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# Talk or walk? The board of directors and firm environmental strategies

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## Abstract

Drawing on legitimacy theory, we study the nexus between green communication and the implementation of green practices, and in particular, we focus on the determinants of their discrepancy. Based on a large sample of firms in 58 countries over a 19-year period, we employ an index to measure the discrepancy between green operations and the communicated practices, mapped to each firm's board structure. The results provide the first empirical evidence that larger, more gender-diverse, and more independent boards are associated with a preponderance of green communication over implementation. We interpret this imbalance as a strategy to participate in the public discourse to gain moral legitimacy. Conversely, CEO duality is associated with a discrepancy in the opposite direction, with firms focusing more on implementing green practices than talking about them, suggesting that these firms aim mainly at gaining pragmatic legitimacy from their stakeholders.

**KEYWORDS**
board of directors, corporate board, environmental communication, environmental practices, greenwashing, walk and talk

## 1 | INTRODUCTION

Scholars have paid considerable attention to green operational practices (Berrone et al., 2010). They are activities that firms undertake with the aim of reducing their environmental footprint (Ortiz-de-Mandojana & Bansal, 2016) and are becoming increasingly important as a way to contribute to mitigating climate change (UNDESA, 2013). However, when firms find it difficult or impossible to reconcile their commercial and environmental goals, they may change their approach toward seeking legitimacy (Scherer et al., 2013; Scherer & Palazzo, 2011). This can lead to a misalignment between the image the firm projects to external stakeholders and its efforts to implement sound green operational practices. We examine this phenomenon using a discrepancy measure that helps determine whether such discrepancies reflect different approaches to seeking legitimacy.

The impact of board structure on environmental performance has been extensively analyzed in the literature (Enciso-Alfaro & García-Sánchez, 2022). However, scholars have mainly focused on the overall environmental performance of firms, often overlooking the implementation of more specific practices–such as pollution prevention, green supply chains, and green product development. Another important gap in the existing literature is the focus on the board impact on the misalignment between communication and operational green practices.

For most listed firms, the power over a company's environmental practices rests with the board of directors. They develop the corporate strategy and allocate the resources to various programs. As such, the influence of the board on green practices has received some attention in the literature (Ben-Amar et al., 2017; de Villiers et al., 2011; Post et al., 2011). However, to the best of our knowledge, no study has distinguished between green communication and green

operations, and the potential discrepancy between the two in light of board structure. As Aguilera et al. (2021)note, novel international evidence is needed on the relationship between specific board characteristics, environmental performance areas, and the disclosure practices related to green activities. Indeed, corporations are under increasing pressure to justify their actions in environmental and social terms, and environmental communication is an important channel through which a firm's legitimacy is established and nurtured in the eyes of stakeholders and society. As Scherer and Palazzo (2007) suggest, organizations seek legitimacy in response to stakeholder demands, and the most effective strategy for achieving legitimacy is to engage in moral reasoning dialogue with stakeholders. We argue that several board characteristics can be either triggering or inhibiting forces behind organizational communication strategies used to maintain and gain legitimacy. While individual corporate governance mechanisms are typically effective in combination (Aguilera et al., 2021), in our work we focused on four of the most effective governance mechanisms (board size, independence, gender diversity and CEO duality) for boosting environmental outcomes of a firm, which have been the subject of previous studies in the literature (Chams & García-Blandón, 2019; Endo, 2020; Jizi, 2017; Naciti, 2019). Based on this premise, we examine board size, gender diversity, independence, and CEO duality as determinants of the walk/talk discrepancy. We then validate our theoretical framework using a large sample of listed firms from both developing and developed countries over a relatively long period of time.

Our study makes several important contributions to the literature on environmental management, corporate governance, and business ethics more broadly. Using the legitimacy theory framework, we seek to answer the following main research question: *Are board characteristics relevant determinants of different legitimacy seeking strategies, resulting in a discrepancy between green communication and the implementation of green practices?*

First, we contribute to the literature stream on walk and talk efforts (Schoeneborn et al., 2020; Schons & Steinmeier, 2016; Testa, Boiral, & Iraldo, 2018; Testa, Miroshnychenko, et al., 2018), providing new insights into which board characteristics may drive the discrepancy between environmental operations and communication practices. Our analysis shows that board characteristics can either act as a deterrent to additional focus on communication (when the CEO also chairs the board) or as a catalyst for excessive reporting (when the board's gender diversity, independence, and size increase). To the best of our knowledge, this study is one of the first empirical attempts to disentangle the role of board structure in the discrepancy between green communication and operational practices.

Second, we look beyond the usual frameworks based on agency theory and resource-based theory to explain why certain board characteristics can affect the discrepancy between environmental communication and operational practices. We posit that this discrepancy can be interpreted from a legitimacy perspective. We argue that an imbalance in communication at the expense of implementation maybe the result of a firm's efforts to participate in the public discourse to increase the firm's desirability, justify its existence, and establish moral legitimacy. In addition, we suggest that greater emphasis on the green practice dimension may be associated with an effort to establish pragmatic legitimacy, that is, legitimacy in the eyes of stakeholders who have directly something to gain from this green activity.

Finally, by using a large cross-national sample over a relatively long period of time and focusing on the discrepancy between environmental communication and operational practices, we significantly extend the studies on the determinants of corporate environmental behavior that have overlooked the board-level drivers of this misalignment (Lyon & Montgomery, 2015). Moreover, most studies on this topic are based on a single-country setting (Aguilera et al., 2021). Importantly, our results are robust to potential unobservable heterogeneity, reverse causality, measurement error, dynamic panel bias and floor/ceiling effects. In addition, we control for potential survivorship bias.

## 2 | THEORETICAL BACKGROUND

The relationship between corporate governance mechanisms and environmental performance has long been recognized in the management literature (Aguilera et al., 2021; Bolourian et al., 2021; Johnson & Greening, 1999; Miroshnychenko et al., 2019; Prado-Lorenzo & Garcia-Sanchez, 2010; Villalba-Ríos et al., 2022). Among these governance mechanisms, we focus on the characteristics of boards and their different attitudes towards environmental issues, both from the perspective of adopting green practices and communication strategies to report on environmental activities, and especially any discrepancies between the two.

The Board of Directors plays a crucial role in interpreting the demands of external stakeholders and designing strategies to satisfy these demands (Hoffman & Ocasio, 2001; Johnson et al., 1996; Van den Berghe & Levrau, 2004). It also constitutes the corporate governance mechanism responsible for all organizational actions aimed at optimizing firm efficiency (Homroy & Slechten, 2019; Ortiz-de-Mandojana & Bansal, 2016), whether these actions are internal, as is the case of hiring, firing, remunerating and monitoring management, or external, such as developing external relations, increasing the firm's legitimacy and public reputation, and maintaining a bridge between the firm and its stakeholders. The board is also the link between the institutional context and the firm (Ben Selma et al., 2022; Hillman & Dalziel, 2003; Kostova & Zaheer, 1999). It has the autonomy to decide how the firm will respond to external pressures, thereby influencing the balance between its talk and its walk. Understanding how and to what extent the structure of the board can influence organizational actions is, therefore, useful and can lead to greater awareness of the reasons and motives behind different environmental strategies and communication approaches.

We adopt a legitimacy theory perspective to explain the discrepancy between green communication and green practice implementation. Indeed, the lack of a theory that can capture all the nuances of this relationship has traditionally led to the adoption of a multi-theoretical framework (Bolourian et al., 2021; Moussa et al., 2020; Shaukat et al., 2016), namely agency theory and resource dependence theory. According to agency theory, there is a conflict of interest between management (short-term oriented) and shareholders (long-term oriented) (Fama & Jensen, 1983; Jensen & Meckling, 1976). The

consequence of this conflict is agency costs, which can be minimized by the effective monitoring function of the board of directors (Hillman & Dalziel, 2003). Therefore, in an agency theory framework, the board is responsible for monitoring the actions of managers (the agents) and protecting the interest of shareholders (the principals). An important determinant of the board's monitoring activity can be found in incentives; if incentives are aligned with shareholder interests, the board will perform effective monitoring (Jensen & Meckling, 1976). On the other hand, resource dependence theory focuses on the board's ability to provide resources. Hillman and Dalziel (2003) list several activities that can be included in this function, among which enhancing the firm's public image, providing expertise, advice, and counsel, facilitating the firm's access to resources, and building external relationships.

However, although these theories are commonly used to explain corporate governance mechanisms (Pandey et al., 2022), they cannot easily explain all the outcomes related to sustainability. As a result, researchers often adopt a mix of theories to explain their findings. Furthermore, we argue that agency theory and resource dependence theory are not sufficient to comprehensively explain why certain dimensions of sustainability strategies diverge, that is, a discrepancy between green communication and green practices. Therefore, in this paper we propose arguments that explain such discrepancies from the legitimacy theory perspective (Ashforth & Gibbs, 1990; Suchman, 1995). In particular, we develop our hypotheses based on a legitimacy theory framework, complementing it where possible with agency theory and resource dependence theory to obtain a more complete picture of the theoretical mechanisms.

## 2.1 | Boards and the discrepancy between green communication and green practices

In recent years, several studies have examined the relationship between different board types and environmental practices, focusing on either the firm's operations (Bernardi et al., 2002; Galbreath, 2011; Walls et al., 2012) or its disclosure practices (Godos-Díez et al., 2018; Lattemann et al., 2009). We argue that the discrepancy between the two is a consequence of the firm's legitimacy seeking strategy. Therefore, in the next sections, we discuss four board characteristics and whether they may be related to the discrepancy between the firm's walk and talk efforts.

Legitimacy is seen as a process by which organizations seek social approval for their actions (Kaplan & Ruland, 1991). According to Suchman (1995), different types of legitimacy can be identified in institutionalized processes: pragmatic, moral, and cognitive. Pragmatic legitimacy is related to the assessments of self-interested individuals in the organization's audience. These actors will tend to grant legitimacy to firms as long as they benefit in some way from the firm's activities. Pragmatic legitimacy, therefore, supports an instrumental view of environmental proactivity. Moral legitimacy takes an ethical approach and is based on stakeholder judgments about whether the firm's actions are consistent with its socially constructed value system. Cognitive legitimacy results from the perception that an organization and its externalities are taken for granted in the societal context, and is therefore the last type to be achieved (Castelló & Lozano, 2011; Ellerup Nielsen & Thomsen, 2018; Palazzo & Scherer, 2006).

While pragmatic legitimacy is strictly dependent on the condition that the legitimizer receives some form of benefit from an action, such as cost reductions, faster payment, or perhaps a macroeconomic advantage, moral legitimacy is considered superior because of the expectation that "moral concerns to some extent prove resistant to self-interested manipulations and to purely pragmatic considerations" (Palazzo & Scherer, 2006, p. 73). Therefore, moral legitimacy is more desirable regardless of whether it is consistent with the firm's business objectives (Zhang et al., 2013). In this paper, we focus on pragmatic and moral legitimacy, arguing that the degree of alignment between green communication and operational practices may provide an interesting perspective to examine the legitimacy seeking strategies of firms. According to Suchman (1995), the only way in which firms can acquire moral legitimacy is by participating in the public debate in which this legitimacy is generated. From an environmental perspective, participating in public debate is essential to implement systematic communication efforts that will contribute to maintaining and gaining moral legitimacy. Instead, pragmatic legitimacy is gained and maintained when firms make efforts to manage the needs of self-interested stakeholders. For example, consider the case where certain environmental policies are implemented because the firm is under pressure from customers or suppliers. Implementing these policies should provide the firm with pragmatic legitimacy if stakeholder needs are met.

It is reasonable to assume that if a firm seeks to maintain legitimacy by implementing green practices, it will align its communication with its implementation efforts. We classify firms exhibiting this coherent behavior as "Leader", while the firms' alternative coherent behavior of limited communication and implementation of green practices is classified as "Laggard"(Figure 1). However, we focus on the cases where there is a discrepancy between the two dimensions. We argue that when a more communication-focused strategy creates a discrepancy between disclosure and practice, firms will direct their efforts on gaining moral over pragmatic legitimacy ("Moral" strategy, Figure 1). We emphasize that this does not necessarily imply that the firms are misrepresenting or overstating their environmental efforts, that is, greenwashing in a nefarious sense, but rather that they are more inclined to participate in "explicit public discussion" (Suchman, 1995, p. 585) than implement practical initiatives. The basic tenet of this relationship is that self-interested stakeholders have an incentive to provide legitimacy to the firm, and this type of legitimacy-seeking strategy may, therefore, come with a lower corresponding communication effort, since these will be primarily directed towards a limited group of stakeholders (Pragmatic, Figure 1).

Within this theoretical framework, we examine how certain board characteristics can influence the degree of discrepancy between environmental communication and practices. Boards can make many decisions that affect how the firm interacts with its social context, in part determining its legitimacy. However, these decisions can also create a

| | | Green Practices | |
|---|---|---|---|
| | | Low | High |
| Green Communication | Low | Laggard | Pragmatic |
| | High | Moral | Leader |

**FIGURE 1** Firm walk/talk classification.

decoupling between communication and environmental efforts. For instance, the board may decide to sign the Global Compact, publish a sustainability report, or hire external auditors to validate the sustainability claims. As discussed above, we expect certain board characteristics to be related to the search for moral legitimacy through green communication. We also expect they can affect the discrepancy between green communication and the efforts to implement green practices. The direction of these effects would then seem to depend on the specific board characteristics and their relationship with the firm's environmental decisions.

## 2.2 | Board size

Much of the research to date explains the effect of board size on firm characteristics using agency theory and resource-based theory, with different predictions about the relationship between board size and environmental practices. Agency theory suggests that larger boards tend to be less efficient than smaller boards because they are less participatory and cohesive, resulting in a lower likelihood of implementing environmental practices (Kassinis & Vafeas, 2002). However, from a resource-based perspective, large boards can lead to better stakeholder representation through a larger pool of experts and access to critical resources. These include specific backgrounds and experiences that can increase the firm's sensitivity to stakeholder interests. As a result, resource dependence theory suggests that large boards are better able to pursue green operations (Endo, 2020; Liu, 2018; Miroshnychenko et al., 2019; Post et al., 2011, 2015).

From a communications perspective, larger boards are associated with a higher propensity for environmental disclosure (Giannarakis, 2014; Htay et al., 2012; Jizi, 2017; Rao et al., 2012). We extend this idea by suggesting that, for a given outcome in the implementation of green practices, larger boards are more likely to put greater effort into communicating their environmental activities. Larger boards have more resources and more time to devote to planning and communicating their environmental actions outside of the firm. As a result, they can achieve greater stakeholder representation and may benefit from collective intelligence (Endo, 2020). Thus, they may move beyond strategies aimed at maintaining pragmatic legitimacy with self-interested stakeholders and instead seek to implement strategies to gain moral legitimacy. The result may be consistent engagement in public discourse and a greater discrepancy between the efforts put into green practices compared with green communication. Hence, our first hypothesis:

> **H1.** Larger boards are positively associated with moral legitimacy-seeking strategies, leading to a positive discrepancy between green communication and operational practices.

## 2.3 | Board independence

The literature suggests that independent directors have incentives to effectively monitor management in a way that protects shareholder interests. Specifically, they contrast the short-termism of most managers with a focus on maximizing long-term value (Fama & Jensen, 1983). Outside directors are likely to have a broader stakeholder orientation when making strategic decisions. They are also more likely to consider potential penalties, negative media exposure, and the need to comply with environmental standards (Johnson & Greening, 1999).

Several empirical studies show that a higher proportion of independent directors on the board is a typical characteristic of socially and environmentally responsible organizations (Cosma et al., 2021; de Abreu et al., 2022; Endo, 2020; Jizi, 2017; Mallin et al., 2013; Post et al., 2011, 2015; Shaukat et al., 2016), and that independent directors have alternative views on environmental efforts compared with insiders. Independent directors are representatives of external stakeholders and often come from diverse backgrounds, such as academia, non-profits, and law (Johnson & Greening, 1999; Williams, 2003). Moreover, studies suggest that independent directors are associated with improved corporate social responsibility (CSR) (Cuadrado-Ballesteros et al., 2015; Jizi, 2017) and environmental information disclosure (Liao et al., 2015; Post et al., 2011; Rao et al., 2012), although contrasting results have recently been observed across Latin American countries (de Abreu et al., 2022).

We add to this literature by arguing that the diverse backgrounds of independent directors and their external perspectives may be natural

triggers for a shift toward moral legitimacy seeking strategies. Indeed, business success is linked to social legitimacy and a good reputation with stakeholders, and outside directors provide human and relational capital in addition to a better understanding of the needs of external stakeholders (Mallin & Michelon, 2011). This implies a more consistent communication effort aimed at increasing the firm's participation in public discourse. Therefore, a higher proportion of independent directors is likely to have a positive impact on the discrepancy between a firm's green communication and operational practices. Thus:

> **H2.** More independent boards are positively associated with moral legitimacy seeking strategies, leading to a positive discrepancy between green communication and operational practices.

## 2.4 | Board gender diversity

The role of gender diversity as a driver of environmental initiatives has recently attracted the attention of many scholars (Bear et al., 2010; Birindelli et al., 2019; Bolourian et al., 2021; Boulouta, 2013; Galbreath, 2011; Harjoto et al., 2015; Orazalin & Mahmood, 2021). From an agency perspective, a balanced board with directors from different backgrounds and with different professional experiences is essential to ensure effective monitoring (Hillman & Dalziel, 2003; Jizi, 2017). Women have specific personality traits that make them more likely to be better educated (Hillman et al., 2002), more sensitive (Williams, 2003), and more inclined to participatory decision-making (Konrad et al., 2008; Oakley, 2000). Therefore, more gender-diverse boards may have an advantage in evaluating strategic plans and management strategies (Laique et al., 2023). This advantage may translate into the selection of projects with long-term payoffs, as is the case with many sustainable practices.

From a resource dependence theory perspective, women are more likely to be influential in the community (Hillman et al., 2002; Hillman & Dalziel, 2003) and use their networks to form sustainability-themed alliances (Post et al., 2015). In addition, they appear more concerned about the welfare of others, more helpful, and more compassionate (Eagly et al., 2003). This suggests that more gender-diverse boards prioritize providing resources to the firm and leveraging the external networks of directors to ensure the firm's social acceptance.

Empirical studies often find a positive relationship between board gender diversity and environmental and social performance (Bear et al., 2010; Li et al., 2017; Liu, 2018; Post et al., 2011). Among these studies, Liu (2018) empirically shows that U.S. firms with high board gender diversity are less likely to be sued for environmental violations because women formulate more effective environmental policies. Similarly, Cosma et al. (2021) show that the presence of female directors is positively associated with pro-environment attitudes. Recent evidence also shows that the presence of women on the board can have a positive impact on green innovation and orientation, providing additional evidence that strengthens the contribution of women to corporate sustainability practices (Ciasullo et al., 2022).

From a disclosure perspective, most of the literature agrees that the presence of women is beneficial for external communication. In a study of Canadian firms, Ben-Amar et al. (2017) find that women on boards increase the probability that a firm discloses information about its climate change strategies and performance, consistent with the biodiversity initiative findings of Issa and Zaid (2023). Cabeza-García et al. (2018)show that Spanish firms with a high percentage of women on their boards are more likely to disclose CSR information. These studies suggest that the relationship between a board's gender diversity policy and its environmental actions is largely related to communication and disclosure, the goals of which are to satisfy the information needs of external stakeholders (Ben-Amar et al., 2017; Cabeza-García et al., 2018; Li et al., 2017; Liu, 2018; Zyglidopoulos, 2003).

Complementing this evidence, we argue that gender-diverse boards are more likely to adopt a communication-focused strategy compared with a male-dominated board. Women have different psychological traits than men, including the ability to consider the rights of others and a better approach to social reasoning. According to Bart and McQueen (2013), women engage in "complex moral reasoning". They are more open to learning, show empathy, and make fair choices. These characteristics are strongly related to the moral legitimacy construct, which is "socially constructed by giving and considering reasons". Therefore, we argue that a higher proportion of women on the board could spur moral legitimacy seeking strategies that consist of increasing participation in public discourse proxied by more communication efforts. Formally stated:

> **H3.** Boards with a higher proportion of women are positively associated with moral legitimacy seeking strategies, leading to a positive discrepancy between green communication and operational practices.

## 2.5 | CEO duality

Many CEOs serve on their boards as chair, and often remain on the board after leaving the CEO position. Yermack (2006) finds that 110 out of 179 CEOs who left their executive position in Fortune 500 companies remained as board chair for at least a few years. The same trend has been observed in European, African, and Asian listed firms (Tuliao & Chen, 2017). The agency perspective suggests that to prevent a powerful CEO from influencing the board, the CEO and chair of the board should not be the same person (or a chair should not be previously CEO). It makes sense that a powerful CEO would reduce the effectiveness of board monitoring, impairing the board's ability to counter management short-termism or pursue long-term value maximization strategies, including the implementation of sustainable practices.

Empirical studies provide contrasting evidence. For example, Giannarakis (2014) and Walls et al. (2012) show that firms excel in operational practices if the CEO is chair of the board. Harjoto and Jo (2011) find that CEO duality is positively related to various green engagement policies in U.S. listed firms. Similar conclusions have been reached in

other studies in China, India, and Spain (Arena et al., 2015; Godos-Díez et al., 2018; Lattemann et al., 2009; Mallin et al., 2013), suggesting that, contrary to the agency perspective, there may be a positive relationship between CEO duality and a firm's environmental actions. However, recent studies using international samples find a negative relationship between CEO duality and environmental performance (Hussain et al., 2018; Mallin & Michelon, 2011; Naciti, 2019), or an insignificant effect (Barako et al., 2006; Chams & García-Blandón, 2019; Liao et al., 2015; McGuinness et al., 2017; Surroca & Tribó, 2008).

CEO duality is also likely to affect the involvement of the board of directors in green communication efforts. When the same person is both CEO and board chair, she/he can exert considerable influence on inside directors (Dey, 2008) and wield considerable power. In addition, CEO duality can lead to nominating board members who have a favorable view of the incumbent CEO and are therefore more likely to support his/her proposals (Krishnan & Visvanathan, 2009). This could hamper the board's ability to effectively promote and implement legitimacy-seeking strategies.

Considering the discrepancy between green communication and practices, we argue that dual CEO boards may have a more introverted perspective of their environmental actions. Consequently, organizational efforts will be directed at gaining pragmatic legitimacy, and interest in participating in public discourse will only be relevant to the extent that it is aligned with the implementation of green practices. Thus:

> **H4.** CEO-chaired boards are positively associated with pragmatic legitimacy seeking strategies, leading to a negative discrepancy between green communication and operational practices.

## 3 | METHODOLOGY

### 3.1 | Sample

Our sample consists of a panel of 3.483 listed firms covering 58 countries and 19 industrial sectors from 2002 to 2020 (inclusively). The financial data are from Refinitiv Worldscope, while the environmental, social, and governance (ESG) data are from Refinitiv ASSET4. Both data sources have been widely validated by studies in the management and finance fields (Aouadi & Marsat, 2016; Gupta, 2018; Miroshnychenko et al., 2017; Miroshnychenko & De Massis, 2022).

The dataset is an unbalanced panel because it includes firms that existed throughout the time period, firms that entered the sample after 2002, and firms that exited during the analysis period if they went private, merged or liquidated. In this way, the dataset avoids potential survivorship bias that could arise excluding firms that failed during the study period. In fact, by restricting our sample to firms that existed throughout the entire study period, firms with poor financial performance leading to delisting due to bankruptcy or restructuring would be automatically excluded. As the link between financial and ESG environmental performance is well documented in the literature (Fayyaz et al., 2022; Gillan et al., 2021), excluding delisted firms could also exclude firms with the worst environmental performance and introduce an unknown bias in our analysis. Similarly, preventing the inclusion of new firms over time could bias the result by avoiding the inclusion of young, small, and fast-growing firms with particular environmental and governance characteristics.

The distribution of yearly observations reported in Table A1 in the Appendix suggests an increasing number of observations throughout the years, in line with the increasing coverage of the Asset4 database. Unreported analyses also suggest that half of the firms are observed for at least 11 out of the 19 years.

In terms of the distribution of firms by geographic region, our sample covers 58 countries, ensuring geographic representativeness. Approximately half the sample is from English-speaking countries (Australia, Canada, the UK, and the US), and the other half shows a relatively broad distribution in the other parts of the world. In terms of the distribution of firms by industry, manufacturing firms dominate the sample (84.90%), while utilities and transportation make up only 10.63% and 4.47%, respectively. The detailed sectoral composition is reported in Table A2 in the appendix. We excluded from the initial sample aerospace, pharmaceutical, retailers, tobacco and financial firms, since these firms 'business models do not provide coverage in terms of data points used to construct the discrepancy variable explained below (Miroshnychenko et al., 2017; Testa, Miroshnychenko, et al., 2018).

The longitudinal nature of our dataset allows for a more precise inference of regression model estimates (Hsiao, 2007). By using a series of dummy variables that capture unobservable characteristics related to sector, country, and year heterogeneity, we benefit from a very large database and control – or at least reduce – bias because of, for example, differences in the corporate governance systems adopted across countries. In addition, by exploiting a longitudinal dataset, we can more easily control for individual characteristics of countries adopting specific measures to mitigate climate change or the unique characteristics associated with different industries.

### 3.2 | Measurements

#### 3.2.1 | Green practice index (GPI) and green communication index (GCI)

GPI is the average of a firm's key performance indicators (KPIs) for the following green practices: pollution prevention, green supply chain management, and green product development, inspired by Miroshnychenko et al. (2017). The GPI values are composed of the sum of the relevant thematic indicators, as shown in Table 1.

GCI is estimated as the average of a firm's integrated KPIs in a given year. As Table 2 shows, this indicator equals the sum of the selected dummies that proxy a firm's management commitment to developing an overarching green vision and strategy. This category measures the firm's ability to competently demonstrate and communicate that the economic

**TABLE 1** Definition of green operational practices.

| Variable | Description |
|---|---|
| *Pollution prevention* | Sum of the 10 emission and resource reduction KPIs:<br>1. Emissions (does the firm describe, claim to have, or mention processes in place to improve emission reduction? Yes = 1/no = 0);<br>2. Nitrogen oxides (NOx) and sulfur oxides (SOx) emissions reduction (does the firm report on initiatives to reduce, reuse, recycle, substitute, or phase out SOx or NOx emissions? Yes = 1/no = 0);<br>3. Volatile organic compounds (VOC) emissions reductions (does the firm report on initiatives to reduce, substitute, or phase out VOC? Yes = 1/no = 0);<br>4. Particular matter emissions reductions (does the firm report on initiatives to reduce, substitute, or phase out particulate matter less than ten microns in diameter [PM10]?Yes = 1/no = 0);<br>5. Waste reduction Total (does the firm report on initiatives to recycle, reduce, reuse, substitute, treat, or phase out total waste? Yes = 1/no = 0);<br>6. e-waste reduction (does the firm report on initiatives to recycle, reduce, reuse, substitute, treat, or phase out e-waste? Yes = 1/no = 0);<br>7. Staff transportation impact reduction (does the firm report on initiatives to reduce the environmental impact of transportation used for its staff? Yes = 1/no = 0);<br>8. Water efficiency (does the firm describe, claim to have, or mention processes in place to improve its water efficiency? Yes = 1/no = 0);<br>9. Energy efficiency (does the firm describe, claim to have, or mention processes in place to improve its energy efficiency? Yes = 1/no = 0);<br>10. Toxic chemicals or substances reduction (does the firm report on initiatives to reduce, reuse, substitute, or phase out toxic chemicals or substances? Yes = 1/no = 0); |
| *Green supply chain management* | Sum of the 4 resource reduction KPIs:<br>1. Environmental supply chain (does the firm describe, claim to have, or mention processes in place to include its supply chain in its efforts to lessen its overall environmental impact? Yes = 1/no = 0);<br>2. Materials sourcing environmental criteria (does the firm claim to use environmental criteria [e.g., lifecycle assessment] to source or eliminate materials? Yes = 1/no = 0);<br>3. Environmental Supply Chain Management (Does the firm use environmental criteria [ISO 14001, energy consumption, etc.] in the selection of its suppliers or sourcing partners? Yes = 1/No = 0);<br>4. Environment supply chain partnership termination (does the firm report or show to be ready to end a partnership with a sourcing partner if environmental criteria are not met? Yes = 1/no = 0); |
| *Green product development* | Sum of the 3 product innovation KPIs:<br>1. Environmental products (does the firm report on at least one product line or service that is designed to have positive effects on the environment or which is environmentally labelled and marketed? Yes = 1/no = 0);<br>2. Product environmental responsible use (does the firm report about product features and applications or services that will promote responsible, efficient, cost-effective, and environmentally preferable use? Yes = 1/no = 0);<br>3. Eco-design products (does the firm report on specific products that are designed for reuse, recycling, or the reduction of environmental impacts? Yes = 1/no = 0); |

(financial), social, and environmental aspects are integrated into the firm's day-to-day decision-making (ASSET4 documents).

### 3.2.2 | Discrepancy index

We followed the strategy that Testa, Miroshnychenko, et al. (2018) propose to trace firms where green communication efforts diverge from the implementation of green practices. We constructed a discrepancy index (DI) that reflects the difference between a firm's green communication and its operational practices. We standardized both components to a mean of 0 and a standard deviation of 1 to ensure comparability. A DI lower than zero indicates that a firm has a "pragmatic" attitude, meaning that the firm focuses more on implementing green practices and less on talking about them. Conversely, a DI greater than zero suggests a "moral" approach, where considerable emphasis is placed on externally communicating the firm's green practices rather than implementing them.

An empirical peculiarity of our dependent variable is that the best (worst) performers find a natural ceiling (floor)if they satisfy all (no one) categories of analysis. To control for this issue, we included High_perf and Low_perf dummies in the model as controls for firms classified as best and worst performers in terms of green practices. Specifically, High_perf is a dummy equal to 1 when the green practices index is higher than the 75th percentile, and 0 otherwise. Conversely, Low_perf is equal to 1 when the green practices index is lower than the 25$^{th}$ percentile. This allows us to control for the ceiling/floor effects and focus on the most informative values of our sample (Liu & Wang, 2021; Wang et al., 2008).

### 3.2.3 | Board structure

We use a range of proxies to capture board characteristics (de Villiers et al., 2011; Walls et al., 2012) signalling the management commitment to good governance practices, as discussed in Section 2 (and

**TABLE 2** Definition of green communication practices.

| Variable | Description |
|---|---|
| *Green communication* | Sum of the 8 integration/vision strategy KPIs<br>1. CSR sustainability committee (does the firm have a CSR committee or team? Yes = 1/no = 0)<br>2. Integrated vision and strategy management discussion and analysis (does the firm explicitly integrate financial and extra-financial factors in its management discussion and analysis section in the annual report? Yes = 1/no = 0)<br>3. Global compact (has the firm signed the UN global compact? Yes = 1/no = 0)<br>4. Stakeholder engagement (does the firm explain how it engages with its stakeholders? Yes = 1/no = 0)<br>5. CSR sustainability reporting (does the firm publish a separate CSR/H&S/sustainability report or publish a section in its annual report on CSR/H&S/sustainability? Yes = 1/no = 0)<br>6. GRI report guidelines (is the firm's CSR report published in accordance with GRI guidelines? Yes = 1/no = 0)<br>7. CSR sustainability report global activities (does the firm's extra-financial report take into account the firm's global activities? Yes = 1/no = 0)<br>8. CSR sustainability external audit (does the firm have an external auditor of its CSR/H&S/sustainability report? Yes = 1/no = 0) |

**TABLE 3** Definition of corporate board variables.

| Variable | Description |
|---|---|
| *Board size* | Natural logarithm of the total number of board members at the end of the fiscal year (Brown et al., 2006; Kassinis & Vafeas, 2002). |
| *Indep* | Percentage of independent board members (de Villiers et al., 2011). |
| *Gender* | Percentage of women on the board (Kassinis et al., 2016; Liao et al., 2015). |
| *Duality* | Takes value of 1 if the CEO is also chair of the board (Khan et al., 2013; Webb, 2004), and 0 otherwise. |

reported Table 3). Such commitment relates to a well-balanced board and reflects the firm's ability to ensure a critical exchange of ideas and unfettered decision-making through a diverse and independent board (ASSET4 documents).

### 3.2.4 | Control variables

We controlled for a number of variables that may be relevant determinants of both green communication strategies and green practice implementation. Given that a firm in good financial health is much more likely to be able to cope with possible reputational or litigation costs associated with its green activities than a financially constrained firm (Delmas & Burbano, 2011), the model includes several proxies for financial constraints. The first is a variable for *Cashflow*, estimated as the ratio of the sum of net income and all non-cash charges or credits to total assets. The second is *Leverage*, measured as the ratio of total debt to total assets. Third, larger and older firms have more resources and experience at their disposal and can, therefore, adopt a range of legitimacy seeking strategies. We can expect that they are more likely to invest resources in communicating their environmental activities and interacting with the public. Therefore, *Firm size*, measured as the natural logarithm of total assets, and *Firm age*, calculated as the natural logarithm of the number of years since the firm was incorporated, are included in the model.

In addition, as there is some evidence that growing firms are more likely to have discrepancies between green communication and green practices (Kim & Lyon, 2015), *Growth* is included in the model, proxied by the log-difference of net sales for firm *i* at time *t* and time *t-1*. The Herfindahl–Hirschman Index (HHI) is also included as a proxy for industry concentration. This is because we argue that, in highly concentrated industries with very little competition, it is much easier for dominant firms to establish themselves at the center of the public discourse, where moral legitimacy is gained and maintained. We estimated HHI as the sum of squared market shares (measured by segment sales at the industry level) ranging from 0 to 1 (Nawrocki & Carter, 2010). A high value of HHI suggests that the industry is highly concentrated, while a low value indicates that the industry has very intense competition.

Finally, the literature shows that organizational environmental awareness can be determined by the institutional and legal characteristics of the country in which the firm operates (Ortiz-de-Mandojana et al., 2016). Therefore, we included country dummies to control for country-level differences in the institutional and legal environments. We also included industry and time dummy variables in our explanatory model to control for systematic differences in green communication and operational practices across industries and different time periods, including economic shocks.

## 3.3 | Explanatory model

We used a pooled OLS estimator and panel fixed effects (FE) estimator to examine the effect of board characteristics on the deviation between GPI and GCI. Where appropriate, all estimators take into account the set of firm-, industry-, and country-level controls. To guard against potential bias due to reverse causality issues, all estimations were conducted with a one-year lag between our dependent variable (time *t*) and explanatory variables (time *t-1*), following Fang et al. (2020). To control for firm-level unobservable heterogeneity, we used panel FE in line with several studies on corporate nonfinancial performance (Hussain et al., 2018; Orazalin & Mahmood, 2021). We used the system generalized method of

**TABLE 4** Descriptive statistics.

| | Mean | Std. dev. | Median | Min. | Max |
|---|---|---|---|---|---|
| 1. GPI | 0.001 | 1.000 | −0.095 | −1.239 | 2.651 |
| 2. GCI | 0.001 | 1.000 | 0.009 | −1.206 | 1.629 |
| 3. DI | −0.000 | 0.735 | 0.033 | −3.629 | 2.868 |
| 4. Board size | 2.267 | 0.338 | 2.303 | 1.099 | 3.664 |
| 5. Indep | 0.569 | 0.272 | 0.600 | 0.000 | 1.000 |
| 6. Gender | 0.130 | 0.124 | 0.111 | 0.000 | 0.75 |
| 7. Duality | 0.381 | 0.486 | 0.000 | 0.000 | 1.000 |
| 8. Leverage | 0.262 | 0.176 | 0.250 | 0.000 | 0.797 |
| 9. Cashflow | 0.097 | 0.075 | 0.089 | −0.207 | 0.362 |
| 10. Growth | 0.093 | 0.339 | 0.051 | −0.583 | 3.061 |
| 11. HHI | 0.069 | 0.101 | 0.046 | 0.000 | 1.000 |
| 12. Firm size | 16.700 | 2.700 | 16.214 | 3.932 | 26.647 |
| 13. Firm age | 3.523 | 0.969 | 3.584 | 0.000 | 5.756 |
| 14. High_perf | 0.290 | 0.454 | 0.000 | 0.000 | 1.000 |
| 15. Low_perf | 0.274 | 0.446 | 0.000 | 0.000 | 1.000 |

Notes: Time, country and industry dummies are not shown in the table. All the definitions of variables are provided in the Measurements section.

**TABLE 5** Univariate analysis of differences in mean in GCI, GPI, and DI by geographic region and industry.

| | GCI | GPI | DI |
|---|---|---|---|
| **Panel A: Univariate tests by country** | | | |
| European Union, reference category | 0.41 | 0.37 | 0.04 |
| Australia | −0.33*** | −0.58*** | 0.26*** |
| Canada | 0.19*** | 0.49*** | 0.30*** |
| Japan | 0.04*** | 0.26*** | −0.22*** |
| United stated of America | −0.44*** | −0.15*** | −0.29*** |
| United Kingdom | 0.21*** | −0.01*** | 0.23*** |
| Others | 0.25*** | 0.11*** | 0.14*** |
| **Panel B: Univariate tests by industry** | | | |
| Industrial, reference category | −0.03 | −0.17 | −0.01 |
| Transportation | 0.08*** | −0.03 | 0.13*** |
| Utility | 0.24*** | 0.15*** | 0.08*** |

Notes: This table shows differences in mean GPI, GCI, and DI by geographic region and industry with the European Union and industrial sectors as the baseline. Significance indicates results of the independent sample t-tests with unequal variance on the equality of mean between the EU and other countries, and between industrial firms and other firms. The EU covers the following countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Spain and Sweden. Others are the following countries: Bermuda, Brazil, Virgin Islands, Cayman Islands, Chile, China, Colombia, Egypt, Hong Kong, India, Indonesia, Israel, Kazakhstan, South Korea, Kuwait, Malaysia, Mexico, Morocco, New Zealand, Norway, Panama, Peru, Philippines, Qatar, Russia, Saudi Arabia, Singapore, South Africa, Sri Lanka, Switzerland, Taiwan, Thailand, United Arabic Emirates, Turkey, Ukraine and Zimbabwe. Industrial firms are the following: apparel, automotive, beverage, chemical, construction, diversified, electrical, electronics, food, machinery, metal producers, metal product manufacturers, oil and gas, paper, printing, publishing and textiles.
*$p < 0.10$.**$p < 0.05$.***$p < 0.01$.

moments (SYS-GMM) estimation (Arellano & Bond, 1991; Blundell & Bond, 1998) as a robustness check to further account for the possible dynamic effects of any discrepancy between green communication and operational practices, in line with the issues that Wintoki et al. (2012) highlight in analyzing corporate governance dynamics. SYS-GMM also simultaneously accounts for potential sources of endogeneity in the board characteristics-discrepancy relationship (Wintoki et al., 2012). Finally, the Tobit estimator has also been adopted as an additional robustness check to deal with censored data (Greene, 2012).

### 3.3.1 | Descriptive statistics, correlations, and univariate analysis

Table 4 shows the descriptive statistics for all the variables used in the study. The average share of independent board members is 56%, while the average share of women on the board across the entire panel is 13%. This share has increased significantly in recent years, reaching around 20% in the post-2018 data. In addition, slightly less than 40% of firms in our sample have CEOs who also chair the board or chaired it in the past.

The distribution of the GPI, GCI, and DI by geographic region and industry, along with the univariate tests, are shown in Table 5. We observe a high degree of heterogeneity across countries and industries in terms of green operational practices. Similar patterns emerge for green communication practices. With respect to the discrepancy between green communication and operational practices, the highest DIs (i.e., moral firms)are found in Canada and Australia, and the lowest DIs (i.e., pragmatic firms) for Japan and the U.S. Table 6 shows the correlation matrix for all the main variables.

## 4 | RESULTS

### 4.1 | Main results

The results of our main analysis are shown in Table 7. The pooled OLS estimations are reported in models (1)–(4), and the panel FE estimations in models (5)–(8).

H1 predicts that board size will have a positive effect on the discrepancy between green communication and operational practices. Models 1 and 5 show that board size has a strong and significant positive effect ($p < 0.01$) on the discrepancy between green communication and operational practices. Consistent with our theoretical framework, this suggests that firms with larger boards devote additional to the search for moral legitimacy, giving priority to communication efforts given the level of green practices implemented, providing empirical support for H1.

Regarding board independence *(Indep)*, our second variable of interest, coefficients are significant($p < 0.01$) both in the pooled OLS (Model 2), and using the FE estimator (Model 6), that control for firm-level unobservable heterogeneity. Consequently, we find strong evidence of the positive relationship between board independence and the discrepancy between green communication and operational practices, confirming H2. As argued in the hypothesis development, this suggests that independent directors might bring relevant views and competencies that lead the board to better understand the needs of all stakeholders, therefore focusing on the search for moral legitimacy and resulting in an increased communication effort.

*Gender* is included as an independent variable in Models 3 and 7. The coefficient is positive and significant at $p < 0.01$ (OLS) in both specifications. Therefore, better gender balance and diversity at the board level are associated with a positive discrepancy between green communication and operational practices, providing empirical support

**TABLE 6** Correlation matrix.

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. GPI | 1.00 | | | | | | | | | | | | | | |
| 2. GCI | 0.73* | 1.00 | | | | | | | | | | | | | |
| 3. DI | −0.37* | 0.37* | 1.00 | | | | | | | | | | | | |
| 4. Board size | 0.28* | 0.23* | −0.06* | 1.00 | | | | | | | | | | | |
| 5. Indep | −0.03* | −0.05* | −0.03* | −0.14* | 1.00 | | | | | | | | | | |
| 6. Gender | 0.25* | 0.27* | 0.03* | 0.07* | 0.32* | 1.00 | | | | | | | | | |
| 7. Duality | −0.01 | −0.12* | −0.16* | 0.08* | 0.10* | −0.04* | 1.00 | | | | | | | | |
| 8. Leverage | 0.07* | 0.07* | 0.01 | 0.13* | 0.07* | 0.06* | 0.02* | 1.00 | | | | | | | |
| 9. Cashflow | −0.01 | −0.03* | −0.03* | 0.01 | 0.03* | −0.04* | 0.05* | −0.16* | 1.00 | | | | | | |
| 10. Growth | −0.15* | −0.12* | 0.05* | −0.09* | −0.02* | −0.07* | −0.02* | −0.05* | 0.09* | 1.00 | | | | | |
| 11 HHI | 0.00 | 0.06* | 0.09* | −0.02* | −0.06* | −0.08* | −0.18* | 0.03* | 0.05* | 0.00 | 1.00 | | | | |
| 12.Firm size | 0.36* | 0.31* | −0.07* | 0.37* | −0.21* | −0.15* | 0.04* | 0.13* | −0.05* | −0.07* | 0.01 | 1.00 | | | |
| 13.Firm age | 0.26* | 0.19* | −0.10* | 0.21* | −0.11* | 0.01 | 0.05* | −0.01 | −0.04* | −0.14* | −0.07* | 0.17* | 1.00 | | |
| 14.High_perf | 0.81* | 0.56* | −0.35* | 0.22* | 0.04* | 0.19* | 0.01 | 0.03* | −0.01* | −0.11* | −0.02* | 0.30* | 0.22* | 1.00 | |
| 15.Low_perf | −0.73* | −0.59* | 0.18* | −0.22* | −0.04* | −0.20* | 0.04* | −0.08* | 0.00 | 0.14* | −0.02* | −0.27* | −0.20* | −0.39* | 1.00 |

Notes: Time, country and industry dummies are not shown in the table. All the definitions of variables are provided in the Measurements section.
*$p < 0.01$.

**TABLE 7** OLS and FE regressions.

| Model | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Estimator | OLS | OLS | OLS | OLS | FE | FE | FE | FE |
| Board size | 0.11*** | | | | 0.06*** | | | |
| | (0.01) | | | | (0.02) | | | |
| Indep | | 0.17*** | | | | 0.10*** | | |
| | | (0.02) | | | | (0.03) | | |
| Gender | | | 0.32*** | | | | 0.30*** | |
| | | | (0.04) | | | | (0.04) | |
| Duality | | | | −0.03*** | | | | −0.03*** |
| | | | | (0.01) | | | | (0.01) |
| Leverage | −0.07*** | −0.06*** | −0.08*** | −0.07*** | −0.11*** | −0.12*** | −0.13*** | −0.11*** |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.03) | (0.03) | (0.03) | (0.03) |
| Cashflow | 0.19*** | 0.20*** | 0.18*** | 0.21*** | −0.01 | −0.02 | −0.00 | −0.02 |
| | (0.05) | (0.05) | (0.05) | (0.05) | (0.06) | (0.06) | (0.06) | (0.06) |
| Growth | −0.01 | −0.00 | −0.01 | −0.01 | −0.01 | 0.00 | −0.01 | −0.01 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| HHI | −0.39*** | −0.39*** | −0.43*** | −0.39*** | −0.34*** | −0.34*** | −0.38*** | −0.34*** |
| | (0.08) | (0.10) | (0.09) | (0.08) | (0.07) | (0.08) | (0.08) | (0.07) |
| Firm size | 0.10*** | 0.11*** | 0.11*** | 0.11*** | 0.09*** | 0.09*** | 0.10*** | 0.10*** |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.01) | (0.01) | (0.01) | (0.01) |
| Firm age | −0.00 | 0.00 | 0.00 | 0.00 | 0.03* | 0.03* | 0.04** | 0.03** |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.02) | (0.02) | (0.02) | (0.02) |
| GPI | −0.21*** | −0.23*** | −0.21*** | −0.20*** | −0.22*** | −0.23*** | −0.22*** | −0.21*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| High_perf | −0.36*** | −0.34*** | −0.36*** | −0.36*** | −0.41*** | −0.40*** | −0.40*** | −0.41*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Low_perf | 0.14*** | 0.11*** | 0.14*** | 0.14*** | 0.26*** | 0.25*** | 0.26*** | 0.27*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Time FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | N | N | N | N |
| Country FE | Y | Y | Y | Y | N | N | N | N |
| Firm FE | N | N | N | N | Y | Y | Y | Y |
| Observations | 30,936 | 27,852 | 30,280 | 30,960 | 30,950 | 27,866 | 30,294 | 30,974 |
| R-square | 0.42 | 0.44 | 0.42 | 0.42 | 0.31 | 0.33 | 0.32 | 0.31 |

Notes: This table presents the coefficients and standard errors (in parentheses) using the pooled OLS and panel fixed effect regressions.
*$p$ < 0.10.**$p$ < 0.05.***$p$ < 0.01.

for H3. This result suggests that women pay attention to the firm's quest for moral legitimacy, improving the firm's participation to the public discourse and driving legitimization by all stakeholders rather than only self-interested ones.

Finally, *duality* is included in Models 4 and 8, where we find a strong negative effect on the discrepancy between green communication and operational practices ($p$ < 0.01) in both models. This suggests that firms with dual CEOs tend to focus more on the implementation of green practices than on participating in public discourse. Thus, H4 is also empirically supported, suggesting that boards with dual CEOs are more inclined to focus on the needs to gain pragmatic legitimacy and will have a lower interest in achieving moral legitimacy.

In summary, our results suggest that board characteristics influence a firm's legitimacy seeking strategies.

The control variables in Table 7 (models 5–8) suggest that increasing leverage is associated with a lower communication strategy, given the level of green practices implemented. This result might be driven by the lower amount of resources available to perform environmental communication after servicing the debt and is consistent with the positive coefficients of the variable Cash Flow in OLS regressions. In addition, an increase in HHI signals a less competitive market, possibly suggesting that the need to communicate effectively to all stakeholders is reduced. Furthermore, larger firms are associated with a positive discrepancy, that is, with a focus on environmental

communication. This is not surprising, since larger firms might have more synergies to lead more communication efforts, and they are regularly targeted by institutional investors (Dahlquist & Robertsson, 2001), which are particularly sensible to the firm environmental profile.

At last, as explained in Section 3.2.2, we include dummies to control for floor/ceiling effect. As expected, High_perf has a negative and significant coefficient, confirming that a high level of environmental practices on average is mechanically associated to allow value of the discrepancy index, due to the characteristics of the performance and communication indexes employed. On the same line, the opposite effect is observed for the interaction Low_perf, as expected.

## 4.2 | Robustness checks

To simultaneously account for potential sources of endogeneity in the board characteristics-discrepancy relationship, and the possible dynamic effects of the discrepancy between green communication and operational practices, we used an instrumental variable method. This controls for possible endogeneity that could arise from firm-level unobservable heterogeneity, reverse causality, or measurement error. We used the system general method of moments (GMM) estimator (Blundell & Bond, 1998) because it includes all other instrumental variable methods as special cases (Ogaki, 1993). The system GMM estimator also allows us to control for past values of DI as explanatory variables in our estimations, thereby modelling the dynamic nature of the discrepancy index. The results of the system GMM regressions are reported in Table 8. Following Roodman (2009), we controlled for instrument proliferation by collapsing the instrument matrix and reporting the number of instruments included. In addition, we implemented the Windmeijer (2005) finite sample correction to avoid downward bias in the standard errors, thus estimating robust standard errors. The Arellano-Bond tests suggest the presence of first-order serial correlation but rule out second-order serial correlation. In addition, the Sargan test is insignificant in all models, suggesting that the chosen instruments are valid. Therefore, both diagnostic tests support the validity of the system GMM estimations. After accounting for potential endogeneity problems and controlling for the dynamic nature of the discrepancy index, all our hypotheses are again supported.

**TABLE 8** System GMM.

| Model | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Estimator | SYS-GMM | SYS-GMM | SYS-GMM | SYS-GMM |
| DI, t-1 | 0.88*** | 0.98*** | 0.92*** | 0.88*** |
| | (0.09) | (0.09) | (0.09) | (0.09) |
| DI, t-2 | −0.11* | −0.14** | −0.13** | −0.09* |
| | (0.06) | (0.06) | (0.06) | (0.06) |
| Board size | 0.11*** | | | |
| | (0.02) | | | |
| Indep | | 0.02* | | |
| | | (0.01) | | |
| Gender | | | 0.35*** | |
| | | | (0.04) | |
| Duality | | | | −0.04*** |
| | | | | (0.01) |
| Controls | Y | Y | Y | Y |
| Time FE | Y | Y | Y | Y |
| Industry FE | N | N | N | N |
| Country FE | N | N | N | N |
| Firm FE | Y | Y | Y | Y |
| Observations | 26,481 | 23,737 | 25,957 | 26,491 |
| No. of instruments | 33.00 | 33.00 | 33.00 | 33.00 |
| AR1 (p-value) | 0.00 | 0.00 | 0.00 | 0.00 |
| AR2 (p-value) | 0.86 | 0.80 | 0.94 | 0.74 |
| Hansen-J (p-value) | 0.58 | 0.84 | 0.53 | 0.58 |

Notes: This table presents the coefficients and robust standard errors (in parentheses, Windmeijer correction for finite samples) using the System GMM regressions. The instrument matrix was collapsed to avoid instrument proliferation. The AR test p-values suggest that first-order autocorrelation is present but excludes second-order serial correlation. In addition, the Hansen tests suggest that the instruments are valid. These diagnostics lead to overall support for the validity of the models presented.
*$p$ < 0.10.**$p$ < 0.05.***$p$ < 0.01.

Moreover, as highlighted above, some specific board characteristics are not applicable in all corporate governance systems. Therefore, we repeated the estimation excluding firms with a two-tier governance system. The results hold and are reported in the appendix, Table A3. Similarly, many changes in environmental regulation have happened in the last decade. Therefore, we repeat our estimations using only data from 2010 onwards. Again, we find that our results, reported in Table A4 in the appendix, hold.

In addition, as a robustness check of our findings in addition to the use of High_perf and Low_perf dummies, we considered the floor/ceiling effects with Tobit models (Wang et al., 2008), as highlighted in the Measurement section. The results of these models are reported in Table 9 and are consistent with the results of the fixed effects estimation presented in Table 7.

## 5 | DISCUSSION

A growing number of scholars have examined when and how a misalignment between talk and environmental action occurs (Schoeneborn et al., 2020). The walk/talk dichotomy implicitly suggests that the two practices should be aligned, otherwise signalling a form of symbolic management (Kim & Lyon, 2015; Lyon & Montgomery, 2015; Marquis et al., 2016). In this study, we argue that a discrepancy between a firm's environmental practices and its communication efforts may signal different legitimacy seeking strategies. We suggest that more of the former (environmental practices)is associated with additional efforts to gain pragmatic legitimacy, while more of the latter (communication) is associated with efforts to gain moral legitimacy.

We applied the legitimacy theory framework to several board characteristics, focusing on their impact on the discrepancy between environmental communication and operational practices (Delmas & Montes-Sancho, 2010; Marquis et al., 2016; Siano et al., 2017; Testa, Miroshnychenko, et al., 2018). Using a large sample of firms from 19 industries and 58 countries over the 2002–2020 period, we find that, ceteris paribus, corporate boards can have a significant and positive impact on green communication strategies. In other words, the balance between these efforts may reflect the type of legitimacy a board seeks. We find that the impact of the board depends on the board characteristics. Larger, more independent, and gender-diverse boards show greater discrepancy between green communication and green practices, suggesting that they focus more on gaining moral legitimacy than pragmatic legitimacy. In terms of gender diversity, we also observe a rather low average percentage of women on the board in our sample, a value which increased substantially only in the most recent years. As a result, the low number of women on the board might create a difficult environment for their voices to be heard, in line with critical mass theory (Nerantzidis et al., 2022; Tilbury & Sealy, 2023), potentially making it difficult for them to impact substantially on the implementation of green practices.

Conversely, CEO duality is associated with a smaller discrepancy between communication and green practices, suggesting that firms with dual CEOs are less likely to seek moral legitimacy through participation in public discourse. Rather, they seem to focus on gaining pragmatic legitimacy through interactions with self-interested stakeholders. Our results are robust to several sources of potential endogeneity, survivorship bias, floor/ceiling effects and dynamic panel bias.

While most studies focus on the impact of corporate boards on either green operations (Cosma et al., 2021; de Villiers et al., 2011; Homroy & Slechten, 2019; Ortiz-de-Mandojana & Aragon-Correa, 2015; Walls & Hoffman, 2013) or green communication practices (Campanella et al., 2021; Jizi, 2017; Liao et al., 2015), none attempt to explain the impact of the board on the discrepancy between the two. Our study, therefore, explores a new avenue in this literature by assessing the impact of various board characteristics on the discrepancy between green communication and operational practices. In so doing, we extend the list of drivers behind the discrepancy between green communication and operational practices proposed by Lyon and Montgomery (2015), also accounting for potential endogeneity problems (Aguilera et al., 2021)within a robust international evidence confirming a link between board characteristics and a firm's environmental actions.

**TABLE 9** TOBIT regressions.

| Model | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Estimator | TOBIT | TOBIT | TOBIT | TOBIT |
| Board size | 0.10*** | | | |
| | (0.01) | | | |
| Indep | | 0.17*** | | |
| | | (0.02) | | |
| Gender | | | 0.33*** | |
| | | | (0.04) | |
| Duality | | | | −0.03*** |
| | | | | (0.01) |
| Controls | Y | Y | Y | Y |
| Time FE | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y |
| Country FE | Y | Y | Y | Y |
| Firm FE | N | N | N | N |
| Observations | 30,936 | 27,852 | 30,280 | 30,960 |
| $Chi^2$ | 15672.20 | 15037.35 | 15566.99 | 15665.49 |
| P | 0.00 | 0.00 | 0.00 | 0.00 |

Notes: This table presents the coefficients and robust standard errors of the Tobit regressions allowing for floor/ceiling effects.
*$p$ < 0.10.**$p$ < 0.05.***$p$ < 0.01.

## 6 | CONCLUSIONS AND IMPLICATIONS

This study provides novel theoretical and empirical insights to understand the factors that lead to unbalanced walk and talk efforts (Lyon & Montgomery, 2015; Schons & Steinmeier, 2016; Testa,

Miroshnychenko, et al., 2018). We significantly extend and complement the main conclusions of Campanella et al. (2021) and Cosma et al. (2021), as we find that board characteristics are a significant determinant of the discrepancy between green communication and operational practices. In so doing, we shed new light on the role that board characteristics can play in determining a firm's environmental legitimacy strategy. Indeed, we find that larger and more gender-diverse boards are more likely to engage in the public debate through additional communication efforts. We also agree with Kock et al. (2012) that corporate governance can align the divergent interests of shareholders and managers with respect to the firm's environmental actions only to a certain extent. Therefore, additional organizational dimensions need to be considered.

### 6.1 | Theoretical and managerial implications

Our study provides important theoretical and managerial implications. First, from the symbolic management literature perspective (Schons & Steinmeier, 2016; Westphal & Park, 2020), a key premise of our study is that firms often fail at aligning their environmental practices and communication management (Kim & Lyon, 2015; Lyon & Montgomery, 2015; Marquis et al., 2016), and that environmental communication is not always supported by environmental management practices (Schoeneborn et al., 2020; Torelli et al., 2020) that are coherent with the firm's strategy and organization. However, less is known about which corporate governance mechanisms encourage or shrink the decoupling between practices and communication. In this context, we offer a new perspective on the significance of internal corporate governance mechanisms – board structure – that have received preliminary validation in studies on environmental performance (Enciso-Alfaro & García-Sánchez, 2022). In other words, by considering the presence of a specific board structures(s) as an internal corporate governance mechanism, we highlight the existence of heterogeneous effects of corporate boards, with different implications for walk and talk efforts of a firm.

Furthermore, our focus on the legitimacy seeking behaviour of a firm recalls and adds to the environmental management literature (Crossley et al., 2021; Montgomery et al., 2023), providing evidence about certain legitimacy seeking strategies that may result in the discrepancy between environmental practices and communication, also calling for future research about the other strategies (e.g., cognitive legitimacy) that can make environmental walk and talk a balanced activity (Schoeneborn et al., 2020). Considering the research gap resulting from inconsistent findings on the relationship between corporate governance mechanisms and environmental actions of a firm (Ellerup Nielsen & Thomsen, 2018; Montgomery et al., 2023), we argue that one reason – apart from differences in the corporate governance mechanism considered – lies in the type of legitimacy strategy that firms seek to achieve (moral vs. pragmatic legitimacy strategies in our case). In this context, the results of our study serve as an additional impetus for increased scholarly attention to the concepts of the green board (Bolourian et al., 2021) and the sustainable corporate governance (Aguilera et al., 2021; Kavadis & Thomsen, 2022).

Second, our study adds to the emerging corporate governance literature on how board characteristics are driven by organizational legitimacy seeking strategies (Martínez-García et al., 2022; Perrault, 2015; Saeed et al., 2022). With this study, we provide a different interpretation, suggesting that board characteristics can represent either an important trigger or inhibitor of the corporate communication strategies designed to maintain moral or pragmatic legitimacy. Specifically, we find empirical support for the notion that firms weigh environmental communication and operational practices differently depending on the type of legitimacy they are aiming to achieve. In so doing, we broaden our current understanding of board structure and its impact on environmental outcomes (Enciso-Alfaro & García-Sánchez, 2022; Karn et al., 2022), drawing attention to the role of legitimacy seeking strategy adopted. Moreover, we highlight the need to recognize the heterogeneous effects of different board types, which have instead been largely referred to as "good" or "bad" boards. Finally, the reliance on the legitimacy theory perspective points to the value of going beyond demographic, functional, and individual characteristics of the board members and CEO, redirecting attention to how environmental decision-making is shaped in looking at legitimacy seeking strategy for environmental actions (Scherer et al., 2013), thus a step toward a more nuanced understanding of how the board of directors and CEO contribute to environmental actions of a firm.

Given the potential of environmental actions and communication to impact existing markets and business models (Ortiz-de-Mandojana & Bansal, 2016), top managers are increasingly challenged to find ways to develop environmentally friendly strategies across different business areas. The in-depth examination of the alignment between environmental practices and communication in publicly traded firms by means of the legitimacy theory lens allows us to identify the specific board characteristics that are conducive or not to fostering and supporting environmental actions' alignment.

External investors and creditors are also interested in how publicly traded firms can walk their environmental talk and thereby increase their contribution to superior and sustained environmental performance over time (Aouadi & Marsat, 2016). At this regard, investors want to consider that corporations with independent and more gender diverse boards are associated with a stronger focus on gaining moral legitimacy and this characteristic might be taken into account when establishing governance mechanisms to ensure a future improvement in the environmental performance and therefore an alignment of walk and talk over time.

Given the ongoing debates in regulatory and business circles on policies to develop a green economy (European Commission, 2021; Starks, 2023), our study reveals that board characteristics have heterogenous effects on the discrepancy between green communication and operational practices. Thus, our study cautions policymakers and potential investors to pay regard to the characteristics of the board when evaluating the degree of alignment between environmental actions and environmental communication, recognizing the different attitudes to implement different legitimacy-seeking strategies and therefore creating incentives for firms to improve environmental performance together with increased communication efforts. Our study

also highlights the important roles played by board size, independence and gender diversity alerting practitioners to take specific types of board structure into account to fully understand a firm's motivations when it comes to environmental strategy of a firm.

## 6.2 | Limitations and future research

We also acknowledge the limitations of our work, noting that these may provide fruitful avenues for future research. While offering novel insights into the board characteristics that influence the discrepancy between environmental walk and talk efforts, other corporate governance mechanisms, such as compensation structure and practices (short- vs long-term incentives), the identity of the ultimate owners (widely-held vs concentrated ownership), and the degree of their involvement in the firms' management (professional vs. family management) may also be important in shaping the firm's environmental actions (Cho et al., 2019; Kim et al., 2017; Miroshnychenko et al., 2019).

It would also be interesting to identify some contextual moderating variables that expand and enrich our findings. In addition, understanding the role of human resource policies (Alt et al., 2014; Seval & Caner, 2015) in the discrepancy between green communication and operational practices could also enrich our knowledge of the environmental walk and talk drivers. In addition, future research could explore the different individual attitudes of board members and how their personal characteristics affect the search for moral or pragmatic legitimacy, perhaps grounding such research in theories of organizational behavior (Cooper et al., 2017).

The sample we used to answer our research question included only listed firms in specific industries, where our discrepancy measure was most consistent with the data obtained. The literature analyzing the determinants and obstacles of green symbolic greenwashing is growing (Aragon-Correa et al., 2008; Chen & Dagestani, 2023; Graafland & Smid, 2017; Lefebvre et al., 2003) and can reveal important aspects of what it takes a private firm to successfully meet (or not) the environmental demands of different stakeholders. Therefore, we also encourage future studies to examine the validity and generalizability of our findings in the context of private firms and other industries.

Further interesting insights may be derived from more granular data on their detailed communication and implementation efforts over time, which could help explore the impact of board characteristics on the actual changes in such practices over time and their discrepancy. Indeed, we believe that a very interesting research avenue is the investigation of whether, after the misalignment between environmental communication and performance, some firm characteristics lead to a better environmental performance and, consequently, to an alignment between green practices and green communication, resulting in a virtuous cycle.

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## APPENDIX A

**TABLE A1** Distribution of observations in the starting sample.

| Year | Frequency | Percentage |
|---|---|---|
| 2002 | 613 | 1.47 |
| 2003 | 613 | 1.47 |
| 2004 | 1,206 | 2.89 |
| 2005 | 1,483 | 3.56 |
| 2006 | 1,501 | 3.60 |
| 2007 | 1,626 | 3.90 |
| 2008 | 1,980 | 4.75 |
| 2009 | 2,292 | 5.50 |
| 2010 | 2,772 | 6.65 |
| 2011 | 2,840 | 6.81 |
| 2012 | 2,840 | 6.81 |
| 2013 | 2,953 | 7.08 |
| 2014 | 2,726 | 6.54 |
| 2015 | 2,912 | 6.98 |
| 2016 | 2,829 | 6.79 |
| 2017 | 2,747 | 6.59 |
| 2018 | 2,681 | 6.43 |
| 2019 | 2,611 | 6.26 |
| 2020 | 2,466 | 5.91 |
| Total | 41,691 | 100.00 |

**TABLE A2** Distribution of sectors.

| Sector | Number | Percentage |
|---|---|---|
| Apparel | 33 | 0.95 |
| Automotive | 78 | 2.24 |
| Beverage | 57 | 1.64 |
| Chemical | 177 | 5.08 |
| Construction | 278 | 7.98 |
| Electrical | 70 | 2.01 |
| Electronics | 438 | 12.58 |
| Food | 134 | 3.85 |
| Machinery | 151 | 4.34 |
| Metal producer | 282 | 8.10 |
| Metal product manufacturers | 59 | 1.69 |
| Oil & gas | 390 | 11.20 |
| Paper | 55 | 1.58 |
| Printing & Publishing | 51 | 1.46 |
| Textiles | 17 | 0.49 |
| Transportation | 156 | 4.48 |
| Utilities | 374 | 10.74 |
| Others | 682 | 19.59 |
| Total | 3,482 | 100.00 |

**TABLE A3** OLS and FE regressions, excluding two-tier boards.

| Model | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Estimator | OLS | OLS | OLS | OLS | FE | FE | FE | FE |
| Board size | 0.12*** | | | | 0.07*** | | | |
| | (0.01) | | | | (0.02) | | | |
| Indep | | 0.17*** | | | | 0.10*** | | |
| | | (0.02) | | | | (0.03) | | |
| Gender | | | 0.30*** | | | | 0.27*** | |
| | | | (0.04) | | | | (0.04) | |
| Duality | | | | −0.04*** | | | | −0.03*** |
| | | | | (0.01) | | | | (0.01) |
| Controls | Y | Y | Y | Y | Y | Y | Y | Y |
| Time FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | N | N | N | N |
| Country FE | Y | Y | Y | Y | N | N | N | N |
| Firm FE | N | N | N | N | Y | Y | Y | Y |
| Observations | 29,488 | 26,783 | 28,959 | 29,508 | 29,502 | 26,797 | 28,973 | 29,522 |
| R-square | 0.42 | 0.44 | 0.42 | 0.42 | 0.30 | 0.31 | 0.30 | 0.30 |

Notes: This table excludes firms with two-tiered boards and presents the coefficients and standard errors (in parentheses) using the pooled OLS and panel fixed effect regressions.
*$p$ < 0.10.**$p$ < 0.05.***$p$ < 0.01.

**TABLE A4** OLS and FE regressions, post 2010.

| Model | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Estimator | OLS | OLS | OLS | OLS | FE | FE | FE | FE |
| Board size | 0.14*** | | | | 0.06*** | | | |
| | (0.02) | | | | (0.02) | | | |
| Indep | | 0.17*** | | | | 0.13*** | | |
| | | (0.03) | | | | (0.03) | | |
| Gender | | | 0.26*** | | | | 0.21*** | |
| | | | (0.04) | | | | (0.05) | |
| Duality | | | | −0.04*** | | | | −0.03** |
| | | | | (0.01) | | | | (0.01) |
| Controls | Y | Y | Y | Y | Y | Y | Y | Y |
| Time FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | N | N | N | N |
| Country FE | Y | Y | Y | Y | N | N | N | N |
| Firm FE | N | N | N | N | Y | Y | Y | Y |
| Observations | 21,268 | 21,182 | 21,188 | 21,260 | 21,276 | 21,190 | 21,196 | 21,268 |
| R-square | 0.47 | 0.47 | 0.47 | 0.47 | 0.36 | 0.36 | 0.36 | 0.36 |

Notes: These models are estimated on data after 2010. The table presents the coefficients and standard errors (in parentheses) using the pooled OLS and panel fixed effect regressions.
*$p$ < 0.10.**$p$ < 0.05.***$p$ < 0.01.