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Why do companies tackle climate change? A mitigation and adaptation resilience-based view

Federica Gasbarro and Antonio Tencati

Department of Economics and Management, Università degli Studi di Brescia, Brescia, Italy

Research Article

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Corresponding author: Federica Gasbarro; Email: federica.gasbarro@unibs.it

Abstract

Non-Technical Summary. Corporate mitigation and adaptation responses to climate change are still considered as distinct strategies, rather than complementary ways of managing climate risk. An analysis of 5,910 companies that responded to the Carbon Disclosure Project (CDP) questionnaire in 2021 suggests that companies perceiving physical climate risks are more likely to define low-carbon transition plans, adaptation measures, and integrated climate strategies combining both. Other climate-related risks (e.g., technology risk) also drive adaptation and a comprehensive climate strategy. This argues for interpreting the business response to climate change from a mitigation and adaptation resilience perspective.

Technical Summary. In current scientific debate and practice, corporate mitigation and adaptation responses to climate change are often investigated in isolation. Drawing on a global sample of 5,910 companies responding to the 2021 CDP questionnaire, predominantly from Asia (37.1%), the Americas (31.5%), and Europe (28.2%), across Manufacturing (37.7%) and Services (21.9%), we conducted a logistic regression to identify key drivers of corporate responses to climate change. 41.3% of firms develop a low-carbon transition plan, 6% adopt adaptation measures, and 3.9% integrate both. Companies perceiving physical risks exhibit higher odds of implementing mitigation (p-value < 0.001, $\text{Exp}(\beta) = 1.65$), adaptation (p-value < 0.01, $\text{Exp}(\beta) = 2.19$), and a comprehensive strategy (p-value < 0.01, $\text{Exp}(\beta) = 4.42$). Nested other climate-related risks further increase the odds of adopting adaptation (p-value < 0.01, $\text{Exp}(\beta) = 11.02$) and a comprehensive strategy (p-value < 0.01, $\text{Exp}(\beta) = 38.96$). These results support interpreting business responses to climate change from a mitigation and adaptation resilience perspective.

Social Media Summary. Mitigation and adaptation are complementary. CDP data from 5,910 firms show risk perception drives climate action.

1. Introduction

As the global average temperature increases, with its dramatic effects, attention to climate change is growing year after year. Scientists and NGOs are not the only ones urging a definitive stop to greenhouse gas (GHG) emissions. Since 2015, several governments have declared their intention to embrace a more sustainable course for the planet, society, and the economy, after the ratification of the UN 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change. Furthermore, with regard to climate change-related disasters, for example, in the EU, the cost was around 738 billion euros (2023 prices) in terms of economic losses of assets, in the period 1980–2023 (European Environment Agency, 2024). Climate scientists maintain that extreme events due to climate change are increasing in both frequency and intensity, with all the associated risks (IPCC, 2018). Adaptation, then, is fundamental too.

Mitigating climate change represents an inside-out perspective on a company's commitments to reduce its impact on the natural environment, while adaptation represents the response a company implements to actual or expected changes in the natural environment, taking an outside-in perspective (Schmidt et al., 2018). Recent research calls for implementing both mitigation and adaptation measures (AMs) as part of a comprehensive climate change strategy in order to achieve a competitive advantage and sustained success (Beermann, 2011; Linnenluecke & Griffiths, 2010; Monika et al., 2011). In other words, companies, by recognizing their embeddedness in ecological ecosystems, should aim to maintain ecosystem functions and services (Winn & Pogutz, 2013), thereby avoiding compromising the business operations that depend on these functions and services. Then, in this way, industrial resilience will be achieved. However, when studying organizational resilience, management academics, for the most part, either focus

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on the ability of an organization to handle and recover from the negative effects of external shocks, such as economic or technological jolts rather than natural disasters (Mithani et al., 2021), or, when focusing on the negative effects of climate-related physical events, consider it a desired outcome of adaptation responses (Unter et al., 2024; Villano et al., 2026).

According to organizational and strategic literature on corporate responses to climate change, mitigation and adaptation have two strategic intents (Todaro et al., 2021) and, therefore, have mainly been discussed as two separate topics (Schmidt et al., 2018). Academics have found that the main contextual antecedents of a company's climate mitigation are usually regulatory and market changes, technological changes, and, lastly, ecosystem changes induced by climate change (Kouloukoui et al., 2021), while the main contextual antecedents of a company's climate adaptation are usually ecosystem changes induced by climate change (Gasbarro et al., 2016; Xia, 2025). Studies on a comprehensive climate change strategy are scarce, especially those that apply a resilience-theory lens (Unter et al., 2024).

This study, then, aims to identify the most important drivers of corporate responses to climate change, considering both mitigation and adaptation responses, taken separately and together, and to compare different kinds of contextual drivers. By analyzing a sample of 5,910 companies that responded to the Carbon Disclosure Project (CDP) questionnaire in 2021 using logistic regression, we found that companies that perceive climate-related physical risks are more likely to define a low-carbon transition plan (LCTP), adaptation measures (AMs), or both. Other climate-related risks (e.g., technology risk) are also drivers of AMs and of a comprehensive climate strategy. This might suggest that companies recognize their dependence on natural ecosystems and are adopting comprehensive climate risk management when defining both mitigation and AMs. Therefore, we support the idea of reconsidering organization theory toward a mitigation and adaptation resilience-based view, and we propose a conceptual framework to interpret the business response to climate change.

This paper has the following structure: the study hypotheses are based on a theoretical framework and a review of the literature about the causes of business responses to climate change, which are presented in the next section. After that, we outline the methodology, showing the source of the data, the measurements adopted, and the model used, and we present the results. We then discuss our findings. Finally, as we approach the conclusion, we provide theoretical and policy recommendations.

2. Theoretical background

2.1. The drivers of business mitigation of climate change

Mitigation of climate change can be defined as: *'human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs)'* (IPCC, 2014a). Therefore, climate change mitigation refers to efforts by actors to reduce their impact on the natural environment. For organizations, this encompasses all measures taken to limit GHG emissions (Weinhofer & Busch, 2013) or to compensate for them (Kolk & Pinkse, 2004). The reduction of GHG emissions is often included in eco-efficiency efforts aimed at reducing a business's environmental impact while achieving energy and resource efficiency and cost reductions (Jouni & Seager, 2008). Management academics studying climate change mitigation responses found that the main contextual antecedents of this kind of response are institutional pressures, such as regulatory, market, technological, and ecosystem changes, which, in turn, may represent either risks or opportunities for companies (Gasbarro et al., 2017). Several studies have investigated the role of regulatory pressure in the adoption of mitigation strategies, yielding mixed results. The introduction of climate policies that regulate product or process emissions usually triggers changes in business practices to achieve regulatory compliance (Dhanda et al., 2022). Okereke (2007) reported that UK FTSE 100 firms recognized the role of existing national and international regulations in driving their carbon management. Investigating the drivers of the adoption of a low-carbon strategy in Canadian oil and gas firms, de Abreu et al. (2021) found that command-and-control policies have a decisive influence on corporate choices. Studying European high-emitting industries, Littlewood et al. (2018) showed that low-carbon regulations exert pressure to adopt mitigation measures. However, other studies have shown that regulations are less effective at pushing companies to adopt mitigation strategies. For instance, Matthias and Baumgartner (2018) showed that in the automotive industry, climate regulations are not associated with a higher corporate mitigation response. This result is also supported by Daddi et al. (2020), who highlighted the ineffectiveness of coercive regulatory pressures in driving the adoption of proactive mitigation strategies. These differences can be due to the different sectors and variables investigated (e.g., mitigation measures). On the one hand, some sectors receive closer regulatory scrutiny due to their contribution to global warming, such as oil and gas (Heede, 2014). On the other hand, climate mitigation encompasses several measures, ranging from low levels of climate action (e.g., setting a limited low-carbon target) to high levels (e.g., setting a carbon-neutrality target).

Market changes appear to strongly influence climate change mitigation strategies (Cadez et al., 2019). Customer demand could shift toward climate-friendly products, and if there is a major market transition, companies may want to reconsider their carbon management practices, regardless of their ethics (Hoffman, 2005). Competition dynamics prompt companies to adopt mitigation measures through imitation or conformity to industry standards (Daddi et al., 2020). Another important driver of a company's mitigation response to climate change is technological change, as it is the primary means of achieving significant carbon and cost reductions (Okereke, 2007).

Regarding the physical risks posed by climate change, Tashman and Rivera (2016) found that ecological uncertainty in the US ski industry did not drive mitigation practices. However, recent studies have shown that mitigation responses can also be driven by the risk of resource scarcity (de Abreu et al., 2021).

Therefore, we suggest the following hypotheses:

Hypothesis 1. *The implementation of a climate change mitigation strategy is driven by the corporate perception of regulatory risk.*

Hypothesis 2. *The implementation of a climate change mitigation strategy is driven by the corporate perception of physical risk.*

Hypothesis 3. *The implementation of a climate change mitigation strategy is driven by the corporate perception of other climate-related risks.*

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2.2. The drivers of organizational adaptation to climate change

According to the IPCC (2014b), adaptation to climate change can be defined as '*the process of adjustment to actual or expected climate and its effects to moderate or avoid harm or exploit beneficial opportunities*'. This definition encompasses all measures aimed at addressing the impacts of climate-related physical events (e.g., extreme weather events, droughts, heatwaves, and cold waves) and the resulting changes in the natural environment.

However, the concept of adaptation is not new in organizational literature, and it has been widely debated in the past (Benischke et al., 2025). It encompasses the organizational changes in response to changing environments. The main theoretical frameworks (e.g., contingency theory, institutional theory, and the theory of organizational learning) suggest that organizational structures should align with external environments, including competitive, macroeconomic, and political contexts, to achieve higher performance or organizational survival (Singh et al., 1986).

Previous debates about organizational adaptation assume that the natural environment is stable and does not affect organizational life (Monika et al., 2011). The business environment usually encompasses regulatory, economic, cultural, socio-demographic, and technological conditions, overlooking the natural context and its changes; therefore, adaptation in such contexts implies implementing measures to fit, for instance, through cost savings, lobbying, or investing in technological innovation or sustainability reporting (Linnenluecke et al., 2013). Another assumption made in the organizational literature is that once a discontinuity affects the business environment and once an organization has dealt with this change (e.g., Meyer, 1982; Tushman & Anderson, 1986), the business environment returns to a new stable equilibrium (Linnenluecke & Griffiths, 2010). However, climate change cannot be compared to the changes related to the business environment that have been studied in organizational literature because it is expected to have greater spatial scope and temporal scale, 'discontinuous' characteristics, unpredictability, irreversibility, and destructive impacts on the natural environments (Monika et al., 2011) on which the socioeconomic systems rely (Frey et al., 2017; Winn & Pogutz, 2013). This means, for instance, that after a climate-related extreme weather event, organizations may not rely on climate or weather stability because further events may occur, leading to large-scale destruction and consequences for the organization's ability to recover and survive (Linnenluecke & Griffiths, 2010). Companies' AMs to climate change encompass risk assessment, technical solutions, risk sharing and shifting, disaster relief and continuity, reducing geographical exposure, portfolio diversification, and cooperation (Pinkse & Gasbarro, 2019).

Many authors have tried to shed light on the antecedents of business adaptation to climate change, especially on internal factors, such as awareness and vulnerability (Gasbarro & Pinkse, 2016; Hoffmann et al., 2009); organizational capabilities (Busch, 2011); the capacity to adapt and the reliance on the impacted business (Hoffmann et al., 2009); managerial cognition and emotions (Bleda & Pinkse, 2023); previous experience with climate events (Pinkse & Gasbarro, 2019); and environmental attitudes and climate change knowledge (Josephine & Linnenluecke, 2016).

The studies on business adaptation to climate change share a common assumption. That adaptation is mainly implemented in response to present or future changes in the natural environment (Linnenluecke et al., 2012). For example, the study by Tashman and Rivera (2016) on the US ski industry revealed that companies managed ecological uncertainty (i.e., uncertainty about snowpack levels) through AMs that increased natural resource consumption. However, it was shown that AMs are driven not only by climate-related physical changes but also by other contextual factors, such as expected changes in markets and policy conditions (Danese & De Marchi, 2024; Frans et al., 2006). For example, if, as is expected and as a consequence of the warmer temperatures at higher latitudes, tropical diseases expand into these areas, the demand for pharmaceutical products will increase (Packard & Reinhardt, 2000). A rise in temperature usually results in increased demand for water and electricity during the summer, which drives adaptation responses from water and electric utilities (Gasbarro et al., 2016). In addition, regulatory changes aimed at restricting natural resource consumption may be introduced in response to resource scarcity, which, in turn, would affect siting and long-term investment decisions (Gasbarro et al., 2016). However, it has been shown that regulatory pressures may be less effective at triggering adaptation than competitive dynamics (Daddi et al., 2020).

Therefore, we suggest the following hypotheses:

Hypothesis 4. *The implementation of a climate change adaptation strategy is driven by the corporate perception of regulatory risk.*

Hypothesis 5. *The implementation of a climate change adaptation strategy is driven by the corporate perception of physical risk.*

Hypothesis 6. *The implementation of a climate change adaptation strategy is driven by the corporate perception of other climate-related risks.*

2.3. The drivers of a comprehensive organizational climate change response

According to recent research, to gain a competitive edge and maintain success, both mitigation and AMs must be implemented (Beermann, 2011; Monika et al., 2011). Mitigation measures aim to limit the probability of occurrence (and intensity), while AMs are meant to moderate or avoid harm (Swart & Raes, 2007).

Hence, mitigation is fundamental to reducing pressure on the natural system, which, in turn, would reduce pressure on the human system and buy time for adaptation (IPCC, 2001). But since climate change is already occurring, mitigation efforts can only limit these changes and affect the extent, timing, and pace of adaptation; adaptation is therefore fundamental, even though it will not be possible to avoid all damage (IPCC, 2014b). One could argue that a single company can make only a limited contribution to curbing global GHG emissions; however, companies are directly and indirectly responsible for their GHG emissions, which are sometimes even higher than those of some countries (Heede, 2014; Patenaude, 2011). This implies that they are important players in tackling climate change. For example, in 2010, the GHG emissions of the mining group Rio Tinto were at a level similar to New Zealand's, whereas ExxonMobil's emissions exceeded those of Belgium (Patenaude, 2010). In addition, the industry sector's direct and indirect global emissions (without considering the energy sector) account for around 32% of total global emissions (IPCC, 2014c).

Regarding climate change disasters, these accounted for 83% of economic losses and 91,455 deaths in the EU (EU-28) from 1980 to 2017 (European Environment Agency, 2019). Economic losses also affect the private sector, so adaptation is crucial. Some

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studies have shown that certain sectors are more dependent on ecosystem services affected by climate change; therefore, they face severe limitations in adaptation, so mitigation seems to be the best way to avoid the collapse of ecosystems (Clément & Rivera, 2017). Neither mitigation nor adaptation, taken separately, is sufficient to address the climate risk. They are, rather, two complementary measures of climate risk management (Frey & Gasbarro, 2019; IPCC, 2014d; Swart & Raes, 2007) when companies take an inside-out and outside-in perspective on the ecosystem on which they depend. Mitigation can be considered as indirect loss prevention, while adaptation is direct loss prevention (Verheyen, 2005). According to Allie et al. (2019, p. 21), '[a]*ppropriate protection and management of ecosystems could serve as a form of insurance against future climate change risks*.' Hence, mitigation and adaptation responses can be seen as two sides of the same coin because they share the general aim of addressing the same problem: changes in the natural environment on which companies rely (Olausson, 2009). However, studies on business responses to climate change, both in terms of mitigation and in terms of adaptation, are rather scarce. Kouloukoui et al. (2021), with an analysis of CDP responses from French, US, and Brazilian multinational companies, showed that climate regulation influences climate risk management, without a specific focus on other contextual drivers.

Therefore, we hypothesize that a comprehensive response to climate change has the same drivers as the two responses considered separately.

Hence, we suggest the following hypotheses:

Hypothesis 7. *The implementation of a comprehensive business response to climate change is driven by the corporate perception of regulatory risk.*

Hypothesis 8. *The implementation of a comprehensive business response to climate change is driven by the corporate perception of physical risk.*

Hypothesis 9. *The implementation of a comprehensive business response to climate change is driven by the corporate perception of other climate-related risks.*

3. Methodology

3.1. Data and measures

We obtained a company's perception of climate-related risks from the CDP survey conducted in 2021. The CDP surveys companies, municipalities, countries, and regions on their climate-related risks and opportunities management, water security, and deforestation, and, since 2002, has become a leader in the global environmental disclosure system. CDP databases are widely used as sources of information on a company's climate change disclosure.

A total of 5,910 companies responded to this survey. To investigate the drivers of corporate responses to climate change in terms of risk, we relied on both closed questions and open questions. Specifically, question C2.2a, 'Which risk types are considered in your organization's climate-related risk assessments – Relevance and inclusion', was used to derive the risk type, which determines the following variables in our model: *Acute physical risk; Chronic physical risk; Current regulation risk; Emerging regulation risk; Legal risk; Market risk; Reputation risk; and Technology risk*. These were then nested into three main groups: *Regulatory risk* (including Current regulation risk and/or Emerging regulation risk); *Physical risk* (including Acute physical risk and/or Chronic physical risk); and *Other climate-related risks* (including at least one of the following risks: Legal; Market; Reputation; Technology) following the approach of Gasbarro et al. (2017).

The question C3.1, 'Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?' was used to derive the implementation of mitigation measures. Among the three items: 'Yes', 'No', and 'Yes, and we have developed a low-carbon transition plan', we used only the last one, and the corresponding variable is the *LCTP* in our model. There are no questions in the questionnaire related to AMs; therefore, we performed text mining using the NVivo software package to identify the themes related to AMs in the following open question: C3.4a, 'Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).' The theme related to water (e.g., water scarcity) was identified through NVivo auto-coding, and the researchers also looked for the presence of the words 'adaptation', 'continuity', and 'resilience'. After random checks of the texts to check whether the words referred to the implementation of AMs, the researchers created a variable named *AMs*, where at least one of the words 'water', 'adaptation', 'continuity', or 'resilience' was observed. A new variable, *LCTP and AMs,* was created to identify whether companies have planned both mitigation and AMs.

We also included control variables, such as the sector and the geographic area. Specifically, the companies responding to the CDP 2021 survey operate in the following sectors: *Apparel; Biotech, health care and pharma; Food, beverage, and agriculture; Fossil fuels; Hospitality; Infrastructure; Manufacturing; Materials; Power generation; Retail; Services*; and *Transportation services*. The geographic areas where these companies are located cover all five continents (i.e., *Africa, the Americas, Asia, Europe, and Oceania*).

All variables in our sample have been dummy-coded: 1 if the variable was present, 0 otherwise.

3.2. Model

We initially used a cross-tabulation and then a binary logistic regression (BLR) with a random intercept to evaluate our hypotheses. The companies were nested at risk and regional levels. In our models, the dependent variables are, respectively: *LCTP; AM*; and *LCTP and AM*. The independent variables are all eight risk types and the nested risks. The control variables are the sector and the geographic area at the nested level.

3.3. Data description

As shown in Figure 1, most companies do not have a *LCTP* (3,472; 58.7%), *AMs* (5,555; 94%), or both (5,682; 96.1%). Of the sample, 41.3% have defined a *LCTP* (2,438), 6% have implemented AMs (355), and 3.9% have defined both LCTP and AMs (228). Regarding the independent variables, most companies perceive *Other climate-related risks* (60.2%), *Regulatory risk* (60.1%), or *Physical risk* (55.9%). In particular, as shown in Figure 2, Current regulation risk is perceived more frequently in our sample (58.9%), while Chronic physical risk is perceived less frequently (52.6%). In our sample, 37.1% of respondents are headquartered in Asia, 31.5% in the Americas, 28.2% in Europe, and the remaining are in Africa (1.6%) and Oceania (1.5%; Figure 3). Most companies operate in the Manufacturing (37.7%) and Services (21.9%) sectors (Figure 4).

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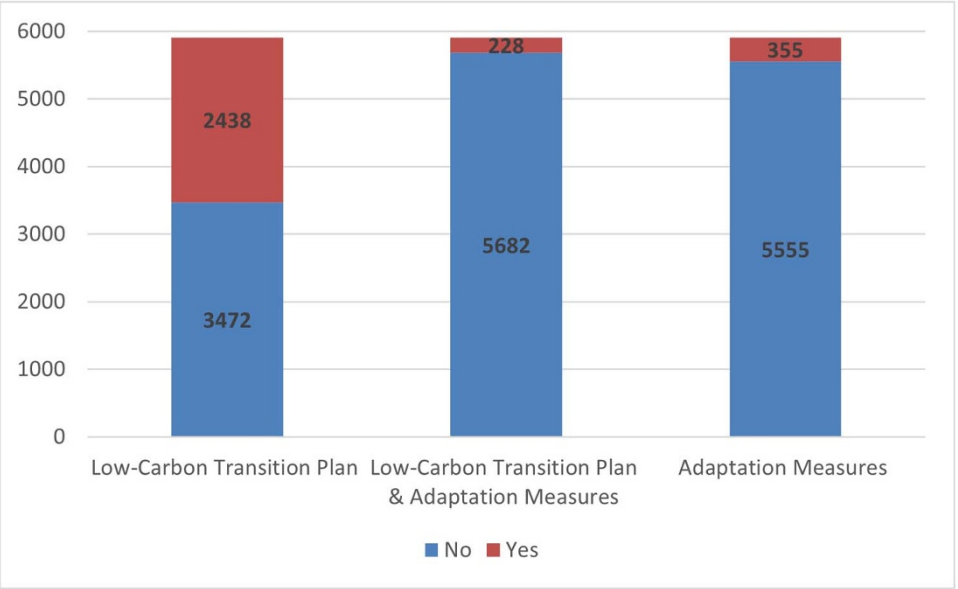


Figure 1. Frequencies of climate measures.

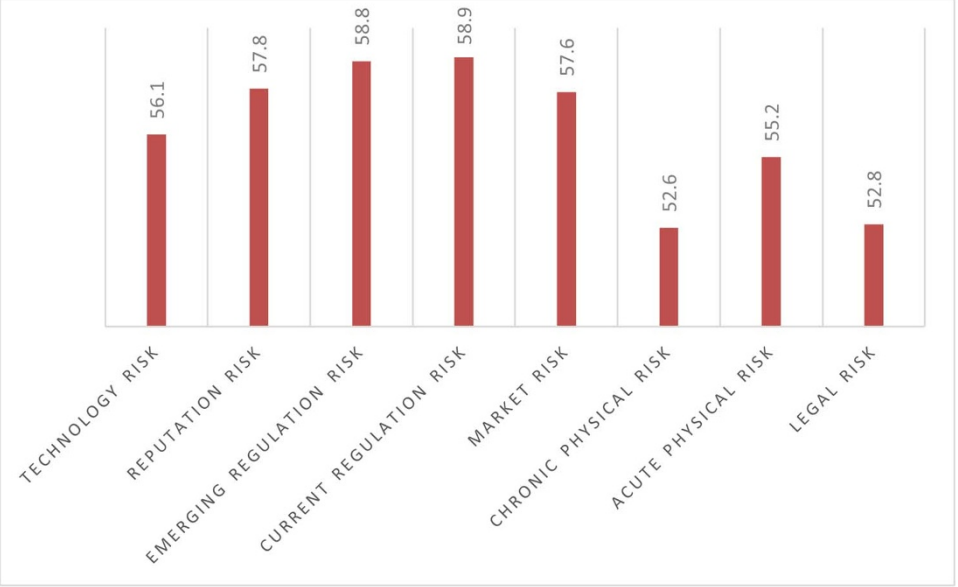


Figure 2. Percentage of companies by risk type.

4. Results

Table 1 presents the results of cross-tabulations of the dependent variables by risks, regions, and sectors. All risks are associated with the three climate-related strategies ($p < 0.05$). However, not all regions or sectors are associated with all strategies. The control variables without significant associations with the independent variables were not included in the BLR models. The Americas, Asia, Europe, Infrastructure, Manufacturing, Materials, and Power generation are associated with the definition of LCTP ($p < 0.05$). Africa, Asia, Oceania, Food beverage and agriculture, Fossil fuels, Hospitality, Infrastructure, Manufacturing, Materials, and Power generation are associated with the definition of AM ($p < 0.05$). Africa, Asia, Europe, Oceania, Infrastructure, Manufacturing, Materials, and Power generation are associated with the definition of LCTP and AM ($p < 0.05$). We conducted further analysis to determine whether certain variables have greater predictive power.

The results of BLR are displayed in Tables 2–4. Models 1A, 1B, and 1C encompass the BLR of the *LCTP*. Models 2A, 2B, and 2C encompass the BLR of *AMs*. Models 3A, 3B, and 3C encompass the BLR of *LCTP and AMs*. Models 1A, 2A, and 3A only include the control variables for each climate strategy. Models 1B, 2B, and 3B add the nested risks. Models 1C, 2C, and 3C substitute the nested risks with specific risks for each climate strategy.

Model 1A makes accurate predictions for 60.6% of the data (Cox and Snell $R^2 = 0.044$, and Nagelkerke $R^2 = 0.059$). According to the Hosmer and Lemeshow test, there is no significant difference between the dependent variable's actual and predicted values (χ^2 [df = 6] = 2.875, $p > 0.05$). With the exception of Materials, all

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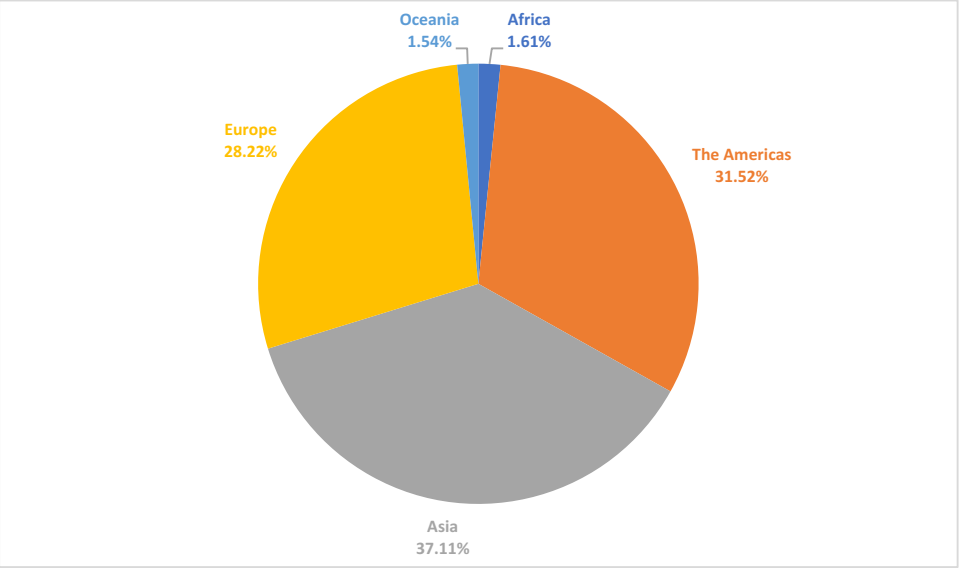


Figure 3. Percentage of companies by continent.

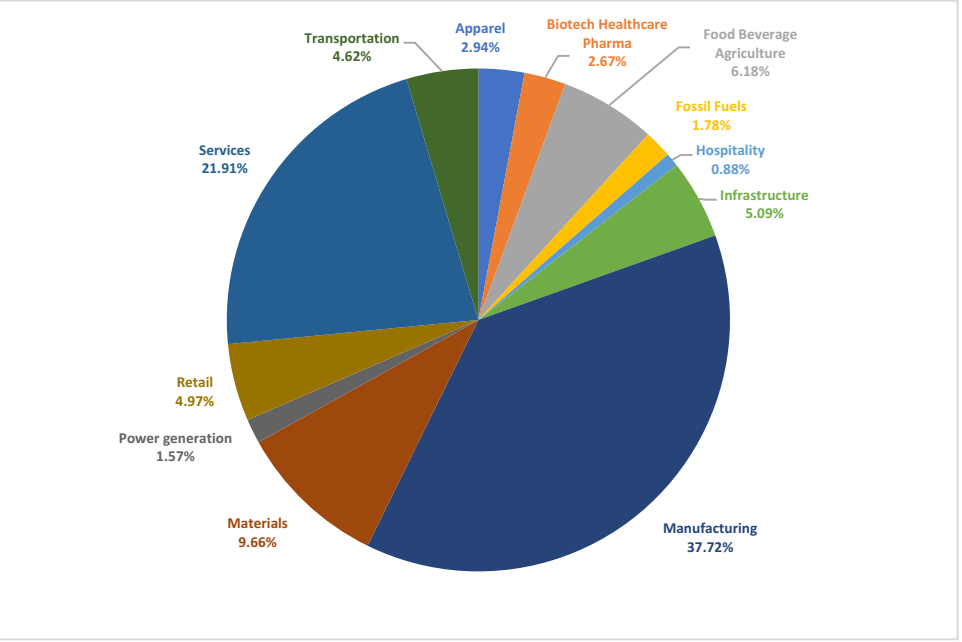


Figure 4. Percentage of companies by sector.

the control variables are significant predictors of LCTP, i.e., the Americas, Asia, Europe, Infrastructure, Manufacturing, and Power generation sectors. Interestingly, Manufacturing and the Americas have a negative coefficient, indicating that companies in this sector or in the American regions are less likely to develop a LCTP.

Model 1B has a better fit (Cox and Snell $R^2 = 0.106$ and Nagelkerke $R^2 = 0.142$) and makes accurate predictions for 65.8% of the values. However, the Hosmer and Lemeshow test is significant ($p < 0.05$). The Wald test indicates that, among the nested risks, only one variable is a significant predictor of whether companies define a *LCTP*: 'Physical risk' ($\beta = 0.498$, Wald χ^2 [df = 1] = 14.699, $p < 0.001$). The positive coefficient implies that the companies that perceive physical risk are more likely to define a LCTP. Unlike in the previous model, the Americas are not a significant predictor.

The substitution of nested risks with specific risks in Model 1C shows similar results. It makes accurate predictions for 66.3% of the values (Cox and Snell $R^2 = 0.109$; Nagelkerke $R^2 = 0.147$). The Hosmer and Lemeshow test is significant ($p < 0.05$). The Wald test indicates that among the specific risks, just one variable is a significant predictor of whether companies define a *LCTP* or not: 'Chronic physical risk' ($\beta = 0.448$, Wald χ^2 [df = 1] = 9.627, $p < 0.01$). The positive coefficient indicates that the companies that perceive a chronic physical risk are more likely to define a LCTP.

Model 2A makes accurate predictions for 94% of the data (Cox and Snell $R^2 = 0.021$, and Nagelkerke $R^2 = 0.057$). The Hosmer and

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Table 1. Type of strategy by variable – no. firms (percentage) and cross-tabulation

	Low-carbon transition plan				Adaptation measures				LCTP&AM			
Variables	Yes, No. (% of variable = 1)	Pearson Chi-square	df	Asymt. Sig.	Yes, No. (% of variable = 1)	Pearson Chi-square	df	Asymt. Sig.	Yes, No. (% of variable = 1)	Pearson Chi-square	df	Asymt. Sig.
Technology risk = 1	1757 (53)	430.932*	1	0.000	332 (10)	215.019*	1	0.000	221 (6.7)	160.708*	1	0.000
Reputation risk = 1	1795 (52.6)	427.842*	1	0.000	340 (10)	223.641*	1	0.000	222 (6.5)	152.448*	1	0.000
Emerging regulation risk = 1	1826 (52.6)	444.846*	1	0.000	342 (9.8)	219.870*	1	0.000	223 (6.4)	149.067*	1	0.000
Current regulation risk = 1	1817 (52.2)	417.842*	1	0.000	342 (9.8)	218.504*	1	0.000	224 (6.4)	148.181*	1	0.000
Market risk = 1	1798 (52.8)	440.641*	1	0.000	338 (9.9)	218.273*	1	0.000	219 (6.4)	143.261*	1	0.000
Chronic physical risk = 1	1677 (53.9)	433.97*	1	0.000	326 (10.5)	232.694*	1	0.000	217 (7)	172.109*	1	0.000
Acute physical risk = 1	1737 (53.2)	429.767*	1	0.000	334 (10.2)	230.429*	1	0.000	222 (6.8)	170.187*	1	0.000
Legal risk = 1	1650 (52.9)	369.842*	1	0.000	309 (9.9)	177.947*	1	0.000	206 (6.6)	134.351*	1	0.000
Africa = 1	34 (35.8)	1.189	1	0.276	16 (16.8)	20.077*	1	0.000	8 (8.4)	5.420*	1	0.020
The Americas = 1	551 (29.6)	153.048*	1	0.000	117 (6.3)	0.360	1	0.548	60 (3.2)	2.979	1	0.084
Asia = 1	995 (45.4)	24.417*	1	0.000	98 (4.5)	14.609*	1	0.000	67 (3.1)	6.057*	1	0.014
Europe = 1	818 (49)	58.2*	1	0.000	113 (6.8)	2.427	1	0.119	84 (5)	8.696*	1	0.003
Oceania = 1	40 (44)	0.279	1	0.597	11 (12.1)	6.054*	1	0.014	9 (9.9)	9.067*	1	0.003
Apparel = 1	78 (44.8)	0.946	1	0.331	5 (2.9)	3.117	1	0.077	3 (1.7)	2.201	1	0.138
Biotech Healthcare Pharma = 1	67 (42.4)	0.089	1	0.765	11 (7)	0.262	1	0.608	8 (5.1)	0.636	1	0.425
Food Beverage Agriculture = 1	155 (42.5)	0.236	1	0.627	36 (9.9)	10.246*	1	0.001	20 (5.5)	2.758	1	0.097
Fossil fuels = 1	49 (46.7)	1.293	1	0.255	12 (11.4)	5.566*	1	0.018	6 (5.7)	0.993	1	0.319
Hospitality = 1	15 (28.8)	3.332	1	0.068	8 (15.4)	8.172*	1	0.004	3 (5.8)	0.517	1	0.472
Infrastructure = 1	160 (53.2)	18.545*	1	0.000	37 (12.3)	22.193*	1	0.000	22 (7.3)	10.184*	1	0.001
Manufacturing = 1	841 (37.7)	18.32*	1	0.000	62 (2.8)	65.936*	1	0.000	38 (1.7)	44.729*	1	0.000
Materials = 1	267 (46.8)	7.912*	1	0.005	56 (9.8)	16.171*	1	0.000	38 (6.7)	13.333*	1	0.000
Retail = 1	106 (36.1)	3.449	1	0.063	22 (7.5)	1.194	1	0.274	11 (3.7)	0.011	1	0.915
Services = 1	506 (39.1)	3.248	1	0.071	82 (6.3)	0.311	1	0.577	60 (4.6)	2.688	1	0.101
Transportation = 1	122 (44.7)	1.395	1	0.238	9 (3.3)	3.723	1	0.054	7 (2.6)	1.292	1	0.256
Power generation = 1	72 (77.4)	51.0*	1.0	0.000	15 (16.1)	17.147*	1	0.000	12 (12.9)	20.843*	1	0.000

*$p < 0.05$.

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Table 2. Binary logistic regression of low-carbon transition plan (LCTP)

	Model 1A						Model 1B						Model 1C					
Dependent variable: LCTP Independent variable	*B*	S.E.	Wald	df	Sig.	Exp(*B*)	*B*	S.E.	Wald	df	Sig.	Exp(*B*)	*B*	S.E.	Wald	df	Sig.	Exp(*B*)
Regulatory risk							0.42	0.249	2.839	1	0.092	1.522						
Physical risk							0.498***	0.13	14.699	1	<0.001	1.646						
Other climate-related risks							0.261	0.259	1.02	1	0.312	1.298						
Technology risk													0.291	0.151	3.684	1	0.055	1.337
Reputation risk													−0.04	0.189	0.043	1	0.835	0.961
Emerg. regulation risk													0.29	0.216	1.806	1	0.179	1.336
Current regulation risk													−0.13	0.196	0.435	1	0.510	0.879
Market risk													0.255	0.189	1.819	1	0.177	1.291
Chronic physical risk													0.448**	0.144	9.627	1	0.002	1.565
Acute physical risk													0.018	0.17	0.011	1	0.918	1.018
Legal risk													0.103	0.113	0.83	1	0.362	1.108
Asia	0.41*	0.16	6.463	1	0.011	1.504	0.613***	0.165	13.846	1	<0.001	1.846	0.637***	0.165	14.843	1	<0.001	1.891
Europe	0.45**	0.16	7.935	1	0.005	1.569	0.589***	0.164	12.897	1	<0.001	1.801	0.624***	0.165	14.368	1	<0.001	1.866
The Americas	−0.38*	0.16	5.582	1	0.018	0.685	−0.125	0.164	0.579	1	0.447	0.882	−0.11	0.165	0.415	1	0.52	0.899
Infrastructure	0.43***	0.124	12.06	1	<0.001	1.54	0.342**	0.129	7.039	1	0.008	1.408	0.316*	0.129	5.984	1	0.014	1.372
Manufacturing	−0.26***	0.063	17.23	1	<0.001	0.769	−0.145*	0.066	4.823	1	0.028	0.865	−0.15*	0.066	5.317	1	0.021	0.859
Materials	0.17	0.095	3.185	1	0.074	1.184	0.134	0.098	1.878	1	0.171	1.144	0.112	0.099	1.293	1	0.255	1.119
Power generation	1.65***	0.255	41.94	1	<0.001	5.202	1.358***	0.258	27.769	1	<0.001	3.89	1.312***	0.258	25.819	1	<0.001	3.714
Constant	−0.49**	0.153	10.37	1	0.001	0.611	−1.441***	0.164	76.742	1	<0.001	0.237	−1.45***	0.165	77.67	1	<0.001	0.234
Model Chi-square	266			7	<0.001		660.552			10	<0.001		683.3			15	<0.001	
Correctness (%)	60.6 (91.7 No LCTP; 16.3 Yes LCTP)						65.8 (73.1 No LCTP; 55.5 Yes LCTP)						66.3 (75.9 No LCTP; 52.7 Yes LCTP)					
Hosmer and Lemeshow Chi-square	2.88			6	0.824		20.184			8	0.01		16.1			8	0.041	
Cox and Snell R^2	0.044						0.106						0.109					
Nagelkerke R^2	0.059						0.142						0.147					

*$p < 0.05$; **$p < 0.01$; and ***$p < 0.001$.

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Table 3. Binary logistic regression of adaptation measures (AM)

	Model 2A						Model 2B						Model 2C					
Dependent variable: AM Independent variable	*B*	S.E.	Wald	df	Sig.	Exp(*B*)	*B*	S.E.	Wald	df	Sig.	Exp(*B*)	*B*	S.E.	Wald	df	Sig.	Exp(*B*)
Regulatory risk							0.347	0.677	0.262	1	0.609	1.415						
Physical risk							0.786**	0.302	6.786	1	0.009	2.194						
Other climate-related risks							2.4**	0.784	9.366	1	0.002	11.02						
Technology risk													0.41	0.316	1.681	1	0.195	1.507
Reputation risk													0.45	0.47	0.915	1	0.339	1.568
Emerg. regulation risk													0.363	0.564	0.414	1	0.520	1.438
Current regulation risk													0.821	0.532	2.380	1	0.123	2.273
Market risk													0.32	0.419	0.583	1	0.445	1.377
Chronic physical risk													0.389	0.315	1.519	1	0.218	1.475
Acute physical risk													0.517	0.398	1.683	1	0.195	1.677
Legal risk													−0.05	0.197	0.071	1	0.790	0.949
Africa	0.98***	0.287	11.74	1	<0.001	2.672	0.773**	0.296	6.819	1	0.009	2.166	0.725**	0.296	5.994	1	0.014	2.064
Asia	−0.16	0.13	1.455	1	0.228	0.854	−0.203	0.133	2.337	1	0.126	0.816	−0.22	0.133	2.810	1	0.094	0.800
Oceania	0.54	0.334	2.571	1	0.109	1.708	0.247	0.337	0.535	1	0.464	1.28	0.244	0.339	0.518	1	0.472	1.276
Food Beverage Agriculture	0.56**	0.198	8.015	1	0.005	1.754	0.684***	0.205	11.091	1	<0.001	1.981	0.649**	0.206	9.909	1	0.002	1.913
Fossil fuels	0.75*	0.321	5.465	1	0.019	2.117	0.342	0.324	1.116	1	0.291	1.408	0.332	0.325	1.042	1	0.307	1.394
Hospitality	1.05**	0.397	6.975	1	0.008	2.854	0.797	0.406	3.851	1	0.050	2.218	0.812*	0.409	3.949	1	0.047	2.252
Infrastructure	0.83***	0.198	17.41	1	<0.001	2.287	0.672***	0.203	10.958	1	<0.001	1.958	0.644**	0.203	10.031	1	0.002	1.905
Manufacturing	−0.68***	0.164	17.36	1	<0.001	0.505	−0.505**	0.167	9.191	1	0.002	0.603	−0.52**	0.167	9.691	1	0.002	0.594
Materials	0.59***	0.17	12.28	1	<0.001	1.812	0.523**	0.173	9.121	1	0.003	1.688	0.501**	0.174	8.276	1	0.004	1.651
Power generation	1.14***	0.298	14.73	1	<0.001	3.134	0.73*	0.3	5.909	1	0.015	2.076	0.682	0.302	5.118	1	0.024	1.979
Constant	−2.8***	0.097	821.9	1	<0.001	0.061	−5.766***	0.388	220.919	1	<0.001	0.003	−5.37***	0.309	302.128	1	<0.001	0.005
Model Chi-square	124			10	<0.001		400.965			13	<0.001		398.9			18	<0.001	
Correctness (%)	94 (100 No Adap.; 0 Yes Adap.)						94 (100 No Adap.; 0 Yes Adap.)						94 (100 No Adap.; 0 Yes Adap.)					
Hosmer and Lemeshow Chi-square	3.443			4	0.487		3.916			8	0.865		7.873			8	0.446	
Cox and Snell R^2	0.021						0.066						0.065					
Nagelkerke R^2	0.057						0.180						0.179					

*$p < 0.05$; **$p < 0.01$; and ***$p < 0.001$.

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Table 4. Binary logistic regression of low-carbon transition plan and adaptation measures (LCTP&AM)

	Model 3A						Model 3B						Model 3C					
Dependent variable: LCTP&AM Independent variable	*B*	S.E.	Wald	df	Sig.	Exp(*B*)	*B*	S.E.	Wald	df	Sig.	Exp(*B*)	*B*	S.E.	Wald	df	Sig.	Exp(*B*)
Regulatory risk							−0.148	0.734	0.041	1	0.84	0.862						
Physical risk							1.486**	0.508	8.565	1	0.003	4.42						
Other climate-related risks							3.663**	1.295	7.998	1	0.005	38.962						
Technology risk													1.211*	0.520	5.428	1	0.020	3.357
Reputation risk													0.317	0.603	0.276	1	0.599	1.373
Emerg. regulation risk													0.155	0.710	0.047	1	0.828	1.167
Current regulation risk													0.632	0.679	0.866	1	0.352	1.882
Market risk													−0.32	0.465	0.467	1	0.494	0.728
Chronic physical risk													0.598	0.426	1.975	1	0.160	1.819
Acute physical risk													1.243*	0.632	3.866	1	0.049	3.464
Legal risk													0.162	0.258	0.394	1	0.530	1.176
Africa	0.91*	0.394	5.334	1	0.021	2.486	0.529	0.401	1.74	1	0.187	1.697	0.503	0.402	1.567	1	0.211	1.653
Asia	0.18	0.187	0.871	1	0.351	1.191	0.006	0.190	0.001	1	0.973	1.006	0.004	0.190	0.001	1	0.981	1.004
Oceania	0.98*	0.379	6.675	1	0.01	2.661	0.556	0.382	2.119	1	0.146	1.745	0.556	0.384	2.096	1	0.148	1.744
Europe	0.45*	0.174	6.575	1	0.01	1.562	0.202	0.177	1.308	1	0.253	1.224	0.249	0.177	1.977	1	0.160	1.283
Infrastructure	0.51*	0.242	4.421	1	0.035	1.664	0.377	0.246	2.355	1	0.125	1.458	0.332	0.247	1.815	1	0.178	1.394
Manufacturing	−0.91***	0.197	21.4	1	<0.001	0.403	−0.701***	0.199	12.375	1	<0.001	0.496	−0.73***	0.200	13.392	1	<0.001	0.481
Materials	0.46*	0.195	5.549	1	0.018	1.584	0.397*	0.198	4.025	1	0.045	1.488	0.349	0.199	3.070	1	0.080	1.418
Power generation	1.18***	0.326	13.09	1	<0.001	3.248	0.763*	0.327	5.424	1	0.020	2.144	0.687*	0.329	4.369	1	0.037	1.988
Constant	−3.35***	0.142	554.9	1	<0.001	0.035	−7.666***	1.007	57.968	1	<0.001	0	−6.57***	0.534	151.125	1	<0.001	0.001
Model Chi-square	80.5			8	<0.001		284.687			11	<0.001		289.8			16	<0.001	
Correctness (%)	96.1 (100 No LCTP&Adap.; 0 Yes LCTP&Adap)						96.1 (100 No LCTP&Adap.; 0 Yes LCTP&Adap)						96.1 (100 No LCTP&Adap.; 0 Yes LCTP&Adap)					
Hosmer and Lemeshow Chi-square	4.48			6	0.612		2.621			7	0.918		5.160			7	0.64	
Cox and Snell R^2	0.014						0.047						0.048					
Nagelkerke R^2	0.049						0.169						0.172					

*$p < 0.05$; **$p < 0.01$; and ***$p < 0.001$.

Lemeshow test is not significant (χ^2 [df = 4] = 3.443, $p > 0.05$). Among the control variables, all the sectors are significant predictors of AM, i.e., Food beverage and agriculture, Fossil fuels, Hospitality, Infrastructure, Manufacturing, Materials, and Power generation, but among the regions, only Africa is a predictor of AM. Interestingly, Manufacturing has a negative coefficient, indicating that companies in this sector are less likely to adopt AMs.

Model 2B predicts 94% of the values correctly and has a better fit (Cox and Snell R^2 = 0.066, and Nagelkerke R^2 = 0.180). The Hosmer and Lemeshow test shows non-significance (χ^2 [df = 8] = 3.916, $p > 0.05$). Two variables are found to be a significant predictor of whether companies define or not *AMs* based on the Wald test: 'Physical risk' ($\beta = 0.786$, Wald χ^2 [df = 1] = 6.786, $p < 0.01$) and 'Other climate-related risks' ($\beta = 2.4$, Wald χ^2 [df = 1] = 9.366, $p < 0.01$). The positive coefficient implies that companies that perceive physical risk are more likely to define AMs, as are those that perceive other climate-related risks. Unlike in the previous model, the Fossil fuels and Hospitality control variables are not significant predictors.

Model 2C makes accurate predictions for 94% of the values and has a similar fit (Cox and Snell R^2 = 0.065, and Nagelkerke R^2 = 0.179). The Hosmer and Lemeshow test shows non-significance (χ^2 [df = 8] = 7.873, $p > 0.05$). The Wald test indicates that no specific risk is a significant predictor of whether companies define AMs.

Model 3A has a positive fit and makes accurate predictions for 96.1% of the values (Cox and Snell R^2 = 0.014, and Nagelkerke R^2 = 0.049. The Hosmer and Lemeshow test indicates that there is no significant difference between the dependent variable's actual and anticipated values (χ^2[df = 6] = 4.483, $p > 0.05$). Except for Asia, all the control variables are significant predictors of LCTP and AM. Manufacturing has a negative coefficient, indicating that companies in this sector are less likely to develop a LCTP and AMs.

Model 3B has a better fit and makes accurate predictions for 96.1% of the values (Cox and Snell R^2 = 0.047, and Nagelkerke R^2 = 0.169). The Hosmer and Lemeshow test is consistent with the results of Model 3A, indicating non-significance (χ^2 [df = 7] = 2.621, $p > 0.05$). According to the Wald test, two factors are significant predictors of whether companies define or not a *LCTP and AMs*: 'Physical risk' ($\beta = 1.486$, Wald χ^2 [df = 1] = 8.565, $p < 0.01$) and 'Other climate-related risks' ($\beta = 3.663$, Wald χ^2 [df = 1] = 7.998, $p < 0.01$). The positive coefficient implies that companies that perceive a physical risk are more likely to define a *LCTP and AMs*, as are those that perceive other climate-related risks. Among the control variables, only Manufacturing, Materials, and Power generation are significant. As per the previous model, Manufacturing has a negative coefficient.

The substitution of nested risks with specific risks in Model 3C shows similar results. It makes accurate predictions for 96.1% of the values (Cox and Snell R^2 = 0.048; Nagelkerke R^2 = 0.172). The Hosmer and Lemeshow test indicates that there is no significant difference between the dependent variable's observed and predicted values (χ^2 [df = 7] = 5.160, $p > 0.05$). The Wald test indicates that, among the specific risks, two variables are significant predictors of whether companies define a *LCTP and AMs* or not: 'Technology risk' ($\beta = 1.211$, Wald χ^2 [df = 1] = 5.428, $p < 0.05$) and 'Acute physical risk' ($\beta = 1.243$, Wald χ^2 [df = 1] = 3.866, $p < 0.05$). The positive coefficient implies that companies that perceive a technology risk are more likely to adopt a *LCTP and AMs*. In contrast to the previous model, among the control variables, only the Manufacturing and Power generation sectors, with negative and positive coefficients, respectively, are significant predictors.

5. Discussion

The results of cross-tabulation suggested an association between all climate-related risks (i.e., *Acute physical risk; Chronic physical risk; Current regulation risk; Emerging regulation risk; Legal risk; Market risk; Reputation risk; and Technology risk*) and three climate-related strategies (i.e., *LCTP; AMs*; and *LCTP and AMs*). However, a more finely-grained analysis showed that companies that perceive either a chronic physical risk or a general physical risk are more likely to define a LCTP. As an example, Company X, an American drug wholesale company, stated:

> [Company X]*'s business objectives and strategy have been influenced by climate-related issues. […] Through our Global Business Resilience team, we continue to be prepared to remain operational in the event of a disaster so that we may continue to serve our patients and customers. We are implementing a phased approach to Business Continuity Planning to ensure that* [Company X]*'s network is equipped to handle potential disruptions from natural disasters or other aspects that may be related to climate change. […] In 2021, we formally committed to set a science-based target, and in the interim have set a new goal and target informed by science. By the end of FY22, we commit to reducing our Scope 1 & 2 emissions by 5% from a FY19 baseline.* [Company X]*'s Global Business Resilience (GBR), an integrated, company-wide program, is part of the Office of Enterprise Risk Management, and designed to ensure that* [Company X] *can proactively anticipate, prepare for, respond, and adapt to incremental changes and sudden disruptions, including climate-related.*

This result confirms hypothesis 2, but hypotheses 1 and 3 are not confirmed. Thus, compared with perceptions of other kinds of climate-related risks, physical risks are significant drivers of LCTP. This result reinforces the findings of de Abreu et al. (2021), who posit that mitigation response could also be driven by the risk of resource scarcity. Hence, although regulatory risk is the most frequently perceived, as underscored by Sakhel (2017) and confirmed in our data (Figure 2), it is not the most significant driver of mitigation responses when compared to physical risks.

AMs are driven by physical risks and other climate-related risks at the nested level, confirming hypotheses 5 and 6. Hypothesis 4 is not confirmed. This result confirms the insights of previous studies, which indicate that physical risks are the main drivers of AMs (Gasbarro & Pinkse, 2016; Linnenluecke et al., 2012) and that regulation may be less effective than other climate-related risks in triggering adaptation (Daddi et al., 2020). For example, Company Y, a real estate company, stated:

> *The event driven (acute) and longer-term (chronic) physical risks resulting from climate change could have a material adverse effect on our properties, operations and business. To the extent climate change causes changes in weather patterns, our U.S. coastal markets of Boston, New York, San Francisco, Washington, DC and Los Angeles could experience increases in storm intensity, extreme temperatures, rising sea-levels and/or drought. Climate change may have indirect effects on our business, including financial implications. These effects may result in: Direct damage to properties; Supply chain disruption; Declining demand for office space in our buildings; Costs associated with infrastructure-related remediation projects; Increased the costs of, or making unavailable, (i) property insurance on terms we find acceptable, (ii) energy and water, and (iii) snow removal; and Increased business continuity risk at our properties. There can be no assurance that climate change will not have a material adverse effect on our properties, operations or business. We are addressing climate risk with stakeholders across the organization that support climate preparedness and resilience efforts, including our Sustainability, Risk Management, Development, Construction and Property Management departments, as well as external consultants and executive leadership.*

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Finally, a comprehensive climate strategy, including both mitigation and adaptation, seems to be driven by technology risk, acute physical risk, or physical risk, and other climate-related risks at the nested level, confirming hypotheses 8 and 9. Hypothesis 7 is not confirmed, in contrast with the findings of Kouloukoui et al. (2021). These results shed light on the drivers of a comprehensive corporate response to climate change, which had remained unknown until now. As an example, Company Z, a reinsurance and financial services company, stated:

> [Company Z] *has built a consistent strategy over time to protect the value of its invested assets and align its portfolios with the Paris Agreement. The sustainable investing policy together with public commitments on portfolio decarbonization and a long-lasting strategy to finance the transition to a low-carbon economy evidence the ambition of the Group to better steer its investments and finance a more sustainable world. […] As discussed previously, jointly with the [Company W] Group,* [Company Z] *has undertaken an assessment of the potential impacts of climate change on our business. This formed part of the process of ensuring we adapt to the expected climate changes including hotter and drier summers, warmer and wetter winters, coastal, riverbed and bank erosion and increasingly extreme weather events such as flooding.*

Our study provided empirical evidence that the perception of physical risk is a driver of all three types of corporate strategy aimed at addressing the climate emergency. According to some academics, understanding the biophysical boundaries of the ecosystems in which businesses operate is essential to their long-term success (Tencati & Pogutz, 2015; Winn & Pogutz, 2013). Winn and Pogutz (2013) suggest reconsidering organization theory in light of the tight relationship between organizations and ecosystems, where businesses affect ecosystem functioning through the overconsumption of ecosystem services; in turn, the depletion of the services on which companies depend affects the companies themselves. These scholars called this mutual relationship *organizational ecosystem embeddedness*. Applying their construct to the relationship between climate change and companies, businesses affect climate services through GHG emissions, and then the depletion of climate services, such as water shortages driven by droughts, extreme weather conditions, heat waves, and so on, affects business operations. Hence, if companies take a longer-term perspective, they need to recognize and address this mutual influence between them and ecosystems, which, in the case of climate change, requires a twofold response, both in terms of mitigation, to avoid the overconsumption of the ecosystem's services, and in terms of adaptation, to address the consequences of the forced reduction of ecosystem services already in place. In other words, companies need to implement measures focused on maintaining an ecosystem's functions and services, allowing them to avoid compromising business operations that depend on them. Therefore, in this way, organizational resilience will be achieved.

Organizational resilience is often interpreted as a survival capability, i.e., the ability of an organization to withstand and recover from adverse effects (Ortiz-de-mandojana & Bansal, 2016). Rather than natural catastrophes, the primary focus of resilience theory and associated research is on an organization's ability to withstand exogenous shocks, including technological and economic shocks (Mithani et al., 2021). When considering organizational resilience to climate-changing conditions, academics consider it as a desired outcome of adaptation responses (Unter et al., 2024). Academics argue that companies aware of their vulnerability to climate change implement AMs to improve their resilience (Clément & Rivera, 2017; Linnenluecke et al., 2012). However, our findings shed light on the role of climate change mitigation in increasing organizational resilience and the likelihood of surviving ecosystem service disruptions driven by climate change. If mitigation aims to address the cause, adaptation aims to address the consequences of climate change. Moreover, the risk related to climate-related physical changes can be expressed as a function of (1) the probability of occurrence and the intensity of natural hazards triggered by climate change; and (2) the negative impacts in the event these hazards happen (IPCC, 2014a). Hence, mitigation measures aim to limit the probability of occurrence (and intensity), while AMs are meant to moderate or avoid harm related to ecosystem service disruptions driven by climate change (Swart & Raes, 2007). From a resilience perspective, if a company implements a LCTP, it aims to reduce disruptions to ecosystem services, thereby limiting the need for further climate change adaptation and increasing organizational resilience. Hence, the fact that a company's perception of physical risk is a driver of mitigation, adaptation, and mitigation and adaptation together may suggest that these companies recognize their dependence on the natural ecosystem and are adopting what we call a mitigation and adaptation resilience-based view, especially those companies defining both mitigation and adaptation, with a comprehensive climate risk management approach (Figure 5).

Interestingly, regulation risk is not a significant driver of corporate climate action, nor is market risk, unless the latter is nested within a broader risk category (also including technology, legal, and reputation risks), as seen, on the contrary, in most of the studies regarding the drivers of corporate responses to climate change (e.g., de Abreu et al., 2021; Cadez et al., 2019; Okereke, 2007). This may be due to the fact that the effect of climate-related physical risk was often not considered in previous studies, or to the fact that attention to changes in the natural environment has increased only in the last decade in the public debate and in corporate concerns. However, as our study also shows, there is an association between all climate-related risks and corporate climate strategies.

6. Conclusions

This study sheds light on the most important drivers of corporate responses to climate change, considering both mitigation and adaptation responses separately and together, and comparing different types of contextual drivers. We found that:

- Companies that perceive either a chronic physical risk or a general physical risk are more likely to define a LCTP.
- Companies that perceive physical risks and other climate-related risks are more likely to define AMs.
- Companies that perceive a technology risk, acute physical risk, or physical risk and other risks at the nested level are more likely to define a comprehensive climate strategy including both mitigation and adaptation.

The contribution of this paper is fourfold:

- First, it uncovers the role of different kinds of climate-related risks in triggering a corporate response to climate change; for example, regulation and market risks were overestimated in previous research, while the role of climate-related physical changes was overlooked.
- Second, these results shed light on the drivers of comprehensive corporate responses to climate change, which until now had remained unknown.

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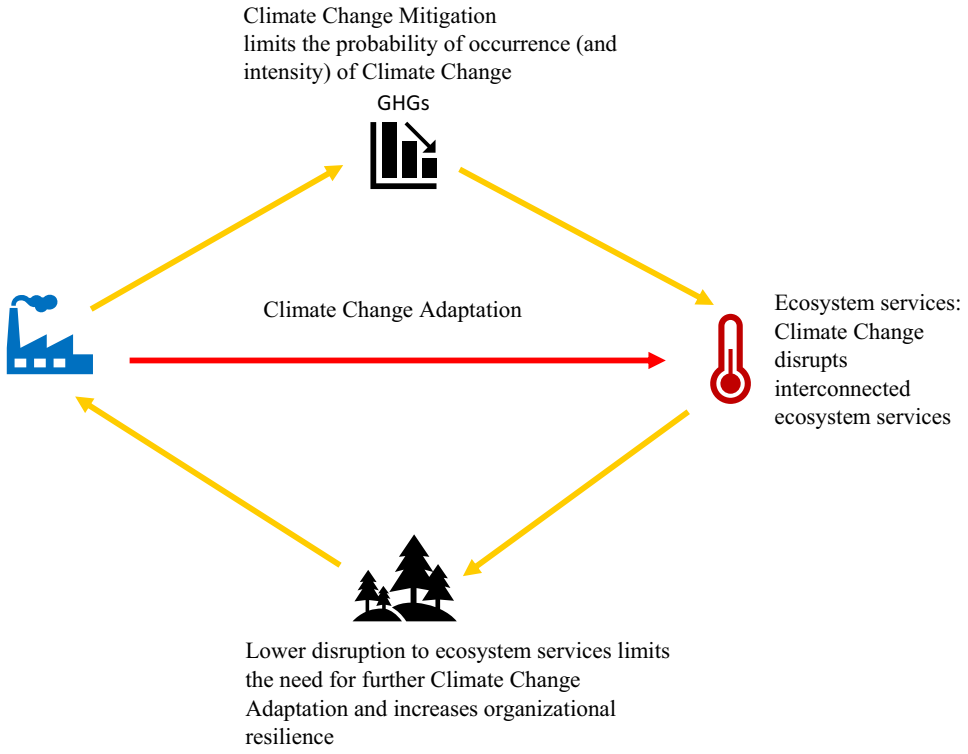


Figure 5. Model: mitigation and adaptation resilience-based view.

- Third, it provides empirical evidence for the organizational ecosystem embeddedness construct (Winn & Pogutz, 2013).
- Finally, we extended the organizational resilience theory by showing that resilience can also be pursued through climate change mitigation in response to climate-related physical changes.

Therefore, as companies are adopting what we call a mitigation and adaptation resilience-based view, combining mitigation and adaptation strategies in a synergistic way, to deal with the loss of ecosystem services caused by climate change, we support the idea of reconsidering the concept of organizational resilience (Figure 5).

Sustainability science has long advocated for a shift away from viewing mitigation and adaptation as binary choices. In particular, the IPCC calls for climate-resilient development, where both mitigation and adaptation support sustainable development (IPCC, 2023). The findings of this study suggest that firms are beginning to recognize these as complementary survival strategies in response to their perceptions of vulnerability. Therefore, this reinforces the importance of climate risk modeling, particularly for the likelihood and intensity of physical risks. On the other hand, sustainability science should consider the important role of corporations in contributing to climate-resilient development. In addition, through supplementary analyses, this resilience-based view could be extended into a broader approach to interpreting companies' responses to the multi-dimensional challenges posed by the depletion of ecosystem services. Further research might also identify the tipping points where economic self-interest aligns with global environmental goals, in other words, the threshold of the ecosystem impacts on firms, which compels a company to reduce its impact on the environment. As for the policy implications, we show that physical risks are the most relevant drivers of organizational climate change responses. We urge policymakers to raise awareness of climate-related physical risks and provide specific risk information at the local and sector levels. In addition, our study shows that companies operating in the Manufacturing sector are less likely to develop any corporate response to climate change, whether for mitigation or adaptation. This may indicate that the climate-related risks perceived by this sector are too weak to trigger a response. Hence, it is worth concentrating efforts on increasing knowledge of climate-related risks, especially the physical risks faced by the Manufacturing sector before they materialize, to increase the sector's resilience.

The limitation of this research is coupled with the limitation of the CDP questionnaire, which did not address adaptation extensively or a comprehensive climate strategy as possible company responses to climate change beyond mitigation. Therefore, further studies might collect further information on company responses to climate change and expand the sample. In addition, this study was carried out with cross-sectional data; a follow-up might be to understand how the drivers of companies' responses to climate change have changed over time with a longitudinal study. Finally, the method adopted for the analysis does not allow for a granular qualitative assessment of the specific measures implemented by firms. Consequently, this research does not distinguish among different types of interventions, such as Nature-based Solutions, technological upgrades, or infrastructure changes. Future research should adopt a qualitative or mixed-methods approach to investigate the specific content of these adaptation and mitigation measures, thereby providing a deeper understanding of how companies operationalize their organizational resilience across sectors.

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References

Allie, G., 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

Beermann, M. (2011). Linking corporate climate adaptation strategies with resilience thinking. *Journal of Cleaner Production*, *19*(8), 836–842. https://doi.org/10.1016/j.jclepro.2010.10.017

Benischke, M. H., D'Ippolito, B., Sharma, G., & Wickert, C. (2025). Climate change adaptation: New vistas for management research. *Journal of Management Studies*, *62*(7), 3259–3279. https://doi.org/10.1111/joms.13193

Bleda, M., & Pinkse, J. (2023). Leaving the cold behind: The role of emotions and cognitive biases in business adaptation to climate change. *Business & Society*, 00076503231219692. https://doi.org/10.1177/00076503231219692

Busch, T. (2011). Organizational adaptation to disruptions in the natural environment: The case of climate change. *Scandinavian Journal of Management*, *27*(4), 389–404. https://doi.org/10.1016/j.scaman.2010.12.010

Cadez, S., Czerny, A., & Letmathe, P. (2019). Stakeholder pressures and corporate climate change mitigation strategies. *Business Strategy and the Environment*, *28*(1), 1–14. https://doi.org/10.1002/bse.2070

Clément, V., & Rivera, J. (2017). From adaptation to transformation: An extended research Agenda for organizational resilience to adversity in the natural environment. *Organization & Environment*, *30*(4), 346–365. https://doi.org/10.1177/1086026616658333

Daddi, T., Bleischwitz, R., Maria Todaro, N., Gusmerotti, N. M., & De Giacomo, M. R. (2020). The influence of institutional pressures on climate mitigation and adaptation strategies. *Journal of Cleaner Production*, *244*, 118879. https://doi.org/10.1016/j.jclepro.2019.118879

Danese, G., & De Marchi, V. (2024). Business adaptation strategies to climate change: A systematic review. *Journal of Cleaner Production*, *485*, 144322. https://doi.org/10.1016/j.jclepro.2024.144322

de Abreu, M. C. S., Webb, K., Araújo, F. S. M., & Cavalcante, J. P. L. (2021). From 'business as usual' to tackling climate change: Exploring factors affecting low-carbon decision-making in the Canadian oil and gas sector. *Energy Policy*, *148*, 111932. https://doi.org/10.1016/j.enpol.2020.111932

Dhanda, K. K., Sarkis, J., & Dhavale, D. G. (2022). Institutional and stakeholder effects on carbon mitigation strategies. *Business Strategy and the Environment*, *31*(3), 782–795. https://doi.org/10.1002/bse.2917

European Environment Agency. (2019). *Economic losses from climate-related extremes in Europe — European environment agency*. https://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-3/assessment-2.

European Environment Agency. (2024). *Economic losses from weather- and climate-related extremes in Europe*. https://www.eea.europa.eu/en/analysis/indicators/economic-losses-from-climate-related.

Frans, B., Hertin, J., & Gann, D. M. (2006). Learning to adapt: Organisational adaptation to climate change impacts. *Climatic Change*, *78*(1), 135–156. https://doi.org/10.1007/s10584-006-9089-3

Frey, M., & Gasbarro, F. (2019). Adaptation and mitigation synergies and trade-offs. In W. L. Filho, U. Azeiteiro, A. M. Azul, L. Brandli, P. G. Özuyar & T. Wall (Eds.), *Climate action* (pp. 1–9). Springer International Publishing.

Frey, M., Gusmerotti, N., & Pogutz, S. (2017). Servizi Ecosistemici e Biodiversità: Una Nuova Prospettiva per Un'economia Più Sostenibile (Ecosystem Services and Biodiversity: A 28 New Perspective for a More Sustainable Economy). *Sinergie Italian Journal of Management*, *35*(Jan-Apr), 165–184. https://doi.org/10.7433/s102.2017.12

Gasbarro, F., Iraldo, F., & Daddi, T. (2017). The drivers of multinational enterprises' climate change strategies: A quantitative study on climate-related risks and opportunities. *Journal of Cleaner Production*, *160*, 8–26. https://doi.org/10.1016/j.jclepro.2017.03.018

Gasbarro, F., & Pinkse, J. (2016). Corporate adaptation behaviour to deal with climate change: The influence of firm-specific interpretations of physical climate impacts. *Corporate Social Responsibility and Environmental Management*, *23*(3), 179–192. https://doi.org/10.1002/csr.1374

Gasbarro, F., Rizzi, F., & Frey, M. (2016). Adaptation measures of energy and utility companies to cope with water scarcity induced by climate change. *Business Strategy and the Environment*, *25*(1), 54–72. https://doi.org/10.1002/bse.1857

Heede, R. (2014). Tracing anthropogenic Carbon dioxide and methane emissions to fossil fuel and cement producers, 1854–2010. *Climatic Change*, *122*(1), 229–241. https://doi.org/10.1007/s10584-013-0986-y

Hoffman, A. J. (2005). Climate change strategy: The business logic behind voluntary greenhouse gas reductions. *California Management Review*, *47*(3), 21–46. https://doi.org/10.2307/41166305

Hoffmann, V. H., Sprengel, D. C., Ziegler, A., Kolb, M., & Abegg, B. (2009). Determinants of corporate adaptation to climate change in winter Tourism: An econometric analysis. *Global Environmental Change*, *19*(2), 256–264. https://doi.org/10.1016/j.gloenvcha.2008.12.002

IPCC. (2001). *Climate change 2001: Synthesis report. A contribution of working groups I, II, and III to the third assessment report of the integovernmental panel on climate change*. R. T. Watson, & the Core Writing Team (Eds.). Cambridge University Press.

IPCC. (2014a). Annex II: Glossary [K. J. Mach, S. Planton, & C. von Stechow (Eds.)]. In Core Writing Team, R. K. Pachauri, & L. A. Meyer (Eds.), *Climate change 2014: Synthesis report. Contribution of working groups I, II and III to the fifth assessment report of the intergovernmental panel on climate change* (pp. 117–130).

IPCC. (2014b). *Climate change 2014: Synthesis report. Contribution of working groups I, II and III to the fifth assessment report of the intergovernmental panel on climate change*. Core Writing Team, R. K. Pachauri, & L. A. Meyer (Eds.).

IPCC. (2014c). Summary for policymakers. In O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler ,I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S Schlömer ,C. von Stechow, T. Zwickel, & J.C. Minx (Eds.), *Climate change 2014: Mitigation of climate change. Contribution of working group III to the fifth assessment report of the intergovernmental panel on climate change* (pp. 1–30). Cambridge University Press.

IPCC. (2014d). Summary for Policymakers. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of working group II to the fifth assessment report of the intergovernmental panel on climate change* (pp. 1–32). Cambridge University Press.

IPCC. (2018). Summary for Policymakers. In V. Masson-Delmotte, P. Zhai, H.O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, & T. Waterfield (Eds.), *Global warming of 1.5 °C. An IPCC special report on the impacts of global warming of 1.5 °C above preindustrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* (pp. 3–24). Cambridge University Press.

IPCC. (2023). Climate resilient development pathways. In *Climate Change 2022 – Impacts, adaptation and vulnerability: Working group II contribution to the sixth assessment report of the intergovernmental panel on climate change* (pp. 2655–2808).Cambridge University Press.

Josephine, B., & Linnenluecke, M. K. (2016). Determinants of the perceived importance of organisational adaptation to climate change in the australian energy industry. *Australian Journal of Management*, *42*(3). https://doi.org/10.1177/0312896216672273

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Jouni, K., & Seager, T. P. (2008). Beyond eco-efficiency: A resilience perspective. *Business Strategy and the Environment*, *17*(7), 411–419. https://doi.org/10.1002/bse.635

Kolk, A., & Pinkse, J. (2004). Market strategies for climate change. *European Management Journal*, *22*(3), 304–314. https://doi.org/10.1016/j.emj.2004.04.011

Kouloukoui, D., de Marcellis-Warin, N., Armellini, F., Warin, T., & Torres, E. A. (2021). Factors influencing the perception of exposure to climate risks: Evidence from the world's largest Carbon-intensive industries. *Journal of Cleaner Production*, *306*, 127160. https://doi.org/10.1016/j.jclepro.2021.127160

Linnenluecke, M., & Griffiths, A. (2010). Beyond adaptation: Resilience for business in light of climate change and weather extremes. *Business & Society*, *49*(3), 477–511. https://doi.org/10.1177/0007650310368814

Linnenluecke, M. K., Griffiths, A., & Winn, M. (2012). Extreme weather events and the critical importance of anticipatory adaptation and organizational resilience in responding to impacts. *Business Strategy and the Environment*, *21*(1), 17–32. https://doi.org/10.1002/bse.708

Linnenluecke, M. K., Griffiths, A., & Winn, M. I. (2013). Firm and industry adaptation to climate change: A review of climate adaptation studies in the business and management field. *WIREs Climate Change*, *4*(5), 397–416. https://doi.org/10.1002/wcc.214

Littlewood, D., Decelis, R., Hillenbrand, C., & Holt, D. (2018). Examining the drivers and outcomes of corporate commitment to climate change action in European high emitting industry. *Business Strategy and the Environment*, *27*(8), 1437–1449. https://doi.org/10.1002/bse.2194

Matthias, D., & Baumgartner, R. J. (2018). external pressures or internal governance – What determines the extent of corporate responses to climate change? *Corporate Social Responsibility and Environmental Management*, *25*(4), 473–488. https://doi.org/10.1002/csr.1473

Meyer, A. D. (1982). Adapting to environmental jolts. *Administrative Science Quarterly*, *27*(4), 515–537. https://doi.org/10.2307/2392528

Mithani, M. A., Gopalakrishnan, S., & Santoro, M. D. (2021). Does exposure to a traumatic event make organizations resilient? *Long Range Planning*, *54*(3), 102031. https://doi.org/10.1016/j.lrp.2020.102031

Monika, W., Kirchgeorg, M., Griffiths, A., Linnenluecke, M. K., & Günther, E. (2011). Impacts from climate change on organizations: A conceptual foundation. *Business Strategy and the Environment*, *20*(3), 157–173. https://doi.org/10.1002/bse.679

Okereke, C. (2007). An exploration of motivations, drivers and barriers to Carbon management: The UK FTSE 100. *European Management Journal*, *25*(6), 475–486. https://doi.org/10.1016/j.emj.2007.08.002

Olausson, U. (2009). Global warming—global responsibility? Media frames of collective action and scientific certainty. *Public Understanding of Science*, 4421–436. https://doi.org/10.1177/0963662507081242

Ortiz-de-Mandojana, N., & Bansal, P. (2016). The long-term benefits of organizational resilience through sustainable business practices. *Strategic Management Journal*, *37*(8), 1615–1631. https://doi.org/10.1002/smj.2410

Packard, K. N., & Reinhardt, F. (2000). What every executive needs to know about global warming. *Harvard Business Review*, *78*(4), 129–136.

Patenaude, G. (2010). Climate class for business schools. *Nature*, *466*(7302), 30–30. https://doi.org/10.1038/466030a

Patenaude, G. (2011). Climate change diffusion: While the world tips, business schools lag. *Global Environmental Change*, *21*(1), 259–271. https://doi.org/10.1016/j.gloenvcha.2010.07.010

Pinkse, J., & Gasbarro, F. (2019). Managing physical impacts of climate change: An attentional perspective on corporate adaptation. *Business & Society*, *58*(2), 333–368. https://doi.org/10.1177/0007650316648688

Sakhel, A. (2017). Corporate climate risk management: Are European companies prepared? *Journal of Cleaner Production*, *165*, 103–118. https://doi.org/10.1016/j.jclepro.2017.07.056

Schmidt, A., Bergmann, A., Hillmann, J., & Guenther, E. (2018). Outperforming peers through a comprehensive climate change strategy: The case of electric utilities. *Journal of Business Strategies*, *35*(2), 1–28. https://doi.org/10.54155/jbs.35.2.1-28

Singh, J. V., House, R. J., & Tucker, D. J. (1986). Organizational change and organizational mortality. *Administrative Science Quarterly*, *31*(4), 587–611. https://doi.org/10.2307/2392965

Swart, R., & Raes, F. (2007). Making integration of adaptation and mitigation work: Mainstreaming into sustainable development policies? *Climate Policy*, *7*(4), 288–303. https://doi.org/10.1080/14693062.2007.9685657

Tashman, P., & Rivera, J. (2016). Ecological uncertainty, adaptation, and mitigation in the U.S. Ski resort industry: Managing resource dependence and institutional pressures. *Strategic Management Journal*, *37*(7), 1507–1525. https://doi.org/10.1002/smj.2384

Tencati, A., & Pogutz, S. (2015). Recognizing the limits: Sustainable development, corporate sustainability and the need for innovative business paradigms. *Sinergie Italian Journal of Management*, *33*(Jan-Apr), 37–55. https://doi.org/10.7433/s96.2015.03

Todaro, N. M., Testa, F., Daddi, T., & Iraldo, F. (2021). The influence of managers' awareness of climate change, perceived climate risk exposure and risk tolerance on the adoption of corporate responses to climate change. *Business Strategy and the Environment*, *30*(2), 1232–1248. https://doi.org/10.1002/bse.2681

Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly*, *31*(3), 439–465. https://doi.org/10.2307/2392832

Unter, K. M. M., Park, S., & Rivera, J. (2024). Business response strategies to climate change: An integrative and research frontiers outlook. *Organization & Environment*, *37*(2), 325–357. https://doi.org/10.1177/10860266231202819

Verheyen, R. (2005). *Climate change damage and international law: Prevention duties and state responsibility*. Brill Nijhoff.

Villano, D., Colli, L., Martellozzo, F., & Lombardi, S. (2026). Shifting tides: A decade of business climate adaptation and resilience research (2013–2023). *Corporate Social Responsibility and Environmental Management*, 1–18. https://doi.org/10.1002/csr.70600

Weinhofer, G., & Busch, T. (2013). Corporate strategies for managing climate risks. *Business Strategy and the Environment*, *22*(2), 121–144. https://doi.org/10.1002/bse.1744

Winn, M. I., & Pogutz, S. (2013). Business, ecosystems, and biodiversity: New horizons for management research. *Organization & Environment*, *26*(2), 203–229. https://doi.org/10.1177/1086026613490173

Xia, L. (2025). Physical climate change exposure and firms' adaptation strategy. *Strategic Management Journal*, *46*(3), 750–789. https://doi.org/10.1002/smj.3674

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