performance and

Table 2 Regression results

Parameters	Model I		Model II		Model III	
	R^2	0.4339	R^2	0.3562	R^2	0.3874
	Adjusted R^2	0.4288	Adjusted R^2	0.2238	Adjusted R^2	0.3374
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
Intercept	11.0857		11.1248		7.8211	
Listed on Overseas Markets	-0.8589	***	-	-	-	-
Inclusion in Sustainability Benchmark	-	-	-0.3354		-	-
Inclusion in ESG-Oriented Investments/funds	-	-	-	-	-0.5413	*
Market Capitalization Size '22 (in Indian Rupees)	-0.2984	***	-0.5065	***	-0.2893	
Net Earnings in Crores of Rupees (Profitability)	0.045		0.0339		-0.0188	
Size of a Board	0.1334	***	0.2187	***	0.1997	***
Number of Independent Directors	-0.2378	***	-0.1155	***	-0.1984	***
Percentage of Institutional Shareholders	-0.2809		-0.3124		-0.2891	

F-test outcomes demonstrate significance

*, ** and *** denote significance at the 10%, 5%, and 1% thresholds, respectively

reducing the incidence of greenwashing, thereby fostering investor trust, attracting responsible capital, and aligning with global sustainability trends. However, it also underscores the importance of robust corporate governance, transparent reporting practices, and authentic sustainability initiatives to maintain credibility and long-term value creation.

We have observed a positive and statistically significant correlation between size of a board of an organization and its greenwashing score. Interestingly, this finding contradicts our initial supposition, which proposed an inverse relationship. Upon closer examination and consulting existing literature regarding board dimensions (Adams & Mehran, 2012), several explanations surfaced to elucidate this unexpected outcome. While larger board sizes may enhance monitoring capabilities, they can also lead to coordination challenges and slower decision-making processes, potentially explaining the direct relationship found in our regression analysis. Furthermore, research by Jensen (1993) suggested that boards consisting of more than eight members are less likely to operate effectively. It's worth noting that the mean board size in our dataset stands at approximately twelve, with only ten out of 49 companies having a board size equal to or less than eight.

Furthermore, we found that factors such as the market cap of a firm and quantity of autonomous directors on the board significantly influence the company's greenwashing score. These results are in line with our initial conjecture and previous investigations into board constitution, which propose that greater board autonomy enhances social accountability and enables a well-rounded approach encompassing both financial and social performance (Arayssi et al., 2020).

3.7 Model 2

The findings of this model- regression analysis- shed light on the intricate relationship between a corporation's participation in sustainability benchmarks and its greenwashing practices. Despite initial expectations, the results failed to reveal a significant correlation between a corporation's inclusion in sustainability benchmarks and its greenwashing score. This unexpected outcome prompts a deeper exploration into the complexities surrounding corporate sustainability practices and the efficacy of current benchmarking mechanisms. The absence of a significant relationship challenges conventional assumptions regarding the effectiveness of sustainability benchmarks in mitigating greenwashing behaviors. One plausible explanation for this discrepancy could be the limitations inherent in the current methodologies used to assess greenwashing. While sustainability benchmarks may impose stringent criteria and require transparent reporting, they may not capture the nuanced tactics employed by corporations to manipulate their environmental image. Greenwashing strategies often involve subtle messaging and selective disclosure, which may evade detection by traditional evaluation frameworks.

Moreover, the lack of a significant correlation does not necessarily negate the potential benefits of participation in sustainability benchmarks. It is essential to recognize that inclusion in these indices signifies a commitment to environmental responsibility and transparency, which can have intrinsic value beyond its immediate impact on greenwashing scores. Corporations may derive reputational benefits from aligning with sustainability initiatives, regardless of their direct influence on greenwashing metrics. Additionally, the absence of a significant correlation may also indicate the need for refinement and enhancement of existing sustainability benchmarks. Continuous monitoring and adaptation of evaluation criteria are essential to keep pace with evolving corporate practices and emerging forms of greenwashing. Incorporating more comprehensive metrics that account for qualitative aspects of sustainability performance and scrutinizing corporate disclosures with greater rigor could enhance the effectiveness of benchmarking initiatives in detecting and deterring greenwashing practices. Furthermore, the findings underscore the complexity of corporate sustainability efforts and the multifaceted nature of greenwashing. Sustainable practices encompass a broad spectrum of environmental, social, and governance dimensions, each subject to interpretation and manipulation. As such, evaluating the sincerity and effectiveness of corporate sustainability commitments requires a nuanced understanding of organizational motivations and behaviors, which may extend beyond the scope of quantitative analysis alone. Nevertheless, market capitalization, board size, and the number of independent directors on the board remained significant predictors of a company's greenwashing score.

In conclusion, while the results of this study may challenge prevailing assumptions regarding the relationship between participation in sustainability benchmarks and greenwashing practices, they also highlight opportunities for further research and improvement. Addressing the limitations identified in this analysis and advancing our understanding of corporate sustainability will require interdisciplinary collaboration, innovative methodologies, and ongoing dialogue between stakeholders. By interrogating the complexities of greenwashing and refining our approaches to sustainability assessment, we can foster greater transparency, accountability, and genuine environmental stewardship within the corporate sector.

3.8 Model 3

In this model, our investigation centered on examining the correlation between a corporation's participation in Indian ESG-centric investment vehicles and its greenwashing score. Indian ESG focus funds represent a burgeoning trend in India's financial landscape, with approximately 10 such funds currently operational (Morningstar, 2021). Employing regression analysis, with an allowance for a 10% error margin due to the nascent nature of these funds, revealed a notable and adverse association between a firm's greenwashing score and its inclusion in Indian ESG-centric funds. The negative relationship observed between a firm's greenwashing score and its involvement in Indian ESG-centric funds offers valuable insights into the dynamics of sustainable investing and corporate behavior in India's financial markets. Several factors contribute to this observed association, reflecting the evolving landscape of ESG integration and the growing significance of responsible investing practices.

Firstly, companies included in ESG focus funds undergo rigorous ESG screening and evaluation processes conducted by fund managers. These screening mechanisms prioritize companies demonstrating genuine commitment to environmental, social, and governance principles while penalizing those engaged in greenwashing practices (Przychodzen et al., 2016). As a result, inclusion in ESG-centric funds creates a strong disincentive for companies to engage in deceptive sustainability practices, fostering a culture of transparency and accountability within the corporate sector. Furthermore, the heightened awareness and importance of ESG factors among investors and regulatory bodies have amplified the scrutiny placed on companies' sustainability performance (Boffo & Patalano, 2020). Companies cognizant of their inclusion in ESG focus funds recognize the significance of aligning their business practices with investor expectations and regulatory requirements to mitigate reputational risks associated with greenwashing. Consequently, these companies are more inclined to adopt authentic sustainability measures, thereby enhancing their long-term sustainability performance and attractiveness to socially responsible investors (Raghunandan & Rajgopal, 2022). Conversely, companies with higher greenwashing scores face challenges accessing ESG-focused capital and may suffer reputational damage, diminishing their ability to attract responsible investors (Liu et al., 2024). The adverse consequences of greenwashing extend beyond financial implications, affecting a company's credibility and stakeholder trust, which are vital for long-term business sustainability. As Indian ESG focus funds gain prominence and investor interest continues to grow, their role in curbing greenwashing behaviors is expected to become even more pronounced (Arayssi et al., 2020). These investment vehicles serve as a validation of a company's genuine commitment to ESG principles, signaling its alignment with sustainable business practices and attracting investors seeking to allocate capital responsibly.

In conclusion, the observed negative association between a company's greenwashing score and its participation in Indian ESG-centric funds underscores the transformative potential of responsible investing in fostering corporate accountability and sustainability. Moving forward, continued vigilance, regulatory oversight, and industry collaboration will be essential to ensure the integrity and efficacy of ESG integration practices, thereby advancing sustainable development goals and fostering a more resilient and responsible financial ecosystem in India.

4 Conclusion

This study delves into the issue of greenwashing within the realm of ESG considerations among major Indian corporations. Our approach involves integrating these ESG aspects into the process of selecting assets, distinguishing responsible investment from traditional ethical investment methodologies. Notably, responsible investment allows for the maximization of returns without necessarily excluding companies, contingent upon investors assessing risks linked to environmental, social, and governance factors. The importance of comprehending greenwashing has surged due to growing demands for enhanced ESG performance and more dependable ESG data to complement financial disclosures. Navigating the landscape of ESG data disclosure presents persistent hurdles, from unverified sustainability reports to the lack of cohesive regulatory standards and oversight. Scholars stress the pivotal link between a company's transparent communication of ESG factors (symbolic) and its tangible actions on ESG issues to combat greenwashing, which hampers investors' ability to leverage ESG data effectively. Our study seeks innovative strategies to curb greenwashing among corporations. We push the boundaries by comprehensively addressing all dimensions of ESG- environmental, social, and governance- and developing bespoke greenwashing assessments for major Indian firms, drawing on Bloomberg's ESG disclosure ratings and Asset4's ESG performance evaluations.

Our examination indicates that various elements, such as company-specific attributes, participation in ESG-oriented investments, and listing on international markets, can act as deterrents against companies resorting to greenwashing practices. Specifically, a higher proportion of independent directors and inclusion in sustainability benchmarks or Indian

ESG-oriented investment vehicles substantially diminishes the inclination for greenwashing among firms. These discoveries underscore the significance of oversight and conscientious engagement by investors in curtailing greenwashing, as companies subject to increased scrutiny demonstrate decreased tendencies for such behaviors. In summary, our investigation contributes to the comprehension of sustainability within financial markets, disclosure practices regarding ESG data, and ethical investment strategies. Empirical results illuminate the factors shaping the greenwashing tendencies of large-scale Indian enterprises and stress the necessity of nurturing oversight mechanisms and advocating for the appointment of independent directors to corporate boards in the Indian context.

4.1 Limitations and future research areas

This paper utilizes the methodology proposed by Yu et al. (2020) to gauge greenwashing, acknowledging potential errors associated with this measure. Despite its limitations, this approach was chosen due to its reliance on objective ESG disclosure and data from a comprehensive database, thus mitigating the subjectivity often associated with textual analysis (Liu et al., 2024). Consequently, accurately measuring greenwashing in ESG reports remains a challenge, presenting an area ripe for further exploration and the development of more precise measurement techniques in subsequent studies.

Our primary focus centers on large-scale enterprises in India, acknowledging that smaller businesses often encounter hurdles in integrating environmental, social, and governance considerations into their operations due to resource constraints. Consequently, smaller companies may necessitate additional assistance from regulatory bodies and governmental entities. The ongoing investigation into whether smaller businesses tend to engage in ESG greenwashing continues to captivate public attention, promising fresh insights into corporate sustainability practices.

Although this study recognizes its small sample size as a limitation in establishing and expanding the understanding of greenwashing behavior and related hypotheses, it emphasizes that the findings should be interpreted judiciously, given this constraint. A larger and more diverse sample would likely yield deeper insights and more robust conclusions. The objective of this research is to support scholars in their endeavors to broaden, examine, and enhance the understanding of ethical investment practices within the sphere of ESG considerations in India. Subsequent inquiries may entail a retrospective examination of Indian enterprises over various fiscal periods, scrutinizing patterns in ESG disclosures, performance metrics, ethical integrity, and their associations with market sentiments and financial results. Exploring novel pathways, such as refining inadequacies and gaps within ESG evaluation frameworks and criteria for admission or exclusion from sustainability indices or ESG-focused investment portfolios, offers promising avenues for innovation. The insights derived from such investigations could contribute to the refinement of regulatory frameworks, the formulation of novel indicators, and the proposal of technical innovations to address obstacles in the successful implementation of socially responsible investment strategies in India.

Data availability The data supporting the findings of this study are available from the Thompson Reuters Database and Bloomberg Terminal; however, access to these data is restricted as they were utilized under license for the current study and, therefore, are not publicly accessible. The remaining data, derived from the company's annual report for the financial year 2022-23, is subject to restrictions on availability, as ongoing research initiatives by the authors are utilizing the same dataset.

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Authors and Affiliations

Mithilesh Gidage[1,2] · Shilpa Bhide[1] · Yuriy Bilan[3]

✉ Mithilesh Gidage
mithilesh.gidage@gmail.com

Shilpa Bhide
bhides@unipune.ac.in

Yuriy Bilan
yuriy_bilan@yahoo.co.uk

[1] Department of Management Sciences (PUMBA), Savitribai Phule Pune University, Pune, Maharashtra, India

[2] Fixed Income Engineering, Morningstar, Inc., Chicago, Illinois, United States

[3] Department of Trade and Finance, Faculty of Economics and Management, Czech University of Life Sciences Prague, Prague, Czech Republic