Received: 20 April 2023 | Revised: 10 July 2023 | Accepted: 8 November 2023

DOI: 10.1002/bse.3639

RESEARCH ARTICLE

Business Strategy and the Environment

WILEY

Joining multi-stakeholder initiatives to fight climate change: The environmental impact of corporate participation in the Science Based Targets initiative

Stefano Romito[1] | Clodia Vurro[1] | Stefano Pogutz[2]

[1]Department of Economics, Management, and Quantitative Methods, University of Milan, Milan, Italy

[2]SDA Bocconi, School of Management, Milan, Italy

Correspondence
Clodia Vurro, Department of Economics, Management, and Quantitative Methods, University of Milan, via Conservatorio 7, 20122 Milan, Italy.
Email: clodia.vurro@unimi.it

Abstract

This study theorizes and empirically tests whether firms' decisions to join multi-stakeholder initiatives, targeting climate mitigation, lead to improved environmental performance. We focus on firms' participations in the Science Based Targets initiative, a multi-stakeholder initiative meant to support firms in setting greenhouse gas (GHG) emission reduction targets in line with the thresholds defined by the Paris Agreement in 2015. The study hypothesizes that participation reduces firm's concerns about uncertainty and encourages investments in timeous internal climate change activities. We used the coarsened exact matching methodology to create a matched sample of European and North American listed firms participating in the initiative and comparable, non-participating firms over a 3-year period from 2015 to 2017. The results showed that firms' participation led to lower levels of GHG emissions compared to similar non-participating counterparts, especially when they committed to the initiative with the intention to follow the proposed indications.

KEYWORDS
climate change, collaboration, green strategies, interorganizational relations, sustainability

1 | INTRODUCTION

The effects of climate change, including rising sea levels, drought and extreme weather, soil degradation, and collapsing food systems, have steadily moved from the periphery to the heart of corporate decision-makers across the globe. Firms have engaged in addressing environmental challenges for a number of reasons, such as stakeholder pressure (Delmas & Toffel, 2008; Kölbel et al., 2020), direct experience of climate-related damages in corporate operations (Sharfman & Fernando, 2008), or search for competitive advantages (Sharma & Vredenburg, 1998). Despite the widespread acknowledgment of the risks and opportunities related to the strategies and actions aimed at mitigating firms' impacts on climate change (Bowen et al., 2018; Dahlmann et al., 2019; Russo & Harrison, 2005), the lack of progress in reducing carbon emissions indicates that firms are struggling to practically deal with such a grand challenge (Goldstein et al., 2019; Williams & Whiteman, 2021; Wright & Nyberg, 2017).

Grand challenges have broadly been defined as a set of entrenched, enduring societal issues that harm large populations, which are unprecedented in terms of scope and intensity of outcomes on interconnected systems, dynamism, and uncertainty (Ferraro et al., 2015; George et al., 2016). The causes behind these challenges, such as climate change, hunger and poverty, and unsustainable production or consumption, are complex and often generated by interconnected systems, sectors, and participants. Similarly, there might be many, not necessarily straightforward, approaches to solving them.

Abbreviations: CEM, Coarsened Exact Matching; CO_2, Carbon Dioxide; MSIs, Multi-stakeholder initiatives; SBTi, Science-based Target Initiative.

Consequences might be difficult to predict with reasonable certitude, and related outcomes could generate unexpected impacts on the parties involved. More importantly, grand challenges encompass a range of interconnected systems and the consideration of a multitude of factors across a variety of scales (Howard-Grenville et al., 2014).

This complexity has either prevented or limited firms from achieving considerable environmental impacts (Doh et al., 2018). The limited impacts are mostly due to the misalignment in terms of temporal horizons between firms and environmental achievements and uncertainty avoidances (Slawinski et al., 2017; Slawinski & Bansal, 2012). Research shows that firms are generally focused on shorter time horizons and prefer to avoid investments that could generate uncertain outcomes in a remote future (Wang & Bansal, 2012). In addition, investments aimed at mitigating climate change are perceived as uncertain, given the complexity of assessing, a priori, which action to take and whether the firm's effort would generate the intended outcome (Abou Chakra et al., 2018; Raihani & Aitken, 2011). Beyond uncertainty and temporal misalignment, firms tend to favor and address challenges that directly threaten their daily operations (Wright & Nyberg, 2017) or are aligned with the expectations of the most relevant stakeholders for resource acquisition and survival (Scherer et al., 2013). This potentially causes firms to be short-sighted on interdependencies and impacts beyond their direct responsibilities, missing climate-related challenges that require large-scale solutions, and coordination that transcended corporate boundaries.

To overcome the limitations of siloed, locally bounded, and short-term approaches to social and environmental problems, the release of the 17 sustainable development goals (SDGs) in 2015, during the Special Summit on Sustainable Development at the United Nations (UN), drew attention to the role and potential impact of multi-stakeholder initiatives (MSIs) in accelerating the achievement of considerable progress on a global scale. MSIs are defined as voluntary rule systems for sustainability that are governed by heterogeneous stakeholders who jointly cross the profit/non-profit and state/non-state boundaries (Fransen, 2012; Fransen & Kolk, 2007). The presence of participants from both business and societal interest groups, as well as the existence of governance structures that allow for an equal possibility of inputs among the different partners, differentiates MSIs from other forms of private regulations such as business-driven initiatives or international standard-setting bodies (de Bakker et al., 2019). Although engagement in MSIs has increasingly been proposed as valuable support for firms that were addressing complex, multifaceted goals that spanned local boundaries such as climate change, research is still emerging on their effectiveness in reaching the intended outcomes (de Bakker et al., 2019; Jastram & Klingenberg, 2018).

Extending preliminary evidence on the sustainability impacts of MSIs, our study aims to theorize and empirically test whether a firm's decision to join an MSI, targeting climate mitigation, turns into improved environmental performance. Participation in an MSI is expected to support firms in overcoming barriers related to temporal misalignment between their goals and environmental achievements. In fact, these initiatives support firms' engagements with stakeholders characterized by longer-term orientations, such as NGOs and governments (Pinkse & Kolk, 2010). By interacting with these stakeholders, firms may extend their tolerance for embracing initiatives that are expected to generate results over longer time horizons (Slawinski et al., 2017). Furthermore, MSIs orchestrate concerted actions that bound firms, institutions, and other participants toward shared, cross-boundary agendas or coordinated goals (Moog et al., 2015). Accordingly, they may act as reassuring mechanisms for firms, reducing their concerns related to the effectiveness of individual actions that face boundary-spanning problems. Finally, the decision to commit to MSIs may support firms in overcoming the perceived uncertainty related to embracing actions for which science or expert views are needed, to bring meaning and to ground their ambitions. MSIs involve experts from heterogeneous fields and are organizational spaces that combine different knowledge streams to propose cross-boundary solutions for complex social issues (Dentoni & Bitzer, 2015). For this reason, the decision to join such MSIs might support firms in overcoming their self-interests during agenda setting while simultaneously sending credible signals of commitment and appeasing concerned stakeholders (Mena & Palazzo, 2012).

The decision to participate in an MSI might not be sufficient to mitigate a firm's environmental impact. The literature, in fact, suggests that firms might vary in the extent to which participation in climate-related initiatives is coupled with effective intentions to implement the structural changes required to mitigate climate change (Berrone et al., 2017). Based on this evidence, we submit that the decision to participate in an MSI generates a stronger positive environmental impact when coupled with the intention to follow the indications proposed by the MSI.

To test our hypotheses, we focused on firms' participation in the Science Based Targets initiative (SBTi), which is an MSI, promoted by the CDP (formerly the Carbon Disclosure Project), the United Nations Global Compact, the World Resource Institute, and the World Wildlife Fund (WWF), aimed at supporting firms in setting greenhouse gas (GHG) emission reduction targets in line with the threshold defined by the Paris Agreement in 2015. The executive board of the SBTi includes representatives from each partner and donor organization that provides strategic input and mobilizes resources to meet the goals of the initiative.[i] By the end of 2020, 1101 firms from all over the world had already committed to or set a science-based target, for an aggregated market cap of $20.5 trillion USD (Science Based Targets Initiative, 2020).

We relied on the coarsened exact matching (CEM) methodology (Iacus et al., 2012) to create a matched sample of European and North American listed firms participating in the SBTi and non-participating comparable firms over a 3-year period from 2015 to 2017. Our final sample consisted of 594 observations: 73 cases of firms that participated in the SBTi and 521 control firms that did not. The results confirmed our hypotheses and showed that firms participating in the MSI displayed lower GHG emission levels compared to their counterparts that had not participated. Furthermore, our analyses indicated that the effect was stronger for firms that had moved beyond mere participation and committed to the initiative with the explicit intention of integrating the indications proposed by the initiative itself.

Our study contributes to the emerging debate on the need and effectiveness of multi-stakeholder collaboration to tackle complex social and environmental problems. First, we documented the effects

of the decisions to join and commit to an MSI on firms' environmental performances. Thus, we answered the call for further studies on the role of MSIs in driving firms' actions (Clarke & Crane, 2018), by showing the persistence of positive environmental performances for firms that had decided to embark on cross-boundary collaboration initiatives. Second, we offered novel insights and preliminary results on the need to investigate the functioning of an MSI to predict participants' outcomes. Our results showed that the beneficial impact of a multi-stakeholder collaboration was stronger when the initiative not only stimulated participation but also supported firms in implementing defined actions and targets.

The remainder of the paper is structured as follows. First, we develop a theoretical framework and hypotheses, building on and extending research on the benefits associated with firms' participation in MSIs. These sections are followed by a description of the methodology, sample selection, and empirical analysis. Finally, findings and contributions are discussed along with the limitations of the paper and future research opportunities.

2 | THEORETICAL BACKGROUND

In recent years, an increasing number of studies have focused on the strategies and actions that firms could implement to mitigate their impacts on climate change or to adapt to it (Wright & Nyberg, 2017). Among the mitigation strategies, scholars point to several aspects, such as the implementation of business solutions (Okereke & Russel, 2010), the provision of incentives (Russo & Harrison, 2005), the implementation of environmental management systems (Aravind & Christmann, 2011) or setting environmental targets (Dahlmann et al., 2019; Haffar & Searcy, 2018), and more recently, cooperation among different stakeholders (Bowen et al., 2018; Dzhengiz et al., 2023). However, the notable lack of progress in reducing carbon emissions suggests that firms struggled to deal practically with such grand challenges. According to a report by the SBTi, global emissions from energy and industrial processes increased by 3.4% from 2015 to 2020 (Science Based Targets Initiative, 2020).

Firms' limited effectiveness in mitigating their impacts on climate change has been mostly related to the uncertain returns on the investments that are required to implement the solutions. This puts environmental commitments in conflict with mainstream corporate attitudes that focus on short time horizons and uncertainty avoidance (Slawinski et al., 2017). Firms' short-term orientations put them at odds with the longer time horizons required to mitigate the impacts of climate change and find solutions for it. The effects of climate change are both long-term and urgent in nature because the biggest impacts of climate change are decades or more away with limited time to find cost-effective ways to reduce GHG emissions (Levin et al., 2012; Ocko et al., 2017). Research found that firms' short-term orientations led to lower investments in environmental innovation and stakeholder relationships (David et al., 2001; Marginson & McAulay, 2008), which not only compromise long-term returns but also sustainable development (Bansal & DesJardine, 2014; Slawinski & Bansal, 2012).

In addition to temporal misalignment, investments aimed at tackling climate change are intrinsically uncertain. In fact, when facing a grand challenge such as climate change, it is difficult for firms to define the possible future states of the world and therefore forecast the consequences of their present actions (Ferraro et al., 2015). Indeed, the identification of appropriate actions and the forecasting of the related impacts often span the boundaries of a single organization when dealing with climate issues (Olsen et al., 2016). In addition, tackling climate change requires coordinated action that crosses organizational boundaries. In these cases, the lack of control on whether climate efforts would achieve the expected, or a sufficient impact may prevent firms from engaging or selecting investments for which the likelihood of obtaining the expected results could not be predicted with reasonable certitude (Jia & Li, 2020; Marginson & McAulay, 2008).

Collaborating with heterogeneous stakeholders is one of the crucial mitigating mechanisms that favor firms' engagement in the climate debate, when they need more time or face uncertainty. Preliminary evidence shows that engaging with stakeholders potentially creates a buffer against market pressures that demand short-term performance (DesJardine & Bansal, 2019; Flammer & Bansal, 2017). Additionally, the actions of external stakeholders, such as activists or interest groups, can compel firms to act when investments are expected to generate returns over a longer time horizon (Hiatt et al., 2015). Firms might also receive additional knowledge from experts and advocacy groups, reducing the perceived uncertainty related to specific investments for which scientific or expert knowledge are required (Olsen et al., 2016; Porter et al., 2020). Similarly, collaboration across sectors that involve heterogeneous participants have the potential to bind these participants in acting toward shared goals, thus strengthening the firms' perceptions that corporate commitments would generate positive outcomes (Bowen et al., 2018).

2.1 | The rise of MSIs in fighting climate change

With increasing awareness of the beneficial roles of cross-sector collaborations in forming agreements on issues of public importance, while overcoming the limits of traditional regulatory approaches (Clarke & Crane, 2018; Vurro et al., 2010), MSIs represent private governance mechanisms to cope with social and environmental challenges (Zeyen et al., 2016). Despite differences in terms of composition, structure, and functioning, MSIs involve different stakeholders such as governments, firms, nonprofit organizations, civil society organizations, and research entities with the aim of combining and coordinating actions across different sectors by leveraging their diverse knowledge and experiences (Baumann-Pauly et al., 2017). Compared to traditional models of governance, it was mentioned that MSIs are decentralized, bounded areas with structures and rules of engagement that allow diverse and heterogeneous participants to dynamically interact, generate, or share ideas; develop and reinforce standards and compliant behaviors; and eventually funnel resources toward effective solutions (de Bakker et al., 2019; George et al., 2016).

As a result of their participation, stakeholders involved in MSIs are expected to reach a consensus about standards, rules, and principles that have to be adopted to pursue their overarching goals. MSIs also develop monitor systems or, less frequently, develop assessment schemes to evaluate participants' commitments (Voegtlin & Scherer, 2017). As participants join the discussions in MSIs, their diversity and heterogeneity prompt intense interaction among multiple, even conflicting identities and interests (Moog et al., 2015; Scherer et al., 2013). By favoring communication and searching for a consensus, the interactions also represent valuable sources of learning because they challenge common wisdom and expose the participants to alternative perspectives (Scherer & Palazzo, 2007). Finally, the plurality of participants and inclusiveness of different non-state entities in the development and implementation of collective norms, rules, and agendas have been associated with greater senses of acceptability, which led to higher perceived legitimacy for the initiatives and the participants (Mena & Palazzo, 2012; Zeyen et al., 2016). Despite expectations about their potential, evidence is still limited on the ability of MSIs to achieve transformational and enduring impacts. In particular, whether MSIs are eliciting firms' commitments and driving their environmental impacts remains an open issue (de Bakker et al., 2019).

To bridge the literature on firm-level obstacles in embracing sustainability and the emerging evidence on the impact of MSIs in facing complex challenges that affect people and society, we identified several reasons for which joining an MSI is likely to increase a firm's commitment to mitigate its environmental impact. First, MSIs mitigate the problems related to temporal misalignment among firms' return expectations and the pay-off of investments aimed at mitigating climate change. In addition, MSIs represent a space in which a firm engages with stakeholders characterized by longer-term orientations, such as NGOs and governments (Pinkse & Kolk, 2010). These interactions foster firms' tolerance for embracing initiatives that would generate results over longer time horizons. In addition, committing to initiatives that a broad array of social participants, who are perceived as legitimate, contributed to, increases the environmental legitimacy of the firm (Berrone et al., 2017). In so doing, participation in such initiatives generates a short-term legitimacy return, mitigating the temporal misalignment issue.

Second, the decision to commit to such initiatives reduces the perceived uncertainty related to the goals and activities that a firm has to pursue to reduce its environmental impact. In fact, these initiatives involve experts from heterogeneous fields and combine different knowledge domains in setting concerted norms, rules, goals, and agendas (Dentoni & Bitzer, 2015). By complementing the role of each stakeholder, MSIs promote mutual responsiveness and collective learning. In so doing, these initiatives are expected to mitigate the perceived uncertainty related to the outcomes of firms' investments that span across boundaries and need coordination across domains.

Third, as they are conceived, MSIs favor the inclusiveness and participation of all relevant stakeholders. They bind heterogeneous participants in moving toward the solution by using shared pathways. Such alignments act as a reassuring, legitimizing mechanism for every participating firm by reducing concerns related to the credibility of its actions. Together, these three arguments point to the positive effects of firms' participation in environmental MSIs.

Thus, we hypothesize:

> **Hp1.** Firms that participate in environmental MSIs will have lower impacts on climate change.

Despite the premise, the literature indicates that a firm's participation in such initiatives might be insufficient to elicit the expected outcome of a lower environmental impact. MSIs often fail to deliver results because of market forces that put downward pressure on collective standards (Moog et al., 2015), the fragility of these initiatives due to a lack of financial resources to sustain their operations (O'Rourke, 2006), and the emergence of conflicting initiatives that might foster a cautious approach by certain stakeholders (Prado & Woodside, 2015; Reinecke et al., 2012).

In addition to context-related factors, firms that join such initiatives often do not lower their environmental impacts unless participation is coupled with the commitment to implement the structural changes, targets, or solutions as suggested by the MSI. Research on the adoption of environmental management practices, such as the provision of incentives (Kolk & Perego, 2014) or the definition of targets (Dahlmann et al., 2019), argues that adoption might reflect intentions to manage stakeholder pressures (Flammer, 2013), to mimic competitors, or to pre-empt regulatory intervention (Bansal, 2005), rather than effectively mitigate a firm's impact on climate change. The motivations underlying the adoption of environmental management practices were observed to substantively affect a firm's environmental performance. For instance, it was found that environmental target setting did not turn into lower GHG emissions unless they reflected the real intention of firms to mitigate their environmental footprints (Dahlmann et al., 2019).

Similarly, scholars suggest that firms participate in environmental MSIs with intentions that may differ from the search for a substantive improvement in their environmental performance (de Bakker et al., 2019; George et al., 2016). This research emphasizes that the role of a firm's underlying intentions and commitment in adopting the initiative's proposed solution is crucial to mitigate its environmental impact and to analyze the effectiveness of an MSI. Following this line of reasoning, we submit that a decision to participate in an MSI supports firms in reducing their environmental impact only when it is coupled with a commitment to comply with the agreed solution. Our argument is based on the observation that the presence of a strategic intention, to achieve an improvement in environmental performance, fosters the development of internal changes in areas such as capabilities, innovation, and the organizational processes that are needed to address the targets. Recent research shows that defining environmental targets reflects a firm's intention to mitigate its environmental impact, stimulating learning, cooperation, and innovation to address such objectives, thus, leading to improved environmental performance (Dahlmann et al., 2019). Thus, we posit that committing to follow the indications arising from an MSI, firms integrate environment-related

considerations in their strategic decision-making. This triggers a range of cultural, organizational, and structural changes that lead to improved environmental performance. We formed our second hypothesis based on this argument.

> **Hp2.** The effect of participating in an environmental MSI on climate change will be stronger for firms committed to complying with the indications provided by the MSI.

3 | DATA AND METHOD

3.1 | Research setting

To test our hypotheses, we identified a specific context that could serve as an extreme case, the SBTi. The SBTi is an MSI promoted since 2015 by the CDP, the United Nations Global Compact, the World Resource Institute, and the WWF aimed at supporting firms in setting GHG emission reduction targets in line with the threshold defined by the Paris Agreement in 2015. These organizations represent the multiple interest groups involved in climate change challenges. The executive board of the SBTi includes representatives from each partner and donor organization that provide strategic input and mobilize resources to meet the goal of the initiative.

The SBTi represented an ideal case to test our arguments for several reasons. As observed by de Bakker et al. (2019), studies on MSIs might be impinged by the coexistence of other MSIs that share the same goal. To our knowledge, this was the only initiative focused on identifying and validating GHG emission targets, and thus, it allowed us to clearly disentangle the hypothesized relationships. Relatedly, the outcome measure of firms' participation in the SBTi was easily measured by measuring GHG emission reductions, which simplified the identification of a cause–effect relationship between participation and intended outcomes. In addition, the process of engaging with the SBTi enables the identification of two groups of firms: those that committed to the initiative with the intention of integrating the proposed indications and those that participated without such intention. Each firm, after having publicly declared its willingness to participate in the initiative, has up to 24 months to develop an emission reduction target that must be approved by the experts involved in the SBTi (Science Based Targets initiative, 2019). As shown by the data provided by the SBTi, the target approval process was not a mere formality, as 32.9% of the firms that started the process in the period 2015 to 2018 failed to obtain approval in the subsequent 2 years. This evidence supported the long-held belief that, for some firms, the decision to publicly declare their intention to mitigate their environmental impacts did not necessarily result in the implementation of the required solutions (Delmas & Montes-Sancho, 2010). Thus, the two-stage process that firms had to follow to engage with the SBTi allowed discrimination between the two groups of firms, namely, firms that decided to participate in the initiative and those that, despite participating, did not commit to implementing the solution that was proposed and validated by the initiative. Finally, the SBTi integrates scientific expertise in determining appropriate emission reduction goals. Thus, it represents an ideal context for studying the role of MSIs as reassuring mechanisms and legitimacy drivers.

3.2 | Sample selections

To test our arguments, we selected the European and North American listed firms included in the Refinitiv ESG database over the period 2014 to 2019, starting from 1 year prior to the launch of the SBTi. Refinitiv is one of the most comprehensive databases providing data on environmental, social, and governance (ESG) indicators for about 9000 firms, combining several public sources such as annual reports, NGO websites, and stock exchange filings. The data collection process is designed to maximize data quality and comprises automated checks, independent audits, and managerial reviews. We focused on the industries that accounted for relevant amounts of GHG emissions, thus excluding banks and insurance companies (Misani & Pogutz, 2015). We retrieved financial data from Datastream. The initial sample included 4833 firms' data over the period 2014 to 2019, making a total of 33,831 firm-year observations. The second step of the sampling process consisted of collecting SBTi participation data over the period 2015 to 2019, distinguishing between the year in which each firm publicly declared its participation in the SBTi and the year in which their presented target was accepted as complying with the SBTi standards. Of the initial sample, 5.2% of the firms participated in the initiative (254 firms). The ISIN identifier, followed by the year of observation, was used as the linking field throughout the entire sampling process to merge the two datasets and identify each firm-year observation.

According to our intended aim, we sought to understand whether participation in the SBTi generated effects that remained consistent over time. Consequently, in our sample, we retained only those firms that displayed environmental performances for at least 3 years after publicly declaring their participations in the SBTi. This choice, combined with missing values in the financial data, reduced the number of firms included in our initial sample to 73 firms participating in the SBTi and 792 firms that had not joined during the period 2015 to 2017. To ensure that the reduction in the number of firms included in our sample did not distort the results, we replicated our analysis by including those firms that displayed data on environmental performances for 1 and 2 years after their decision to join the SBTi and obtained results aligned with those observed in our main analyses.

3.3 | Empirical approach

To ensure homogeneity between the treatment and control groups, we used CEM (Iacus et al., 2012), a widely adopted matching technique in the management literature (Chirico et al., 2019; Feldman et al., 2016; Rogan & Sorenson, 2014), which allowed us to, at least partially, reduce concerns about endogeneity. CEM outperforms other matching techniques in achieving optimal covariate balance when the

number of matching covariates is high (Hird & Pfotenhauer, 2017; Ripollone et al., 2020). We used CEM to identify the treatment group as each of the firms *i* that publicly declared their participation in the SBTi in a given year. The group of firms that displayed similar characteristics to those of firms *i* and had not participated in the initiative was the control group. CEM helped to mitigate selection bias concerns based on identifying the variables that affected the relationship between participation in the SBTi and the firm's environmental performance (Corritore et al., 2020).

The selection of covariates to be incorporated into the matching process was a decisive step. In this stage, it was important to include all the variables with known or hypothesized effects on both the treatment characteristics and the analyzed outcome measures. CEM allowed for exact matching of some covariates and coarsened matching on other variables when an exact match was not feasible (Iacus et al., 2012). We matched exactly on the industry of operations, distinguishing between carbon-intensive and non-carbon-intensive sectors, as defined by the European Emission Trading System.[ii] The presence of a GHG emission reduction target, as reported in Refinitiv ESG, the year of the participation in the SBTi, and the region of the firms' headquarters were represented by a binary variable that took the values Europe and North America. Distinguishing between these two regions was relevant because historically they had different environmental policies and regulations, which might have influenced both the rate of participation in initiatives such as the SBTi and the measured outcome for the study, that is, GHG emissions. We coarsen matched past GHG emissions, measured as the GHG total emissions lagged to 1 year before participation, and firm size, measured as total assets. For firm size, a percentile-based categorization was performed before running the matching to obtain bins with respect to the firm's total assets.

The matching procedure yielded a sample of 594 observations consisting of 73 cases and 521 control firms, and the multivariate distance L1 was 0.220. In Figure 1, we plotted the temporal trends of the main dependent variables for the treatment and control groups in both the pre- and post-participation periods. As shown in Figure 1, the total GHG emissions between the two groups generally exhibited a parallel trend up to the year of participation in the SBTi and then began to diverge.

To test our hypotheses, we ran OLS regressions by applying the weights produced by the CEM algorithm on all the models.

3.4 | Dependent variable

The scope of the study was narrowed to companies' impact on climate change as measured by their level of GHG emissions, in line with the SBTi mission. The dependent variable, namely, environmental performance, was measured in absolute terms and was operationalized by taking the level of a firm's CO_2 and equivalent emissions, which corresponded to the Refinitiv ESG variable ENERDP023. This variable accounts for the level of Direct (Scope 1) and Indirect (Scope 2) emissions reported by each firm according to various protocols (e.g., GHG Protocol, Kyoto Protocol, and EU Trading Scheme). Among the different protocols, Refinitiv prioritizes the GHG Protocol over the others. The natural log of GHG emissions was computed to reduce the variance within the variable. We focused on the absolute level of emissions of the firm, which was a direct representation of the effectiveness of a firm's efforts toward mitigating its environmental footprint (Delmas et al., 2015; Russo et al., 2021).

3.5 | Independent variables

3.5.1 | Participation

To test Hp1 on the environmental effects of a firm's participation in MSIs, a participation variable was constructed, which was a dichotomous variable that took a value of one in the year of participation in the SBTi, and zero otherwise.

3.5.2 | Commitment

Hp2 aimed to test whether commitments to implementing the solution proposed by the MSI led to stronger environmental impacts than

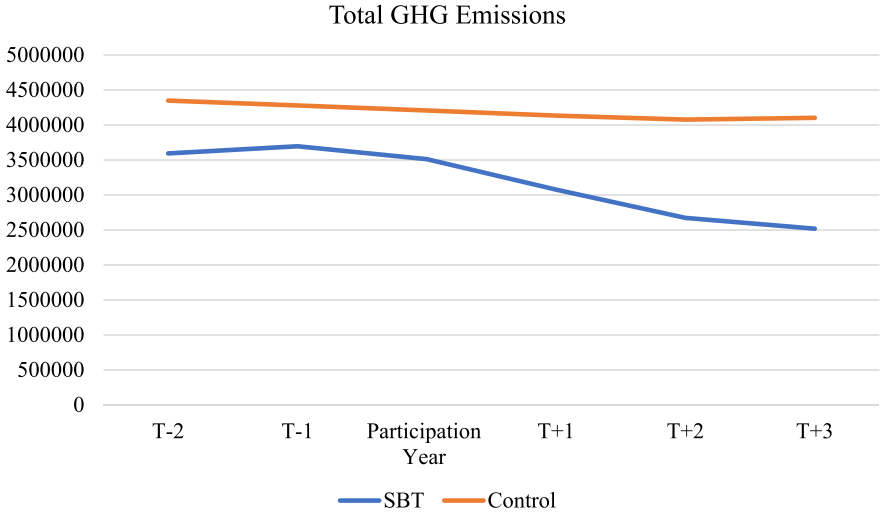

FIGURE 1 Total GHG emission trends in the two groups.

mere participation. To test this hypothesis, we identified the sub-group of participating firms that followed the indications proposed by the SBTi and set GHG emission reduction targets in line with the SBTi requirements. To compare the sub-group with the main group of participating firms, we built a variable that took a value of one for the uncommitted firms in the participation year if they had not set an environmental target that was approved by the SBTi in the subsequent 2 years, two for the committed firms in the participation year if they turned in an approved target in the subsequent 2 years, and zero otherwise. This variable allowed the isolation of cases in which participation had not led to an approved target once the 2-year development period expired; for example, companies still having a value of one in 2017 were those that committed in 2015 but never set a target.

3.6 | Control variables

In addition to the *strata fixed effect* (Corritore et al., 2020), we accounted for temporal dynamics across different regions and industries by including *industry* × year × *region* fixed effects, together with a number of other control variables that were likely to influence a firm's environmental performance. We controlled for a firm's *profitability* using return on assets (ROA), obtained as the ratio between net income and total assets, as retrieved from Datastream (Flammer & Bansal, 2017). Profitability might have influenced firms' environmental performances because firms with greater profitability may have been more inclined to undertake environmental practices due to slack resources (Waddock & Graves, 1997). Additionally, we controlled for a firm's size to account for industry dependency. We operationalized this variable as the ratio between a firm's total assets and the industry average to limit potential distortions due to collinearity with the dependent variable (Russo et al., 2021). We included the *debt/equity* ratio to control for the financial structure effect, measured as the ratio of the firm's debt to shareholders' equity. To account for differences in strategic and management orientation by firms, we included the variable *governance score* assigned by the Refinitiv ESG variable, GOVSCORE. This variable was calculated by aggregating the scores attributed to three different categories: CSR strategy, management structure, and shareholder rights. This synthetic measure of governance management had been widely used to assess aggregated firms' governance practices, which might have influenced their decisions to participate in MSIs as well as their environmental performances (Khaled et al., 2021; Murcia et al., 2021). Descriptive statistics and pairwise correlations of all variables included in the analysis are presented in Table 1.

4 | RESULTS

Table 2 presents the results of the regressions aimed at examining Hp1, which predicted that participating in an MSI, targeting climate mitigation, reduced a firm's impact on climate change. Model 0 is the

TABLE 1 Descriptive statistics and pairwise correlations.

	Variables	Obs	Mean	Std. dev.	Min	Max	1	2	3	4	5	6	7	8	9
1	GHG emissions $t+1$ (ln)	594	13.095	1.928	3.398	18.400	1.000								
2	GHG emissions $t+2$ (ln)	594	13.066	1.939	3.336	18.372	0.994	1.000							
3	GHG emissions $t+3$ (ln)	594	13.029	1.961	2.632	18.372	0.988	0.995	1.000						
4	Participation	594	0.121	0.327	0.000	1.000	0.014	0.006	−0.003	1.000					
5	Commitment	594	0.217	0.602	0.000	2.000	0.011	0.003	−0.007	0.972	1.000				
6	Profitability	594	0.056	0.067	−0.224	0.304	−0.133	−0.128	−0.128	0.038	0.042	1.000			
7	Size	594	3.770	5.426	0.051	40.353	0.217	0.216	0.211	0.034	0.050	0.073	1.000		
8	Debt/equity	594	109.60	97.295	0.000	353.06	0.136	0.132	0.130	−0.011	−0.013	−0.111	0.016	1.000	
9	Governance score	594	60.668	20.89	11.24	96.630	0.163	0.162	0.160	0.080	0.079	0.030	0.101	0.467	1.000

TABLE 2 The effect of participating to MSI on firm environmental performance.

Variables	Model 0 DV: GHG emissions $t+1$ (ln)	Model 1 DV: GHG emissions $t+1$ (ln)	Model 2 DV: GHG emissions $t+2$ (ln)	Model 3 DV: GHG emissions $t+3$ (ln)
MSI participation		−0.474***	−0.457**	−0.513***
		(0.009)	(0.017)	(0.008)
Profitability	−2.721***	−2.627***	−2.308***	−2.340***
	(0.001)	(0.001)	(0.003)	(0.002)
Size	0.072***	0.072***	0.073***	0.071***
	(0.000)	(0.000)	(0.000)	(0.000)
Debt/equity	0.001	0.001	0.001	0.001
	(0.137)	(0.108)	(0.141)	(0.156)
Governance score	0.007**	0.007**	0.008***	0.008***
	(0.020)	(0.012)	(0.007)	(0.007)
Constant	11.661***	11.445***	11.533***	11.851***
	(0.000)	(0.000)	(0.000)	(0.000)
Strata fixed effect	Yes	Yes	Yes	Yes
Sector*Year*Region fixed effect	Yes	Yes	Yes	Yes
Observations	594	594	594	594
R-squared	0.799	0.803	0.803	0.804

Note: Robust *p*-value in parentheses.
***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

baseline model that includes only control variables. The results of the analysis showed that a firm's relative size was associated with higher GHG emissions levels ($p = 0.000$), while a firm's profitability ($p = 0.0001$) and governance quality ($p = 0.020$) enhanced its environmental performance, which was consistent with previous results (Endrikat et al., 2020; Walls et al., 2012). Models 1, 2, and 3 presented the results of the regressions aimed at testing the effect of joining an MSI on a firm's GHG emissions for 1, 2, and 3 years after its decision to participate. In particular, the results presented in Model 1 showed that participation was associated with lower total GHG emissions in $t+1$, and the coefficient estimate was negative and significant at $p = 0.009$. Model 2 reports the results of the regression on the level of total GHG emissions 2 years after participation; the coefficient estimated was negative and significant at $p = 0.017$. Likewise, the results presented in Model 3 indicated that the impact on a firm's total GHG emission performance persisted 3 years after the participation year; the coefficient estimated that was associated with our main independent variable was negative and significant at $p = 0.008$. Together, these results supported Hp1.

Table 3 presents the results of the regressions aimed at testing Hp2, which predicted that the environmental effects of participating in an MSI were stronger for firms that committed to integrating the agreed solutions. Specifically, the main explanatory variable used in Models 4, 5, and 6 distinguished between firms that, after participation, set GHG emission reduction targets approved by the SBTi and firms that did not. In the three regression models, we analyzed how this distinction might have affected their subsequent impacts on climate change over the 3-year period following the participation year. The results presented in Model 4 confirmed our hypothesis showing that the effects on GHG emission reductions were stronger for firms committed to the initiative, that is, firms that would later translate their commitments into targets approved by the SBTi, as compared to firms that had not participated ($\Delta = -0.654$; $p = 0.000$) and firms that participated without following the proposed indications ($\Delta = -0.905$; $p = 0.056$). These results remained stable over time, as shown in Models 5 and 6. The effects on total GHG emissions in $t+2$ and $t+3$ were stronger for firms that adopted the solution proposed by the MSI than for non-participating firms ($\Delta_{(t+2)} = -0.631$; $p_{(t+2)} = 0.001$; $\Delta_{(t+3)} = -0.694$; $p_{(t+3)} = 0.000$) and for those firms that had not translated their participations into the SBTi approved emission reduction targets ($\Delta_{(t+2)} = -0.905$; $p_{(t+2)} = 0.048$; $\Delta_{(t+3)} = -0.962$; $p_{(t+3)} = 0.036$). These results supported Hp2. The implications are discussed in the subsequent sections of this paper.

To corroborate our results, we conducted a set of robustness tests. First, we re-ran all the regressions using the GHG emission ratio calculated for each firm *i* in industry *k* at time *t* as the dependent variable (Dowell et al., 2000; Hart & Ahuja, 1996). Following the procedure adopted by Russo et al. (2021), we first standardized a firm's total GHG emissions over the firm's total sales. Then, we normalized it by computing the ratio between the firm's GHG emissions/sales ratio and the average GHG emissions ratio of the sector in which the firm operated, calculated by excluding the value of the focal firm from the sample. A ratio equal to one indicated that the firm emitted the same quantity of emissions per dollar of revenue as its industry. A ratio

TABLE 3 The effect of participating to MSI on firm environmental performance.

Variables	Model 4 DV: GHG emissions $t+1$ (ln)	Model 5 DV: GHG emissions $t+2$ (ln)	Model 6 DV: GHG emissions $t+3$ (ln)
MSI committed firms	−0.645***	−0.631***	−0.694***
	(0.000)	(0.001)	(0.000)
MSI not-committed firms	0.260	0.296	0.268
	(0.563)	(0.500)	(0.533)
Profitability	−2.637***	−2.317***	−2.350***
	(0.001)	(0.002)	(0.002)
Size	0.075***	0.075***	0.073***
	(0.000)	(0.000)	(0.000)
Debt/equity	0.001	0.001	0.001
	(0.126)	(0.166)	(0.181)
Governance score	0.007**	0.008***	0.008***
	(0.011)	(0.007)	(0.006)
Constant	11.499***	11.588***	11.402***
	(0.000)	(0.000)	(0.000)
Strata fixed effect	Yes	Yes	Yes
Sector*Year*Region fixed effect	Yes	Yes	Yes
Observations	594	594	594
R-squared	0.806	0.806	0.807
Difference	0.905	0.927	0.962
Prob > *F*	0.056	0.048	0.036

Note: Robust *p*-value in parentheses.
***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

lower than one indicated better performance than the industry. The results reported in Table 4 were consistent with those observed in previous models.

Second, we recognized that firms that were committed to following the indications proposed by the MSI might have differed substantially from those firms that only participated without such commitments in terms of both observable factors such as industry and performances and unobservable factors such as the intention behind their commitments to the initiative. This heterogeneity might have reduced the effectiveness of the matching procedure in creating an observational equivalent sample of firms. To mitigate this concern, we conducted a set of additional analyses in which we used CEM to identify the treatment group for each committed firm *i*, and the control group of firms that displayed similar characteristics to those of firm *i* and had not participated in the initiative, or that had participated in the initiative without the commitments to follow the indications proposed by the MSI. We matched the firms based on the same variables adopted in the first matching, that is, the type of industry in which the firm operated, specifically if it was a carbon-intense industry or not, the region of the corporate headquarters, the year of commitment to the SBTi, the presence of a target for the reduction of GHG emissions, size, and total GHG emissions in the year before the commitment. The results of this set of analyses are presented in Table 5 and were qualitatively aligned with those included in Table 3, providing further support for Hp2.

5 | DISCUSSION

This study advanced the research on how firms could effectively be driven toward climate change mitigation. Previous studies in this field had mostly focused on aspects that were internal to firms, such as the provision of incentives (Russo & Harrison, 2005), the implementation of environmental management systems (Aravind & Christmann, 2011), the definition of environmental targets (Dahlmann et al., 2019; Ioannou et al., 2016), and the characteristics of their governance (Burke et al., 2019; Walls et al., 2012). By acknowledging the limits of private responses to environmental grand challenges, academic and practitioner debates increasingly shared excitement about the promises of joining collaborative initiatives involving multiple stakeholders (Bowen et al., 2018; Niesten et al., 2017; Niesten & Jolink, 2015). In this regard, MSIs were increasingly praised for their potential to enhance the system-level governance of social and environmental problems (Clarke & Crane, 2018; Jastram & Klingenberg, 2018), while concurrently enabling participants to better address the complexities of such challenges (Clarke & MacDonald, 2019; Shumate et al., 2018).

TABLE 4 Robustness test with a different dependent variable.

	Model 7 DV: GHG efficiency $t+1$	Model 9 DV: GHG efficiency $t+2$	Model 10 DV: GHG efficiency $t+3$	Model 11 DV: GHG efficiency $t+1$	Model 12 DV: GHG efficiency $t+2$	Model 13 DV: GHG efficiency $t+3$
Participation	−0.453**	−0.302*	−0.393**			
	(0.013)	(0.076)	(0.023)			
MSI committed firms				−0.612***	−0.503***	−0.581***
				(0.000)	(0.000)	(0.000)
MSI not-committed firms				0.251	0.582	0.437
				(0.613)	(0.284)	(0.402)
Profitability	−1.329	−1.072	−1.531*	−1.310	−1.049	−1.507*
	(0.128)	(0.218)	(0.082)	(0.116)	(0.195)	(0.071)
Size	−0.034***	−0.030***	−0.039***	−0.032***	−0.028***	−0.037***
	(0.002)	(0.002)	(0.001)	(0.004)	(0.004)	(0.002)
Debt/equity	−0.000	−0.000	−0.001	−0.000	−0.000	−0.001
	(0.370)	(0.542)	(0.294)	(0.336)	(0.481)	(0.265)
Governance score	0.006**	0.005**	0.009***	0.006**	0.005**	0.008***
	(0.025)	(0.036)	(0.007)	(0.027)	(0.039)	(0.007)
Constant	−0.843	−0.701	−0.942**	−0.785	−0.628	−0.873*
	(0.103)	(0.130)	(0.039)	(0.125)	(0.170)	(0.052)
Strata fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year*Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	589	589	589	589	589	589
R-squared	0.662	0.641	0.638	0.668	0.650	0.655
Difference				0.863	1.085	1.018
Prob > *F*				0.076	0.043	0.049

Note: Robust *p*-value in parentheses.
***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

However, how the collective capacity of an MSI is related to its effectiveness in achieving its goals remains an open question (Williams & Whiteman, 2021).

In an attempt to advance the literature in this important respect, we drew from and extended preliminary evidence of the sustainability impacts of MSIs (de Bakker et al., 2019; Jastram & Klingenberg, 2018), testing whether a firm's decision to join an MSI, that focused on climate mitigation, resulted in a better corporate environmental performance. Our results provided empirical evidence that participation in such MSIs was associated with reductions in environmental footprints and that these effects remained consistent over time. Moreover, we empirically showed that participation per se might not suffice to generate a positive impact in mitigating climate change contributions.

By disentangling participation patterns within the same multi-stakeholder framework, our findings provided preliminary evidence that the effects on firms' environmental performances were stronger for those firms that participated in the initiative and had committed to work in the direction traced by the initiative itself. In fact, we observed that a reduction in terms of a firm's total GHG emissions was more pronounced for those firms that would set environmental targets approved by the SBTi in the subsequent 2 years. In this regard, it is worth noting that the positive effects in terms of climate change mitigation for committed firms were observed immediately after the participation year, even though their targets had not yet been approved by the SBTi. Our results provided a less simplistic view of the role of MSIs in driving firms' engagements in sustainability. We pointed out the importance of designing initiatives so that they could elicit substantive responses by firms from inception, that is, the moment from which a firm makes the decision to join.

These findings have substantial implications for the different participants in the current economic and geopolitical situation and their efforts to mitigate the environmental impact of GHG emissions. Our results supported the vital role that MSIs could play in mobilizing firms' actions for climate mitigation. MSIs effectively overcame the barriers that prevented firms from making climate commitments that span beyond corporate boundaries with longer time horizons (Fransen, 2012; Slawinski et al., 2017). In so doing, we also answered

TABLE 5 Robustness test with a different CEM criteria.

Variables	Model 1 DV: GHG emissions $t+1$ (ln)	Model 2 DV: GHG emissions $t+2$ (ln)	Model 3 DV: GHG emissions $t+3$ (ln)
MSI committed firms	−0.643***	−0.632***	−0.698***
	(0.001)	(0.002)	(0.001)
Profitability	−3.088***	−2.802***	−2.805***
	(0.001)	(0.001)	(0.001)
Size	0.077***	0.077***	0.075***
	(0.000)	(0.000)	(0.000)
Debt/equity	0.001	0.001	0.001
	(0.355)	(0.421)	(0.408)
Governance score	0.007**	0.007***	0.007***
	(0.013)	(0.009)	(0.009)
Constant	12.006***	12.118***	−0.698***
	(0.000)	(0.000)	(0.001)
Strata fixed effect	Yes	Yes	Yes
Sector*Year*Region fixed effect	Yes	Yes	Yes
Observations	563	563	563
R-squared	0.788	0.786	0.790

Note: Robust *p*-value in parentheses.
***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

the call for more empirical research and quantitative data on the effectiveness of these forms of private regulations (Bowen et al., 2010; Jastram & Klingenberg, 2018; MacDonald et al., 2019). Digging deeper into the case of the SBTi, we performed a quantitative, statistical analysis on the performance outcomes of firms' participations in and commitments to MSIs. In the context of the SBTi, establishing outcome indicators was reasonably straightforward, as the organization's goal was to set GHG reduction targets which could be assessed by measuring the level of its emissions.

Our findings also contributed to the understanding of voluntary environmental practices through the lens of substantive and symbolic intentions (Berrone et al., 2017; Dahlmann et al., 2019). We extended this core conceptualization to the participation in MSIs aimed at mitigating climate change. Our results corroborated the evidence that firms might have only appeared to share the same targets as those of the MSI, while their underlying intentions, expectations, or actions may have been substantially different. We empirically showed the coexistence of firms with heterogeneous participation patterns in the same MSI, with stricter commitments being associated with better environmental performances. This evidence provided further insights into those planning to join or regulate the functioning of an MSI, as it emphasized the importance of designing the participation properly, as mentioned in a previous study, to influence the initiative's capacity to mobilize their partners into action beyond mere participation (Van Tulder et al., 2016). The stronger environmental impacts of committed firms suggested the importance of MSIs in developing monitoring or enforcement capabilities themselves, as well as increasing the commitments of interested firms. This may be beneficial not only in terms of better environmental outcomes but also in avoiding a false sense of legitimacy for members who are performing poorly or not in accordance with the concerted solution.

5.1 | Areas for future research and limitations

This study examined the environmental consequences of firms' participation in MSIs by focusing on firms that joined and committed to the SBTi. Despite the appropriateness of the empirical context to isolate the hypothesized relationships and compare the results across participating firms, we cannot exclude the possibility that our results were affected by the design and functioning of the SBTi itself. Being aware of the limitations of cross-sectional analyses in the field of multi-stakeholder collaborations (de Bakker et al., 2019) could enable future studies to extend the view to other MSIs sharing similar targets but paired with alternative designs in terms of participation and commitment. Additionally, extending the focus on MSIs with different social or environmental targets and with similar designs or functioning could shed further light on the effectiveness of multi-stakeholder collaborations in driving firms' behaviors. This could support the development of a contingency view of multi-stakeholder partnerships by associating taxonomies of grand challenges to appropriate configurations (MacDonald et al., 2019).

Our results strongly supported the existence of a substantial difference between participation and commitment in driving firms' environmental performances. However, the research design and available data did not allow us to identify the firm-, MSI-, or context-level

factors behind the non-approval of targets in firms that publicly declared their decisions to join the SBTi. We envisage future qualitative research to disentangle the process and driving forces behind the shift from participation to commitment to enrich our understanding of the conditions driving substantive commitments by interested firms. Emerging evidence showed that the positive impact of multi-stakeholder collaborative governance in tackling complex social and environmental problems was often taken for granted and mostly tied to ideals of openness, alignment, and harmony among the parties involved (Schüssler et al., 2014). In particular, future research could investigate how stakeholder-based governance arrangements that were purposefully developed to support firms and other participants, in response to big societal issues, might have unintentionally created conditions for failure, limited efficacy, or prevented scalability of the envisaged solutions while concealing more controversial goals (Mair et al., 2016; Vakili & McGahan, 2016). Similarly, we analyzed the direct effect of participating in MSIs on environmental performance. Although our matching procedure reduced differences between participating and non-participating firms, we did not investigate how different factors, such as the provision of incentives, the presence of a sustainability committee, or long-term investors might have influenced our hypothesized relationship. Future work might focus on how the simultaneous presence of such factors influences the effectiveness in mitigating firms' impacts on climate change.

Further, we theorized about the positive impact on a firm's performance when joining an MSI that focused on climate mitigation. However, it is common for firms to join multiple, different collaborations that might have reinforced or hindered each other in terms of targets and commitments. Paralleling mainstream alliance research, future studies could investigate the appropriateness of adopting a portfolio lens in the study of multi-stakeholder collaborations and deepen the current understanding of their performance consequences (de Almeida et al., 2021; Jiang et al., 2010).

Our research was bounded by data availability in a relatively recent time frame. The SBTi was first launched in 2015, and although a growing number of companies are joining every year, it remains a recent project. This led to a relatively small sample size for participating firms. Additionally, not all participating firms publicly disclose data on CO_2 and equivalent emissions, which resulted in an even smaller sample size. We attempted to moderate the small sample size constraint by using the CEM methodology. However, this issue must be considered as well as the relatively short time frame that did not allow us to assess the impact of the initiative over the long term. Future studies should evaluate whether the hypotheses tested and validated in this work remain robust when analyzed on a wider sample of firms and over a longer timeframe.

ACKNOWLEDGMENT

We gratefully acknowledge support received from Beatrice Aiello and Alice Iavarone as research assistants in the early stages of data collection. We also thank two anonymous reviewers and participants at the GRONEN Reading Group Meeting at Amsterdam Business School (2022) for constructive comments.

[Correction added on 7 December 2023, after first online publication: Acknowledgment section has been added in this version.]

ORCID

Clodia Vurro https://orcid.org/0000-0002-1300-7426

ENDNOTES

[i] As reported on the website of Science Based target (https://sciencebasedtargets.org/about-us/governance).

[ii] Detailed information on the criteria used to distinguish such industries can be found on the website of the European Emission Trading System (https://ec.europa.eu/clima/policies/ets_en).

REFERENCES

Abou Chakra, M., Bumann, S., Schenk, H., Oschlies, A., & Traulsen, A. (2018). Immediate action is the best strategy when facing uncertain climate change. *Nature Communications*, *9*(1), 1–9.

de Almeida, J. M. G., Gohr, C. F., Morioka, S. N., & da Nobrega, B. M. (2021). Towards an integrative framework of collaborative capabilities for sustainability: A systematic review and research agenda. *Journal of Cleaner Production*, *279*, 123789. https://doi.org/10.1016/j.jclepro.2020.123789

Aravind, D., & Christmann, P. (2011). Decoupling of standard implementation from certification: Does quality of ISO 14001 implementation affect facilities' environmental performance? *Business Ethics Quarterly*, *21*, 73–102. https://doi.org/10.5840/beq20112114

de Bakker, F. G., Rasche, A., & Ponte, S. (2019). Multi-stakeholder initiatives on sustainability: A cross-disciplinary review and research agenda for business ethics. *Business Ethics Quarterly*, *29*(3), 343–383. https://doi.org/10.1017/beq.2019.10

Bansal, P. (2005). Evolving sustainably: A longitudinal study of corporate sustainable development. *Strategic Management Journal*, *26*(3), 197–218. https://doi.org/10.1002/smj.441

Bansal, P., & DesJardine, M. R. (2014). Business sustainability: It is about time. *Strategic Organization*, *12*(1), 70–78. https://doi.org/10.1177/1476127013520265

Baumann-Pauly, D., Nolan, J., Van Heerden, A., & Samway, M. (2017). Industry-specific multi-stakeholder initiatives that govern corporate human rights standards: Legitimacy assessments of the Fair Labor Association and the Global Network Initiative. *Journal of Business Ethics*, *143*(4), 771–787. https://doi.org/10.1007/s10551-016-3076-z

Berrone, P., Fosfuri, A., & Gelabert, L. (2017). Does greenwashing pay off? Understanding the relationship between environmental actions and environmental legitimacy. *Journal of Business Ethics*, *144*(2), 363–379. https://doi.org/10.1007/s10551-015-2816-9

Bowen, F., Newenham-Kahindi, A., & Herremans, I. (2010). When suits meet roots: The antecedents and consequences of community engagement strategy. *Journal of Business Ethics*, *95*(2), 297–318. https://doi.org/10.1007/s10551-009-0360-1

Bowen, F. E., Bansal, P., & Slawinski, N. (2018). Scale matters: The scale of environmental issues in corporate collective actions. *Strategic Management Journal*, *39*(5), 1411–1436. https://doi.org/10.1002/smj.2764

Burke, J. J., Hoitash, R., & Hoitash, U. (2019). The heterogeneity of board-level sustainability committees and corporate social performance. *Journal of Business Ethics*, *154*(4), 1161–1186. https://doi.org/10.1007/s10551-017-3453-2

Chirico, F., Gómez-Mejia, L. R., Hellerstedt, K., Withers, M., & Nordqvist, M. (2019). To merge, sell, or liquidate? Socioemotional wealth, family control, and the choice of business exit. *Journal of Management*, *46*(8), 1342–1379. https://doi.org/10.1177/0149206318818723

Clarke, A., & Crane, A. (2018). Cross-sector partnerships for systemic change: Systematized literature review and agenda for further research. *Journal of Business Ethics*, *150*(2), 303–313. https://doi.org/10.1007/s10551-018-3922-2

Clarke, A., & MacDonald, A. (2019). Outcomes to partners in multi-stakeholder cross-sector partnerships: A resource-based view. *Business & Society*, *58*(2), 298–332. https://doi.org/10.1177/0007650316660534

Corritore, M., Goldberg, A., & Srivastava, S. B. (2020). Duality in diversity: How intrapersonal and interpersonal cultural heterogeneity relate to firm performance. *Administrative Science Quarterly*, *65*(2), 359–394. https://doi.org/10.1177/0001839219844175

Dahlmann, F., Branicki, L., & Brammer, S. (2019). Managing carbon aspirations: The influence of corporate climate change targets on environmental performance. *Journal of Business Ethics*, *158*(1), 1–24. https://doi.org/10.1007/s10551-017-3731-z

David, P., Hitt, M. A., & Gimeno, J. (2001). The influence of activism by institutional investors on R&D. *Academy of Management Journal*, *44*(1), 144–157. https://doi.org/10.2307/3069342

Delmas, M. A., & Montes-Sancho, M. J. (2010). Voluntary agreements to improve environmental quality: Symbolic and substantive cooperation. *Strategic Management Journal*, *31*(6), 575–601.

Delmas, M. A., Nairn-Birch, N., & Lim, J. (2015). Dynamics of environmental and financial performance: The case of greenhouse gas emissions. *Organization & Environment*, *28*(4), 374–393. https://doi.org/10.1177/1086026615620238

Delmas, M. A., & Toffel, M. W. (2008). Organizational responses to environmental demands: Opening the black box. *Strategic Management Journal*, *29*(10), 1027–1055. https://doi.org/10.1002/smj.701

Dentoni, D., & Bitzer, V. (2015). The role (s) of universities in dealing with global wicked problems through multi-stakeholder initiatives. *Journal of Cleaner Production*, *106*, 68–78. https://doi.org/10.1016/j.jclepro.2014.09.050

DesJardine, M., & Bansal, P. (2019). One step forward, two steps back: How negative external evaluations can shorten organizational time horizons. *Organization Science*, *30*(4), 761–780. https://doi.org/10.1287/orsc.2018.1259

Doh, J., Tashman, P., & Benischke, M. (2018). Adapting to grand environmental challenges through collective entrepreneurship. *Academy of Management Perspectives*, *33*(4), 450–468. https://doi.org/10.5465/amp.2017.0056

Dowell, G., Hart, S., & Yeung, B. (2000). Do corporate global environmental standards create or destroy market value? *Management Science*, *46*(8), 1059–1074. https://doi.org/10.1287/mnsc.46.8.1059.12030

Dzhengiz, T., Riandita, A., & Broström, A. (2023). Configurations of sustainability-oriented textile partnerships. *Business Strategy and the Environment*, *32*, 4392–4412. https://doi.org/10.1002/bse.3372

Endrikat, J., De Villiers, C., Guenther, T. W., & Guenther, E. M. (2020). Board characteristics and corporate social responsibility: A meta-analytic investigation. *Business & Society*, *60*(8), 2099–2135. https://doi.org/10.1177/0007650320930638

Feldman, E. R., Amit, R., & Villalonga, B. (2016). Corporate divestitures and family control. *Strategic Management Journal*, *37*(3), 429–446. https://doi.org/10.1002/smj.2329

Ferraro, F., Etzion, D., & Gehman, J. (2015). Tackling grand challenges pragmatically: Robust action revisited. *Organization Studies*, *36*(3), 363–390. https://doi.org/10.1177/0170840614563742

Flammer, C. (2013). Corporate social responsibility and shareholder reaction: The environmental awareness of investors. *Academy of Management Journal*, *56*(3), 758–781. https://doi.org/10.5465/amj.2011.0744

Flammer, C., & Bansal, P. (2017). Does a long-term orientation create value? Evidence from a regression discontinuity. *Strategic Management Journal*, *38*(9), 1827–1847. https://doi.org/10.1002/smj.2629

Fransen, L. (2012). Multi-stakeholder governance and voluntary programme interactions: Legitimation politics in the institutional design of Corporate Social Responsibility. *Socio-Economic Review*, *10*(1), 163–192. https://doi.org/10.1093/ser/mwr029

Fransen, L. W., & Kolk, A. (2007). Global rule-setting for business: A critical analysis of multi-stakeholder standards. *Organization*, *14*(5), 667–684. https://doi.org/10.1177/1350508407080305

George, G., Howard-Grenville, J., Joshi, A., & Tihanyi, L. (2016). Understanding and tackling societal grand challenges through management research. *Academy of Management Journal*, *59*(6), 1880–1895. https://doi.org/10.5465/amj.2016.4007

Goldstein, A., Turner, W. R., Gladstone, J., & Hole, D. G. (2019). The private sector's climate change risk and adaptation blind spots. *Nature Climate Change*, *9*(1), 18–25. https://doi.org/10.1038/s41558-018-0340-5

Haffar, M., & Searcy, C. (2018). Target-setting for ecological resilience: Are companies setting environmental sustainability targets in line with planetary thresholds? *Business Strategy and the Environment*, *27*(7), 1079–1092. https://doi.org/10.1002/bse.2053

Hart, S. L., & Ahuja, G. (1996). Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy and the Environment*, *5*(1), 30–37. https://doi.org/10.1002/(SICI)1099-0836(199603)5:1<30::AID-BSE38>3.0.CO;2-Q

Hiatt, S. R., Grandy, J. B., & Lee, B. H. (2015). Organizational responses to public and private politics: An analysis of climate change activists and US oil and gas firms. *Organization Science*, *26*(6), 1769–1786. https://doi.org/10.1287/orsc.2015.1008

Hird, M. D., & Pfotenhauer, S. M. (2017). How complex international partnerships shape domestic research clusters: Difference-in-difference network formation and research re-orientation in the MIT Portugal Program. *Research Policy*, *46*(3), 557–572. https://doi.org/10.1016/j.respol.2016.10.008

Howard-Grenville, J., Buckle, S. J., Hoskins, B. J., & George, G. (2014). Climate change and management. *Academy of Management Journal*, *57*(3), 615–623. https://doi.org/10.5465/amj.2014.4003

Iacus, S. M., King, G., & Porro, G. (2012). Causal inference without balance checking: Coarsened exact matching. *Political Analysis*, *20*(1), 1–24. https://doi.org/10.1093/pan/mpr013

Ioannou, I., Li, S. X., & Serafeim, G. (2016). The effect of target difficulty on target completion: The case of reducing carbon emissions. *The Accounting Review*, *91*(5), 1467–1492. https://doi.org/10.2308/accr-51307

Jastram, S. M., & Klingenberg, J. (2018). Assessing the outcome effectiveness of multi-stakeholder initiatives in the field of corporate social responsibility—The example of the United Nations Global Compact. *Journal of Cleaner Production*, *189*, 775–784. https://doi.org/10.1016/j.jclepro.2018.04.005

Jia, J., & Li, Z. (2020). Does external uncertainty matter in corporate sustainability performance? *Journal of Corporate Finance*, *65*, 101743. https://doi.org/10.1016/j.jcorpfin.2020.101743

Jiang, R. J., Tao, Q. T., & Santoro, M. D. (2010). Alliance portfolio diversity and firm performance. *Strategic Management Journal*, *31*(10), 1136–1144. https://doi.org/10.1002/smj.869

Khaled, R., Ali, H., & Mohamed, E. K. (2021). The Sustainable Development Goals and corporate sustainability performance: Mapping, extent and determinants. *Journal of Cleaner Production*, *127599*, 127599. https://doi.org/10.1016/j.jclepro.2021.127599

Kölbel, J. F., Heeb, F., Paetzold, F., & Busch, T. (2020). Can sustainable investing save the world? Reviewing the mechanisms of investor impact. *Organization & Environment*, *33*(4), 554–574. https://doi.org/10.1177/1086026620919202

Kolk, A., & Perego, P. (2014). Sustainable bonuses: Sign of corporate responsibility or window dressing? *Journal of Business Ethics*, *119*(1), 1–15. https://doi.org/10.1007/s10551-012-1614-x

Levin, K., Cashore, B., Bernstein, S., & Auld, G. (2012). Overcoming the tragedy of super wicked problems: Constraining our future selves to

ameliorate global climate change. *Policy Sciences*, *45*(2), 123–152. https://doi.org/10.1007/s11077-012-9151-0

MacDonald, A., Clarke, A., & Huang, L. (2019). Multi-stakeholder partnerships for sustainability: Designing decision-making processes for partnership capacity. *Journal of Business Ethics*, *160*(2), 409–426. https://doi.org/10.1007/s10551-018-3885-3

Mair, J., Wolf, M., & Seelos, C. (2016). Scaffolding: A process of transforming patterns of inequality in small-scale societies. *Academy of Management Journal*, *59*(6), 2021–2044. https://doi.org/10.5465/amj.2015.0725

Marginson, D., & McAulay, L. (2008). Exploring the debate on short-termism: A theoretical and empirical analysis. *Strategic Management Journal*, *29*(3), 273–292. https://doi.org/10.1002/smj.657

Mena, S., & Palazzo, G. (2012). Input and output legitimacy of multi-stakeholder initiatives. *Business Ethics Quarterly*, *22*(3), 527–556. https://doi.org/10.5840/beq201222333

Misani, N., & Pogutz, S. (2015). Unraveling the effects of environmental outcomes and processes on financial performance: A non-linear approach. *Ecological Economics*, *109*, 150–160. https://doi.org/10.1016/j.ecolecon.2014.11.010

Moog, S., Spicer, A., & Böhm, S. (2015). The politics of multi-stakeholder initiatives: The crisis of the Forest Stewardship Council. *Journal of Business Ethics*, *128*(3), 469–493. https://doi.org/10.1007/s10551-013-2033-3

Murcia, M. J., Panwar, R., & Tarzijan, J. (2021). Socially responsible firms outsource less. *Business & Society*, *60*(6), 1507–1545. https://doi.org/10.1177/0007650319898490

Niesten, E., & Jolink, A. (2015). The impact of alliance management capabilities on alliance attributes and performance: A literature review. *International Journal of Management Reviews*, *17*(1), 69–100. https://doi.org/10.1111/ijmr.12037

Niesten, E., Jolink, A., de Sousa Jabbour, A. B. L., Chappin, M., & Lozano, R. (2017). Sustainable collaboration: The impact of governance and institutions on sustainable performance. *Journal of Cleaner Production*, *155*, 1–6. https://doi.org/10.1016/j.jclepro.2016.12.085

Ocko, I. B., Hamburg, S. P., Jacob, D. J., Keith, D. W., Keohane, N. O., Oppenheimer, M., Roy-Mayhew, J. D., Schrag, D. P., & Pacala, S. W. (2017). Unmask temporal trade-offs in climate policy debates. *Science*, *356*(6337), 492–493. https://doi.org/10.1126/science.aaj2350

Okereke, C., & Russel, D. (2010). Regulatory pressure and competitive dynamics: Carbon management strategies of UK energy-intensive companies. *California Management Review*, *52*(4), 100–124. https://doi.org/10.1525/cmr.2010.52.4.100

Olsen, A. Ø., Sofka, W., & Grimpe, C. (2016). Coordinated exploration for grand challenges: The role of advocacy groups in search consortia. *Academy of Management Journal*, *59*(6), 2232–2255. https://doi.org/10.5465/amj.2015.0730

O'Rourke, D. (2006). Multi-stakeholder regulation: Privatizing or socializing global labor standards. *World Development*, *34*(5), 899–918. https://doi.org/10.1016/j.worlddev.2005.04.020

Pinkse, J., & Kolk, A. (2010). Challenges and trade-offs in corporate innovation for climate change. *Business Strategy and the Environment*, *19*(4), 261–272. https://doi.org/10.1002/bse.677

Porter, A. J., Tuertscher, P., & Huysman, M. (2020). Saving our oceans: Scaling the impact of Robust action through crowdsourcing. *Journal of Management Studies*, *57*(2), 246–286. https://doi.org/10.1111/joms.12515

Prado, A. M., & Woodside, A. G. (2015). Deepening understanding of certification adoption and non-adoption of international-supplier ethical standards. *Journal of Business Ethics*, *132*(1), 105–125. https://doi.org/10.1007/s10551-014-2301-x

Raihani, N., & Aitken, D. (2011). Uncertainty, rationality and cooperation in the context of climate change. *Climatic Change*, *108*(1), 47–55. https://doi.org/10.1007/s10584-010-0014-4

Reinecke, J., Manning, S., & Von Hagen, O. (2012). The emergence of a standards market: Multiplicity of sustainability standards in the global coffee industry. *Organization Studies*, *33*(5–6), 791–814. https://doi.org/10.1177/0170840612443629

Ripollone, J. E., Huybrechts, K. F., Rothman, K. J., Ferguson, R. E., & Franklin, J. M. (2020). Evaluating the utility of coarsened exact matching for pharmacoepidemiology using real and simulated claims data. *American Journal of Epidemiology*, *189*(6), 613–622. https://doi.org/10.1093/aje/kwz268

Rogan, M., & Sorenson, O. (2014). Picking a (poor) partner: A relational perspective on acquisitions. *Administrative Science Quarterly*, *59*(2), 301–329. https://doi.org/10.1177/0001839214531719

Russo, A., Pogutz, S., & Misani, N. (2021). Paving the road toward eco-effectiveness: Exploring the link between greenhouse gas emissions and firm performance. *Business Strategy and the Environment*, *30*, 3065–3078. https://doi.org/10.1002/bse.2789

Russo, M. V., & Harrison, N. S. (2005). Organizational design and environmental performance: Clues from the electronics industry. *Academy of Management Journal*, *48*(4), 582–593. https://doi.org/10.5465/amj.2005.17843939

Scherer, A. G., & Palazzo, G. (2007). Toward a political conception of corporate responsibility: Business and society seen from a Habermasian perspective. *Academy of Management Review*, *32*(4), 1096–1120. https://doi.org/10.5465/amr.2007.26585837

Scherer, A. G., Palazzo, G., & Seidl, D. (2013). Managing legitimacy in complex and heterogeneous environments: Sustainable development in a globalized world. *Journal of Management Studies*, *50*(2), 259–284. https://doi.org/10.1111/joms.12014

Schüssler, E., Rüling, C.-C., & Wittneben, B. B. (2014). On melting summits: The limitations of field-configuring events as catalysts of change in transnational climate policy. *Academy of Management Journal*, *57*(1), 140–171. https://doi.org/10.5465/amj.2011.0812

Science Based Targets Initiative. (2020). *From ambition to impact: How companies are reducing emissions at scale with science-based targets*. Science Based Target Initiative.

Sharfman, M. P., & Fernando, C. S. (2008). Environmental risk management and the cost of capital. *Strategic Management Journal*, *29*(6), 569–592. https://doi.org/10.1002/smj.678

Sharma, S., & Vredenburg, H. (1998). Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic Management Journal*, *19*(8), 729–753. https://doi.org/10.1002/(SICI)1097-0266(199808)19:8<729::AID-SMJ967>3.0.CO;2-4

Shumate, M., Fu, J. S., & Cooper, K. R. (2018). Does cross-sector collaboration lead to higher nonprofit capacity? *Journal of Business Ethics*, *150*(2), 385–399. https://doi.org/10.1007/s10551-018-3856-8

Slawinski, N., & Bansal, P. (2012). A matter of time: The temporal perspectives of organizational responses to climate change. *Organization Studies*, *33*(11), 1537–1563. https://doi.org/10.1177/0170840612463319

Slawinski, N., Pinkse, J., Busch, T., & Banerjee, S. B. (2017). The role of short-termism and uncertainty avoidance in organizational inaction on climate change: A multi-level framework. *Business & Society*, *56*(2), 253–282. https://doi.org/10.1177/0007650315576136

Vakili, K., & McGahan, A. M. (2016). Health care's grand challenge: Stimulating basic science on diseases that primarily afflict the poor. *Academy of Management Journal*, *59*(6), 1917–1939. https://doi.org/10.5465/amj.2015.0641

Van Tulder, R., Seitanidi, M. M., Crane, A., & Brammer, S. (2016). Enhancing the impact of cross-sector partnerships. *Journal of Business Ethics*, *135*(1), 1–17. https://doi.org/10.1007/s10551-015-2756-4

Voegtlin, C., & Scherer, A. G. (2017). Responsible innovation and the innovation of responsibility: Governing sustainable development in a globalized world. *Journal of Business Ethics*, *143*(2), 227–243. https://doi.org/10.1007/s10551-015-2769-z

Vurro, C., Dacin, M. T., & Perrini, F. (2010). Institutional antecedents of partnering for social change: How institutional logics shape cross-

sector social partnerships. *Journal of Business Ethics*, *94*(Supplement 1, 39–53. https://doi.org/10.1007/s10551-011-0778-0

Waddock, S., & Graves, S. B. (1997). Quality of management and quality of stakeholder relations. *Business & Society*, *36*(3), 250–279. https://doi.org/10.1177/000765039703600303

Walls, J. L., Berrone, P., & Phan, P. H. (2012). Corporate governance and environmental performance: Is there really a link? *Strategic Management Journal*, *33*(8), 885–913. https://doi.org/10.1002/smj.1952

Wang, T., & Bansal, P. (2012). Social responsibility in new ventures: Profiting from a long-term orientation. *Strategic Management Journal*, *33*(10), 1135–1153. https://doi.org/10.1002/smj.1962

Williams, A., & Whiteman, G. (2021). A call for deep engagement for impact: Addressing the planetary emergency. *Strategic Organization*, *14761270211011703*, 526–537. https://doi.org/10.1177/14761270211011703

Wright, C., & Nyberg, D. (2017). An inconvenient truth: How organizations translate climate change into business as usual. *Academy of Management Journal*, *60*(5), 1633–1661. https://doi.org/10.5465/amj.2015.0718

Zeyen, A., Beckmann, M., & Wolters, S. (2016). Actor and institutional dynamics in the development of multi-stakeholder initiatives. *Journal of Business Ethics*, *135*(2), 341–360. https://doi.org/10.1007/s10551-014-2468-1

How to cite this article: Romito, S., Vurro, C., & Pogutz, S. (2024). Joining multi-stakeholder initiatives to fight climate change: The environmental impact of corporate participation in the Science Based Targets initiative. *Business Strategy and the Environment*, *33*(4), 2817–2831. https://doi.org/10.1002/bse.3639