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Abstract

Non-State Superpowers, Transnational Challenges, and 21st Century Global Order: Private Sector Climate Action in an Age of State Inaction

Charlotte Jude Hulme
2021

This project explores the new actors, issues, and dynamics that are reshaping the landscape and context in which states will have to advance their interests in the 21st century. Examining the case study of private sector climate action, it demonstrates that select transnational actors have not just the capacity to alter relationships between governments, as scholars like Nye and Keohane anticipated in the 1970s, but the ability and, increasingly, the ambition to address non-traditional issues that states cannot address independently. Focusing on 34 of the world's largest companies, representing four industry groups (energy-intensive, automotive, technology, and finance) and three main headquarter countries (Germany, India, and the United States), this project investigates and analyzes the process by which private sector actors coalesced into a new pattern of response to climate change during the 2010–2017 timeframe and became key, even leading, actors in the issue area. It considers what the phenomenon of private sector climate action implies about changes in global order, including in the actors that are shaping a landscape defined increasingly by non-traditional issues—and, in certain cases, by states' abdication of leadership and action in the face of these complex new challenges.

I make three main arguments in this study. First, I argue that private sector actors coalesced around a set of climate-relevant actions as the new “dominant design,” or paradigm for long-term success in a changing environment. Second, in contrast to the intuitive explanation, which is that during the 2010s changes in their political and consumer contexts led companies to perceive more serious climate-related risks and/or opportunities, I

argue that individual companies did not perceive increasingly strong material incentives to alter their approach vis-à-vis climate change—and it was in *this* context that they coalesced into a new pattern of response to the issue. The pattern was emergent, or a second-order outcome that would not have been anticipated on the basis of how individual actors perceived the climate issue.

Third, I propose that the condition accounting for why companies coalesced in an emergent fashion into a new pattern of behavior was their declining confidence in states' willingness to play their expected role vis-à-vis a critical issue poised to shape future global trends. As I show, from 2010 through 2017, as companies adopted climate practices and became more deeply invested in them, and as select actors altered their approaches decisively and adopted “climate active” sensibilities, companies' outlook for bold state action (in the form of high-impact climate-related regulation) declined significantly.

Among the industry groups, technology and finance were the drivers of emergent action. Within most industries, American companies undertook the highest absolute level of action that “ran ahead of” expectations for costly climate-related risks or high-yield climate-related opportunities. However, German companies contributed most significantly to the upward trend in emergent action—an especially notable finding given that historically they have operated in a context of strong state leadership in the climate issue area.

The overarching implication of this study is that non-state actors that individually do not appear inclined to alter their approach vis-à-vis a global issue can, through a decentralized and uncoordinated process, and in the context of states failing to provide leadership, come to change course and move in a cohesive new direction—and ultimately reshape the landscape in which states must advance their own interests.

Non-State Superpowers, Transnational Challenges, and 21st Century Global Order:
Private Sector Climate Action in an Age of State Inaction

A Dissertation
Presented to the Faculty of the Graduate School
Of
Yale University
In Candidacy for the Degree of
Doctor of Philosophy

By
Charlotte Jude Hulme

Dissertation advisors: Tyler Pratt, Frances Rosenbluth, and Detlef Sprinz

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For my parents, Sandy and Diana—such people.

AMDG.

‘The biggest dynamic in modern history of the last few hundred years was great power relations and competition. But...we’re at a different period of history.

What’s really new and different about this era is that the dominant and even defining issues of this moment...may be global challenges like pandemics, like climate change, like cyberspace. And that is what will probably define this era of history far more than the more familiar great power competition.’¹

¹ Richard Haas, ‘How Will Coronavirus Pandemic Change The Way We See The World?’ Interview with Steve Inskeep, *Morning Edition*, NPR, May 14, 2020. I have made minor edits to the interview transcript for the purposes of clarity.

CHAPTER 1—Introduction and Theory

Non-state superpowers and 21st century challenges

In 2016, a *Foreign Policy* article, observing that Apple’s cash on hand ‘exceeds the GDPs of two-thirds of the world’s countries,’ suggested that the Pew Research Center, which regularly asks respondents whether states like China will eclipse the United States as a superpower, might consider ‘widening its scope of research—for corporations are likely to overtake all states in terms of clout.’¹ That year, one study found that of the world’s 100 wealthiest actors, only 31 were states;² the other 69 were corporations like Shell and Volkswagen and subnational actors like California, which in 2018 passed the United Kingdom to become the world’s fifth largest economy, and Texas, whose \$1.6 trillion economy puts it on par with Russia, just behind Canada, and ahead of South Korea.³

That select non-state⁴ actors have outsized resources and reach is not altogether new.⁵ What is new is that these actors are becoming increasingly autonomous on the global stage. As Khanna has observed, whereas ‘multinational corporations of the Cold War era were strongly rooted in home markets, today a growing class of companies have elevated

¹ Parag Khanna, ‘These 25 Companies Are More Powerful Than Many Countries,’ *Foreign Policy*, March 15, 2016.

² Phillip Inman, ‘Study: big corporations dominate list of world’s top economic entities,’ *The Guardian*, September 12, 2016.

³ Lisa Marie Segarra, ‘California’s Economy Is Now Bigger Than All of the U.K.,’ *Fortune*, May 5, 2018. See also Samuel Stebbins and Grant Suneson, ‘Does Texas or Russia have the larger GDP? Here’s how US states compare to other countries,’ *USA Today*, April 17, 2019; and Prableen Bajpai, ‘The World’s Top 20 Economies,’ *Investopedia*, April 12, 2019.

⁴ By “non-state” I mean actors other than nation-states; therefore, subnational actors are included.

⁵ For example, it was in 1993 that a *Foreign Affairs* article observed that ‘California in many ways is not a state, but a nation.’ James Goldsborough, ‘California’s Foreign Policy,’ *Foreign Affairs* Vol. 7, No. 2 (1993). Consider also how since 1953, when New York City launched its first missions abroad, ‘over two hundred U.S. state and city offices have opened around the world’; likewise, in the City of London Corporation, ‘twenty-four thousand companies elect its executives and lord mayor, who travels like a statesman from Brazil to China securing financial arrangements, all with the full support of the U.K.’ Parag Khanna, *Connectography* (New York: Random House, 2016), 58, 59.

themselves above national boundaries.’⁶ What is also new, I argue, is that whether subnational heavyweights or ‘companies with more power than governments,’⁷ select non-state actors have not just the capacity to ‘alter relationships between governments,’ as Nye and Keohane anticipated in the 1970s,⁸ but the ability and, crucially, the growing *ambition* to address certain non-traditional issues that states cannot confront alone. By non-traditional issues, I mean those that are non-military in nature and that call for transnational responses (e.g. climate change, pandemic disease, irregular migration, and cybersecurity).

My primary aim in this project is to analyze how new actors and issues are spurring underlying changes in global order and reshaping the landscape in which states will have to articulate and advance their interests in the 21st century. I use the case study of private sector climate action to demonstrate how and why non-state actors with the resources and reach to rival the majority of states developed the ambition to act in the context of a non-traditional global issue.

My objectives in the case study are two-fold. First, I argue that the private sector developed into a climate actor specifically in the context of its declining confidence that states were willing to lead in the issue area. As states failed to provide a strong response, some of the world’s largest companies came to behave as key, even leading, actors. Second, I explain how this transition was possible despite an apparent absence of strong material incentives for action among individual companies. I demonstrate that private sector actors coalesced around a certain set of climate-relevant actions as the new “dominant design” for the future, or paradigm for long-term success in a changing environment.

⁶ Khanna, *Connectography*, 57.

⁷ *Ibid.*, 58.

⁸ Joseph Nye and Robert Keohane, ‘Transnational Relations and World Politics: An Introduction,’ *International Organization* Vol. 25, No. 3 (1971): 336.

Simply because states abdicated leadership and action on this complex global challenge, it did not follow that other actors necessarily would step up. This project investigates the process by which select private sector actors did, in fact, come to “fill the vacuum” left by states in the climate issue area.⁹ It ultimately considers what this development implies about the defining actors, issues, and dynamics of the 21st century global landscape.

The first empirical observation motivating this project is that during the 2010s, as states deferred ambitious and concerted action on climate change, climate action by non-state actors gained momentum.¹⁰ At the subnational level, for example, membership in the C40 Cities for Climate Leadership Initiative, founded in 2005 by the mayors of several European cities, expanded to include 97 cities, representing 700 million people and 25% of global GDP.¹¹ Between 2012 and 2014 alone, there was a doubling of the number of actions that member cities had taken to ‘reduce greenhouse gas emissions and climate risks across multiple sectors.’¹² In 2017, in a notable case of climate engagement between a state and a subnational “superpower” that has become increasingly active on the global stage in the context of this issue, President Xi Jinping invited then-Governor of California Jerry Brown to Beijing to discuss climate cooperation, breaking ‘long-standing protocol’ by meeting with ‘a sitting governor and not a national head of state.’¹³

⁹ Importantly, I do not claim that these actors *replaced* the state in terms of the kind of action that they undertook. This is a point that I reiterate throughout the project; the fact that select private sector actors undertook certain actions specifically in the context of a dearth of effective and ambitious action by states did not mean that these actors were behaving “like” states or could “replace” states.

¹⁰ To reiterate, by “non-state” I mean actors other than nation-states; thus, subnational actors are included.

¹¹ C40 Cities, ‘About,’ accessed March 13, 2021. Seventy of these 97 members are megacities, or cities with populations of more than 10 million.

¹² In 2014, C40 cities had undertaken 8,068 actions, ‘nearly doubling the number of actions in just two years.’ C40 Cities, ‘10 Years of Results: C40 By the Numbers,’ February 19, 2015.

¹³ Nathan Gardels, ‘Jerry Brown’s next role as elder statesman on climate,’ *Washington Post*, September 10, 2018.

At the private sector level, during the 2010s certain multinational companies pursued ambitious emissions reduction initiatives far exceeding what regulation required,¹⁴ generated demand for renewable energy in areas governed by fossil fuel-friendly regulation,¹⁵ and presented themselves as indispensable leaders in the world's journey toward the 'carbon-constrained economy of the future.'¹⁶ One US-based group, We Are Still In – whose members include 300 cities and 10 states, in addition to 4,000 businesses – demonstrated, strikingly, 'that many firms have reaffirmed or increased their emissions reduction commitments in the face of a declining risk of near-term government regulation.'¹⁷ During President Donald Trump's term in office, We Are Still In described its representatives as '[s]tepping in for the federal government' at international climate meetings to 'maintain and encourage American progress toward its national climate goals.' In fact, at the 2019 Madrid Climate Conference, the group announced that 'the American public's voice on climate [change] will best be represented by US subnational and non-national actors' as opposed to the State Department delegation.¹⁸

¹⁴ For example, in 2017 Walmart announced the Project Gigaton Initiative aimed at cutting one gigaton of emissions from its supply chain by 2030. See Pippa Stevens, 'Behind Walmart's push to eliminate 1 gigaton of greenhouse gases by 2030,' CNBC, December 15, 2019.

¹⁵ For example, the southeastern states of the United States 'would be the sixth largest emitter if they were a country, and these states are not known as leaders in climate policy....Although these states are not pursuing carbon emissions reductions, Google, Facebook, and other companies are pushing utilities in the region to provide renewable energy for new facilities such as data centers and are extending their influence by encouraging other electricity buyers to do the same.' Michael Vandenberg and Jonathan Gilligan, 'Why private "actors" are taking center stage on climate change,' *GreenBiz*, December 9, 2017.

¹⁶ For example, in 2012, in the context of its announcement about plans to become carbon neutral, Microsoft pointed out that with '*governments slow to act* on the accelerating climate change challenge, it is essential that leadership to drive a low carbon economy come from the private sector.' Noting the importance of putting a price on emissions, Microsoft announced that '*[r]ather than wait for policymakers to take this vital but elusive step, Microsoft is putting an internal price on carbon.*' Emphasis added. *Microsoft Citizenship Report 2012*, 59.

¹⁷ Michael Vandenberg and Jonathan Gilligan, *Beyond Politics: The Private Governance Response to Climate Change* (Cambridge, UK: Cambridge University Press, 2019), 150.

¹⁸ We Are Still In, 'US Climate Action Center at COP25 in Madrid, Spain,' accessed March 13, 2021.

The growing contrast between how states and non-state actors were approaching the climate issue was thrown into sharp relief at the 2019 UN Climate Action Summit. As one observer noted, whereas countries in attendance made milquetoast pledges of action, and while some major emitters were altogether absent ‘because they were not invited unless they were willing to come forward and make a big announcement,’ some of the ‘interesting pledges that were made were made by cities, made by [sub-national] states, [and] made by companies,’ including agricultural and ‘big transportation’ companies.¹⁹

The second empirical observation motivating this project is that the conditions that defined the international system for hundreds of years no longer hold, in two key respects. First, actors beyond states – from a mega-corporation like Apple, whose 2019 market capitalization was higher than the GDPs of six G-20 nations, to a mega-city like Mumbai, with a population twice that of 150 states – have the ability and, increasingly, the ambition to influence the global landscape.²⁰ As a result, we are living, as Khanna describes it, through ‘not merely a shift in structure, from one superpower to multiple, but rather a far deeper shift from a state-based order to a multi-actor *system*.’²¹

Second, the defining issues no longer are exclusively military in nature or centered around Great Power relations. As the president of the Council on Foreign Relations, Richard Haas, observed in 2020, what ‘will probably define this era of history far more than the more familiar great power competition’ are such ‘global challenges’ as pandemics,

¹⁹ William Brangham, ‘Fiery calls to action at UN climate summit don’t win pledges from worst emitters,’ Interview by Judy Woodruff, *PBS Newshour*, September 23, 2019.

²⁰ In 2019 Apple’s market capitalization was \$1.3 trillion. Mark Kolakowski, ‘At \$1.3 Trillion, Apple Is Bigger Than These Things,’ *Investopedia*, January 6, 2020. Mumbai’s estimated population is 20 million. Khanna observes that 150 states, with populations of less than 10 million, are ‘more like city-regions than robust states.’ *Connectography*, 68.

²¹ Notably, whereas structural change ‘happens every few decades,’ a change in systems occurs ‘only every few centuries.’ Khanna, *Connectography*, 30. Emphasis in original.

climate change, and cyberspace.²² In this project, particularly significant is the fact that in the context of these non-traditional challenges, states cannot secure their interests without others—and depending on the issue, these others may be the private sector, subnational actors, or civil society. For instance, experts argue that even if states had the will to address climate change, the magnitude of the problem now is such that they lack the ability to do so alone—appreciable additional efforts by private actors are needed to ‘substantially reduce the risk of catastrophic climate change.’²³

This project examines how and why one of this century’s new actors – corporate “nations” with the resources and reach to exceed most states – came to behave as key players in the context of one its new issues, climate change.²⁴ Analyzing data from 2010 through 2017, I argue that companies’ coalescence around a new approach, or a “pattern of response,” was a function of their declining confidence that states were willing to play their traditional role in addressing a critical issue of transnational importance.²⁵

A key implication of my argument is that the conventional wisdom that companies will not take meaningful climate action without robust action by states is simply outdated; it also underestimates the capacities and ambitions of some of this century’s global actors. Indeed, one of my aims in this project is to situate the phenomenon of private sector climate action in its proper context, showing that its true significance rests on the fact that it illuminates the early days of underlying changes in global order. In particular, it demonstrates changes in the actors that have the ability and ambition to behave as “Great

²² Haas, ‘How Will Coronavirus Pandemic Change The Way We See The World?’

²³ Michael Vandenberg and Jonathan Gilligan, ‘Government action isn’t enough for climate change. The private sector can cut billions of tons of carbon,’ *The Conversation*, June 21, 2017.

²⁴ I borrow the term corporate “nations” from Khanna, ‘These 25 Companies Are More Powerful Than Many Countries.’

²⁵ I borrow the phrase “pattern of response” from David Brooks, ‘Biden’s Rise Gives the Establishment One Last Chance,’ *New York Times*, March 5, 2020.

Powers” in the context of non-traditional issues and thereby shape the landscape in which states will have to advance their interests in the 21st century.

The roadmap for the project is as follows. In the remainder of this chapter, I discuss my theory and contribution to the literature. Chapter 2 outlines the research design. Chapters 3–6 present the case studies, each of which examines how companies in a certain type of industry approached the climate issue from 2010 through 2017. Chapter 7 concludes by drawing together the data from the empirical chapters and analyzing my findings and their implications.

Theory: Emergent concert among global actors

‘It was like watching a flock of geese or a school of fish, seemingly leaderless, sensing some shift in conditions, sensing each other’s intuitions, and smoothly shifting direction *en masse*.’²⁶

Introduction

In a 2019 interview, ex-Shell Oil President John Hofmeister was asked why oil majors like Shell, BP, and Exxon opposed the Trump administration’s rollback of methane emissions regulations. He explained that such environmental regulations ‘are essential for the [fossil fuel] industry to be successful down the road. That’s changed in the last 20 years. And so[,] it’s necessary for the industry to recognize that this is the way it’s going to be, and it is the way it should be.’²⁷ What would have seemed like a surprising statement a decade prior was unexceptional by the late 2010s. In fact, by the end of a decade that opened in the aftermath of the Great Recession and in the wake of the collapse of the latest international climate conference (in 2009, at Copenhagen), a growing cohort of leaders of some of the

²⁶ Ibid.

²⁷ John Hofmeister, ‘Former Shell Oil President John Hofmeister Weighs In On Rollback Of Emissions Rules,’ Interview with Ailsa Chang, *All Things Considered*, NPR, August 29, 2019.

world's largest companies characterized climate change as a major – even existential – risk and the low-carbon future as inevitable, even just on the horizon.²⁸

While the empirical chapters examine industry-specific evidence of a new paradigm of climate-relevant behavior among some of the world's largest companies, this introductory section marshals preliminary evidence for my claim that a new overall pattern of response developed during the 2010s. This claim is grounded in observations about the proliferation of new practices, creation of organizations, and perception that by the late 2010s elements of old debates about climate change and the low-carbon future had vanished. This section's aim is to begin to show that the ex-Shell Oil president's words were not just “cheap talk” but rather indicated meaningful changes in how even some of the unlikeliest of companies were approaching the climate issue.

Beginning with practices, a key example of a behavior that proliferated during the 2010s is internal carbon pricing, which ‘places a monetary value on greenhouse gas emissions, which businesses can then factor into investment decisions and business operations’ and that can direct ‘finance away from high-emitting activities.’²⁹ According to one expert consulted for this project, among the climate-relevant practices that companies can adopt, internal carbon pricing has special significance as it indicates that a company has at least begun to think about climate change in financial terms; in other words, it is a positive sign when companies have not siloed climate change as one “CSR” (corporate social

²⁸ As BlackRock CEO Larry Fink wrote in his 2020 annual letter to company executives, a ‘fundamental reshaping of finance’ is occurring, with issues like climate change having ‘become a defining factor in companies’ long-term prospects.’ Larry Fink, ‘A Fundamental Reshaping of Finance,’ BlackRock, 2020. See also Microsoft CEO Satya Nadella’s statement that if companies fail to factor environmental sustainability into their growth plans, capitalism ‘will fundamentally be in jeopardy.’ Cited in Tyler Clifford, ‘Capitalism “will fundamentally be in jeopardy” if business does not act on climate change,’ Microsoft CEO Satya Nadella says,’ CNBC, January 16, 2020.

²⁹ Nicolette Bartlett, Hannah Cushing, and Sara Law, ‘Putting a price on carbon: Integrating climate risk into business planning,’ CDP, October 2017, 4.

responsibility) issue among many but rather are looking at it through the lens of the bottom line.³⁰ An internal carbon price is significant not only for its potential near-term impacts on a company's activities but also as an indicator of what kind of future a company anticipates; as CDP explains, adhering to an internal carbon price 'helps companies prepare for and hedge against future regulatory changes, and ensures long term capital investments don't become too costly, or even obsolete, in an environment where greenhouse gas emissions carry a price.'³¹

In the early 2010s, the use of an internal carbon price was rare; in 2014, just 150 global companies reported using one. But by the end of 2017, putting a price on carbon had become 'the new normal for major multinationals,' with roughly '1,400 companies factoring an internal carbon price into their business plans' – including 'more than 100 Fortune Global 500 companies with collective annual revenues of US\$7 trillion' – which represented 'an eight-fold leap in take up in the last four years.'³²

CDP disclosure is a second example of a practice that proliferated during the 2010s and that was seemingly indicative of a new private sector climate sensibility. The non-profit CDP (formerly the Carbon Disclosure Project) conducts annual surveys asking companies about climate-relevant aspects and impacts of their activities. One of its main purposes in collecting this data is providing investors with information about how companies are managing climate-related risks and opportunities.

The substantial increase in the number of companies participating in CDP disclosure during the 2010s suggests the development of a new understanding of the business

³⁰ Energy and climate expert at the Center for European Policy Studies, Interview by author, October 6, 2018, Interview 17, Düsseldorf, Germany.

³¹ CDP, 'More than eight-fold leap over four years in global companies pricing carbon into business plans,' October 12, 2017.

³² Ibid.

relevance of climate change.³³ As of 2010, approximately 2,900 companies participated in CDP disclosure on climate issues; by 2015, this number was over 5,500, and in 2020 there were 9,526 companies disclosing climate data, representing a 228% increase in ten years.³⁴ In 2010, CDP's members (formal backers) included banks and institutional investors representing \$64 trillion under management, reported the *Harvard Business Review*, which noted that CDP 'was always intended to give voice to concerns about climate risk *stirring within the investment community*.'³⁵ By 2021, CDP reported that investors with 'assets of over US\$110 trillion' were requesting that companies participate in CDP disclosure, representing a roughly 72% increase since 2010 in the assets held by investors backing CDP's efforts.³⁶

Turning to climate-related organizations, the 2010s saw the creation of groups focused on climate mitigation activities in certain industries and the development of initiatives focused on policy advocacy. For example, considering an industry-specific group, the Oil and Gas Climate Initiative (OGCI) was created in 2014 by the CEOs of ten of the world's largest oil and gas companies to 'accelerate the industry response to climate change.'³⁷ As an executive from Shell, an OGCI member company, explained in a 2018 interview, the fact that OGCI is specifically CEO-led 'is important, because they can make decisions and

³³ As Das has pointed out, given that it 'is based on voluntary reporting, one indicator of [climate change] interest and awareness is simply the extent of participation in CDP.' Taran Das, 'Climate Change and the Private Sector,' in Navroz Dubash, ed., *Handbook of Climate Change and India* (New York: Earthscan, 2012), 248.

³⁴ CDP, 'Mainstreaming transparency,' accessed March 13, 2021. Note that these figures represent climate-specific disclosure. CDP also collects disclosures pertaining to other environmental issue areas.

³⁵ Andrew Winston, 'The Most Powerful Green NGO You've Never Heard Of,' *Harvard Business Review*, October 5, 2010. Emphasis added.

³⁶ CDP, 'Request environmental information,' accessed March 13, 2021.

³⁷ Oil and Gas Climate Initiative, accessed March 13, 2021. The original members were Aramco, BP, CNPC, Eni, Equinor, Petrobras, Reliance Industries, Repsol, Shell, and Total. In 2018, Reliance Industries quit the group while three others – Chevron, Exxon Mobil, and Occidental Petroleum – joined.

set ambitions that force the rest of the organization to follow.’³⁸ Membership involves a \$100 million buy-in to fund projects such as the Carbon Capture, Utilization and Storage (CCUS) Kickstarter ‘to facilitate large-scale commercial investment in CCUS’ and to ‘*create the market conditions* for CCUS to play a significant role in decarbonizing industry.’³⁹ Considering a policy group, We Are Still In was launched in 2017; its member businesses, investors, cities, and states, representing \$9.5 trillion in GDP, committed to abide by the terms of the Paris Agreement regardless of the U.S. withdrawal announced in 2017 by the Trump administration.⁴⁰

Finally, in addition to the proliferation of new practices and organizations, a third initial indicator of a new private sector “pattern of response,” grounded in a shared sensibility, is the sense among experts that during the 2010s certain elements of erstwhile debates about climate change vanished and a new consensus crystallized. In 2014, for example, the president of the World Resources Institute observed,

America’s smartest business leaders are pursuing a strategy *unheard of a few short years ago*: they are building economic growth while tackling climate change at its source. We believe *this is one of the true mind-shifts in modern commerce*, as U.S. business leaders see the opportunity of investment in a low-carbon economy and the risk of following a business-as-usual, high-carbon path.⁴¹

As I address throughout the empirical chapters, interviewees for this project strongly supported the notion of a “mind-shift” having occurred. For instance, in a 2018 interview the

³⁸ Shell executive, Interview by author, November 8, 2018, Interview 1, London, United Kingdom.

³⁹ Oil and Gas Climate Initiative, ‘Carbon Capture Utilization and Storage,’ accessed March 13, 2021. Emphasis added.

⁴⁰ The United States formally re-joined the Paris Agreement in February 2021.

⁴¹ Andrew Steer, ‘Seeing U.S. Business Opportunity in a Low-Carbon Economy,’ World Resources Institute, October 14, 2014. Emphasis added.

former director of strategy and energy policy for a major European power company reflected,

*If you go back ten years, there was a variety of views as to where the energy system was going in the long term. And that variety of views was driven by different views on technology, how real the threat of climate change was, and how politicians may or may not react to it. What we've seen over that ten years is that diversity of views disappearing.*⁴²

Likewise, an expert from Berlin's Stiftung 2Grad (the 2° Foundation) explained that what is now clear among the businesses with which he works is that 'the *train of transforming the economy has left the station and is not going to return.*' Businesses that are 'not compliant' with a 2° economy 'will, in the end, have to transform or even will disappear.'⁴³

Perceiving the disappearance of a 'diversity of views,' believing that the 'train' has 'left the station,' and accepting that 'this is the way it's going to be' (in the words of the ex-Shell Oil president cited earlier) all point to the possibility of a new private sector consensus vis-à-vis the climate issue area.

Theory

The dependent variable in this study is the new pattern of response to the climate issue that developed among private sector actors during the 2010s. As discussed in the previous section, its general components included new practices (e.g. internal carbon pricing and CDP disclosure), organizations (e.g. We Are Still In and the Oil and Gas Climate Initiative),

⁴² Energy expert specializing in business and the low-carbon transition, Interview by author, November 12, 2018, Interview 2, London, United Kingdom.

⁴³ Climate and energy expert specializing in corporations and the low-carbon transition, Interview by author, November 13, 2018, Interview 3, Berlin, Germany. By 2° economy this expert was referring to the scenario 'widely seen as the global community's accepted limitation of temperature growth to avoid significant and potentially catastrophic changes to the planet.' This is the agreed-upon scenario in the Paris Agreement, which also includes a goal 'to aim for a no more than 1.5 degrees Celsius increase.' S&P Global, 'What's the Deal with the 2-Degree Scenario?' February 25, 2020.

and ideas (e.g. certain debates about the future were off the table). In the empirical chapters, I investigate the pattern's specific components.⁴⁴

What explains this pattern? The intuitive explanation is that over the course of the 2010s, changes in their political and consumer contexts led private sector actors to view climate change differently, and specifically to perceive increasingly urgent climate-related business risks and/or opportunities. Accordingly, explaining this study's dependent variable would seem to be a matter of seeing the *overarching* pattern as a function of how the *individual* actors saw the issue.

My argument, which runs counter to the intuitive explanation, is that individual companies in fact did not perceive increasingly strong material incentives to change course or alter their approaches vis-à-vis the climate issue—and it was in *this* context that the new private sector pattern developed. Borrowing from Jervis, the whole was '*different* from, not greater than, the sum of the parts.'⁴⁵

My argument is that the new pattern of response was *emergent*, or a second-order outcome that would not have been anticipated on the basis of how individual actors perceived the climate issue. An emergent process produces 'patterns and consistencies' that arise through the interactions of entities that individually do not have these characteristics.⁴⁶ Emergence is what Jervis is observing in *System Effects* when he notes that in a system, 'actions have unintended effects on the actor, others, and the system as a whole,

⁴⁴ As the research design in Chapter 2 will discuss, I focus in particular on such specific components as how companies were addressing the climate "profile" of their goods/services, their investments in the low-carbon future (e.g. through research and development), and their efforts to align their current activities with the low-carbon future (e.g. through such practices as internal carbon pricing).

⁴⁵ Jervis argues that if 'we are dealing with a system, the whole is different from, not greater than, the sum of the parts,' since actors' behavior 'alters the environment in ways that affect the trajectory of actors, outcomes, and environments.' Emphasis added. Robert Jervis, *System Effects: Complexity in Political and Social Life* (Princeton, NJ: Princeton University Press, 1997), 12-13.

⁴⁶ Henry Mintzberg and James Waters, 'Of strategies, deliberate and emergent,' *Strategic Management Journal* Vol. 6 (1985): 257. The authors discuss emergence in terms of 'patterns or consistencies realized despite, or in the absence of, intentions.'

which means that one cannot infer results from desires and expectations and vice versa.⁴⁷ As others have explored, evaluating inputs is insufficient to explain outputs in a system given that systems have emergent properties, which are ‘second-order properties arising from the interactions of elements.’⁴⁸

An emergent outcome in the natural world is the V-shaped flight pattern of migrating geese. Given the inputs – each constituent goose – we would not anticipate the output – the flight pattern – which emerges ‘spontaneously from the way geese interact with one another, trying to find the best possible energy reduction and sensory information during flight. In addition to there not being a pre-specified flight pattern in geese, there is also no flight commander goose telling his subordinates to follow him or her in the form of a V-pattern.’⁴⁹

In any given flock of migrating geese, the particular attributes of the V-pattern (e.g. its width, length, and whether it has different layers or branches) and of the flight (e.g. its timing and duration) depend on conditions in the surrounding environment (e.g. temperature, wind resistance, and season). My theory is that the underlying condition, or independent variable, that explains why private sector actors coalesced in an emergent fashion into a new pattern of response to the climate issue – or why corporate “geese” came into a “V-pattern” – was states’ abdication of their expected role in addressing such a critical issue of transnational importance.

⁴⁷ Jervis, *System Effects*, 61.

⁴⁸ Philippe Le Prestre, *Global Ecopolitics Revisited: Toward a Complex Governance of Global Environmental Problems* (New York: Routledge, 2017), 143. See also Reuben Ablowitz, who observed in early work on emergence that something that is emergent ‘results from the structural relation of its component parts.’ Reuben Ablowitz, ‘The theory of emergence,’ *Philosophy of Science* Vol. 6 (1939): 3.

⁴⁹ ‘Theory of developmental complex dynamical systems,’ *The Cambridge Encyclopedia of Childhood Development*, Brian Hopkins, Elena Geangu, and Sally Linkenauger, eds. (Cambridge, UK: Cambridge University Press, 2017), 23.

For decades, climate change has commanded growing international recognition and concern, and states periodically have raised expectations that they will act to address the issue. Yet, ultimately they have been unwilling to do so in a concerted, ambitious fashion. The private sector traditionally has looked to states to address risks with serious geopolitical, security, economic, and humanitarian implications. My theory is that in terms of the risk of climate change, the private sector's confidence in states' willingness to play their traditional role declined, and it was in *this* context – a milieu of diminishing outlook for state action on an issue poised to shape future global trends– that some of the world's most powerful companies altered their approaches and became key, even leading, actors in the issue area.

To theorize how private sector actors coalesced into a new pattern of behavior vis-à-vis the climate issue – due to the underlying condition of states' abdication of leadership, and through an emergent process in particular – the point of departure is considering how global actors develop an awareness of their environment in order to prioritize among various interests, threats, and opportunities.

In the introduction to this chapter, I proposed that the state-dominated international order is giving way to a multi-actor system, the “Great Powers” of which include national, subnational, and corporate actors. These actors are distinct given that, in contrast to the vast majority of states – 150 of which have populations of 10 million or less⁵⁰ – they have sufficient power that they can bring multiple elements to bear and have such geographic reach or scope of activities that a systemic approach to deploying their power is necessary.⁵¹ By systemic, I mean an approach based on coordinating the elements of

⁵⁰ Khanna, *Connectography*, 68.

⁵¹ This logic underpins Martel's argument that because grand strategy 'operates on a global scale,' only states 'with a global reach can truly have grand strategies,' and behind Murray's claim that 'grand strategy is the purview of 'great states and great states alone.' William Martel, *Grand Strategy in Theory and Practice: The Need for an Effective American Foreign Policy* (New York: Cambridge University Press, 2015), 34; and

power across policy contexts to advance an overarching aim. Great Powers have a marked challenge in prioritizing among interests in their interest sets; they face the task of determining ‘which interests are truly vital and which threats and opportunities most urgent.’⁵²

How does a Great Power prioritize among the interests in its interest set?⁵³ One key way is by interacting with the interest sets of *other* global actors, as each actor’s theories about its history and purpose in the world ultimately must come into contact with external realities, including what *others* want to achieve and how. To make the process of interaction and encounter more concrete, it can be understood as akin to a continuous “summit” of global actors, each of which brings with it an existing set of interests and issues prioritized in a certain way. While interacting with others during the summit, an actor can maintain its existing priorities and determinations about interests, threats, and opportunities—or it can take another look at its interest set and come to reprioritize a certain issue. Importantly, by “interacting with others,” I do not mean that actors necessarily talk to one another in a literal fashion; rather, they develop an awareness of their environment and consistently update their understandings about what is most important to other actors, adjusting their own priorities if needed.

At this figurative summit, there are “breakout sessions” about different global issues of varying importance to attendees. At any given point in the session concerning the climate change issue area, for example, some actors will attend because the issue is important to them; others not because it is a pressing concern but because they want to be “at the table,” given who else is there. For others, climate change is such a low priority in

Williamson Murray, ‘Thoughts on Grand Strategy and the United States in the Twenty-first Century,’ *Journal of Military and Strategic Studies* Vol. 13, Issue 1 (2010): 1.

⁵² Hal Brands, ‘The Promise and Pitfalls of Grand Strategy’ (Carlisle, PA: US Army War College, 2012): 5.

⁵³ Hereafter, unless I indicate otherwise, when referring to “Great Powers” I mean *all* global actors (whether national, subnational, or corporate) that meet the “resources and reach” threshold discussed here.

their interest sets that there is no perceived need even to be in the room. Depending on which actors join or leave the session as well as the trajectory of the discussion, attendees may reevaluate their interest sets and adjust where climate change is ranked. Global actors can reach an effective consensus about an issue if they come to reprioritize it similarly in their interest sets based on new information about its importance or updated assessments of its implications for their other interests.

My theory is that during the 2010s, amid growing global concern and awareness about climate change, multinational companies – which are vulnerable to the future geopolitical, economic, and security implications of this risk (to be sure, many companies also are concerned with related *opportunities*) – saw a growing need to be “in the room” on the issue. At the relevant session of the figurative “summit,” they increasingly appreciated that states, despite periodically raising expectations that they would act concertedly to address an issue calling for a transnational response, ultimately were not moving climate change up in their interest sets, or making the issue a higher priority. States, particularly the most powerful, consistently failed to marshal the will to act in a decisive and effective fashion.

If the underlying condition (this study’s independent variable) was states’ abdication of leadership in the climate issue area, what were the mechanisms of the emergent process by which companies coalesced into a new pattern of response?

One central mechanism was positive feedback, which Jervis characterizes as a ‘self-amplifying’ effect whereby ‘change in one direction sets in motion reinforcing pressures that produce further change in the same direction.’⁵⁴ Positive feedback expresses how climate-relevant actions undertaken by individual companies have the potential to nurture a particular understanding among others about how they should be behaving to best

⁵⁴ Jervis, *System Effects*, 125.

advance their highest interests. The positive feedback mechanism captures how an actor at the climate “session” of the figurative global “summit” can, through its actions, convey a certain message about where the issue ranks in its interest set and thereby reshape perceptions “around the table” about the issue’s importance and the need for action.

To capture the potential dynamics of positive feedback in this case study, I borrow from the business world the concept of the “dominant design,” a name for the product that is treated as the *de facto* standard setter in a given industry (whether or not it yet predominates in practice), leading alternatives to fall away.⁵⁵ In this study, my argument is that a positive feedback dynamic was set in motion as certain corporate Great Powers began to adopt particular kinds of behaviors vis-à-vis the climate issue. Again, these private sector actors started to take a new approach specifically in the context of losing confidence in states’ willingness to act. Their behavior suggested to other companies that in terms of this non-traditional challenge there was a new dominant design on the horizon for how the private sector needed to act to advance its highest interests. The new dominant design would entail certain kinds of practices reflecting a particular sensibility about climate change. As I will show, during the 2010s what came to be *treated* as the dominant design was not yet *actually* predominant. But, through positive feedback dynamics, its signature sensibility and defining practices became more widespread and more deeply entrenched; companies thereby effectively coalesced around a new pattern of response in the climate issue area.

⁵⁵ For an overview of the concept of dominant design, see Pek-Hooi Soh, ‘Dominant Design,’ in Mie Augier and David Teece, eds., *The Palgrave Encyclopedia of Strategic Management*, June 30, 2016. Notably, what wins out as the new dominant design is not necessarily “better” or reflective of consumer preferences; it may emerge and become “locked in” due to path dependencies, or lock-in dynamics like immediate durability and self-reinforcement (i.e. rising reversal costs over time). A classic example of a “not necessarily better” dominant design that became locked in due to technological path dependencies (and particularly the dynamic of rising reversal costs over time) is the QWERTY keyboard. These definitions of lock-in and self-reinforcement are informed by Kelly Levin, Benjamin Cashore, Steven Bernstein and Graeme Auld, ‘Overcoming the tragedy of super-wicked problems,’ *Policy Sciences* Vol. 45 (2012).

To summarize the argument thus far: the private sector behavioral pattern that developed during the 2010s reflected companies coalescing around a certain set of climate-relevant behaviors, grounded in a particular sensibility toward the issue. The pattern represented an emergent outcome; the whole was not greater than the sum of the parts—it was *different* than the parts, as at the individual level many companies did not actually perceive that climate change had become a much more pressing business concern.⁵⁶ Looking at each individual corporate “goose,” we would not have anticipated the end result: a new “flight pattern” where diverse companies, dispersed across industries and countries, were pulling in a remarkably cohesive direction in terms of their approach to the climate issue. My theory is that the independent variable that explains why this pattern took shape, or the key condition in the environment in which the “geese” were flying, was states’ abdication of their traditional role in addressing an issue of transnational importance.

Observable implications and hypotheses

If my theory is correct and a new private sector pattern of response developed in an emergent fashion, and did so in the specific context of companies’ diminishing confidence that states would act to address climate change, what should the data show? There should be an inverse relationship between the private sector’s *behavior*, in terms of its adoption of a new climate approach, and individual companies’ *perceptions*, in terms of their sense that climate change was becoming a more pressing business concern. As the previous section discussed, this is the relationship that the concept of “emergence” illuminates: the misalignment between individual actors’ characteristics, on the one hand, and an overall pattern of behavior, on the other. We should see that companies adopted *more* of certain

⁵⁶ I again am paraphrasing Jervis, who writes that in a system, ‘the whole is different from, not greater than, the sum of the parts.’ Jervis, *System Effects*, 12-13.

climate-relevant behaviors, and became *more* invested in them, the more their individual outlooks that climate change was a high-impact material concern remained unchanged—or even *declined*. The research design in Chapter 2 discusses my approach for demonstrating that these patterns occurred.

Below, I articulate a hypothesis concerning my theory’s general expectation, which is that the development of the pattern of private sector climate action will have accelerated over the course of the timeframe of interest, 2010–2017. Hypothesis 1 focuses on this study’s independent variable—the key condition that, I argue, accounts for why the private sector coalesced into a “V-formation” in terms of its approach to climate change. I take the international climate policy context as a proxy for states’ general appetite for taking effective action to address an issue calling out for a transnational response.

Hypothesis 1 (H1)

The less the international landscape is characterized by prospects for ambitious and concerted climate action, the more the private sector will behave as a climate actor.

If there are reasonable prospects for concerted climate action by the international community, the private sector would not have a strong incentive to become “climate active” prior to perceiving pressing material reasons for doing so. The private sector would expect that states would continue to play their traditional role vis-à-vis this issue and, in essence, “pave the way” for companies to succeed in a changing global environment. In contrast, waning prospects for concerted international action on a transnational issue that has gained global recognition and concern, and that the private sector appreciates will inform future trends and entail far-reaching and potentially significant implications for its activities, will lead to private sector action, even if individually companies do not yet perceive strong material reasons to act.

H1 captures the underlying logic of the entire project: the clearer it became that the 2009 Copenhagen Climate Conference signified a definitive collapse of what prospects had existed for concerted international action on an issue that is not amenable to “go-it-alone” solutions, the more that corporate Great Powers came to recognize that states were abdicating their traditional roles and responsibilities and the stronger the incentive to act on their own.⁵⁷ Even the most powerful companies cannot “replace” states as climate actors, but they *can* make significant progress by themselves in mitigating the problem—enough to ‘improve the odds of avoiding catastrophic climate change,’ according to some experts.⁵⁸

H1 addresses the independent variable explaining the overall pattern of response (i.e. the “V-formation”), but it does not shed light on which actors became part of the emergent process through which the pattern developed (i.e. which “geese” were part of the formation). Implicit in the previous section’s discussion of positive feedback is the fact that “nothing comes from nothing.” In order to set in motion a dynamic whereby ‘change in one direction’ leads to ‘reinforcing pressures that produce further change in the same direction,’ there needs to be early movers;⁵⁹ in order for there to develop a broad sense that the direction of change is the “right” one, or that it represents the new dominant design, there needs to be at least some actors moving confidently in that direction.⁶⁰

⁵⁷ The widely-anticipated Copenhagen Conference, which culminated in a milquetoast general agreement about the need to limit further global warming to 2°C above pre-industrial levels without offering specifics about how this would be achieved, ‘became known as “the low point” in the history of the climate regime.’ Maria Ivanova, ‘Politics, Economics, and Society,’ in Daniel Klein et al., eds., *The Paris Agreement on Climate Change: Analysis and Commentary* (Oxford, UK: Oxford University Press, 2017), 17.

⁵⁸ Vandenbergh and Gilligan, ‘Why private “actors” are taking center stage on climate change.’

⁵⁹ Jervis, *System Effects*, 125.

⁶⁰ Importantly, no matter which companies are “out front” on an issue, or make a change seemingly with a high potential to set in motion a positive feedback loop, it never is a foreordained conclusion that others will follow. For instance, in hindsight it is easy to treat as a given that Tesla (which as of this writing has a market capitalization of \$844 billion) would, by the turn of the 2020s, see its vision and approach come to be recognized as embodying the new dominant design for the future in the auto industry. But there was nothing predetermined about the success of its vision (or the timing thereof); indeed, Tesla was on the brink of collapse in 2012 and was saved by a loan from Daimler. See Cadie Thompson, ‘The Christmas miracle that saved Tesla,’ *Insider*, December 14, 2015.

Which actors became integral to the process through which the new pattern developed? Which companies were early or ambitious in adopting a new climate approach prior to perceiving strong material incentives to do so—thus establishing conditions for a positive feedback loop potentially to be set in motion, and for belief in a new dominant design potentially to take root? Below, I articulate hypotheses about company- and industry-level determinants of emergent action, by which I mean instances where there was a notable contrast, or misalignment, between how actors assessed the material importance of climate change and how they behaved. These hypotheses anticipate that certain corporate Great Powers, depending on their industry and/or headquarter country, will be more inclined not just to recognize the need for a new approach to non-traditional issues like climate change, but to seize the initiative and take on a new role vis-à-vis these kinds of challenges.

Hypothesis 2 (H2)

Emergent action will occur more frequently within industries with lower energy intensities compared to those with higher energy intensities.

Companies in energy-intensive industries are invested in the status quo to a greater extent than those in non-energy-intensive industries. Given that their business models are based on fossil fuel-centered activities, companies in energy-intensive industries are less likely to undertake actions with the potential to alter the status quo without perceiving powerful material incentives to do so. The logic of H2 is that even if an energy-intensive company appreciates that the climate issue is of high importance and accepts that the low-carbon transition is inevitable, and even if it anticipates certain costs of waiting to adjust its approach, its preference might be to “run out the clock” on a highly favorable status quo. In contrast, companies without business models based on energy-intensive activities are

more likely to undertake action on a critical issue that they perceive will shape future global trends *and* that states have proven unwilling to address—even prior to perceiving strong material incentives to do so.

If H2 correctly anticipates the relationship between emergent action and industry type, the data should show a lower prevalence of emergent action by companies in industries that are energy-intensive (such as oil and gas, steel, and automotive: see Chapters 3 and 4) and a higher prevalence of emergent action by companies in non-energy-intensive industries (such as technology and finance: see Chapters 5 and 6).

Hypothesis 3 (H3)

If its headquarter country historically has *not* been active in addressing climate change through policy and regulation, within a given industry a company is more likely to undertake emergent action than a company whose headquarter country has a record of climate activity.

A company headquartered in a country in which the state historically has been active in addressing climate change would not have a strong incentive to become “climate active” prior to perceiving strong material reasons for doing so. In this issue area, the corporate Great Power would expect continued leadership and action from the state that anchors its activities and that historically has colored how the company has seen its role relative to states.⁶¹ In contrast, if the state in its headquarter country has a record of relative inactivity on an issue that a company believes is of transnational importance and will shape future global trends, the company may take action on its own, even prior to perceiving strong material incentives to do so.

⁶¹ The research design in Chapter 2 addresses the choice to evaluate a company’s headquarter country as opposed to primary market.

This project's three main case study countries – Germany, India, and the United States – represent varying degrees of historical activity in the climate issue area, with Germany at the higher end of the activity continuum and the United States and India at the lower end. If H3 correctly anticipates the relationship between emergent action and head-quarter country, then US- and India-based companies should account for most emergent action within a given industry and Germany-based companies should account for a smaller share. In addition, if the prevalence of climate action trends upward over time, as H1 anticipates, then H3 expects that US- and India-based companies primarily will account for the upward trend (i.e. will register more marked relative increases in emergent action compared to Germany-based companies).

What are the main alternative explanations for this study's dependent variable, the new private sector pattern of response to climate change? The first is that the independent variable that I am proposing (companies' declining confidence in states' willingness to act) is based on a misinterpretation of what the 2010s conveys about states and the climate issue area. One could argue that the 2015 Paris Conference actually *was* a watershed and that, as Falkner claims, the Paris Agreement breaks 'new ground in international climate policy' and represents a major step forward.⁶² Following this logic, the collapse of the 2009 Copenhagen Conference was not the death knell for states' leadership on the climate issue; rather, it showed the international community finally coming to terms with an unworkable approach and laying the groundwork to find a better way forward. According to this alternative explanation, the new pattern of response would best be explained as a function of the private sector being spurred to action due to states' bold new climate approach.

⁶² Robert Falkner, 'The Paris Agreement and the new logic of international climate politics,' *International Affairs* Vol. 92, Issue 5 (September 2016): 1107.

As I will show throughout the empirical chapters, there is little evidence to suggest that the private sector interpreted the trajectory of international climate efforts in the way that this alternative explanation proposes, and every indication that the Paris Agreement was *not* interpreted as heralding bold action by states—quite the opposite. The data supports my argument that the pattern of private sector climate action developed specifically in the context of low or diminishing confidence in states’ willingness to address this issue.

A second alternative explanation is that the independent variable was consumer pressure: private sector behavior was a function of companies perceiving increasingly serious business impacts from failing to adjust to changing consumer expectations. Consumers are not the focus of this study, but in each empirical chapter, alongside data on companies’ limited expectations for high-impact climate policy and regulation, I also present data conveying that companies did not, in fact, see climate-related changing consumer practices becoming a significantly more urgent concern.

A third interpretation of the dependent variable specifically concerns *how* (as opposed to *why*) the new pattern of response developed. As discussed earlier, one of my claims is that it was the result of companies coalescing around a set of practices, ultimately reflecting a certain sensibility, which they treated as the new dominant design for the future (although it was not yet predominant in practice). As a counter to my claim, one could argue that to characterize the new pattern as taking shape through positive feedback dynamics that made certain new practices and attitudes become entrenched as the new dominant design is to complicate the story. The alternative explanation is that individual companies made their own piecemeal behavioral adjustments but that the seeming new pattern of behavior did not signify an “agreed-upon” dominant design (which intrinsically entails gathering information about best practices through “interaction” [as before, in a non-literal sense] with others).

To make the case that the pattern of new practices among the world's most powerful companies is best understood as a coalescence around a new dominant design rather than simply the aggregation of siloed actions, I examine company-level data on which actors adopted particular climate-relevant behaviors, to what extent, and when. The research design in Chapter 2 discusses my approach for evaluating the data for markers of a new paradigm, or an informal "template" for action. As I will show, over time companies adopted a set of two practices while becoming more deeply invested in three practices; further, the cohort advanced steadily in overall climate performance, never regressing once it moved forward. Throughout the study, I underscore why the question of *how* the new pattern of action developed is significant for this project's concern not just with the 21st century's new actors and issues, but with its new *dynamics*.

In this part of the chapter, I have proposed that the variable that explains the private sector's new climate approach is its declining confidence in states' willingness to address the issue in a concerted, ambitious fashion. I suggested that in coalescing around a set of climate-relevant practices, companies behaved much like a 'leaderless flock of geese,' sensing 'some shift in conditions and sensing each other's intuitions,' and changing direction.⁶³ I theorized the process by which this change of direction could occur and a new pattern be realized, explaining why the conditions for such an emergent process were in place in this case study. The essence of my argument was that the new pattern of response, which ultimately reflected a certain way of seeing the climate issue, was an emergent, or second-order, outcome, as *individually* many companies did not yet perceive the issue in that light.

⁶³ Brooks, 'Biden's Rise Gives the Establishment One Last Chance.'

In the final part of the chapter, I present my contribution to the literature, proposing that within political science the conventional focus on climate change as a collective action problem to be solved by the international community is obsolescent, while newer scholarship on the transnational governance of climate change overlooks some of the key new climate actors, or *de facto* “governors” of this non-traditional issue. I also discuss how the natural state-centrism of the field of International Relations leaves it inadequately prepared to grapple with underlying changes in global order that this case study illuminates.

Contribution to the literature

The problem with collective action

For decades political scientists have argued that climate change poses the quintessential collective action problem: everyone would benefit if greenhouse gas emissions were curbed and global warming were slowed, but because no country wants to pay the cost of cutting emissions without sufficient assurance that others will do the same, regulating emissions has proven to be an intractable problem. The literature has examined how formal or informal institutions may help groups achieve collective goods by supplying selective incentives,⁶⁴ generating shared norms and applying group sanctions,⁶⁵ or providing

⁶⁴ On the need for (formal) institutions to overcome collective action problems pertaining to common pool resources in particular, see Robert Keohane and David Victor, ‘The Regime Complex for Climate Change,’ Harvard Kennedy School, Harvard Project on International Climate Agreements, Discussion Paper 10-33 (January 2010). On selective incentives see Mancur Olson, *The Logic of Collective Action* (Cambridge, MA: Harvard University Press, 1965); Pamela Oliver, ‘Rewards and Punishments as Selective Incentives for Collective Action: Theoretical Investigations,’ *American Journal of Sociology* Vol. 85, No. 6 (1980); and Gerald Marwell, ‘Altruism and the Problem of Collective Action,’ in Valerian Derlega and Janusz Grzelak, eds., *Cooperation and Helping Behavior: Theories and Research* (Cambridge, MA: Academic Press, 1982).

⁶⁵ On shared norms see Elinor Ostrom, *Governing the Commons: The evolution of institutions for collective action* (Cambridge, UK: Cambridge University Press, 1990); Jed Ela, ‘Law and Norms in Collective Action: Maximizing Social Influence to Minimize Carbon Emissions,’ *UCLA Journal of Environmental Law and Policy* Vol. 27, No. 1 (2009); and Darwyn Linder, ‘Social Trap Analogs: The Tragedy of the Commons in the Laboratory,’ in Valerian Derlega and Janusz Grzelak, eds., *Cooperation and Helping Behavior: Theories and Research* (Cambridge, MA: Academic Press, 1982).

platforms for altruistic actors to be first-movers and generate a cascade effect.⁶⁶ But international institutions clearly have failed to supply adequate selective incentives or generate sufficiently powerful norms to achieve collective action on the most critical climate issues. Indeed, critics of the 2015 Paris Agreement might argue that it *embodies* unresolved collective action problems; hinging on ‘Nationally Determined Contributions’ instead of legally binding emissions caps, the agreement is attractive to free-riders seeking the benefits of membership without having to contribute anything costly.⁶⁷

Other scholarship points out that if institutions fall short, collective goods can be generated by individual behaviors through a domino effect, whether by achieving a ‘critical mass,’ as Schelling argued,⁶⁸ or by passing a ‘threshold’ for collective behavior, as Granovetter proposes.⁶⁹ Whether focusing on institutions or individuals, however, framing climate change as a collective action problem or in terms of collective goods is limiting, as it encourages scholars to focus their attention on certain actors (i.e. states and intergovernmental organizations) and settings (e.g. fora like the annual Conference of the Parties to the United Nations Framework Convention on Climate Change), even as these actors and settings constitute an increasingly limited part of the true picture of global climate action.

⁶⁶ On altruism and personal moral norms, see Paul Stern, ‘Toward a Coherent Theory of Environmentally Significant Behavior,’ *Journal of Social Issues* Vol. 56, No. 3 (2003); and Marwell.

⁶⁷ On free-riding see Olson, 21; and David Reisman, *Theories of Collective Actions: Downs, Olson and Hirsch* (New York: Palgrave Macmillan, 1990), 46. Other criticisms of the Paris Agreement may include that it represents a ‘lowest common denominator’ approach. On limitations to international agreements posed by the least ambitious party, see Daniel Esty and Anthony Moffa, ‘Why Climate Change Collective Action has Failed and What Needs to be Done Within and Without the Trade Regime,’ *Journal of International Economic Law* Vol. 15, No. 3 (2012), 783.

⁶⁸ Thomas Schelling, *Micromotives and Macrobehavior* (New York: W.W. Norton & Company, 1978), 95. See also Thomas Schelling, ‘Hockey Helmets, Concealed Weapons, and Daylight Saving: A Study of Binary Choices with Externalities,’ *The Journal of Conflict Resolution* Vol. 17, No. 3 (1973): 383. According to Schelling, a critical mass is marked by an activity that sustains itself once a certain minimum level of the activity has been achieved.

⁶⁹ Mark Granovetter, ‘Threshold Models of Collective Behavior,’ *The American Journal of Sociology* Vol. 83, No. 6 (1978). According to Granovetter’s threshold model, what matters is not *who* chooses a behavior before you, or in what order, but the *number* of actors who choose before you.

Further, and relatedly, the focus on collective action and collective goods (and the attendant emphasis on the international community) reinforces as the point of departure that all countries matter for addressing climate change, when in fact a limited number do. China, the United States, and the European Union (EU) contribute roughly half of global emissions (27%, 14%, and 10%, respectively), while the bottom 100 countries only account for 3.5%. The top 10 emitters together ‘account for over three-quarters of global [greenhouse gas] emissions.’⁷⁰ Climate change is not a collective action problem where the collective is all 195 countries; more accurately, the collective is China, the US, and the EU—and, increasingly, India, the world’s fourth largest emitter (contributing 7% of global emissions).⁷¹ Specifically, the problem rests on a handful of industries within these economies; for example, electricity and heat account for 32% of emissions worldwide; transportation, 16%; and manufacturing and construction, 14%.⁷² Even more precisely, the problem rests on a small number of companies; in fact, a 2017 CDP study found that just 100 companies are responsible for 70% of all emissions since 1988.⁷³

⁷⁰ Johannes Friedrich, Mengpin Ge, and Andrew Pickens, ‘This Interactive Chart Explains World’s Top 10 Emitters, and How They’ve Changed,’ World Resources Institute, April 11, 2017.

⁷¹ Note that within the EU, we can be even more specific about which countries “matter”: Germany and Poland alone are responsible for 51% of installed coal capacity and 54% of emissions from coal-fired power plants. See Marcia Rocha et al., ‘A Stress Test for Coal in Europe Under the Paris Agreement: Scientific Goalposts for a Coordinated Phase-out and Divestment,’ Climate Analytics, February 2017, vi. While its per-capita emissions rate remains low, India is a “climate vital” country, given a population of 1.3 billion (set to surpass China by 2024) and its development potential. For example, buildings generate 40% of annual global emissions, and estimates suggest that 70% of the buildings that will exist in India in 2030 have yet to be built. On India’s population growth, see Hannah Ritchie, ‘India will soon overtake China to become the most populous country in the world,’ Our World in Data, April 16, 2019. On the building sector’s contribution to emissions and the problem in India specifically, see Architecture 2030, ‘Why the Building Sector?’ accessed March 13, 2021; and The Economic Times, ‘Nearly 70% of building stock that will be there in 2030 is yet to be built in India,’ July 7, 2012.

⁷² DownToEarth, ‘Current global emissions: who is emitting what,’ November 9, 2015.

⁷³ Paul Griffin, ‘The Carbon Majors Database,’ CDP, July 2017.

In this project, I attempt to cut through the “noise” of the collective action approach by focusing on some of the world’s largest companies, including in energy-intensive industries, in such climate-crucial countries as the United States, Germany, and India.

While political science broadly has failed to make many fresh strides in understanding global responses to climate change, more promising progress has been made by scholars focused on transnational governance generally and transnational climate governance specifically. Their work better appreciates that, as Weiss puts it, in ‘an increasingly diverse, complex, and interdependent world, states alone cannot really pretend to have all the answers for collective-action questions.’⁷⁴ However, as the next section discusses, by focusing on the *governance* of climate change, scholars have limited their scope to the ‘creation and adoption of instruments that are explicitly aimed at realizing public goals, involve a process of steering a particular constituency of actors, and are authoritative.’⁷⁵ One of my key arguments in this project is that during the 2010s powerful members of the global private sector became climate actors – achieving results akin to those that might be achieved by certain types of climate “governors” – without meeting those criteria.

Transnational relations and transnational climate governance

The early literature on transnational relations, while identifying new actors in global politics, did not argue that these new actors would supplant states in any meaningful sense, but rather that their interactions would, as Nye and Keohane wrote in 1971, ‘increase the sensitivity of societies to one another and thereby alter relationships between governments.’⁷⁶ In 1971, Kaiser, while proposing the need for a field of transnational politics to

⁷⁴ Thomas Weiss, *Global Governance: What? Why? Whither?* (Cambridge, UK: Polity, 2013), 14.

⁷⁵ Harriett Bulkeley et al., *Transnational Climate Change Governance* (New York: Cambridge University Press, 2014), 14.

⁷⁶ Nye and Keohane, ‘Transnational Relations and World Politics: An Introduction,’ 336.

capture the complex interactions ‘between societal actors in different nation-state systems and one or several governments,’ argued that ‘despite the increasing relevance of interaction across boundaries that bypass governments and despite the blurring of traditional frontiers between different governmental systems or the growing importance of international organizations, the nation-state remains the dominant unit in world politics.’⁷⁷ As Thiel and Maslanik summarize, influential scholarship from the 1990s, such as that by Keck and Sikkink, focused on ‘activism-based [transnational] actors pursuing principled ideas’ and pressuring international organizations or specific states to adopt certain policies, especially surrounding human rights issues like slavery and women’s suffrage.⁷⁸

For many scholars, transnational actors can alter the landscape in which states are operating, and potentially can convince states to change their behaviors, but states and the international organizations to which they belong remain the dominant actors in world politics and the ultimate arbiters in deciding how transnational challenges will be met. But fifty years after the pioneering work on transnational relations, there is good reason to challenge this understanding and mounting evidence to suggest that there has been an underlying change in the relationship among non-state actors, states, and certain transnational challenges. The best way to describe the change is that although states still are the primary actors in world politics overall, they no longer necessarily can claim to be preeminent in addressing certain critical issues of transnational importance.⁷⁹ As discussed earlier in this chapter, this is partly a function of the fact that by their nature these

⁷⁷ Karl Kaiser, ‘Transnational Politics: Toward a Theory of Multinational Politics,’ *International Organization* Vol. 25, No. 4 (1971): 797.

⁷⁸ Markus Thiel and Jeffrey Maslanik, ‘Transnational Actors,’ *Oxford Research Encyclopedias*, International Studies Association and Oxford University Press (November 2017).

⁷⁹ While states no longer are *preeminent* in addressing certain issues, this is not to say that they do not have an indispensable role to play. As Le Prestre points out, although ‘it is no longer the only important actor, the state remains the indispensable actor. With regard to climate change, only it has the necessary regulatory authority.’ Le Prestre, *Global Ecopolitics Revisited: Toward a Complex Governance of Global Environmental Problems*, 41.

challenges cannot be addressed solely by states, and partly a result of some states absenting themselves from playing a constructive role in addressing them.

Much of the literature examining efforts by non-state actors to address climate change highlights the first dimension of the changing role of states vis-à-vis transnational challenges: their *inability* to address them alone. At the most basic level, as Bulkeley and Newell discuss, the processes and services that generate greenhouse gases ‘are often diffuse, transnational, and frequently beyond direct state control.’⁸⁰ Similarly, Heal notes that governments only have indirect influence, through regulations and incentives, over the ‘billions of de-centralized and independent decisions by private households for heating and transportation and by corporations for these and other needs, all outside the government sphere.’⁸¹

In the context of the need for action by other actors, the literature has mapped the proliferation of sub-national and market-based transnational governance initiatives that ‘cut across traditional state-based jurisdictions, [and] operate across public-private divides’.⁸² Building on Keohane and Victor’s discussion of the ‘regime complex’ for climate change, or the diffuse network of legal regimes, bilateral agreements, and multilateral institutions operating in the climate policy space,⁸³ Green and Auld examine *private* actors within this complex, considering their role in setting regulatory rules, reformulating the problem of climate change in politically tractable ways, and supplying new institutional avenues for diffusing public rules.⁸⁴ Similarly, highlighting the potential for mutually

⁸⁰ Harriet Bulkeley and Peter Newell, *Governing Climate Change* (New York: Routledge, 2015), 6.

⁸¹ Geoffrey Heal, cited in *ibid.*, 4.

⁸² Bulkeley et al., *Transnational Climate Change Governance*, 1.

⁸³ Keohane and Victor, ‘The Regime Complex for Climate Change.’

⁸⁴ Jessica Green and Graeme Auld, ‘Unbundling the Regime Complex: Effects of Private Authority,’ *Transnational Environmental Law* Vol. 6, Issue 2 (2016).

reinforcing relationships between national and non-state climate action, Cashore and Bernstein propose four pathways by which global climate governance can produce domestic effects: international rules, international norms and discourse, markets, and direct access to domestic policy-making processes.⁸⁵

A subset of the literature points to the second dimension of states' changing role vis-à-vis certain transnational issues: their demonstrated *unwillingness*, in many cases, to undertake those actions that *are* within their power. For example, Green proposes a theory to explain the conditions under which non-state actors create authoritative rules and standards, not only by using 'delegated private authority,' which states can confer upon them, but also by using 'entrepreneurial private authority,' which non-state actors can claim in the absence both of an international organization serving as a focal institution for an issue and of homogenous policy preferences among powerful states.⁸⁶ In practice, this lack of homogenous preferences simply means that powerful states have been unwilling to align or come close to aligning how they rank climate change in their interest sets, whether due to unresolved domestic distributive conflicts over climate policy⁸⁷ or due to their choosing to use limited resources to address problems deemed more pressing.

One shortcoming of this literature is that it paints an incomplete picture of non-state climate action by emphasizing *governance*, which concerns formal and authoritative instruments and defined groups of actors explicitly concerned with achieving specific public goals.⁸⁸ Governance instruments include carbon markets, certification standards, and

⁸⁵ Steven Bernstein and Benjamin Cashore, 'Complex Global Governance and Domestic Policies: four pathways of influence,' *International Affairs* Vol. 88, Issue 3 (2012).

⁸⁶ Jessica Green, *Rethinking Private Authority: Agents and Entrepreneurs in Global Environmental Governance* (Princeton, NJ: Princeton University Press, 2013), 28.

⁸⁷ See Matto Mildemberger, 'Fiddling While the World Burns: The Double Representation of Carbon Polluters in Comparative Climate Policymaking' (Ph.D. dissertation, Yale University, 2015).

⁸⁸ Bulkeley et al., *Transnational Climate Change Governance*, 14.

emissions registries; Green, for example, focuses on the Greenhouse Gas Protocol, created by two NGOs.⁸⁹ As a result of this emphasis on instruments, public goals, and authority, however, climate-relevant behaviors that have considerable potential to affect the problem but that cannot be classified as “governance” are overlooked, as are actors who cannot be characterized as “governors” (i.e. participants in the creation and adoption of governance instruments).

To further grasp why “governance” is an inadequate concept for evaluating the extent, nature, and significance of non-state climate action, consider how Bulkeley et al. note that on their ‘comprehensive’ list of transnational climate governance initiatives, they point out that many if not most ‘are not directly involved in emission reductions. Rather, many are focused on providing information, incentives and capacity building for *others* to reduce emissions.’⁹⁰ Thus, some of the most crucial non-state actors for climate mitigation, including companies, which *are* involved directly in emissions reductions, are excluded. These excluded actors are the focus of this project.

International Relations and the limits of state-centrism

While this project contributes to the literature on the transnational governance of climate change, it also sheds light on how the natural state-centrism of International Relations (IR) leaves the field unprepared to make sense of the changes in global order that this project addresses.

First, the IR canon was developed during, and reflects the concerns of, an era when major risks were exclusively military in nature and when states were more or less able to

⁸⁹ Green, *Rethinking Private Authority: Agents and Entrepreneurs in Global Environmental Governance*, 19.

⁹⁰ Bulkeley et al., *Transnational Climate Change Governance*, 159. Emphasis in original.

look after their interests on their own, or in concert with other states.⁹¹ Neither condition exists today. Some of the most destabilizing risks are non-military in nature, and states cannot address them alone. States retain their political authority and monopoly on the legitimate use of military force but other actors – whether NGOs, multinational corporations, or international organizations – should be treated as potential global security actors. Furthermore, some of these non-traditional security actors may play a larger role in addressing certain transnational risks to states and their populations than states themselves.⁹²

Second, contemporary scholarship grounded in classic IR thinking fails to consider how non-state actors can constrain states by reshaping the structure of the system in which states operate, or, put differently, by recasting the context for states' decision-making. For example, in Braumoeller's systemic theory of international relations, *states*, and specifically Great Powers, are the agents whose decisions today 'take place in an environment shaped by yesterday's actions,' and whose actions today shape the environment for tomorrow's decisions.⁹³ According to this theory, interactions of 'many different states with different capabilities and diverse national interests determine the most important qualities of the [international] system,' including how Great Powers behave.⁹⁴ But my theory

⁹¹ The IR canon – ranging from Hans Morgenthau's *Politics Among Nations* (New York: Alfred Knopf, 1948) to Kenneth Waltz's *Theory of International Politics* (Long Grove, Illinois: Waveland Press, 1979) – is grounded in the era of interstate war and an international system defined primarily by military threats.

⁹² From Iraq and Syria to Nigeria, states have proven incapable of securing their land and people from 21st century threats like transnational terrorism. The same holds true for countries confronting refugee crises. When states are unable to address these risks effectively, other actors may fill the gaps. Consider the place of transnational NGOs, international organizations, and even the private sector in responding to the refugee crisis; in 2015, the UN Global Compact and the UN High Commissioner for Refugees partnered to identify how global businesses could 'provide solutions to the widespread societal disruption' caused by the refugee crisis. See 'Private Sector Engagement in Humanitarian Action,' UN Global Compact, accessed March 13, 2021.

⁹³ Bear Braumoeller, *Great Powers in the International System: Systemic Theory in Empirical Perspective* (Cambridge, UK: Cambridge University Press, 2012), 9.

⁹⁴ *Ibid.*, 17.

proposes that, vis-à-vis certain issue areas, it is the interactions of *global actors* – some states and some not – with different capabilities and interests that determine how Great Powers behave. Global actors, whether states or corporations, make today’s decisions and produce today’s actions that shape the environment for tomorrow’s decisions.

Third, classic IR theory naturally accommodates structural change (e.g. a change in the number of superpowers) but not change in systems (i.e. a change from a state-based order to something different). The IR theoretical edifice is built around the Westphalian nation-state, a relatively new organizational form in human history;⁹⁵ this orientation makes it difficult for the field to give much credence to the idea of, much less be attuned to evidence of, a transition from a *state-based* international system to a *multi-actor* global system. One of this project’s intended contributions is to make the case that in fact we are in the early days of such a transition—a shift ‘toward a new kind of pluralistic world system,’ in which states remain very important but no longer are necessarily the centers of gravity, whether from an economic, security, or political perspective, and particularly when considering the landscape of non-traditional issues.⁹⁶

As this section has underscored, this project represents a case study in underlying changes in global order, including in the actors with the ability and ambition to respond to non-traditional issues like climate change. As the next chapter will describe, my empirical strategy necessarily focuses on the particulars of the climate case study, but ultimately the project is grounded in the broader questions that this section has illuminated (and that this chapter has considered more broadly).

⁹⁵ As Khanna notes, cities ‘are mankind’s most enduring and stable mode of social organization, outlasting all empires and nations over which they have presided.’ *Connectography*, 49.

⁹⁶ *Ibid.*, 58.

Conclusion

This chapter introduced the two key empirical observations motivating this project. First, select non-state actors with the economic resources and geographic reach to rival the majority of states are becoming increasingly assertive and independent in a global landscape whose defining issues no longer are exclusively military in nature or centered around Great Power dynamics. Second, during the 2010s a growing number of the world's largest companies adopted particular practices reflecting a certain sensibility toward the climate issue area. It also introduced the overarching question that this study examines: what does the phenomenon of private sector climate action reveal about the new actors and issues that are reshaping the landscape and context in which states will have to advance their interests?

In this chapter, I presented my theory of why the private sector coalesced, in what I argue was an emergent fashion, into a new pattern of response to the climate issue area over the course of the 2010s, proposing that it was due to declining confidence in states' willingness to act that companies changed their approach. In Chapter 2, I lay out the research design for examining *how* the pattern came about and *why* certain corporate Great Powers developed the ambition to address this critical issue of transnational importance.

CHAPTER 2—Research Design

Introduction

This chapter presents my empirical strategy for addressing each of the two main research questions that Chapter 1 introduced: first, *how* the new pattern of corporate climate action developed during the 2010s (based on which actors, practices, and processes), and second, *why* it developed. One of this chapter's aims is to show how the empirical chapters, each of which focuses on developments in a certain industry or group of industries, relate to exploring the overall outcome of interest: the private sector's new approach to the climate issue. Put in terms of concepts introduced in Chapter 1, this chapter presents the research design for analyzing the relationship among the individual corporate "geese" (the actors of interest), the "V-flight pattern" that developed during the 2010s (this study's dependent variable), and the conditions in their environment (including states' lack of willingness to address the climate issue, the independent variable).

The roadmap for the chapter is as follows. First, I discuss my approach to evaluating the specific components of the dependent variable (the general components of which Chapter 1 surveyed) across case study companies, industry groups, and headquarter countries. I explain my strategy for showing that the pattern signified the private sector identifying a new dominant design, or coalescing around a new paradigm of action.

Second, I describe my strategy for examining whether this development was emergent. The key question is whether there was a disjuncture, or misalignment, between the overall outcome (the private sector's adoption of a certain set of practices) and how individual companies perceived the business importance (i.e. the material impact) of the climate issue. The reason why such a misalignment would be significant in terms of this study is what it would imply about the possible dynamics of a changing global landscape marked

by new actors and issues. In particular, it would suggest that diverse global actors that individually do not appear inclined to alter their approaches vis-à-vis a global issue can, through a decentralized and uncoordinated process, and in the context of states failing to provide leadership on the issue, come to change course and move in a remarkably cohesive new direction.

Identifying a new pattern of response to climate change

Case selection

Before describing the case selection process, a note is in order about the timeframe of interest, 2010–2017. This timeframe spans several phases in the international climate policy landscape, capturing evolution in states’ approach to climate action. The phases include: 1) *post-Copenhagen* (2010–2012, or after the 2009 Copenhagen Climate Conference but before what would become the “Paris model” of climate action came into view); 2) *pre-Paris* (approximately 2013–2015, encompassing the run-up to the December 2015 Paris Climate Conference, as the new model came into clearer focus and states announced their Intended Nationally Determined Contributions to overall emissions reduction goals); and 3) *Paris* (2016–2017, including ratification of the Paris Agreement and the wake of the Paris “moment”).¹

Which companies became part of the process that ultimately produced a new private sector pattern of response? I began the process of case selection by choosing three “climate vital” countries: the United States, Germany, and India.² The United States is the

¹ I roughly have divided the three phases by years but the boundaries are not rigid. For example, one could argue that the “pre-Paris” phase really did not begin until 2014, *after* the November 2013 climate conference in Warsaw, where countries were asked to publish their Intended Nationally Determined Contributions. What is most important in the context of this project is not specifying the precise starting and ending years of the different phases but rather appreciating that there *were* distinct phases during the 2010s and that they represented changes in how states were approaching the climate issue.

² As Chapter 1 discussed, while political scientists classically have approached climate change through the lens of collective action, this approach presents climate change as a problem requiring action by the

world's second largest emitter of greenhouse gases, accounting for 14% of emissions.³ The European Union (EU), the third largest emitter, accounts for 10% of global emissions, and Germany is the highest emitting EU Member State, accounting for 21% of the EU total.⁴ While it contributes just 2% of total global emissions, Germany wields outsized influence within the EU, the world's second largest economy by GDP, and thus its climate approach is of critical importance.⁵ Last, the world's fourth largest emitter (contributing 7% of emissions) and one of the fastest growing economies, India is a crucial climate player given its population size (1.3 billion, set to surpass China by 2024⁶) and development potential; for example, buildings account for 40% of annual global emissions,⁷ and estimates have suggested that up to 70% of buildings that will exist in India in 2030 have yet to be built.⁸

China is a notable exclusion from the sample set as a result of state ownership of many of the largest Chinese companies and involvement in the private sector. Therefore, it falls outside the scope of this project.

After selecting the case study countries, I built the company sample set. The starting criterion for inclusion was having the resources and reach to belong to the tier of corporate “nations” that are this study's focus. I examined *Fortune* and *Forbes*' rankings of companies by revenue, identifying the top companies headquartered in the United States,

collective of the international community, when in fact it is a problem requiring action by a relatively small group of states.

³ Friedrich, Ge, and Pickens, ‘This Interactive Chart Explains World's Top 10 Emitters, and How They've Changed.’

⁴ European Commission, ‘Greenhouse gas emission statistics – emission inventories,’ June 2020.

⁵ Abby Budiman and Dorothy Manevich, ‘Few see EU as world's top economic power despite its relative might,’ Pew Research Center, August 9, 2017.

⁶ Ritchie, ‘India will soon overtake China to become the most populous country in the world.’

⁷ This is primarily due to buildings' energy consumption. See Architecture 2030, ‘Why the Building Sector?’

⁸ See The Economic Times, ‘Nearly 70% of building stock that will be there in 2030 is yet to be built in India.’

Germany, and India.⁹ I focused on four industry categories: energy-intensive (e.g. steel, cement, and chemical), automotive, finance (banking and insurance),¹⁰ and technology.¹¹

While US- and Germany-based companies are well-represented in the *Global Fortune 500* rankings, from 2010–2017 India-based companies were not.¹² Thus, I expanded the inclusion criteria to account for companies that were not top-ranked in terms of revenue but were industry leaders. For example, in 2010 Tata Steel, headquartered in India, was the world’s 410th largest company by revenue but the seventh-largest steelmaker (in terms of production), and thus met the criteria for inclusion.¹³ While this expanded the number of India-based sample companies, India overall still was represented to a lesser degree in the sample set than the United States and Germany.

For several industries, I included a vital company headquartered in a country beyond the main three; these included Japan-based Toyota for automotive, Netherlands-based Shell for oil and gas, and Korea-based Samsung for technology. This choice enhanced the study’s potential to capture as fully as possible how pivotal actors in the focus industries behaved vis-à-vis the climate issue.

⁹ Throughout the period of interest, 2010–2017, typically there were only negligible changes in the rank orderings of the largest companies, making it a relatively straightforward task to identify the top companies for the eight-year period.

¹⁰ Banks have a vital role to play in advancing the low-carbon transition and the insurance industry is one of a select few that is highly vulnerable to climate change per se (other examples include the oil and gas and beverage industries). See Marianne Curphey, ‘Industries most vulnerable to climate change,’ *Raconteur*, April 4, 2019.

¹¹ Technology companies are of special interest to this project given their exceptional resources and the sheer scope of their operations. Indeed, a company like Apple is more corporate “superpower” than “nation.”

¹² The government is the majority shareholder in many of India’s largest companies (e.g. Indian Oil Corporation, Oil and Natural Gas Corporation, and Bharat Petroleum Corporation), thus excluding these companies from this study.

¹³ On Tata Steel’s overall ranking by revenue, see Fortune, ‘Global 500 2010,’ accessed March 13, 2021. On its ranking among steelmakers in terms of production, see World Steel Association, *World Steel in Figures 2011*, 7.

Table 2.1 lists the sample companies by headquarter country and industry group. The company in the row labeled “other,” Walmart, does not belong to any of the four focus industries and features in this project as a mini-case study in this chapter.

Table 2.1. Sample companies.

	United States	Germany	India	Other
Automotive	Chrysler Ford General Motors	BMW Daimler Volkswagen		Toyota (Japan)
Energy-intensive (steel, cement, chemical, power, pharmaceutical, oil/gas)	Chevron Dow Chemical Exxon Johnson & Johnson Pfizer	BASF Bayer E.ON HeidelbergCement RWE Thyssenkrupp	Reliance Industries Tata Steel Ultratech Cement	Shell (Netherlands)
Finance (banking and insurance)	AIG Bank of America Citigroup JPMorgan	Allianz Deutsche Bank		
Technology (hardware, software, services)	Apple Google Microsoft		Infosys	Samsung (South Korea)
Other	Walmart			

Thirty-four of the world’s largest companies and key players in climate-relevant industries, representing four industry groups and covering six headquarter countries.

Methods and sources

I selected three metrics to evaluate the specific components of the dependent variable: the pattern of behavior vis-à-vis the climate issue (the general components of which Chapter 1 outlined). The metrics were as follows:

1. **product:** the carbon “profile” of a company’s goods/services,
2. **alignment:** whether/how a company deployed resources to make current activities coherent with the low-carbon future, and
3. **investment:** a company’s investments in the low-carbon future.

The indicators for each metric differed by industry. For the *product* metric, for five industries (steel, cement, pharmaceutical, chemical, and technology) the indicator was “specific emissions,” which provides a measurement of how much carbon a company generates per unit of revenue or production.¹⁴ Measuring specific emissions as opposed to absolute emissions allows for more meaningful comparison between companies of varying types and sizes. For the remaining industries, the indicator for product concerned their portfolios: specifically, whether automakers had significant zero- or low-emission vehicle portfolios; the share of coal in power companies’ generation portfolios; whether oil and gas companies had significant renewable energy portfolios; and whether banks and insurers offered green bonds and/or other vehicles by which to expand the market for climate initiatives.¹⁵

For the *alignment* metric, for four industries (auto, steel, cement, and power) the indicator was the use of an internal carbon price.¹⁶ For four others (chemical, pharmaceutical, oil and gas, and technology) the indicator was addressing value chain emissions (i.e. “Scope 3” emissions, covering all emissions outside of a company’s control/ownership, including those generated by suppliers and end-users). For banks and insurers it was incorporating emissions standards for funding certain sectors (e.g. coal) and incorporating climate-related risks in underwriting strategies, respectively.

Last, for the *investment* metric, the indicator behavior was spending on low-carbon research and development (R&D) in the case of seven industries (auto, steel, cement,

¹⁴ The measure of specific emissions varied slightly by industry. For example, for the steel industry the measure was tons of CO₂ in Scope 1 & Scope 2 emissions divided by tons of crude steel produced. For the cement industry the measure was kilograms of CO₂ in Scope 1 and Scope 2 emissions divided by tons of cement produced.

¹⁵ Complete information about the selected indicators is provided in the online appendix; for access, please contact the author: charlotte.hulme@yale.edu.

¹⁶ To recall from Chapter 1, an internal carbon price ‘places a monetary value on greenhouse gas emissions, which businesses can then factor into investment decisions and business operations’ and that can direct ‘finance away from high-emitting activities.’ Bartlett, Cushing, and Law, ‘Putting a price on carbon: Integrating climate risk into business planning,’ 4.

pharmaceutical, chemical, power, and oil and gas); producing/procuring renewables for technology companies; and climate financing/investment for banks and insurers.

To gather data on the indicators described above, I relied on two key data sources. The first was CDP disclosures covering 2010–2017.¹⁷ I drew on CDP data on companies’ “Scope 1” and “Scope 2” emissions (i.e. emissions under a company’s control), investments in low-carbon R&D, and use of internal carbon pricing. Given my extensive use of CDP data in this study, it is important to acknowledge a potential concern related to selection effects stemming from the fact that companies self-select into the pool of respondents. While one scholar rightly points out that because CDP disclosure is voluntary, ‘one indicator of [climate-related] interest and awareness is simply the extent of participation,’¹⁸ there also is no evidence that companies treat their responses as an exercise in “green-washing.”¹⁹

Given that not all sample companies participated in CDP disclosure each year from 2010–2017, I also leveraged data from companies’ annual reports to shareholders, documents which are required for all publicly traded companies, as well as sustainability reports, where available. During the timeframe of interest, some companies adopted the practice of publishing a combined “business and sustainability report” instead of two separate documents; others continued to publish only a conventional annual report. I relied on annual and/or sustainability reports particularly for data about value chain emissions

¹⁷ I am grateful to Barbara Esty of the Yale University Library for acquiring the CDP dataset and to Yale University for making this purchase to enable this part of my research. As discussed in Chapter 1, CDP, formerly the Carbon Disclosure Project, collects data annually from thousands of global companies about their overall environmental performance as well as their strategies toward specific issues, including climate change.

¹⁸ Das, ‘Climate Change and the Private Sector,’ 248.

¹⁹ Some respondents consistently communicated that climate change is irrelevant and presents no risks and no opportunities. Further, participation in CDP cannot be treated simply as an image-boosting exercise as these disclosures are specifically meant for investors (CDP explicitly presents its data as being intended to help investors in their decision-making; companies have incentives to present their climate approaches accurately or be held to account by investors).

(i.e. “Scope 3” emissions, which CDP disclosures do not address systematically), low-carbon products, renewable energy holdings, and strategic decisions pertaining to the climate issue (e.g. for an insurer, whether and to what extent climate-related risks were incorporated into its underwriting strategy; and for a bank, whether and to what extent there were emissions standards for funding certain areas, such as coal or tar sands).

As discussed, the indicator behaviors for the three metrics conveyed certain information about whether a company approached climate change as a business-relevant concern. But to differentiate gradations of behavior, a company’s performance was evaluated on a continuum. For example, when evaluating a steel company on the alignment metric, asking whether the company used an internal carbon price (the indicator behavior for the steel industry) was the first step; if the answer was “yes,” the next step was evaluating how and to what extent the company did so, as different methods of internal carbon pricing vary in terms of their ambition and potential impacts.²⁰

I developed a 20-point scale and distributed the points among the three metrics; each metric carried a different weight depending on the industry (or the company, based on its main activities, as in some industries companies are primarily involved in different areas). For instance, for a technology company focused on hardware there were 10 possible points for the alignment metric, as supply chain emissions (addressed by this metric) account for the vast majority of hardware companies’ emissions. Meanwhile, there were four available points for product and six for investment. But for a steel company, there were 10 possible points for the product metric, as the direct emissions produced through the steelmaking process (addressed by this metric) account for the overwhelming share of

²⁰ For example, a company can adopt a “shadow” internal carbon price, which is a ‘theoretical price on carbon that can help support long-term business planning and investment strategies.’ In general, a more ambitious approach is the use of an internal carbon fee, which places ‘a monetary value on each ton of carbon emissions,’ and which ‘creates a dedicated revenue or investment stream to fund the company’s emissions reduction efforts.’ Center for Climate and Energy Solutions, ‘Internal Carbon Pricing,’ accessed March 13, 2021.

steelmakers' emissions. Meanwhile, there were four available points for alignment and six for investment.

With 20 points available to each company in each year (2010–2017), I coded companies' performance on each metric. As mentioned, for the indicator behaviors there was a performance spectrum, ranging from limited participation in a certain behavior to adoption of the most ambitious form of that behavior. For example, in a certain year two cement companies could lower their specific emissions; however, if the first company lowered its specific emissions by 5% and the second company by just 0.5%, the first company's performance was significantly higher and would be reflected as such in a higher score on the product metric.²¹

The purpose of coding each company's annual behavior across the three metrics was to gain traction on the first research question: how private sector actors behaved during the 2010–2017 timeframe (i.e. which actors were the corporate “geese” that became part of the “V-formation,” and when), and what were the specific elements of their behavior. To systematically distinguish among varying levels of climate action in each year and track change over time, I developed four company types, each of which corresponded to a range of scores out of 20. The types and corresponding point ranges were as follows.

- 1) **Business-as-usual (BAU):** 0–8 points.
- 2) **Evolutionary:** 9–12 points.
- 3) **Innovator:** 13–15 points.
- 4) **Disruptor:** 16–20 points.

Classifying each company by type allowed me to capture the distribution over time of distinct approaches, or sensibilities, across industries and headquarter countries. BAUs had

²¹ Specifically, in this case the first cement company would receive all ten possible points for the product metric; the second would receive six out of ten. Details about the point distributions for gradations of behavior and the coding rules are provided in the online appendix, which is available upon request. Please contact the author: charlotte.hulme@yale.edu.

a status quo sensibility and treated climate change as a limited concern and the low-carbon future as a consideration more for 2050 than 2030. At the other end of the spectrum, disruptors approached climate change with ambition and urgency and treated the low-carbon future as just on the horizon. Meanwhile, evolutionaries and innovators fell in between. Evolutionaries were climate active to a limited degree; their behavior and sensibility were much closer to that of the BAUs than the disruptors (although there were meaningful shades of difference between an evolutionary scoring 9, for example, and one scoring 12). The innovators, in contrast, were climate active to a significant degree; their behavior and sensibility much more closely approximated that of the disruptors than the BAUs.

Thus far, this section has presented my approach for collecting and analyzing data on company- and industry-level components of the dependent variable—in other words, for capturing the overarching pattern’s development within and across specific industries over the course of the 2010–2017 timeframe. The remainder of the section discusses how I marshal this data to make the case that the pattern signified companies coming to treat a certain set of practices, grounded in a particular sensibility, as the new dominant design for the future, or paradigm of behavior.

I propose that if a new paradigm developed, it will have three features:

- 1) companies’ climate performance increasing over time,
- 2) more companies adopting a certain set of practices, and
- 3) companies making deeper investments in a certain set of practices.

Beginning with the first feature, in each empirical chapter I evaluate changes over time in companies’ types. As discussed, for each year from 2010–2017, depending on their scores on the three metrics (product, investment, and alignment), companies were classified as one of the four types: BAU, evolutionary, innovator, or disruptor. To capture the thrust of

companies' climate performance and smooth the data, I divided 2010–2017 into three-year periods (2010–2012, 2011–2013, and so on) and calculated each company's average score in each period. For example, a company scoring 5, 8, 11, and 14 in 2010, 2011, 2012, and 2013, respectively, would score 8 for the 2010–2012 period and thus be classified as a BAU (the point range for which is 0–8); meanwhile, for 2011–2013, it would score 11 and thus be classified as an evolutionary (the point range for which is 9–12).

To evaluate whether companies' climate performance increased over time, in each empirical chapter I identified how many companies belonged to a higher type in the last period (2015–2017) than in the first (2010–2012). This provided a preliminary, industry-level cut at the question of whether a new paradigm of action developed, as the types capture both progressively higher levels of performance in specific practices and progressively more “climate active” sensibilities.

Turning to the second feature of a new paradigm, I evaluated whether more companies came to adopt a certain set of climate practices by examining changes in “participation” in each of the three metrics (product, investment, and alignment). As discussed, the metrics were umbrella categories of climate actions, under which fell industry-specific practices, or indicator behaviors.

For each of the three-year periods in the 2010–2017 timeframe, I determined how many companies were participating in product, investment, and alignment by evaluating how many received *any* score on each metric. If a company's performance was sufficiently poor, it received a score of zero. Calculating how many companies participated in each metric (which, again, represented distinct categories of climate actions) over the course of the 2010–2017 timeframe, I evaluated whether, consistent with the second marker of a new paradigm, more companies came to adopt a certain set of climate actions.

Finally, to examine evidence for the third feature of a new paradigm, I evaluated whether a company that was participating in a given metric was doing so in a limited fashion or instead was invested deeply in the relevant practice or indicator behavior. To distinguish those companies participating “deeply” in each metric, I identified those that received over half the available points on the metric, in each of the three-year periods. Calculating how many companies participated “deeply” in each metric over the span of the 2010–2017 timeframe, I evaluated whether, consistent with marker 3 of a new paradigm, companies came to make deeper investments over time in a certain set of climate actions.

As the empirical chapters will tentatively consider and Chapter 7 will analyze more fully, in the context of the aggregate empirical findings concerning the three proposed features of a new paradigm, we can observe momentum gathering over time. Momentum is an observable implication of positive feedback, a mechanism leading certain new practices and attitudes to become more entrenched over time (as Chapter 1 discussed). Once the private sector moved forward in terms of level of climate activity and performance (feature 1) it never retreated; overall, the circle of actors adopting certain practices (feature 2) expanded and never contracted; and investments that companies made in specific practices (feature 3) deepened over time.

Identifying emergent climate action

How did the new pattern of response develop? If the previous part of the chapter addressed this question in terms of the industry- and company-level practices on which it was based, this part addresses it in another sense: the process through which it developed. Did it follow the pattern of emergent action as described in Chapter 1?

Emergence is conceptually powerful but notoriously challenging from a methodological perspective. Identifying emergence requires assessing whether a system produced

intended or expected outputs based on the inputs, or whether instead the outputs differed in qualitative ways from the inputs. Simply put, is there an overall pattern whose essential property the individual entities do not exhibit? If so, the outcome is emergent.

Some scholars have used computational modeling to explore emergent outcomes in world politics generally and climate politics specifically. For example, Cederman has used complex adaptive system (CAS) modeling to examine ‘aggregate properties that emerge from the local interaction among many agents mutually constituting their own environment.’²² The CAS approach allowed for modeling the process of minute interactions among smaller actors through which the state system emerged. In their work on “climate clubs,” or bottom-up mitigation efforts among select actors, Sprinz et al. have used agent-based modeling (ABM), a tool for investigating how the features of complex systems can generate emergent outcomes, to capture the impacts of certain parameters being introduced into a given system. For example, in a paper written in the context of the Trump administration’s announcement of U.S. withdrawal from the Paris Climate Agreement, they used ABM ‘to derive the impact that lack of US participation may have on the membership of such clubs and their emissions coverage.’²³

I chose a qualitative approach to analyze emergence in this project, not only because qualitative methods generally are best-suited to in-depth analysis of small-n sample sets but also because this approach was best-suited to working with the CDP disclosures (my data source in this part of the study), and specifically to analyzing companies’ in-depth qualitative responses.

²² Lars-Erik Cederman, *Emergent Actors in World Politics: How states and nations develop and dissolve* (Princeton, NJ: Princeton University Press, 1997), 50.

²³ Detlef Sprinz, Håkon Sælen, Arild Underdal, and Jon Hovi, ‘The effectiveness of climate clubs under Donald Trump,’ *Climate Policy*, Vol. 18, Issue 7 (2017): 828.

As an emergent process yields an outcome that appears misaligned with the individual traits of the actors involved in the process, my approach to investigating emergence hinged on identifying a trait that we would expect would align with the outcome of interest. Given that a public company's *raison d'être* is increasing shareholder value, I propose that we would expect it to treat climate change as a serious concern if it entailed high business costs and/or opportunities. In other words, intuitively we would not expect to see companies becoming "climate active" and altering their approach to the issue in a decided manner unless they perceived strong material reasons for doing so.

To measure company perceptions of the material importance of climate change in order to assess consistency between perception and action, I examined CDP data on how each of the 34 sample companies annually perceived climate-related risks and opportunities in specific categories, including regulation, physical impacts, and changing consumer behavior. In each year, I examined risks and opportunities that each sample company reported; for most industries, I examined only those pertaining to climate-related regulation and changing consumer behavior (the rationale for which is explained in the footnote), but for select industries that are markedly vulnerable to climate change as such (e.g. insurance and oil and gas), I also examined those pertaining to physical impacts.²⁴

In most of the sample cases, a company could report up to two risks and two opportunities in a given year (one risk and one opportunity in each of the two categories: regulation and changing consumer behavior). For those select cases in which I also considered physical impacts due to the nature of the businesses in question, a company could

²⁴ Climate-related regulation and consumer behavior are the most pertinent categories. The former is of central importance to this study's independent variable, while the latter relates to a key alternative explanation for the development of interest in this study, as discussed in Chapter 1. Excluded categories of risk and opportunity included reputation (treated by CDP as a separate concern from changing consumer behavior, despite that companies often treat reputational concerns *within* the consumer behavior category), uncertain market signals (as this was often discussed and incorporated within the regulation category), and socioeconomic/humanitarian factors (which were wide-ranging and not well-specified).

perceive up to six risks and opportunities in a given year (one risk and one opportunity in each of three categories: regulation, changing consumer behavior, and physical impacts).

For each reported risk and opportunity, company respondents also assess the likelihood, time horizon, and estimated material (financial) impact. Thus, for each company, in each year, I coded the reported risks and opportunities according to these three parameters. First, I eliminated reported risks and opportunities that did not reasonably appear to be salient; for instance, if a company responded “yes” to a risk from changing consumer behavior, but reported the anticipated timeframe as “unknown” and the likelihood as “exceptionally unlikely,” I coded this risk as not salient. This coding procedure increased the comparability of data from self-reporting companies that for idiosyncratic reasons may have taken different approaches to responding to the CDP questionnaires. The appendix provides full details about coding for risk/opportunity salience.²⁵

Then, I identified which salient risks and opportunities were perceived to have high material impacts. This enabled me to create a “perception profile” for each company, for each year: out of a possible four or six (depending on the industry) climate-related risks and opportunities, how many did a company perceive as being highly relevant (i.e. high-impact or potentially high-impact) from a material perspective? The number of high-impact risks and opportunities that a company perceived out of the total possible represented its “perception strength” in a given year. For example, if an insurance company perceived a high-impact risk only from regulation in 2012, its perception strength would be 17% that year (having perceived one out of six possible risks and opportunities). Consistent with the approach discussed in the previous part of the chapter, I calculated rolling three-year averages from the annual data.²⁶ For example, if a steel company perceived one high-

²⁵ For access to this appendix, please contact the author: charlotte.hulme@yale.edu.

²⁶ Note that this part of the project only covers 2010–2016, as changes in the 2017 CDP questionnaire compromised the comparability of the “perception data” with that from other years. In contrast to all prior years,

impact risk in 2010 (out of four possible risks/opportunities), two in 2011, none in 2012, and none in 2013, then its perception strength for 2010–2012 would be 25% (three out of 12), while for 2011–2013 it would be 17% (two out of 12).

Thus far, I have sketched my approach to identifying emergence by leveraging CDP data on companies' perceptions about climate-related risks and opportunities. Ultimately, I was interested in whether there was a misalignment, or disjuncture, between how individual companies perceived the direct business relevance (i.e. material impacts) of climate change over the course of the 2010s and how the private sector behaved overall. The wider the disjuncture between companies' perceptions that climate change was an increasingly serious material concern, on the one hand, and the private sector's level of climate activity, on the other, the stronger the evidence of an emergent pattern of action.

In each empirical chapter, I assess the consistency between perception and action at both the industry and company levels. First, at the industry level, I compare the findings about the development of a new pattern of response – or, the patterns of “participation” in the three metrics (product, investment, and alignment) – with companies' perception strength scores. If an industry's breadth and depth of participation in the metrics were greatest or increased most when companies *least* viewed climate change as entailing high-impact risks or opportunities, this would suggest an emergent pattern of action, as we would not expect *increasing* participation in and *growing* commitments to climate practices when companies *least* perceived material incentives to change approach.

Second, at the company level I evaluate how materially relevant climate change was for those companies that transitioned to a higher type (e.g. from BAU to evolutionary),

in 2017 companies were given the opportunity to report about “relevant” risks and, separately, about risks that stood to have a financial and/or strategic impact. The rationale for and implications of this new distinction were unclear. Similarly, in 2017 CDP significantly altered the categories of risks and opportunities. For example, when respondents were asked about “reputation” as a risk and opportunity (a category I ultimately did not include) they were encouraged to think not only about *consumers* but also about *investors*—a fundamentally different question than that posed in years past.

examining their perception strength scores over time. If a company did not register climate change as a high-impact concern, or if its perception strength score *declined* over time, and yet it transitioned to a higher type, its behavior followed a pattern of emergent action. As at the industry level, we would not anticipate a company to change its approach to the climate issue in a decided fashion (which is what a type transition signifies) if it did not perceive a strong material incentive to do so.

As Chapter 1 introduced, my theory is that the condition that explains why private sector actors coalesced in an emergent fashion into a pattern of response – or why corporate “geese” came into a “V-pattern” – was states’ abdication of their expected role in addressing such a critical issue of transnational importance. To make the case that this indeed was the independent variable ultimately accounting for the new pattern of response, throughout the project I focus on the CDP data concerning companies’ perceptions of prospects for high-impact climate-related regulation, which is a proxy for their sense of states’ willingness to take ambitious action. Additionally, I marshal data from 45 semi-structured interviews conducted in 2018 with company executives and representatives as well as with various experts to demonstrate that the development of a new private sector pattern of response occurred specifically in the context of companies’ waning confidence that states were willing to act.

Case study of emergent climate action

To conclude the chapter, I present a mini-case study to demonstrate how the methods that I have described apply to a specific company case, Walmart. Few companies so clearly embody the outsized resources and reach of corporate “nations” as Walmart, which is the world’s largest retailer and largest private employer (and third largest employer overall,

after the U.S. Defense Department and the Chinese People’s Liberation Army), and which has an annual revenue of half a trillion dollars and a supply chain spanning 100 countries.²⁷ In addition, few private sector actors rival Walmart in terms of climate ambition; in 2017, for example, Walmart unveiled “Project Gigaton,” which aims to cut emissions between 2015 and 2030 by 1 billion tons, ‘roughly the same reduction that would be achieved by a government regulation that required the U.S. iron and steel industry to cut its emissions to zero.’²⁸

When, how, and in what context did Walmart’s approach to the climate issue area develop? To begin to address these questions, Table 2.2 demonstrates my approach to classifying companies by type according to the scores received for their performance across the three metrics (product, investment, and alignment) in each three-year period spanning 2010–2017. The table conveys that over time, Walmart, consistently a high performer, increased its score by 21% and landed among the disruptors—those companies that most strongly had a “climate active” sensibility.

²⁷ Kaityn Stimage, ‘The World’s Largest Employers,’ WorldAtlas, February 15, 2018.

²⁸ Vandenbergh and Gilligan, ‘Why private “actors” are taking center stage on climate change.’

Table 2.2. Company type, 2010–2017.

Type (point range)	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)	2015–2017 (period 6)
Disruptor (16–20)						Walmart, 17 (cumulative: +21%)
Innovator (13–15)	Walmart, 14	Walmart, 15	Walmart, 15	Walmart, 15	Walmart, 15	
Evolutionary (9–12)						
BAU (0–8)						

Walmart, classified according to its three-year performance on lowering the emissions intensity of its activities (the product metric), addressing supply chain emissions (alignment), and procuring/producing renewable energy (investment).

Table 2.3 captures the types of action in which Walmart participated over time, or the “breadth” of its climate action. For each metric, 100% indicates that it participated for all three years in a given period, 67% that it participated for two years, and 33% that it participated for one year. Table 2.4 conveys the metrics for which Walmart received over half the available points, addressing the “depth” of its climate action. One hundred percent indicates that Walmart received over half the available points for the metric in all three years; 67% that it received over half in two years; and 33% that it received over half in one year.

Table 2.3. Breadth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	100	100	100
2011–2013 (2)	100	100	100
2012–2014 (3)	100	100	100
2013–2015 (4)	100	100	100
2014–2016 (5)	67	100	100
2015–2017 (6)	67	100	100
Percent change between periods 1 and 6	-33	0	0

The percentage of years that Walmart received a score for lowering the emissions intensity of its activities (product), addressing supply chain emissions (alignment), and procuring/producing renewable energy (investment).

Table 2.4. Depth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	100	33	67
2011–2013 (2)	67	67	100
2012–2014 (3)	33	100	100
2013–2015 (4)	33	100	100
2014–2016 (5)	33	100	100
2015–2017 (6)	67	100	100
Percent change between periods 1 and 6	-33	+67	+33

The percentage of years that Walmart received over half the available points for lowering the emissions intensity of its activities (product), addressing supply chain emissions (alignment), and procuring/producing renewable energy (investment).

Earlier in the chapter, I proposed that by examining the *breadth* and *depth* of companies' participation in the three metrics of climate action, we can gain traction on the question of the specific components of the new private sector "pattern of response" in the climate issue area. Table 2.3 conveys that Walmart consistently participated in two out of the three metrics, alignment and investment, but that its participation in product dropped in periods 5 and 6. Meanwhile, Table 2.4 captures the quality of its commitments to this certain set of actions and conveys that Walmart consistently was a "deep" participant in alignment and investment.

A closer look at the data sheds light on the particular significance of the developments that Table 2.4 captures. The most heavily weighted metric in Walmart's case was alignment—the indicator behavior for which was addressing supply chain emissions, as an estimated 90% of its emissions come from its supply chain.²⁹ Table 2.4 conveys that from period 3 onward, Walmart was a "deep" participant in the *most* important kind of climate action. The evidence shows Walmart becoming progressively more ambitious in addressing its supply chain emissions: for example, in 2010 the company committed to eliminating '20 million metric tonnes of greenhouse gas emissions from our supply chain';³⁰ in 2014, it piloted a program for suppliers which, if implemented by 1,000 factories, was projected to be able to 'reduce coal consumption by an estimated 230,000 tons';³¹ finally, in 2017, Walmart unveiled Project Gigaton, whose goal of eliminating 1 billion tons of supply chain emissions represented a 49-fold increase from the 2010 target.³²

²⁹ See Gina Roos, 'Wal-Mart Pledges to Cut Supply Chain Emissions 20M Metric Tons by 2015,' *Environment and Energy Leader*, February 26, 2010.

³⁰ Walmart, 2010 *Annual Report*, 11.

³¹ Walmart, 2014 *Global Responsibility Report*, 106.

³² See Stevens, 'Behind Walmart's push to eliminate 1 gigaton of greenhouse gases by 2030.'

Likewise, the evidence shows Walmart’s consistently ambitious approach to the investment metric, the indicator behavior for which was producing/procuring renewable energy. As Chapter 5 discusses, variants of this behavior differ significantly in terms of ambition; there are ways, for example, that companies can claim to be using 100% renewable energy when in fact they simply are purchasing enough so-called “renewable energy credits” to offset their conventional power usage. In contrast, one of the more ambitious variants is entering into a clean power purchase agreement (PPA) with a supplier in sufficiently close proximity that a company can actually use the clean power it purchases.

Walmart has been ambitious *and* consistent as a producer/procurer of renewables. In 2010, for example, it entered into a PPA with Duke Energy wind farm in Notrees, Texas, supplying ‘up to 15 percent of the energy needs in 350 of [its] Texas locations.’³³ Between 2010 and 2013 it increased its global production/procurement of renewables by 600%, eliminating the need for two fossil fuel power plants.³⁴ As Chapter 5 also discusses, one of the reasons why this particular “alignment” behavior is especially significant for companies like Walmart is that it carries the potential to influence climate-relevant developments *outside* of these companies’ own industries. As Walmart itself put it in 2014, ‘We hope our commitment to renewables will encourage innovation and new market entries into the sector.’³⁵

Tables 2.2–2.4 demonstrate how by applying the methodology presented earlier in the chapter we can identify how a company’s climate performance developed over time. To show that Walmart’s ambitious climate action did not reflect merely its underlying

³³ Walmart, 2011 *Global Responsibility Report*, 11.

³⁴ Walmart, ‘Walmart Announces New Commitments to Dramatically Increase Energy Efficiency and Renewables,’ April 15, 2013.

³⁵ Walmart, 2014 *Global Responsibility Report*, 5.

perceptions of climate risks and opportunities but rather followed the pattern of emergent action, Table 2.5 presents Walmart’s perception strength scores for each of the five periods spanning 2010–2016 (to recall, 2017 was excluded due to a lack of comparable data). For each period, Table 2.5 shows as a percentage the total number of risks and opportunities out of those possible that Walmart reported as a high-impact material issue (whether present or anticipated).³⁶ With its perception strength declining by 66% between periods 1 and 5, Table 2.5 captures how Walmart over time became significantly less concerned with the financial implications of the climate issue.

Table 2.5. Material impact of climate change, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
Walmart	50	42	33	17	17

For Walmart, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern in each of five periods.

Due to the lack of perception data for 2017, we cannot gauge precisely Walmart’s perception strength in the period (2015–2017) when it increased its performance enough to transition to a higher type, from innovator to disruptor (see Table 2.2). But we can appreciate that for the two periods preceding the change (2013–2015 and 2014–2016) it hardly registered climate change as a high-impact concern (with a perception strength of just 17%). Already a high performer, Walmart increased its climate action even further, while apparently perceiving limited material reason to address the issue. This case demonstrates, at the company level, the inconsistency between perception and action that indicates a pattern of emergent behavior.

³⁶ I looked at two climate factors, in Walmart’s case: changing consumer behavior and regulation. For each of these factors, there was one possible risk and one possible opportunity, or four possible risks and opportunities in each year, providing 12 possible risks/opportunities in a given period.

With this mini-case study, I have provided a preview of how each empirical chapter will examine how and to what extent the new private sector pattern of response developed within the four case study industry groups. Each chapter yields tentative insights into the kinds of actors that became part of the process that produced the pattern over time, which practices they adopted, and whether developments followed an emergent pattern. Chapter 7 then evaluates the aggregate findings and examines the hypotheses presented in Chapter 1 in order to offer conclusions about which corporate “geese” became part of the “V-formation,” the extent to which this development heralded a new dominant design, and the variable or condition in their surroundings that ultimately accounts for why they coalesced this way.

CHAPTER 3—Energy-Intensive Industries

‘In the end, they have also entered the game.’¹

Snapshot of the new dominant design

In 2018, Ørsted – which until 2017 was Danish Oil and Gas, responsible for one-third of Denmark’s CO₂ emissions – became the global leader in offshore wind, with a 30% market share; since 2019, Ørsted’s stock has risen over 70%, putting its value at 40% of BP’s market capitalization.²

Introduction

This chapter examines the extent to which 15 of the world’s largest energy-intensive companies became part of the process that ultimately produced the outcome of interest in this study: the new private sector pattern of climate action. To what extent did these companies change their approaches to the climate issue from 2010 through 2017? Did increasing action correspond with the perception that climate change posed more serious business impacts? By exploring these questions, this chapter addresses which of these private sector actors with deep investments in the high-carbon status quo identified a new dominant design for the future and adopted a new approach—and, crucially, in what context, in terms of how they individually saw the material importance of the climate issue.

In the chapter, I demonstrate that climate action increased over the course of the 2010–2017 timeframe, and that increasing action corresponded with declining perceptions that climate change was a high-impact material concern. In particular, companies in energy-intensive industries became *less* concerned about prospects for climate-related

¹ Climate and energy expert specializing in corporations and the low-carbon transition, Interview by author, November 13, 2018, Interview 3, Berlin, Germany.

² David Sheppard, ‘Can Orsted be the first green energy supermajor?’ *Financial Times*, February 3, 2020.

regulation—an indication of their diminishing confidence that states would act in a bold fashion to address the issue. The inconsistency between how companies behaved and how they individually perceived the climate issue is indicative of the pattern of emergent action that Chapter 1 proposed; the declining outlook for regulation, particularly, points to the fact that a key condition in the environment was states’ perceived lack of leadership and action on the issue, as Chapter 1 theorized.

The remainder of the chapter is divided into two main parts. Part I examines how the 15 companies behaved; in each three-year period spanning the 2010–2017 timeframe, I classify each company as one of four types, as described in Chapter 2: business-as-usual (BAU), evolutionary, innovator, or disruptor. I show that the company cohort overall moved toward a different sensibility and approach to the climate issue, while 47% of companies altered their approach in a significant and decisive fashion, transitioning to higher types by the final period. To assess whether these developments represented a coalescence around a new dominant design, or paradigm of behavior, Part I also explores the specific practices that companies adopted. It shows that two of three practices became more widespread and that companies also became more deeply invested in two of three practices. This finding, particularly when considered alongside illustrative data from interviews conducted in 2018, provides evidence in this industry case study of a certain sensibility and set of practices becoming recognized as the new dominant design.

One of this study’s main arguments is that the private sector pattern of climate action is akin to a “V-formation” of geese; it represents an outcome whose essential attribute the individual entities do not exhibit. In each empirical chapter, I examine whether at the industry- and/or company-levels, we see the signature pattern of emergent action—a hint of the overall “V-formation” (which Chapter 7 analyzes). Part II explores how the 15

companies saw climate change as *less* of a serious material concern over time—and how it was in *this* context that the cohort changed its approach to the issue.

Part I: Climate action, 2010–2017

This part of the chapter examines how companies behaved during six three-year periods spanning 2010–2017 to assess change over time in climate action. I begin at a macro-level of analysis, evaluating the distribution of company types during each of the periods, and demonstrate that seven out of 15 companies altered their climate approaches significantly enough to belong to a higher type in 2015–2017 than in 2010–2012. I consider what this development implies about the first feature of a new dominant design, or paradigm of behavior, as discussed in Chapter 2: the overall level of climate performance increasing over time. Shifting to a micro-level, I then examine specific practices and show that the data supports the two other proposed features of a new paradigm: more companies adopting a certain set of practices (feature 2), and companies making deeper investments in a certain set of practices (feature 3).

Identifying private sector climate actors

To investigate how companies behaved from 2010 through 2017, I evaluated data on their yearly performance on the three metrics discussed in Chapter 2: product, alignment, and investment. As that chapter explained, in each empirical chapter the metrics act as umbrella categories encompassing industry-specific practices. In the context of the energy-intensive industries that are the focus of this chapter, the specific practices, or “indicator behaviors,” for each metric are: lowering the emissions intensity of a company’s activities (the product metric), using an internal carbon price or addressing supply chain emissions

(the alignment metric),³ and investing in low-carbon research and development (the investment metric).

Table 3.1 presents each company's score and corresponding type in each of the three-year periods spanning 2010–2017.⁴ A company's score is listed after its name; the higher the score, the more robust its action, or the better its performance across the three metrics, during that period. In period 6, I indicate in parentheses the net percent change in score compared to period 1; a company's name is in bold if its type is higher in the last than in the first period. The last row shows the total points for all 15 companies in each period, with the percent change since the prior period indicated parenthetically. The cumulative scores for each period capture when and to what extent underlying momentum was gathering over the course of the eight-year timeframe.

³ Given the variety of energy-intensive industries that this chapter includes, for some companies the alignment indicator behavior was the use of an internal carbon price; for others, it was addressing supply chain emissions. A detailed rationale is available in the appendix; contact the author for access (charlotte.hulme@yale.edu).

⁴ See Chapter 2 for details about my approach for scoring each company's annual performance on each of the three metrics, which were weighted differently according to industry but whose combined point value was uniformly 20. I used a rolling average approach to capture the thrust of climate action while smoothing the data.

Table 3.1. Company types, 2010–2017.

Type (point range)	2010– 2012 (period 1)	2011– 2013 (period 2)	2012– 2014 (period 3)	2013– 2015 (period 4)	2014– 2016 (period 5)	2015– 2017 (period 6)
Disruptor (16-20)					Heidel., 17 E.ON, 16	E.ON , 18 (+67) Heidel. , 16 (+33)
Innovator (13-15)		Heidel., 13	Heidel., 14 J & J, 13	Heidel., 15 BASF, 14 E.ON, 13	BASF, 14	BASF , 13 (+18) Tata , 13 (+30) Thyssen. , 13 (+86)
Evolutionary (9-12)	Heidel., 12 BASF, 11 Bayer, 11 E.ON, 11 J&J, 10 Tata, 10	BASF, 12 J & J, 12 E.ON, 11 Bayer, 10 Tata, 10 Pfizer, 9	E.ON, 12 BASF, 11 Dow, 10 Bayer, 9 Pfizer, 9	J&J, 11 Pfizer, 10 Bayer, 9 Dow, 9 Tata, 9	J&J, 11 Bayer, 10	Bayer, 10 (-9) Pfizer , 10 (+100) Ultra , 10 (+67) J&J, 9 (-10)
BAU (0-8)	Dow, 7 Thyssen., 7 Chevron, 6 Ultra., 6 Pfizer, 5 RWE, 5 Shell, 5 Exxon, 3 Reliance, 0	Dow, 8 Chevron, 6 Ultra, 6 RWE, 5 Shell, 5 Thyssen., 5 Exxon, 3 Reliance, 0	Tata, 7 Chevron, 6 Ultra, 6 RWE, 5 Shell, 5 Thyssen., 5 Exxon, 3 Reliance, 0	Ultra, 8 Thyssen., 6 Chevron, 5 RWE, 5 Shell, 5 Exxon, 4 Reliance, 0	Pfizer, 8 Tata, 8 Thyssen., 8 Dow, 7 Ultra, 7 Shell, 6 Chevron, 4 Exxon, 4 RWE, 4 Reliance, 1	Dow, 7 (0) Shell, 7 (+40) Exxon, 5 (+67) Chevron, 4 (-33) RWE, 4 (-20) Reliance, 0 (0)
Total points (% change)	109 (--)	115 (6%)	115 (--)	123 (7%)	125 (2%)	139 (11%) (cumulative: +28%)

* Heidel. is HeidelbergCement; J&J, Johnson & Johnson; Tata, Tata Steel; Thyssen., Thyssenkrupp; and Ultra, Ultratech.

Fifteen energy-intensive companies, classified according to performance on lowering the emissions intensity of their activities, using an internal carbon price or addressing supply chain emissions, and investing in low-carbon R&D.

Table 3.1 conveys which of these energy-intensive companies, in altering their climate approaches and sensibilities to varying degrees, became part of the process that led to the overarching result, a new pattern of action among private sector actors across different industries and countries. It captures how, by the last period, seven companies (47%)

belonged to a higher type than in the first period, having made significant changes in their approaches and performance.⁵ With five of those seven companies (71%) landing in either the disruptor or innovator camp by the last period, we can appreciate that among the type-changers there was a high level of ambition.

Table 3.1 conveys when and to what extent momentum was gathering at the collective and individual levels. As shown in the last row, there was a 28% increase in companies' collective scores between periods 1 and 6, with three key periods of change: period 2 (2011–2013), period 4 (2013–2015), and period 6 (2015–2017). Considering momentum at the individual company level, period 6 was especially significant; while three companies (E.ON, Heidelberg, and BASF) maintained their already-high performance, four others (Tata Steel, Thyssenkrupp, Ultratech, and Pfizer) increased their performance considerably, transitioning to higher levels.⁶

Consistent with the first proposed feature of a paradigm, once momentum toward a new approach and sensibility gathered early on, it was sustained; once the cohort moved forward, it never retreated. Of particular importance is the considerable momentum achieved *prior* to the December 2015 Paris Conference, widely interpreted as a watershed for the private sector beginning to reckon with climate change and the low-carbon future in a more serious fashion.⁷ For example, it was in 2014 that Heidelberg became a disruptor. Likewise, BASF and E.ON became innovators in period 4 (2013–2015), which reflects

⁵ Four companies (RWE, Chevron, Johnson & Johnson, and Bayer) had lower scores in 2015–2017 compared to 2010–2012, but whereas the nine companies that scored *higher* in the last period compared to the first gained an average of *four* points, the four lower-scoring ones lost an average of *one* point, a small enough loss to be “noise” in the data. Dow and Reliance had the same scores in the first and last periods.

⁶ While the choice to consider three-year rolling averages afforded advantages, one disadvantage is that we cannot appreciate what likely would have been intensified momentum had 2015 been dropped and 2016 and 2017 been considered separately (or, had the timeframe of interest been extended and two additional three-year periods, for 2016–2018 and 2017–2019, been added).

⁷ See Patricia Espinosa, ‘Paris Agreement Enters into Force – Celebration and Reality Check,’ United Nations Climate Change, November 4, 2016.

pre-Paris Conference behavior. Given that E.ON became not just a disruptor in period 5 (2014–2016) but the very highest scoring company as it consolidated its performance in period 6 (2015–2017), particularly notable is that it was in 2014, in another pre-Paris development, that it announced that in the future it would be ‘focusing entirely’ on ‘the building blocks of the new energy world,’ including renewables and energy networks—and that it was transferring all of its conventional power generation business (i.e. fossil fuel-centered activities) to a new company, Uniper. In 2016, the deal complete, E.ON described itself as ‘the first major European energy supplier to orient itself wholly around the new energy world.’⁸

Although Chapter 7 takes up the task of evaluating factors (e.g. headquarter country and industry) that help to account for why particular actors became part of the process that helped to produce the new pattern of private sector climate action, it is worth highlighting that of the seven companies that transitioned to higher types over time (having made decided changes in their climate approaches), four were headquartered in Germany, two in India, and one in the United States; they represented various industries, including steel, cement, pharmaceutical, chemical, and power.⁹ Three German companies transitioned to higher types before the Paris Conference (in periods 2 and 4); in contrast, the American and Indian companies changed type in period 6. Further, by period 6 there were four German companies and one Indian company in the disruptor and innovator camps, and two American companies, one German company, and one Indian company in the evolutionary camp.

⁸ E.ON, *Sustainability Report 2016*, April 24, 2017.

⁹ Of the five unchanging BAUs – companies that undertook no or very little action to alter the status quo – three were oil and gas companies: Shell, Exxon, and Chevron. The others were RWE, Germany’s largest utility, and Reliance Industries, a conglomerate and India’s largest private company, whose primary businesses are petrochemicals and energy.

Identifying new climate practices

While the previous section addressed what overall changes in companies' approach and sensibilities toward the climate issue (as captured by their types) suggest about movement toward a new paradigm, this section analyzes the texture of those developments. It investigates the performance underpinning companies' types; in particular, it examines how widespread certain climate-relevant practices were and considers whether companies became more deeply invested in them over time.

As the previous section recalled from Chapter 2, for energy-intensive companies the three specific practices of interest and their corresponding metrics were: lowering the emissions intensity of a company's activities (product), using an internal carbon price or addressing supply chain emissions (alignment), and investment in low-carbon R&D (investment). I analyzed how widespread each practice was, calculating how many companies out of 15 received any points for each metric in a given year. Consistent with my approach in the previous section, I then calculated three-year averages for the six three-year periods spanning 2010–2017. Table 3.2 displays the results, showing the “breadth” of action across the three metrics (i.e. the specific practices they encompass). Each period's participation rate is shown as a percentage of the number of companies that participated.¹⁰

¹⁰ As the research design described, receiving points on a metric signified that a company had made at least some progress on the relevant climate behavior or had not regressed appreciably; companies received a score of 0 if they regressed significantly on the behavior.

Table 3.2. Breadth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	69	42	67
2011–2013 (2)	62	49	69
2012–2014 (3)	56	58	73
2013–2015 (4)	44	62	78
2014–2016 (5)	47	69	84
2015–2017 (6)	53	73	84
Percent change between periods 1 and 6	-23	+74	+25

The percentage of energy-intensive companies receiving a score for lowering the emissions intensity of their activities (product), addressing supply chain emissions/using an internal carbon price (alignment), and investing in low-carbon R&D (investment).

As Table 3.2 conveys, in their adoption of certain practices companies became increasingly confident in the low-carbon future and in the need for a different approach to the climate issue area; increasing participation in the alignment and investment metrics indicates that more companies decided to prepare for and invest in a future where carbon would carry a cost for them and their suppliers, and where it would be incumbent to find a new way of producing their goods. The increase in participation in alignment is an especially clear indicator of growing confidence in the low-carbon future.¹¹ As discussed earlier, internal carbon pricing (the alignment indicator behavior for some companies in this chapter) ‘helps companies prepare for and hedge against future regulatory changes, and

¹¹ By contrast, participating in low-carbon R&D is a relatively less powerful signal; depending on the industry, a company that is firmly committed to the status quo still might be investing significantly in developing technologies that it only anticipates needing to use in 15, 20, or 30 years.

ensures long term capital investments don't become too costly, or even obsolete, in an environment where greenhouse gas emissions carry a price.¹² Addressing supply chain emissions (the alignment practice for others in this chapter), including through engagement with thousands or even tens of thousands of suppliers, is one of the more complex and challenging actions that companies can undertake.¹³

Showing a decline in participation in product, Table 3.2 highlights the challenge of making “sticky” progress on the practice least amenable to quick change (decreasing the emissions intensity of a company's activities, the indicator behavior for the product metric) *and* underscores that even as they were becoming more confident in the low-carbon future (as evidenced by widening participation in the investment and alignment metrics), for companies in energy-intensive industries this future was not yet “on their doorstep” as of 2015–2017. Yet, product may act as a lagging indicator of alignment and investment;¹⁴ therefore, if the timeframe were extended through 2020 (which would add three new periods: 2016–2018, 2017–2019, and 2018–2020) we may well see the earlier growth in participation in alignment and investment translating to increased participation in product. In other words, by 2018–2020 the low-carbon future may have seemed closer to companies' “doorstep” than it was even in 2015–2017—partly due to decisions that companies made and actions they undertook during the early and mid-2010s.

Thus far in this section I have considered the implications of the two practices that broadened over time in terms of the number of companies “participating” sufficiently to receive a score. Table 3.3 considers how deeply invested companies were in three specific

¹² CDP, ‘More than eight-fold leap over four years in global companies pricing carbon into business plans.’

¹³ This is why exceptional initiatives aimed at addressing supply chain emissions, like Walmart's “Project Gigaton,” have garnered significant attention.

¹⁴ The logic is that if, for example, a cement company decides to align its activities with the low-carbon future by using a higher percentage of lower-carbon materials in its cement, this decision would appear in later data about the carbon intensity of its cement (the product metric).

practices. The table conveys the percentage of companies receiving over half the available points for a given metric. Identifying the “depth” of action on each metric provides a first cut at differentiating practices to which companies were more seriously committed from those in which they were less invested.

Table 3.3. Depth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	57	4	70
2011–2013 (2)	60	13	65
2012–2014 (3)	65	26	61
2013–2015 (4)	71	38	55
2014–2016 (5)	72	40	52
2015–2017 (6)	71	57	52
Percent change between periods 1 and 6	+25	+1,325	-26

The percentage of energy-intensive companies receiving over half the available points for performance on lowering the emissions intensity of their activities (product), using an internal carbon price/addressing supply chain emissions (alignment), and investing in low-carbon R&D (investment).

While Table 3.2 captured how confidence in the low-carbon future became more widespread, Table 3.3 shows confidence in this future *intensifying*, captured by the significant gain in alignment (which vastly outweighed investment’s decline). In concrete terms, this gain shows that companies that engaged at all with their suppliers on addressing supply chain emissions engaged more substantively over time.¹⁵ Whereas Table 3.2 showed

¹⁵ As discussed, the specific practice or indicator behavior for the alignment metric was addressing supply chain emissions for some of the companies in this chapter and using an internal carbon price for others (depending on the industry). The gains in “depth of action” in terms of the alignment metric specifically reflect progress among those companies for whom the indicator behavior was addressing supply chains. In other

that for the 15 companies overall the low-carbon future was not yet “on their doorstep,”¹⁶ Table 3.3 demonstrates that when companies’ decisions to advance the low-carbon future *did* yield results, those results became more pronounced over time, captured by product’s 25% increase. In other words, those companies that in a given period were making progress on lowering the emissions intensity of their activities made *more* progress as the decade unfolded. Notably, the majority of progress occurred *prior* to the Paris Conference, with the product metric reaching 71% “deep participation” in period 4, the same level as in period 6. Crucially, realizing progress on product can nurture a virtuous cycle: the more companies see previous decisions and investments bearing fruit, the greater their confidence in the possibility of low-carbon behavior; the greater their confidence, the more inclined they will be to maintain their decisions and deepen their investments, or the likelier their “lock-in” to these behaviors.

While Table 3.3 conveys certain insights about how committed companies were to specific practices, it does not capture whether companies were participating “in depth” in the *most* significant practices, or whether they were scoring at least 51% on the metrics that were weighted most heavily for their industries.¹⁷ As a check on the findings in Table

words, a comparable “deepening” did not occur among those for whom the indicator behavior was using an internal carbon price. An illustrative example of deepening investment in the practice of addressing supply chain emissions comes from Johnson & Johnson. In 2012, the company launched its ‘expanded Responsibility Standards for Suppliers, supported by assessment tools, protocols and implementation guidance, to assist our suppliers in complying with the standards.’ By 2017, it had enrolled suppliers covering 51% of its spending in its Sustainability Procurement Program; the target for 2020 was to enroll suppliers covering 80% of its spending. See Johnson & Johnson, *2012 Citizenship and Sustainability Report*, 7; and Johnson & Johnson, 2018 CDP disclosure (covering 2017). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

¹⁶ To recall, there was a slight (2-company) decline in participation in the indicator behavior for the product metric: decreasing the emissions intensity of activities.

¹⁷ For all industries the most heavily weighted metric was product and/or alignment (as in some cases these metrics carried equal weights). I treated investment as *relatively* less significant because, although important, it typically is comparatively low-cost in terms of the degree of behavioral change it entails. To grasp the importance of differentiating those companies that undertook relatively more demanding actions, it is useful to consider how even such an unwavering business-as-usual company as RWE performed very well on investment each year, investing in projects focused on carbon capture and storage technology, carbon capture and usage, and renewable energy technologies.

3.3, Table 3.4 shows the percentage of companies that in each period received over half the available points on the most heavily weighted metric for their respective industries.¹⁸

Table 3.4. Depth of action on the most significant climate practices, 2010–2017.

Years (period number)	Percentage
2010–2012 (1)	33
2011–2013 (2)	40
2012–2014 (3)	42
2013–2015 (4)	49
2014–2016 (5)	47
2015–2017 (6)	51
Percent change between periods 1 and 6	+55

The percentage of energy-intensive companies receiving over half the available points on the most significant climate practice for their respective industries.

As Table 3.4 captures, by 2015–2017, half of companies – up from one-third in 2010–2012 – were receiving over half the available points on the most crucial practice (of the three that I examine) in their respective industries. In other words, companies did not just “dabble at the margins” (e.g. increasing low-carbon R&D investments, a relatively low-cost action, while registering no progress on addressing the emissions intensity of their activities); rather, they increasingly moved forward on aspects of their activities that were least amenable to short-term change (e.g. lowering the emissions intensity of their

¹⁸ Note that for companies in industries with two metrics carrying the same weight, a company had to score 51% only on *one* of those metrics for inclusion.

activities) and/or posed particularly complex challenges (e.g. addressing supply chain emissions).

Thus far, this section has shown that during the 2010–2017 timeframe, consistent with the features of a new paradigm proposed in Chapter 2, a set of climate practices broadened (the alignment and investment metrics) and a set deepened (the alignment and product metrics). To conclude the section, I marshal illustrative data from interviews conducted in 2018 with industry experts as well as representatives of energy-intensive companies to provide further initial evidence for my claim that by the late 2010s, even among some of the world’s most status-quo oriented companies, there was a recognition of a new dominant design and paradigm of behavior vis-à-vis the climate issue.

A key finding was that interviewees frequently expressed the perception that during the 2010s the climate and low-carbon “game” changed and a paradigm shift occurred. As Chapter 1 discussed, a veteran of the European energy sector described developments among actors in the energy business this way:

If you go back 10 years, *there was a variety of views* as to where the energy system was going in the long term. And that variety of views was driven by different views on technology, different views on how real the threat of climate change was, different views on how politicians may or may not react to it, and different views driven by how much money politicians would be prepared to spend on it.

What I think we’ve seen over that ten years is that diversity of views disappearing, and that if you talk to almost anyone, and clearly not everyone — it’s never everyone — but if you talk to almost anyone, *they will describe the energy system of the future in very similar terms*. They will talk about decentralization, renewables, electric vehicles...they will all talk about the ‘smart’ system of the future.¹⁹

¹⁹ Expert specializing in the energy sector and businesses and the low-carbon transition, Interview by author, November 12, 2018, Interview 2, London, United Kingdom.

Similarly, when asked about when and why the low-carbon future seemingly became perceived as a foregone conclusion in Europe, a Berlin-based expert on climate and energy policy replied:

I don't have a specific date, event, or process I would link it to. Perhaps it's multiple engagements across national and European policy processes...but also this kind of question where *companies started to realize*, okay, we are seeing in the marketplace these developments, and then they are asked by the investors, "*Where do you see yourself [in the long-term]?*"²⁰

In India, a Tata Power C-Suite executive reflected, 'We were the first one who went into renewable energy, realizing that though it is expensive, *this is the technology of the future.*' Why did India's largest integrated power company believe this was the future, and why was it willing to absorb the costs of being an early mover? 'What we saw,' the executive explained, 'was the technology shift that [was] happening the world over.' Over time, Tata increased its target for renewable energy's share in its generation portfolio, a decision this executive attributes to costs 'coming down drastically,' improvements in technology, and the fact that 'there is *a huge amount of pressure globally* that we need to move toward renewables. And not because it's a fashion statement, but *it is also a necessity today, with the type of climate change challenges which [are] coming.*'²¹ By 2016, observing that '[d]ecarbonisation...[is] *poised to disrupt present paradigms* of business,' Tata announced that it was 'positioning as [India's] largest green energy player';²² the following year, it became India's largest renewables company with a \$1.4 billion acquisition.²³

²⁰ Climate and energy expert specializing in the power sector, Interview by author, November 14, 2018, Interview 4, Berlin, Germany.

²¹ Company executive, Interview by author, August 14, 2018, Interview 6, Mumbai, India.

²² Tata Power, *Annual Report 2016–2017*.

²³ Sushma U N, 'Why a 100-year-old Indian company is investing billions into renewable energy,' *Quartz India*, May 15, 2018.

Discussing the critical factors behind the success of renewables in India, a veteran of the conventional power sector who now is head of a renewable energy company credits the government with creating enabling market conditions. But he also perceives change at another level. Echoing the Berlin-based expert’s observation about investor pressure, this Indian CEO observed,

On top of it, [there are the] international investors, including the utilities. I know quite a few utilities and *they have all decided they will not invest any further in carbon-based power plants...*A lot of funds have decided that most of our funds will be for green power, but not for the conventional power. So, all these things have helped.²⁴

During the 2010s, even some of the companies *most* strongly entrenched in the status quo came to acknowledge a new dominant design on the horizon—to recognize, in the words of the Stiftung 2Grad (2° Foundation) expert cited in Chapter 1, that ‘the train of *transforming the economy has left the station and is not going to return.*’²⁵ The vignettes below provide a snapshot of two BAU companies that undertook certain actions, by the late 2010s, that belied their seemingly unshakeable commitment to the old dominant design.

RWE

Perhaps no company so fully embodies “business-as-usual” as RWE, Germany’s largest utility and Europe’s biggest polluter.²⁶ As Table 3.1 showed, from 2010–2017 RWE registered very little climate-relevant action.²⁷ At the start of the decade, RWE, reporting

²⁴ Veteran of the Indian conventional power sector and CEO of renewable energy firm, Interview by author, September 26, 2018, Interview 5, conducted by phone.

²⁵ Interview 3.

²⁶ Rachel Morison and Mathew Carr, ‘How EU’s Biggest Polluter Escaped a Tripling of Carbon Price,’ Bloomberg, August 14, 2018.

²⁷ The few points for climate performance that RWE received each year were the result of its investment in low-carbon R&D, focusing on technologies like carbon capture and storage.

that coal accounted for the ‘lion’s share’ of its generation capacity (at 50%),²⁸ announced the goal of ‘a generation portfolio that is 75% low-carbon or carbon-free by 2025, most of it either renewables- or gas based,’²⁹ and pledged that by 2020 renewable energy would have at least a 20% share (up from 7.6% in 2011.)³⁰ Yet, by 2012 RWE announced it would invest ‘much less than we had originally planned’ in expanding renewables and that ‘[w]e cannot maintain our goal for 2020, either.’³¹ In 2012, in fact, coal’s share in RWE’s generation capacity had spiked 13% compared to 2011 (to 63%), while renewable energy’s already-small share had declined to just 5%.³²

Yet, in 2016 RWE split its renewables-focused subsidiary, Innogy, into a separate entity (which later became a subsidiary of E.ON). The ‘key idea of this demerger,’ explained an expert at Innogy who used to work for RWE, ‘was to separate the conventional parts of the business from the green parts of the business. It was not to separate *only* the renewables part from the rest, but everything which is not CO₂ emitting: renewables, grid, and retail.’ Why did RWE make this decision? According to my interviewee, one of the main motivations was ‘to remain attractive for investors, because there are more and more international investors who say, “I’m not going to invest in anything which is carbon-rich. I’m not going to invest in coal mines, coal—sometimes even in gas-fired power plants.” So, *if you want to remain attractive for these kinds of investors, you have to set up a business which is completely free of carbon.*’ Asked when investors became more reluctant ‘to invest in anything which is carbon-rich,’ he explained that ‘in Europe, a big move was when

²⁸ RWE, 2010 *Responsibility Report*, March 31, 2011, 8.

²⁹ RWE, 2011 CDP disclosure (covering 2010). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

³⁰ RWE, 2011 *Responsibility Report*, March 28, 2012, 5.

³¹ RWE, 2012 *Annual Report*, March 5, 2013, 33.

³² *Ibid.*, 53.

the Norwegian State Fund [NSF] announced [its divestment from fossil fuels]....[I]t was striking because the NSF became so rich because of oil and gas.’ That was ‘four or five years ago [i.e. in 2014 or 2013] and to me, *that was a kind of turning point.*’³³

Royal Dutch Shell

The world’s largest oil company and fifth largest company overall, few companies have profited as much from the status quo as Royal Dutch Shell. As I demonstrated earlier in the chapter, from 2010–2017 Shell behaved as a BAU. Insofar as it was concerned with becoming greener, Shell was ‘focusing on natural gas,’ announced the CEO in 2011. ‘About half of the energy we produce comes out of wells in that form already, and we plan to increase that proportion in the coming years. It is, after all, the cleanest fossil-fuel.’³⁴

Yet, in 2016, Shell created a New Energies business ‘to further explore opportunities in alternative transport fuels, such as biofuels and hydrogen,’ and to ‘act as an incubator for potentially game-changing technologies of the future.’³⁵ In 2017 – the year Shell observed that, following the World Bank’s decision ‘to stop financing upstream oil and gas projects in 2019,’ other financial institutions ‘appear to be considering limiting their exposure to certain fossil fuel projects’ and that ‘our ability to use financing for future projects may be adversely impacted’ – New Energies agreed to purchase a UK-based residential energy provider, First Utility.³⁶ By 2019, the rechristened “Shell Energy” had abandoned First Utility’s coal- and natural gas-reliant fuel mix and was delivering customers

³³ Expert on the German energy transition, Interview by author, December 6, 2018, Interview 7, Hamburg, Germany.

³⁴ Royal Dutch Shell 2011 *Annual Report*, 5.

³⁵ Royal Dutch Shell, 2016 *Annual Report*, 6.

³⁶ Royal Dutch Shell, 2017 *Annual Report*, 15.

100% renewable energy.³⁷ By 2019, New Energies had set its sights on becoming the world’s largest power company by 2030, a vision grounded in the *‘irreversible choice the world has made* to decarbonize, to address climate change, and to go to [a] net-zero energy system.’³⁸

In short, by the late 2010s even two of the world’s most status quo-oriented companies, RWE and Shell, recognized a new dominant design for the future, perceiving that a “turning point” had been passed and that the world had made an “irreversible choice” to decarbonize and to address climate change.

This part of the chapter examined how companies behaved during six three-year periods spanning 2010–2017 to assess change over time in their approaches vis-à-vis the climate issue area. I identified which of the 15 companies were “climate actors” who became part of the process that ultimately produced the overarching pattern of a new private sector response to the issue. I examined the data for the three features of a new paradigm of behavior, and found that by 2015–2017, 47% of companies had altered their approaches to a significant extent, belonging to a higher type in the last period than in the first (relevant for the first proposed feature). Action gained momentum early on and was sustained; overall, this company cohort never retreated once it moved forward.

I also found evidence of two additional features of a new paradigm: over time, more companies became confident in the low-carbon future, as participation in two climate-related behaviors widened (feature 2); and some became *more* confident, as participation

³⁷ Royal Dutch Shell, ‘First Utility Becomes Shell Energy Retail Ltd and Switches Customers to 100% Renewable Electricity,’ March 25, 2019. Importantly, noted Green Tech Media, ‘Shell’s offering is certified by Renewable Energy Guarantees of Origin, which ensures that for every unit of electricity Shell Energy customers use, a unit of renewable electricity is put into the grid by renewable generators in the U.K.’ Julia Pyper, ‘Shell New Energies Director on Investing in Clean Energy: “It’s About Survival,”’ Green Tech Media, April 1, 2019. Emphasis added.

³⁸ Pyper, ‘Shell New Energies Director on Investing in Clean Energy: “It’s About Survival.”’

in two climate-related behaviors deepened (feature 3). Importantly, companies were not simply deepening their investments in relatively low-cost behaviors but were realizing increasingly meaningful results on challenging actions that had the potential to “lock in” their commitments to lower-carbon behavior.

Part II: Patterns of emergent action

Chapter 1 proposed that the private sector’s new approach to the climate issue area developed during the 2010s through an emergent process; there was an inconsistency between the overall outcome and the attributes of the individual actors whose behavior helped to produce it. My theory is that the private sector, in becoming progressively more “climate active,” behaved *as if* climate change presented increasingly significant material risks and opportunities, even though individual companies did not widely see the issue in that light. This unexpected pattern of action developed due to the private sector’s diminishing confidence in states’ willingness to play their expected role vis-à-vis this critical transnational issue set to shape future global trends.

This part of the chapter explores how the 15 companies perceived the material impacts of climate change over time in order to explore whether there is evidence at the industry- and/or company-level of the signature pattern of emergent action. As I will show, companies saw climate change as *less* of a high-impact material concern over time — in particular, the outlook for robust regulatory action declined — and it was in *this* context that their approach to the issue evolved toward a more “climate active” sensibility, as Part I showed. As previously mentioned, the empirical chapters offer only tentative conclusions about emergent action, treating industry- and company-level patterns as hints of a possible emergent pattern at the general level of the private sector (which Chapter 7 fully explores).

Emergent action at the industry level

In this section, I begin at the industry level, considering how the cohort of sample companies perceived climate change's material importance from 2010 through 2016.³⁹ To recall from Chapter 2, 2017 is excluded due to substantive changes in the CDP surveys that are my key data source in this part of the chapter.⁴⁰ I analyzed whether companies identified risks and/or opportunities related to climate-related regulation, changing consumer behavior, and, for oil and gas companies, physical impacts—and if so, on what time horizon, with what degree of certainty, and with what anticipated level of material (financial) impact.⁴¹ I used the data to calculate the annual strength of the perception, among the sample companies, that climate change had high material relevance. Consistent with my approach in Part I, I then calculated averages for each three-year period spanning the timeframe of interest, using a rolling average technique to smooth the data.⁴²

Table 3.5 presents data on companies' perceptions of climate change as a high-impact material concern. If all companies in a given period had perceived climate change (in terms of regulation, changing consumer behavior, and, for oil and gas companies, physical impacts) to be a concern entailing high-impact risks and opportunities, the

³⁹ Reliance did not participate in CDP from 2010–2017.

⁴⁰ For instance, in contrast to all prior years, in 2017 companies were given the opportunity to report about “relevant” risks and, separately, about risks that stood to have a financial and/or strategic impact. Similarly, in 2017 CDP significantly altered the categories of risks and opportunities. For instance, when respondents were asked about “reputation,” they were encouraged to think not only about *consumers* but also about *investors*. As a result, had the 2017 data on reputation been included it would have appeared that reputation as a concern increased by 15 points compared to 2016.

⁴¹ Oil and gas companies belong to one of a relatively short list of industries set to be significantly impacted by climate change *as such*, that is, by its actual physical implications. Other examples include wineries and insurers. See Nicholas Duva, “7 industries at greatest risk from climate change,” CNBC, October 22, 2014.

⁴² To recall, as the research design described, to calculate how materially important climate change was during each year, for each company that responded to CDP that year I identified which climate-related risks and opportunities were reported as having a high financial impact (or were anticipated to have one), focusing on how companies assessed risks and opportunities related to two categories: climate-related *regulation* and *changing consumer behavior*. In the case of the oil and gas companies included in this chapter, I also examined the category of *physical impacts*, given that the oil and gas industry is particularly vulnerable to impacts from climate change as such.

“material impact” column would register 100. Tables 3.6 and 3.7 distinguish strength of perception concerning regulation from that concerning changing consumer behavior, respectively, providing a finer-grained picture of the factors driving companies’ understandings of the material implications of climate change.⁴³

Table 3.5. Material impact of climate change, 2010–2016.

Years (period number)	Material impact
2010–2012 (1)	23
2011–2013 (2)	22
2012–2014 (3)	20
2013–2015 (4)	18
2014–2016 (5)	19
Percent change between periods 1 and 5	-17

For energy-intensive companies, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern.

⁴³ I do not separately consider the strength of perception for physical impacts as this included only three oil and gas companies. Note, however, that none of the three perceived any high-impact risks or opportunities from physical impacts at any time during the 2010–2016 timeframe.

Table 3.6. Material impact of regulation, 2010–2016.

Years (period number)	Material impact, regulation
2010–2012 (1)	39
2011–2013 (2)	35
2012–2014 (3)	31
2013–2015 (4)	26
2014–2016 (5)	29
Percent change between periods 1 and 5	-26

For energy-intensive companies, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Table 3.7. Material impact of changing consumer behavior, 2010–2016.

Years (period number)	Material impact, consumers
2010–2012 (1)	11
2011–2013 (2)	12
2012–2014 (3)	13
2013–2015 (4)	13
2014–2016 (5)	14
Percent change between periods 1 and 5	+27

For energy-intensive companies, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

Table 3.5 captures that among this group of energy-intensive companies, over time there was a declining perception that climate change was a high-impact material concern.

Table 3.6 shows how this development was driven by companies becoming considerably *less* concerned about prospects for states enacting high-impact climate-related regulation (i.e. measures that either would impose serious financial costs or would offer major financial opportunities). Meanwhile, Table 3.7 underscores how, for this industry, the consumer-based alternative explanation for changes in companies' behavior (as described in Chapter 1) finds minimal support, as consumer behavior remained a marginal concern (at 14%) for these energy-intensive companies.

Considered alongside the findings in Part I, Table 3.5 points to the pattern of emergent action. First, perceptions of climate change's material impact were *strongest* during the only period, 2010–2012, when there were *no* companies undertaking ambitious action (i.e. all 15 behaved as BAUs or evolutionaries). In other words, when companies' perception that climate change was a serious concern was at its zenith (which, at just 23%, was still low), their overall level of action was at its nadir.

Second, in examining the patterns of changing breadth and depth of certain climate practices, Part I showed that the most significant changes pertained to the practices falling under the umbrella of the alignment metric. As Table 3.2 showed, participation in the indicator behavior for this metric (the breadth of action) increased by 74%; as Table 3.3 indicated, the percentage of companies that were making meaningful investments in the behavior (the depth of action) increased by 1,325%. Interpreted in light of the data in Table 3.5, this indicates that companies were participating *least* in the crucial climate action of alignment – which largely relates to mitigating potential financial risks from carbon exposure – during the period (2010–2012) when they *most* viewed climate change as having high-impact material (financial) effects. As climate change was perceived as *less* of a serious material concern over time, *more* companies participated in alignment—and they also participated more *deeply*. This counterintuitive finding, where *less* concern about climate

change as a major material concern was coupled with *more* action, points to the misalignment between perception and action that is the signature of emergence.

Emergent action at the company level

Is there evidence of the pattern of emergent action at the company level? Table 3.8 shows companies that changed types at any point perceived the climate issue in terms of its relevance as a high-impact material concern.⁴⁴

Table 3.8. Material impact of climate change for climate active companies, 2010–2016.

Company	2010– 2012 (period 1)	2011– 2013 (period 2)	2012– 2014 (period 3)	2013– 2015 (period 4)	2014– 2016 (period 5)
Pfizer	0	0	0	0	0
Johnson & Johnson	0	0	0	0	0
Heidelberg	33	33	17	0	0
E.ON	50	33	17	0	0
Ultratech	25 ⁴⁵	25	25	17	8
Dow	25	25	25	25	25
Tata Steel	13 ⁴⁶	8	25	33	50
BASF	50	50	50	50	58
Thyssenkrupp	67	58	50	50	67

Among energy-intensive companies that moved toward a more climate active sensibility, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern.

⁴⁴ Note that I include the seven companies that belonged to a higher type in the last period compared to the first as well as two companies that made type-changes that were not “sticky.” As Table 3.1 showed, Johnson & Johnson began and ended as an evolutionary, but changed to innovator in period 3. Dow began and ended as a BAU, but changed to evolutionary in periods 3 and 4.

⁴⁵ Ultratech did not participate in CDP during the 2010 or 2011 response cycles, so period 1 data reflects perceptions from 2012 only and period 2 data reflects perceptions from 2012 and 2013 only.

⁴⁶ Tata Steel did not participate in CDP during the 2010 response cycle, so period 1 data reflects its perceptions from 2011 and 2012 only.

Tables 3.9 and 3.10 separate strength of perception concerning regulation from that concerning changing consumer behavior, respectively, to show which factors were driving each company's understanding of the material impacts of climate change.

Table 3.9. Material impact of regulation for climate active companies, 2010–2016.

Company	2010– 2012 (period 1)	2011– 2013 (period 2)	2012– 2014 (period 3)	2013– 2015 (period 4)	2014– 2016 (period 5)
Pfizer	0	0	0	0	0
Johnson & Johnson	0	0	0	0	0
Heidelberg	67	67	33	0	0
E.ON	100	67	33	0	0
Ultratech	50	50	50	33	17
Dow	50	50	50	50	50
Tata Steel	0	0	17	33	50
BASF	50	50	50	50	67
Thyssenkrupp	100	67	50	50	83

Among energy-intensive companies that moved toward a more climate active sensibility, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Table 3.10. Material impact of changing consumer behavior for climate active companies, 2010–2016.

Company	2010– 2012 (period 1)	2011– 2013 (period 2)	2012– 2014 (period 3)	2013– 2015 (period 4)	2014– 2016 (period 5)
Pfizer	0	0	0	0	0
Johnson & Johnson	0	0	0	0	0
Heidelberg	0	0	0	0	0
E.ON	0	0	0	0	0
Ultratech	0	0	0	0	0
Dow	0	0	0	0	0
Tata Steel	25	17	33	33	50
BASF	50	50	50	50	50
Thyssenkrupp	33	50	50	50	50

Among energy-intensive companies that moved toward a more climate active sensibility, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

What do these tables indicate about a pattern of emergent action at the company level? Coupled with the data presented in Table 3.1 in Part I, Tables 3.8–3.10 capture that four companies – HeidelbergCement, E.ON, Johnson & Johnson, and Pfizer – during the “change periods,” or the periods when they *most* improved their performance (periods 5, 5, 3, and 2, respectively), climate change was not perceived as a high-impact material concern; there was *no* expectation of high-impact climate regulation or changes in consumer behavior. The same was true in the periods immediately prior to the change periods. For another company, Ultratech Cement, climate change barely registered as a high-impact

material concern during the period of change (period 5) and it was even *less* concerning then (at 8%) than it had been in the period immediately prior (at 17%).⁴⁷

Coupled with Part I's findings, Tables 3.8–3.10 show three cases that demonstrate the pattern of emergent action. The pattern was especially pronounced in two cases (Heidelberg and E.ON) and more moderate in one case (Johnson & Johnson).

To consider the first of the cases where the pattern of emergent action was especially strong, Heidelberg perceived climate change as a high-impact material concern in just two years (2011 and 2012).⁴⁸ In the remaining years, neither climate-related regulation nor changing consumer behavior were perceived to entail any high financial impacts. To recall, Heidelberg became an innovator in 2011–2013 and further advanced toward a more “climate active” sensibility in 2014–2016 when it became a disruptor (see Table 3.1 in Part I). In other words, its move into the type representing the *most* ambitious climate approach and the most active sensibility (where it would remain through 2015–2017) coincided with a period (2013–2016) when the company expected *no* high-impact ramifications either from bold climate action by states or from changes in consumer practices.

E.ON represents the second case strongly demonstrating the pattern of emergent action at the company level—foreshadowing, I argue, the pattern in the private sector as a whole (as Chapter 7 explores). In 2010–2012, climate change was a serious material concern for the company; from 2013 onward, it never was.⁴⁹ To recall, E.ON became an innovator in 2013–2015 and in 2014–2016 joined Heidelberg as a disruptor. In other words, its two moves forward (i.e. its two type changes) coincided with the period (2013–2016)

⁴⁷ Considering the 2014–2016 timeframe (as no perception data was available for 2017), we see that Ultratech had only a 25% strength of perception in 2014 and then a 0% score in 2015 and 2016, seeing *no* high-impact risks/opportunities.

⁴⁸ Its perceptions were due in particular to risks and opportunities from climate-related regulation.

⁴⁹ During the 2010–2012 period, E.ON perceived high-impact regulatory risks and opportunities.

when it expected *no* high-impact effects either from bold climate action by states or from changes in consumer practices.

Finally, the inconsistency between how Johnson & Johnson perceived the climate issue and how it acted offers an illustrative example of the pattern of emergent action at the company level. But it represents a more moderate case, as the misalignment between its perception strength (low) and level of action (moderate) was relatively smaller than that between Heidelberg and E.ON's perception strength (low) and level of action (high). Johnson & Johnson adopted practices that would have seemed to indicate that climate change was becoming more relevant from a business perspective, despite that it never reported perceiving on the horizon *any* high-impact climate-related regulations or changes in consumer behavior. For example, by 2016 the company had adopted science-based emissions reduction targets, or targets aligning with the 2°C scenario outlined in the Paris Climate Agreement—an exceptional kind of climate action that by 2018 had been adopted by only 103 companies worldwide.⁵⁰

This part of the chapter has explored the pattern of emergent climate action, as described in Chapter 1, at the industry and company levels. I demonstrated that there was an inconsistency in how this industry cohort moved toward a different climate approach and sensibility and how companies individually perceived the issue's material importance. Likewise, there was a disjuncture between the behavior of the specific companies that became climate actors – or, that became part of the process that ultimately produced a certain private sector pattern of response – and their perceptions of the material relevance of the issue.

⁵⁰ Science Based Targets, 'Over 100 global corporations using science-based targets to align strategies with Paris Agreement,' April 17, 2018.

In terms of this study's overall argument about the variable or condition accounting for private sector actors' coalescence around a new approach to the climate issue, an especially key finding in this part of the chapter was that companies' outlook for bold state action on the climate issue (in the form of regulation entailing high-impact material costs or opportunities) declined over the course of the 2010s. Meanwhile, a key alternative explanation posited in Chapter 1 gained no purchase in this chapter; changing consumer behavior was a minimal concern for companies and become only marginally more relevant over time.

Conclusion

Of the 34 companies that this project examines, the type that this chapter considered are especially significant given their relevance to the climate issue; for instance, if the cement industry were a country, it would be the world's third largest emitter,⁵¹ and the pharmaceutical industry emits 13% more than the automotive industry despite being 28% smaller.⁵²

This chapter has shown that a cohort of 15 of the world's largest energy-intensive, and thus most "climate critical," companies, spanning various industries and headquarter countries, moved toward a new climate approach and sensibility over the course of the 2010–2017 timeframe—and did so specifically in the context of *declining* outlooks for bold climate action by states in the form of high-impact regulation. Over time, momentum gathered; once the cohort moved forward toward a more "climate active" sensibility it never retreated, and actors increasingly adopted certain practices suggestive of a new

⁵¹ Jocelyn Timperley, 'Q&A: Why cement emissions matter for climate change,' Carbon Brief, September 13, 2018.

⁵² Lotfi Belkir, 'Big Pharma emits more greenhouse gases than the automotive industry,' *The Conversation*, May 27, 2019.

paradigm of behavior. Even some of the most staunchly “business-as-usual” actors acknowledged by the late 2010s that there was a new dominant design on the horizon; as a Berlin-based climate and energy expert put it, reflecting on how major energy actors in Germany ‘fought the energy transition over years,’ it took these companies ‘quite some time to realize that in the end, they have also entered the game.’⁵³

⁵³ Interview 3.

CHAPTER 4—The Automotive Industry

“This is the time where it totally changes.”¹

Snapshot of the new dominant design

In 2020, Tesla, the largest electric vehicle manufacturer, overtook Toyota as the world’s most valuable automaker with a market capitalization of \$208 billion—never having had a profitable year since going public in 2010.²

Introduction

As Chapter 1 described, my argument is that during the 2010s the private sector embraced a new approach and sensibility vis-à-vis climate change, and that this development was an emergent outcome; it would not have been anticipated given how companies individually perceived the climate issue. Theorizing how dispersed and uncoordinated global actors can come into an effective alignment on an issue, I proposed that a cohort of private sector actors effectively reprioritized climate change within their interest sets on the basis of their perception that there was a new dominant design for the future, or a new paradigm for how companies had to behave, relative to the climate issue, to secure their interests in the long-term. The essence of my argument is that private sector actors came into an emergent concert, like “geese” coming into a “V-formation,” due to diminishing confidence in states’ willingness to play their expected role in responding to a transnational issue poised to shape future global trends.

¹ Volkswagen executive, Interview by author, November 23, 2018, Interview 8, conducted by phone.

² See Lora Kolodny, ‘Tesla stock is up more than 4,000% since its debut 10 years ago,’ CNBC, June 29, 2020. Information on market capitalizations from Kirsten Korosec, ‘Tesla blows past Toyota to become most valuable automaker in the world,’ Tech Crunch, July 1, 2020. Note that Tesla’s market capitalization reached \$820 billion by the beginning of 2021; here, I refer to its market capitalization at the time that it surpassed Toyota to become the most valuable automaker.

As each empirical chapter considers my arguments about how and why the private sector changed its behavior in the context of a certain industry or group of industries, this chapter focuses on the automotive industry, and specifically on seven of the largest automakers: BMW, Chrysler, Daimler, Ford, General Motors, Toyota, and Volkswagen.³ With annual revenues ranging from \$117B to \$281B⁴ and operations in 140 to 200 countries,⁵ these companies belong to the class of corporate “nations” that, as Chapter 1 considered, have the economic resources and geographic reach to rival most states.

In this chapter, I explore the extent to which these seven automakers altered their approaches to the climate issue area and demonstrate that during this project’s timeframe, 2010–2017, they were not an integral part of the process producing the outcome of interest in this study: the new private sector pattern of climate action. Like many of the companies that I consider, automakers did not perceive climate change to be a high-impact material concern; in fact, in terms of both regulation and changing consumer behavior, they considered it to be of lessening importance over time. But unlike many other companies that changed their approaches to the issue *despite* the apparent lack of material incentives to do so, automakers failed to recognize the new dominant design on the horizon. They failed to appreciate how other companies were pulling into a “V-formation,” or were becoming part of the new pattern of response in the context of states’ abdication of leadership and action on the climate issue area. As this chapter explores, automakers were late in realizing

³ While Chrysler became “Fiat Chrysler” in 2014 following a merger with Fiat, for the sake of consistency I will refer to the company as Chrysler throughout the chapter.

⁴ 2019 figures. BMW represents the low end and Toyota the high end. Data gathered from I. Wagner, ‘Revenue of leading automakers worldwide in 2019,’ Statista, July 15, 2020.

⁵ General Motors is at the low end, with operations in 140 countries, and Ford is at the high end, with operations in 200 countries. Information gathered from The Economic Intelligence Unit, ‘Key player – Ford,’ November 22, 2016; Securities and Exchange Commission, ‘Stephen J. Girsky Named GM Vice Chairman, Corporate Strategy and Business Development,’ February 22, 2020; Market.us, ‘Volkswagen Group Statistics and Facts,’ September 14, 2020; Fiat Chrysler Automobiles, ‘Group Overview,’ December 31, 2019; BMW Group, ‘The BMW Group – A Global Company,’ accessed March 12, 2021; Toyota Europe, ‘Where Do We Come From,’ accessed March 12, 2021; and Daimler, ‘Daimler at a Glance,’ accessed March 12, 2021.

that their old assumptions about the issue would no longer work going forward; as of this writing, they are trying to catch up to a new dominant design that largely took shape without them.

The remainder of this chapter is divided into three parts. Taking a reverse chronological approach, Part I presents a snapshot of what these “late to the game” automakers came to appreciate, in the late 2010s and early 2020s, was the new dominant design. Part II then examines how companies behaved over the span of the 2010–2017 timeframe, showing that the cohort moved toward a different climate sensibility and approach only to a limited extent. I demonstrate that four automakers belonged to higher types in 2015–2017 than in 2010–2012—but that only two of the four were undertaking ambitious action (i.e. landing in the innovator camp; the others were evolutionaries). I also show that one of three specific climate practices broadened and one practice deepened.

Finally, Part III evaluates whether at the industry- and/or company-level, there is evidence of the pattern of emergent action, or of an inconsistency between perceptions about the climate issue and behaviors. Although in this chapter there is not strong evidence overall of companies becoming integral to the new “pattern of response” in the private sector, some automakers *did* alter their approaches to the climate issue in significant ways—and, as Part III demonstrates, they did so in the context of diminishing concerns about its material relevance, and, of special relevance to my argument, specifically amid a declining outlook for robust state action.

Part I: Sketch of the new dominant design

The infamous “Dieselgate” scandal began unfolding in September 2015 when Volkswagen admitted to manipulating the software in 11 million cars worldwide so that they could pass

laboratory emissions tests while emitting 40 times more nitrous oxide on the road.⁶ In the wake of the scandal, consumers hardly imposed a harsh penalty; in fact, Volkswagen posted record sales in 2016.⁷ Such a consumer response would have been unsurprising to experts like J., previously at Volkswagen, who in 2018 assessed that in Germany consumer demand for green products was a non-issue: “There is none. Consumers don’t care.”⁸ A Daimler executive shared a similar view that year: “The current outlook is that we need to be at CO₂ neutral, basically, by 2050. Of course, we can have the portfolio totally turned around by that time. The big question is, are there people who will buy that?” Daimler customers, whether in Germany, the United States, or China, ‘want to buy more SUVs,’ she explained. “That is what we see in our sales.”⁹

Yet, in 2017 Volkswagen forecast that by 2025 ‘one in every four new vehicles manufactured by our Group around the world will run on all-electric powertrains’ and announced plans to electrify the ‘entire model range’ (about 300 models) by 2030 at the latest—an endeavor that would entail over €20 billion in direct investments.¹⁰ That year, Volkswagen partnered with Daimler, BMW, and Ford to launch a joint venture (“IONITY”) aimed at ‘the construction and operation of high-performance charging stations for battery electric vehicles in Europe. The plan is to build some 400 fast-charging stations by 2020 in order to support electric mobility on long-haul routes and thereby establish the

⁶ Russell Hotten, ‘Volkswagen: The Scandal Explained,’ *BBC News*, December 10, 2015.

⁷ Andreas Cremer, ‘VW manages record 2016 sales despite Dieselgate crisis,’ Reuters, January 10, 2017. Part of the late 2015 decline in sales that Volkswagen registered in Germany, the UK, and the US was interpreted by some as a buyer backlash; however, Volkswagen also had stopped selling models influenced by the Dieselgate software, which accounted for part of the decline in sales. See Andy Sharman, ‘Volkswagen Hit by Consumer Backlash after Emissions Scandal,’ *Financial Times*, December 4, 2015.

⁸ Expert on climate and energy issues in the automotive industry, Interview by author, November 6, 2018, Interview 9, conducted by phone.

⁹ Company executive, Interview by author, October 15, 2018, Interview 10, Stuttgart, Germany.

¹⁰ Volkswagen, 2018 CDP disclosure (covering 2017). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

market.’¹¹ In 2018, when asked about the EV market in Germany, a Volkswagen executive shared his belief that ‘we are right now close to a tipping point.... This, I think, is now the time where it totally changes.’ He explained,

If you look at the global numbers by the end of 2016, I think in the global market, over history, two million e-vehicles were sold. By the end of 2017, it was three million. And *we’re going to see a massive uptake in the near future*. So, according to our plans, we expect to have roughly 25% of sales being [EVs] in 2025, with *a steep, steep increase in e-cars* on the road.¹²

Then, in 2019, in what Tesla CEO Elon Musk characterized as a ‘[v]ery meaningful action by the company that invented the internal combustion engine,’¹³ Daimler’s head of development announced that the company had no plans for developing new internal combustion engines and would focus on electrification, electric drives, and battery development.¹⁴

In the late 2010s, some of the world’s largest automakers were behaving as if a much different future was just on the horizon, despite seeming evidence to the contrary. For instance, consistent with the pattern of consumer behavior that J. and the Daimler executive described, in 2019, the year of Daimler’s announcement, not only did fuel-inefficient sport utility vehicles (SUVs) and off-road vehicles achieve a record-high market share in Germany,¹⁵ its largest single-country market in Europe,¹⁶ but there were only 100,000 electric vehicles (EVs) registered in the country, falling badly short of Berlin’s

¹¹ This description of IONITY is from BMW Group, *2017 Annual Report*, 149.

¹² Interview 8.

¹³ Elon Musk, cited in Bridie Schmidt, ‘Daimler calls time on fossil fuel cars, draws praise from Musk,’ *The Driven*, September 20, 2019.

¹⁴ Gregor Hebermehl, ‘Volle Konzentration auf Elektroantrieb,’ *Auto Motor Sport*, September 17, 2019. Original article translated by author using Google Translate.

¹⁵ Anna Sauerbrey, ‘Does Germany’s Vaunted Car Industry Have Long to Live?’ *New York Times*, December 30, 2019. Note that in 2019 every third car newly registered in Germany was an SUV or off-road vehicle.

¹⁶ While unit sales of Mercedes-Benz cars were highest in China (which accounted for 29% of the total; Germany, meanwhile, accounted for 14%), Europe still accounted for 69% of Daimler’s revenue in 2019. See Daimler, ‘Major markets,’ accessed March 13, 2021; and I. Wagner, ‘Daimler AG’s consolidated revenue in 2018 and 2019, by region,’ Statista, March 4, 2021.

target (set in 2009) to have one million EVs on the road by 2020.¹⁷ Meanwhile, in China, Volkswagen's largest market by one million vehicles, although EVs *had* gained ground since 2016, growth still was being driven primarily by demand for SUVs, not EVs.¹⁸

It was not just German automakers behaving as though suddenly there was a new dominant design. In 2015, for example, while Ford announced that 'through 2020, we plan to invest \$4.5 billion in electrified vehicle solutions,' it also emphasized that it would continue 'to pursue opportunities to further improve vehicles with conventional gasoline and diesel power.'¹⁹ By 2017, however, Ford, which the year before had committed to electrifying 40% of its global nameplates by 2020,²⁰ not only had joined the IONITY venture with the Big Three German automakers but also had created a dedicated EV team to '*dramatically accelerate* our electric vehicle plans,'²¹ and had announced the expansion of its 'electrified portfolio to 40 electrified vehicles globally, including 16 full battery electric vehicles.' Ford also had 'increased planned investments in electrification to over \$11 billion by 2022' to '*substantially increase* the number of battery electric vehicles we offer around the world.'²² In 2017, Ford's President and CEO remarked in his annual letter to shareholders that '*we are clearly entering a period of radical disruption.*'²³ This was a

¹⁷ Andreas Franke, 'A million German EV charge points needed by 2030: Merkel,' S&P Global, November 4, 2019.

¹⁸ As Volkswagen reported in 2018, noting that China 'was again the main growth driver' in the Asia-Pacific region, 'Above all, there was continued strong demand for attractively priced entry-level models in the SUV segment.' Volkswagen, 2017 *Annual Report*, 103.

¹⁹ Ford, 2016 CDP disclosure (covering 2015). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

²⁰ *Ibid.*

²¹ Ford Motor Company, 2017 *Annual Report*, 29. Emphasis added.

²² Of particular note concerning Ford's joining of IONITY is that the US remained its largest single-country market by 20 percentage points: in 2016, the United States accounted for 39% of global sales, while China, its second largest market, accounted for 19%. 2016 sales in the United States were 2.59 million vehicles out of a total of 6.65 million. Data from Ford Motor Company, 2016 *Annual Report*, 4. Emphasis added.

²³ Ford Motor Company, 2017 *Annual Report*. Excerpt can be found in CEO's letter to shareholders. Emphasis added.

significant departure from just four years prior, when Ford expressed ambivalence about the future, stating that rather than going all-in on low-emission vehicles, ‘[w]e prefer to provide our customers with the power of choice, with a full technology range of gasoline, diesel, hybrid, plug-in hybrid, and electric propulsion systems.’²⁴

By 2017, even General Motors – which, as Part II shows, was one of the automakers most staunchly committed to “business as usual” during the decade – conceded that ‘the automotive industry will experience *significant and continued change in the coming years*’ and admitted that its own future success would require developing new ‘products and services that are *outside of our historically core business*, such as autonomous and electric vehicles.’²⁵

These developments point to the acceptance of a new dominant design and shared sensibility about the future—one that caught automakers on the back foot, given how the decade opened and seemed poised to unfold. The beginning of the 2010s was marked by considerable market uncertainty, particularly as the ramifications of the Great Recession continued to unfold. Especially unclear was how, in certain key markets, politicians planned to bridge the gap between the ambitious EV targets they had set and paltry consumer interest in EVs. For example, according to a study by Lieven et al., in 2009, when the German government announced a target of one million EVs on the road by 2020, there were only 162 EVs among the 3.8 million new cars registered in Germany that year.²⁶ Likewise, a 2012 McKinsey report found that in 2011 there were just 6,000 EVs and plug-in hybrid-electric vehicles produced in China, ‘taking the industry just a fraction of the way

²⁴ This was a continuation of a theme of uncertainty since 2010, when Ford perceived that it was ‘*too early to express any firm opinions* about the future cost effectiveness or optimality of different future fuel and vehicle powertrain technology combinations.’ Ford Motor Company, *Sustainability 2011/12*.

²⁵ General Motors, 2017 *Annual Report*, 10. Emphasis added.

²⁶ Theo Lieven, Silke Muehlmeier, Sven Henkel, and Johan Waller, ‘Who will buy electric cars? An empirical study in Germany,’ *Transportation Research* Vol. 16, Issue 3 (May 2011): 236.

to the half-million units of production capacity the government had originally expected for 2015.’²⁷

Perhaps nothing so clearly captures how the industry was taken by surprise, in terms of the new dominant design for the future, as the changing fortunes of Tesla, whose stock has risen by over 4,900% since its 2010 initial public offering.²⁸ In 2009, Tesla was ‘on its deathbed’ when a \$50 million investment by Daimler rescued the EV upstart from the brink of collapse;²⁹ at the time, it would have seemed near-inconceivable that in eleven years Tesla would surpass Toyota as the world’s most valuable automaker with a market capitalization of \$208 billion.³⁰ It would have been equally difficult to imagine that Tesla would achieve this distinction never having had a profitable year since going public,³¹ and having annual sales of 367,500 units compared to Toyota’s 10.74 million³²—a powerful indication of the market betting on its future profitability and thus on the EV-centered future on which its business model hinges.

Although with the benefit of hindsight it is easy to characterize as inevitable automakers’ shift toward a more serious emphasis on EVs, the game changed more suddenly and dramatically than industry incumbents had reckoned it would.³³ To draw on an analogy from Chapter 1, they either were latecomers to the low-carbon and climate “session”

²⁷ Axel Krieger, Phillip Radtke, and Larry Wang, ‘Recharging China’s electric-vehicle aspirations,’ McKinsey & Company, July 2012.

²⁸ Data from Google Finance, NASDAQ: TSLA, February 8, 2021.

²⁹ Thompson, ‘The Christmas miracle that saved Tesla.’

³⁰ Korosec, ‘Tesla blows past Toyota to become most valuable automaker in the world.’

³¹ Kolodny, ‘Tesla stock is up more than 4,000% since its debut 10 years ago.’

³² Japan Times, ‘Toyota second in 2019 car sales, overtaking Nissan-Renault,’ January 30, 2020.

³³ I borrow the term “incumbents” from Lovins, who distinguishes “incumbents” from “insurgents” (i.e. the difference between GM and Tesla). Sören Amelang, ‘Disruption caused by energy transition is unstoppable – Amory Lovins,’ Clean Energy Wire, October 17, 2018.

of the global “summit,” and thus missed out on much of the conversation during the 2010s, or they consistently were present but failed to appreciate fully how the discussion was evolving. Having assumed that the status quo was more durable than it turned out to be, during much of the decade these incumbents failed to adjust adequately their interest sets to reprioritize climate change and the low-carbon future, leading one German auto industry expert to project in 2019 that, facing the ‘biggest crisis since the invention of the automobile,’ no one in the industry ‘will survive in the form they exist today.’³⁴

Part II: Climate action, 2010–2017

This part of the chapter explores how automakers behaved during six three-year periods spanning 2010–2017 to assess change over time in their approaches to the climate issue area. I begin at a macro-level, evaluating the distribution of company types during each of the periods, and demonstrate that four of the seven companies altered their approaches significantly enough to belong to a higher type in 2015–2017 than in 2010–2012. Then, I shift to the micro-level, examining the degree to which companies were taking up certain practices and becoming more invested in them—key indicators, as Chapter 2 discussed, of whether a new dominant design or paradigm of behavior was taking shape.

Identifying private sector climate actors

To investigate how automakers behaved, I evaluated and scored companies’ annual performance on three metrics of climate action: product, resource alignment, and investment. Then, for each of six three-year periods spanning the 2010–2017 timeframe, I classified

³⁴ Joe Miller and Peter Campbell, ‘German car industry faces “day of reckoning,”’ *Financial Times*, December 1, 2019.

each company by type: BAU, evolutionary, innovator, or disruptor.³⁵ Table 4.1 shows the results of these classifications. The higher a company's score (listed after its name) the better its performance across the metrics. In period 6, I indicate parenthetically the percent change in score compared to period 1; companies' names are bolded if their types are higher than in the first period. The last row shows the total points for all seven automakers for each period, with the percent change since the prior period indicated in parentheses—data that sheds light on when and to what extent underlying momentum was gathering over the eight-year time frame.

Table 4.1. Company types, 2010–2017.

Type (point range)	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)	2015–2017 (period 6)
Disruptor (16–20)						
Innovator (13–15)					VW, 13	VW , 15 (+88) BMW , 13 (+30)
Evolutionary (9–12)	BMW, 10 Daimler, 10	BMW, 11 Daimler, 10 VW, 9	BMW, 11 Daimler, 11 VW, 9	BMW, 12 VW, 12 Daimler, 11	BMW, 12 Daimler, 12 Toyota, 9	Daimler, 12 (+20) Ford , 10 (+43) Toyota , 9 (+13)
BAU (0–8)	Toyota, 8 VW, 8 Ford, 7 Chrysler, 6 GM, 6	Ford, 7 Toyota, 7 GM, 6 Chrysler, 5	GM, 7 Toyota, 7 Chrysler, 6 Ford, 6	GM, 8 Toyota, 8 Ford, 6 Chrysler, 5	Ford, 8 GM, 8 Chrysler, 7	Chrysler, 7 (+17) GM, 7 (+17)
Total points (% change)	55 (–)	55 (–)	57 (4%)	62 (9%)	69 (11%)	73 (6%) (cumulative: +33%)

Seven automakers, classified according to three-year performance on producing zero- and low-emission vehicles, using an internal carbon price, and investing in low-carbon research and development.

³⁵ See Chapter 2 for details about my approach for scoring each company's annual performance on each of the three metrics, which were differently weighted according to industry but whose combined point value was uniformly 20. Note that I used a rolling average approach to capture the thrust of climate action while smoothing the data.

Table 4.1 conveys which automakers altered their climate approaches and sensibilities to a significant extent. It shows that by period 6, four automakers (57%) belonged to higher types than in the first period, having made sufficiently significant changes in their approach and performance. With only two of those companies becoming innovators and none becoming disruptors, however, among the type-changers there was a limited level of ambition.

While the company cohort made limited progress in terms of type changes, Table 4.1 captures underlying change and forward momentum over time. The last row conveys that although there either was no or almost no change in the cohort's cumulative score in the first two inter-period changes, between periods 3 and 6 – representing just a three-year span – there was a 28% increase. Of particular potential significance is the 9% change between periods 3 and 4, which represents progress achieved prior to either of two events that have been interpreted as watersheds for how global automakers have approached climate change and the low-carbon future: the “Dieselgate” emissions scandal, news of which broke in September 2015, and the Paris Climate Conference, which took place in December 2015.³⁶ Notably, however, type changes only occurred in periods 5 and 6, or from 2014–2016 onward. Considering momentum at the company level, Table 4.1 captures how once companies belonged to a certain type, they never regressed to a lower type. Consistent with the first proposed feature of a new paradigm of behavior (as Chapter 2 described), once momentum was achieved, it was sustained.

While Chapter 7 evaluates factors that may help to explain why particular companies became climate actors and part of the “V-formation” in the private sector, it is helpful

³⁶ As Amelang and Wehrmann note, Dieselgate ‘started out as a scandal exclusively affecting Germany’s largest car company[,] Volkswagen. But since it broke in September 2015, it has morphed into a global issue involving many industry giants.’ Sören Amelang and Benjamin Wehrmann, “Dieselgate” – a timeline of the car emissions fraud scandal in Germany, Clean Energy Wire, May 25, 2020.

to highlight here that of the four automakers that transitioned to higher types over time, having made decisive changes in their approaches, two were German companies, one was American, and one was Japanese. By period 6, the only innovators, or companies adopting an ambitious approach, were German. American automakers were laggards; by period 6, Chrysler and GM were the last BAUs standing.

Identifying new climate practices

Having shown in the previous section how companies' behavior changed overall, this section examines those changes in detail, investigating the performance underpinning companies' scores and types. In particular, I analyze changes over time in how many companies participated, and to what extent, in three kinds of climate action: producing zero and low-emission vehicles (the indicator behavior for the product metric); applying an internal carbon price (the behavior for the alignment metric); and investing in developing zero and low-emission vehicle technologies (the behavior for the investment metric).

To investigate, first, how widespread each type of action was, I examined how many automakers out of seven received *any* points for each of the metrics in each year, and then, as in the previous section, calculated three-year averages for the six periods spanning 2010–2017. Table 4.2 displays the results, showing the “breadth” of action across the three metrics.³⁷ Each period's participation rate is shown as a percentage of companies out of seven.

³⁷ As the research design described, receiving points on a metric signified that a company had made at least some progress on the relevant climate behavior or had not regressed appreciably; companies received a score of 0 if they regressed significantly on the behavior.

Table 4.2. Breadth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	100	14	86
2011–2013 (2)	100	14	86
2012–2014 (3)	100	29	86
2013–2015 (4)	100	43	86
2014–2016 (5)	100	57	86
2015–2017 (6)	100	57	86
Percent change between periods 1 and 6	0	+307	0

The percentage of automakers receiving a score for producing zero- and low-emission vehicles (product), using an internal carbon price (alignment), and investing in zero- or low-emission technologies (investment).

Table 4.2 conveys that automakers were uniformly and consistently confident in a future where low- and zero-emission vehicles would be a key part of their portfolios (the investment metric) and at least to some extent already were beginning to offer them (the product metric). In short, even in the early 2010s, the low-carbon future had entered the automakers' field of vision. In period 1, for example, Ford reported that it was 'pursuing an aggressive electrified vehicle strategy,'³⁸ Volkswagen was positioning itself to 'usher in the age of pure e-mobility...taking the electric car out of the niche and bringing it to the mass market,'³⁹ and BMW was launching a separate EV brand.⁴⁰ Meanwhile, the 307%

³⁸ Ford Motor Company, 2010 *Annual Report*, 20.

³⁹ Volkswagen, 2010 *Annual Report*, 200.

⁴⁰ BMW Group, 2011 *Annual Report*, 34.

increase in participation in alignment captures how automakers became increasingly confident that carbon would carry a cost in the future.

Automakers consistently participated in two kinds of climate action (investment and product) and broadened their participation in another (alignment)—but how meaningful was their participation? Table 4.3 considers how deeply invested companies were in the three kinds of action. The table conveys the percentage of companies receiving over half the available points on each metric, taking a first cut at identifying those practices in which companies were seriously invested.

Table 4.3. Depth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	14	100	54
2011–2013 (2)	19	100	39
2012–2014 (3)	24	78	33
2013–2015 (4)	29	53	36
2014–2016 (5)	43	28	45
2015–2017 (6)	57	28	48
Percent change between periods 1 and 6	+307	-72	-11

The percentage of automakers receiving over half the available points on performance on producing zero- and low-emission vehicles (product), using an internal carbon price (alignment), and investing in zero- or low-emission technology (investment).

Whereas Table 4.2 showed all seven companies, by consistently including zero- or low-emission vehicles in their portfolios, perceiving from 2010 onward that the low-carbon future was within their field of vision, Table 4.3 shows the shadow of the future

shortening over time, captured by product's 307% gain. In concrete terms, this increase captures how companies placed increasing emphasis on EVs in their portfolios. The data illustrates this finding. For example, in 2015 Volkswagen's low-carbon portfolio gained momentum with a plan to launch more than 20 new plug-in hybrid-electric vehicles (PHEVs) and battery-powered electric vehicles (BEVs) by 2020.⁴¹ By 2016, the company announced plans to launch 'more than 30 different types' of BEVs 'and to sell between two and three million BEVs by 2025 – equivalent to around 20–25% of the Group's expected total unit sales.'⁴² Then, in 2017 with its new "Roadmap E" – 'the most far-reaching electrification initiative our industry has ever seen' – Volkswagen became 'the first major mobility company to commit to a specific deadline for the full electrification of its fleet' (as discussed, this encompassed about 300 models, 'across all brands and markets').⁴³ As Part I considered, by 2017 Ford also emphasized EVs to a much greater extent than it had even as recently as 2015.⁴⁴

Importantly, in my methodology product was the most heavily weighted metric for the automotive industry. Table 4.3 thus captures the increase in the number of companies that were not just making relatively conservative changes to their portfolios (for instance, investing in hybrids), but were moving forward on ambitious technologies (for instance,

⁴¹ For example, in 2015 Volkswagen announced that it would launch 'more than 20 further models' of EVs and PHEVs by 2020, and that by 'the end of this decade, a new battery technology that will allow us to offer vehicles with a range of 500 kilometers will be available.' Volkswagen, 2015 *Annual Report*.

⁴² Volkswagen, 2016 *Annual Report*, 52.

⁴³ Volkswagen, 2018 CDP disclosure (covering 2017). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

⁴⁴ To recall, in 2015 Ford announced that 'through 2020, we plan to invest \$4.5 billion in electrified vehicle solutions,' but underscored that it continued 'to pursue opportunities to further improve vehicles with conventional gasoline and diesel power.' Ford, 2016 CDP disclosure (covering 2015). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu. By 2017, Ford – which the year prior committed to electrifying 40% of its global nameplates by 2020 – announced that it had 'increased planned investments in electrification to over \$11 billion by 2022' in order 'to substantially increase the number of battery electric vehicles we offer around the world.' Ford Motor Company, 2017 *Annual Report*, 29.

BEVs or PHEVs). While automakers started with “low-hanging fruit” (e.g. improving the fuel efficiency of conventional vehicles or investing in hybrid technology), during the 2015–2017 period companies’ portfolio strategies were beginning to reflect fundamental change.

Table 4.3 shows a major drop (72%) in the depth of alignment activities, which was primarily a function of the fact that more companies became participants in the behavior over time (see Table 4.2) but were not as invested as BMW, which for several periods was the only participant and took an ambitious approach to internal carbon pricing (captured by the 100 in periods 1 and 2 in Table 4.3).⁴⁵ Interestingly, the table shows that automakers’ participation in alignment was least “in-depth” in the two periods encompassing the Paris Conference (periods 5 and 6). Given that internal carbon pricing largely concerns what companies expect from regulators,⁴⁶ it is notable that the Paris Conference did not spur companies to adopt especially ambitious outlooks vis-à-vis the future cost of carbon. Importantly, it was during the same two periods (5 and 6) that companies, for the first time, changed their approaches significantly enough to transition to higher types (see Table 4.1). Their more in-depth participation in “product” compensated for their much less intense participation in “alignment.”

This part of the chapter examined how companies behaved during each of six three-year periods spanning 2010–2017 in order to assess change over time in their

⁴⁵ Some of the newer participants in internal carbon pricing used existing prices of the EU Emissions Trading System or other regional pricing schemes as opposed to setting their own, more ambitious prices. BMW described its approach to internal carbon pricing this way: ‘The integration of environmental aspects in the early stages of major investment decisions increases the profitability of these projects. Considering the costs of carbon emissions in the planning phase of investment decisions increases the incentive to implement emissions reduction activities. Costs of carbon emissions are included in profitability calculations and are reflected in the return on investment.’ BMW, 2011 CDP disclosure (covering 2010). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

⁴⁶ CDP, ‘More than eight-fold leap over four years in global companies pricing carbon into business plans.’

approaches. I identified four of seven companies (57%) that made decided progress, changing types over time. Once the company-cohort moved forward overall, it never regressed, providing support for one of the features of a new paradigm. Yet, ambitious action was limited; by period six, only two companies were innovators (meanwhile, three were evolutionaries and two were BAUs).

In this industry case study, I found only limited evidence of companies coalescing around a set of new practices (feature 2 of a new paradigm) or becoming more deeply invested in a set of new practices (feature 3). From the outset, companies widely participated in two kinds of action (product and investment); this does not demonstrate coalescence or convergence over time, however, which is the phenomenon of interest. One kind of action became more widespread over time (participation in alignment increased significantly). Meanwhile, companies became more committed over time to one kind of action (the product metric), while maintaining moderately deep commitments to a second type (the investment metric).

Part III: Patterns of emergent action

As Part II showed, the seven automakers were not among the private sector actors that, during this study's timeframe of interest, became integral players in the process that ultimately produced the new pattern of action vis-à-vis the climate issue. In general, these automakers were late to recognize or fully appreciate the new dominant design as it was developing around them. Prior to the second half of the 2010s, they failed to appreciate that old assumptions about the climate issue area no longer would work moving forward; indeed, it was only in the late 2010s and early 2020s (in "post-script" developments to this project, as I discuss later in the chapter) that the most staunchly status quo-oriented automakers began to reckon more seriously with the new dominant design. Yet, Part II *also*

showed that, overall, the sample cohort moved toward a different climate sensibility during the 2010–2017 timeframe; between 2010–2012 and 2015–2017, there was a 38% increase in automakers’ cumulative performance on the three metrics of climate action. Companies became more serious about their portfolios of low- and zero-emissions vehicles, particularly in the 2015–2017 period when there was a growing realization that a new dominant design had arrived much sooner than had been anticipated.

This part of the chapter explores how the seven automakers perceived the material impacts of climate change over time in order to assess whether there is evidence of the emergent pattern of action as described in Chapter 1. As I will show, companies saw climate change as significantly less of a material concern over time – their outlook both for high-impact regulation and changes in consumer behavior declined appreciably – and it was in *this* context that they ultimately came to accept a new dominant design for the future and to strive to “catch up.”

Emergent action at the industry level

This section begins at the macro-level, considering how the cohort of seven automakers perceived the material importance, or financial relevance, of climate change from 2010 through 2016.⁴⁷ After evaluating whether automakers perceived risks and/or opportunities from climate-related regulation and/or changing consumer behavior – and if so with what degree of certainty, on what time horizon, and with what anticipated level of financial impact – I assessed the annual “strength of perception” and then calculated three-year

⁴⁷ Note that 2017 is excluded due to substantive changes in CDP surveys, the data source for this part of the chapter, which compromised the comparability of the 2017 data with that from prior years. For instance, in contrast to all prior years, in 2017 companies were given the opportunity to report about “relevant” risks and, separately, about risks that stood to have a financial and/or strategic impact. Similarly, in 2017 CDP significantly altered the categories of risks and opportunities. For instance, when respondents were asked about “reputation” they were encouraged to think not only about *consumers* but also about *investors*. As a result, had the 2017 data on reputation been included it would have appeared that reputation as a concern increased by 15 points compared to 2016.

averages. Table 4.4 presents the data on companies' perceptions of climate change as a high-impact material concern.⁴⁸

Table 4.4. Material impact of climate change, 2010–2016.

Years (period number)	Material impact
2010–2012 (1)	35
2011–2013 (2)	35
2012–2014 (3)	31
2013–2015 (4)	24
2014–2016 (5)	22
Percent change between periods 1 and 5	-37

For automakers, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern.

Tables 4.5 and 4.6 separate strength of perception concerning regulation from that concerning changing consumer behavior, respectively, providing a granular picture of the concerns that were driving changes in how automakers saw the climate issue.

⁴⁸ Note that a company that perceived climate change to be *very* relevant overall (presenting high-impact risks and opportunities tied to regulation and changing consumer behavior) would score 100 in the “material impact” column in the tables, while a company that perceived it to be *not* very relevant (presenting *no* major material risks or opportunities in either of the categories) would score 0.⁴⁸

Table 4.5. Material impact of regulation, 2010–2016.

Years (period number)	Material impact, regulation
2010–2012 (1)	41
2011–2013 (2)	41
2012–2014 (3)	36
2013–2015 (4)	32
2014–2016 (5)	30
Percent change between periods 1 and 5	-27

For automakers, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Table 4.6. Material impact of changing consumer behavior, 2010–2016.

Years (period number)	Material impact, consumers
2010–2012 (1)	29
2011–2013 (2)	29
2012–2014 (3)	25
2013–2015 (4)	16
2014–2016 (5)	14
Percent change between periods 1 and 5	-52

For automakers, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

Table 4.4 shows that among this group of automakers there was a declining perception that climate change was a high-impact material concern. Tables 4.5 and 4.6 capture how companies' outlook for regulatory action diminished considerably (27%), while perceptions that climate-related changing consumer behavior posed serious material risks

or opportunities declined nearly twice as much (52%). To recall from Chapter 1, one of the alternative explanations for the private sector pattern of climate action that developed during the 2010s is that companies felt increasing pressure from consumers to alter their behavior. As Table 4.6 underscores, this explanation is not supported in the data; during the 2010–2017 timeframe consumer behavior became significantly *less* of a concern for automakers as they assessed the climate issue area.

Considered alongside the findings in Part II, Tables 4.4–4.6 point to the pattern of emergent action. First, Table 4.4 shows that perceptions of climate change as a pressing material concern were weakest, at 22%, during the period, 2014–2016, when Volkswagen became the first automaker to alter its approach decisively enough to change types, breaking into the innovator camp. While we lack perception data for the following period, 2015–2017 was the period when – in the context of outlooks for high-impact regulation having declined by 27% since period 1 and perceived prospects for serious changes in consumer behavior having dropped by 52% since period 1 – the three other type changes occurred; BMW became an innovator and Ford and Toyota changed from BAUs to evolutionaries.

Second, examining the breadth and depth of specific climate-related practices over time, Part II found that two key changes were that the breadth of participation in the *alignment* metric and the depth of participation in the *product* metric each increased by 307%. Considered in light of data in Tables 4.4–4.6, we can appreciate that companies were participating *least* in alignment (at just 14%) during the periods (1 and 2) in which they *most* viewed climate change (in terms of both regulation *and* changing consumer behavior) as having significant financial impacts (although at 35%, it was not very high). Over time, as climate change became *less* materially relevant to companies, *more* companies participated in the metric. Likewise, companies were *least* invested in the product metric (i.e. the depth of their participation was weakest, at 14%) during the periods (1 and 2) that the

perception that climate change was a high-impact material concern was highest (again, at 35% it still was not very high). Over time, as climate change became *less* of a material concern, the quality of participation climbed. This counterintuitive inconsistency – where *less* concern about the climate issue was coupled with instances of broader and deeper action – points to the disjuncture that is the signature of the pattern of emergent action.

Emergent action at the company level

Shifting to the company level, how materially relevant was climate change specifically for those four companies that transitioned to a higher type (as shown in Table 4.1 in Part II)? Table 4.7 shows the strength of perception of each of the four companies in each of the three-year periods. As in the previous section, Tables 4.8 and 4.9 separate strength of perception concerning regulation from that concerning changing consumer behavior, respectively, in order to provide a granular picture of which concerns were driving each company’s understanding of the material impacts of climate change.

Table 4.7. Material impact of climate change for climate active companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
BMW	0	0	0	0	0
Ford	0	0	0	0	8
Toyota	58	50	50	50	50
Volkswagen	92	75	58	50	58

Among automakers that moved toward a more climate active sensibility, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern.

Table 4.8. Material impact of regulation for climate active companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
BMW	0	0	0	0	0
Ford	0	0	0	0	17
Toyota	100	100	100	100	100
Volkswagen	83	67	50	50	50

Among automakers that moved toward a more climate active sensibility, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Table 4.9. Material impact of changing consumer behavior for climate active companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
BMW	0	0	0	0	0
Ford	0	0	0	0	0
Toyota	17	0	0	0	0
Volkswagen	100	83	67	50	67

Among automakers that moved toward a more climate active sensibility, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

What do Tables 4.7–4.9 indicate about a pattern of emergent action at the company level? Considered alongside the data presented in Table 4.1 in Part II (concerning the type changes over time), they show that there were three cases where the pattern was visible: BMW, Volkswagen, and Ford.

Beginning with the case where the pattern of emergent action was clearest, BMW never perceived climate change to be a high-impact concern, whether in terms of regulation or changing consumer behavior—and it was one of just two companies to become an innovator. Thus, it offers a strong example at the company level of a disjuncture between perception and action. Volkswagen offers another clear example of the pattern. Over time, Volkswagen’s perception of climate change as a high-impact material concern declined by

37%; meanwhile, it changed from being a BAU in 2010–2012 to an innovator in 2015–2017.

Ford represents a more moderate example of the pattern of emergent action. On the one hand, it is significant that through period 5 Ford never perceived *any* high-impact material risks or opportunities related to climate change, and its move toward a different approach to the issue area was accompanied only by a slight increase in how it viewed the likelihood of serious impacts. But on the other, while Ford *did* move forward and transition to a higher type, it still landed only in the evolutionary camp. Compared to, for example, BMW, where there was a significant inconsistency between its perception of the climate issue and its action, there was a relatively smaller misalignment between how Ford perceived the issue and how it acted.

This part of the chapter has examined the pattern of emergent climate action at the industry and company levels and thereby helped to draw out a crucial implication of the findings from Parts I and II. Namely, it was in the context of diminishing outlooks for bold state climate action, and amid a precipitous decline in prospects for serious climate-related changes in consumer behavior, that automakers came to accept that a new dominant design was on their doorstep and to perceive that it was incumbent on them to catch up, having failed to appreciate fully changes in their environment during the 2010s.

Conclusion

Following President Donald Trump's failed reelection bid in November 2020, General Motors (GM) announced that it no longer would support his administration's legal challenge to California's right to mandate zero-emission vehicles. Said CEO Mary Barra, 'We believe the ambitious electrification goals of the President-elect, California, and General Motors

are aligned, to address climate change by drastically reducing automobile emissions.’⁴⁹ In early 2021, GM announced that by 2035 it would stop manufacturing all gas and diesel vehicles, a move characterized as ‘a seismic shift by one of the world’s largest automakers that makes billions of dollars today from gas-guzzling pickup trucks and sport utility vehicles.’⁵⁰ After GM’s announcement, Ford revealed that it would be ‘increasing its electric-vehicle investment to \$22 billion through 2025, almost double what it had previously pledged to spend.’ Said CEO Jim Farley, ‘We’re not going to cede the future to anyone.’⁵¹

Even prior to its early 2021 announcement, analysts claimed that with its new EV strategy, GM was bringing about ‘one of the most profound strategic turnarounds, not just in the auto industry, but in business.’⁵² While the outcome of the presidential election undoubtedly provided a fillip, what this chapter has demonstrated is that GM’s ‘profound strategic turnaround’ was not simply a function of changing political and regulatory winds in the United States – which can change dramatically from one administration to the next – but was grounded in much deeper changes in the landscape. GM, one of the most status quo-oriented automakers that this chapter examined – a BAU for the entirety of the 2010–2017 timeframe – was behaving as though it had to “catch up” to a new reality—one not of its own making.

⁴⁹ CBS News, ‘GM drops out of air pollution lawsuit against California, says it’s all in on electric cars,’ November 23, 2020. Note that Chrysler and Toyota also had sided with the Trump administration while Ford, Volkswagen, BMW, and Honda had remained neutral. Notably, General Motors and Chrysler were the weakest climate performers in this chapter, while Volkswagen and BMW were the strongest; see Table 4.1 in Part II. Carl Surran, ‘Ford, others to stay neutral on challenges to Trump vehicle emissions rule,’ Seeking Alpha, June 26, 2020.

⁵⁰ Neal Boudette and Coral Davenport, ‘G.M. Will Sell Only Zero-Emission Vehicles by 2035,’ *New York Times*, January 28, 2021.

⁵¹ Kevin Stankiewicz, ‘Ford CEO confident in electric-vehicle strategy, says automakers won’t “cede the future to anyone,”’ CNBC, February 5, 2021.

⁵² *Ibid.*

GM was not alone; as this chapter showed, no automaker was “ahead of the curve” of the new dominant design. As one expert explained in 2018, speaking about German automakers particularly, it is now clear that ‘the diesel or the combustion engine in the broader sense is not going to have a future,’ but the industry ‘is still fighting that fight, and it’s not yet decided whether in the end they’re going to have realized early enough that they have to be up front in this transition to be successful.’⁵³ But as GM’s early 2020s “turnaround” throws into sharp relief, the fight can wane – and in effect disappear – rapidly; strong incumbents with ‘business models, legacy assets, and culture’ grounded in the status quo can come to perceive that the alternative to investing ‘heavily in the transformation’ of their industry is, as an auto industry expert for PricewaterhouseCoopers in Germany put it, to ‘lose your business model,’ and even, in the long term, ‘to lose your existence.’⁵⁴

⁵³ Interview 3.

⁵⁴ PricewaterhouseCoopers automotive industry expert, Interview by author, October 23, 2018, Interview 11, conducted by phone.

CHAPTER 5—Technology

‘Competition among the two tech giants seems headed in an unexpected direction: climate leadership.’¹

Snapshot of the new dominant design

A 2020 study found that ‘global corporations have purchased enough clean energy in the past 12 years to eclipse the entire energy capacity of countries such as Vietnam or Poland,’ and that technology companies bought roughly 25% of all renewables sold to global companies in 2019.²

Introduction

As in each empirical chapter, my aim in this chapter is to investigate the extent to which companies in a particular industry altered their climate approach over the course of the 2010–2017 timeframe, thereby becoming part of the broader development in the private sector, and in what context. Specifically, I am interested in how individual companies perceived the material relevance of climate change – especially how they saw the outlook for state leadership and action on the issue – and whether there was an inconsistency between their perception and behavior, thereby pointing to an emergent pattern of action.

This chapter features five technology companies: Apple, Google, Infosys, Microsoft, and Samsung (the footnote explains the exclusion of Amazon and Facebook).³

¹ The complete original quote is: ‘The competition among the two Seattle-based tech giants [Amazon and Microsoft] seems to be headed in an unexpected direction: climate leadership.’ Nives Dolsak and Aseem Prakash, ‘The Climate Leadership Race: Microsoft’s Climate Moonshot and Amazon’s Climate Pledge,’ *Forbes*, January 17, 2020.

² Jillian Ambrose, ‘Tech giants power record surge in renewable energy sales,’ *The Guardian*, January 28, 2020.

³ Both Amazon and Facebook were excluded due to a lack of available data. Amazon is notorious for its long-time lack of transparency on climate-related issues. As a 2012 *Guardian* article noted (in an observation that would remain relevant for most of the 2010s), ‘Just try to find Amazon’s sustainability report. You can’t. There’s no such thing.’ Marc Gunther, ‘Amazon’s no show on sustainability,’ *The Guardian*, December 20, 2012. See also Oberhaus, who noted in 2019 that Amazon ‘has...made a habit of keeping information about

Contributing 2% of global emissions, the information and technology (IT) sector⁴ has a carbon footprint ‘on a par with the aviation industry’s emissions from fuel’; data centers alone use 200 terawatt hours of energy yearly, a higher energy usage than that of Iran.⁵ IT giants can ‘consume as much energy as small states’ and in the 2020s are poised to rank ‘among the largest users of electrical power on the planet.’⁶

But in this project’s context, more significant than technology companies’ carbon footprint is their potential to influence developments outside of their industries. As scholars pointed out in 2017, for example, the southeastern states of the United States

would be the sixth largest emitter if they were a country, and these states are not known as leaders in climate policy....Although these states are not pursuing carbon emissions reductions, Google, Facebook, and other companies are pushing utilities in the region to provide renewable energy for new facilities such as data centers and are extending their influence by encouraging other electricity buyers to do the same.⁷

In 2015, one observer noted that over ‘the past two years, Microsoft has contracted for 285 [megawatts] of renewable power from two off-site wind energy projects. These two wind farms – capable of generating enough electricity to power 125,000 U.S. homes – *could not have been built* without the long-term off-take agreement provided by Microsoft.’⁸ As of 2018, the Rocky Mountain Institute’s Business Renewable Center tracker had found that

its carbon footprint out of public view,’ and that it just had released data on its global carbon footprint for the first time. Daniel Oberhaus, ‘Amazon, Google, Microsoft: Here’s Who Has the Greenest Cloud,’ *Wired*, December 10, 2019. Meanwhile, Facebook went public in 2012 and for several years thereafter issued an “annual report” only in the form of the required Securities and Exchange Commission Form 10-K, with the minimum of information required and no discussion of climate concerns or environmental issues more broadly.

⁴ Software and services, hardware and technology, and semiconductors and semiconductor equipment manufacturers are the three main areas encompassed by the IT sector. See Fidelity, ‘Information Technology,’ accessed March 13, 2021.

⁵ Nicola Jones, ‘How to stop data centres from gobbling up the world’s electricity,’ *Nature*, September 13, 2018.

⁶ Microsoft, 2016 *Corporate Social Responsibility Report*, 42.

⁷ Vandenbergh and Gilligan, ‘Why private “actors” are taking center stage on climate change.’

⁸ Stephen Abbott, ‘Inside Microsoft’s wind energy strategy,’ *GreenBiz*, August 18, 2015. Emphasis added.

‘around 2.4 [gigawatts] of new U.S. wind and solar generation are *directly attributable* to Google’s power purchase agreements.’⁹

Of the 34 companies that this project considers, none so clearly demonstrate the extraordinary resources, reach, and potential influence of corporate “nations” as these technology companies (save Infosys, which, although a global player, is not on a par with the others). From Apple, whose market capitalization hit \$2.2 trillion in 2020 (equivalent to 10% of U.S. GDP) and that has an ‘active installed base’ of 1.65 billion devices as well as 620 million subscribers on its platform,¹⁰ to Google, whose search engine processes 2 trillion searches per year¹¹ and that has seven products with over 1 billion monthly users,¹² these companies enjoy not only exceptional economic power and political clout but also sheer ubiquity in society and the culture.

The remainder of the chapter is divided into two parts. Part I examines how the companies behaved during six three-year time periods spanning 2010–2017, showing that the cohort moved toward a different climate sensibility; 80% of companies altered their approaches in a significant and decisive fashion. To assess whether companies were coalescing around a new dominant design, or paradigm of behavior, Part I also examines the specific practices that they adopted, demonstrating that two of three became more widespread and that companies became more deeply invested in all three practices.

⁹ Silvio Marcacci, ‘The World’s Biggest Corporations Are Charging Toward 100% Renewable Energy. Google And Apple Are Leading the Way,’ *Energy Central*, April 25, 2018. Emphasis added.

¹⁰ Stephen Nellis, ‘Apple posts record profit as iPhone sales surge in China,’ *The Economic Times*, January 28, 2021.

¹¹ Danny Sullivan, ‘Google now handles at least 2 trillion searches per year,’ *Search Engine Land*, May 24, 2016.

¹² Anita Balakrishnan, ‘Here’s how billions of people use Google products, in one chart,’ *CNBC*, May 18, 2017.

In Part II, I evaluate data about companies' annual perceptions of the material impacts of climate change and demonstrate that there was not a widespread perception that climate-related regulation or changing consumer behavior would impose high costs or offer major benefits—and as the decade unfolded, concern with the material impacts of these factors *lessened*. Part II shows that developments in this industry case study foreshadow the pattern of emergent action that, I argue, characterizes the overall phenomenon of interest in this project: the private sector becoming a key climate actor during the 2010s.

Part I: Climate action, 2010–2017

This part of the chapter examines how companies behaved during six three-year periods spanning 2010–2017 to assess overall changes in how the cohort was approaching the climate issue (relevant for the first feature of a new dominant design, or paradigm, as Chapter 2 discussed), and to identify which actors in particular became “climate active.” After showing that 80% of companies made significant changes in their approaches over time, I examine the practices that they adopted and demonstrate evidence for two other features of a new paradigm: two out of three practices became more widespread over time (feature 2), and all three became more deep-seated (feature 3). In short, in this industry case study, at both the macro- and micro-levels, there is support for the argument that a new paradigm of climate action developed over time.

Identifying private sector climate actors

To investigate how companies behaved from 2010 through 2017, I evaluated and scored their annual performance on three metrics of action, capturing industry-specific practices, or indicator behaviors: reducing the emissions intensity of their activities (the product metric), reducing value chain emissions (the alignment metric), and producing/procuring

renewable energy (the investment metric). I classified each company by type: BAU, evolutionary, innovator, or disruptor. Table 5.1 presents each company's average score in each of six three-year periods.¹³ The higher a company's score (listed after its name), the better its performance across the three metrics. In period 6, I indicate in parentheses the percent change in each company's score compared to period 1; a company's name is in bold if its type is higher in period 6 than in period 1. The last row shows the total points for all six companies, with the percent change since the prior period indicated in parentheses.

Table 5.1. Company types, 2010–2017.

Type (point range)	2010– 2012 (period 1)	2011– 2013 (period 2)	2012– 2014 (period 3)	2013– 2015 (period 4)	2014– 2016 (period 5)	2015– 2017 (period 6)
Disruptor (16–20)				Apple, 16	Apple, 17	Apple , 17 (+143)
Innovator (13–15)		Google, 13	Google, 13			Google , 13 (+18) Infosys , 13 (+63)
Evolutionary (9–12)	Google, 11	Infosys, 11 Apple, 9	Apple, 12 Infosys, 11	Infosys, 11 Google, 10	Infosys, 12 Google, 11	Micro. , 9 (+50)
BAU (0–8)	Infosys, 8 Apple, 7 Micro., 6 Samsung, 5	Micro., 7 Samsung, 7	Micro., 7 Samsung, 7	Samsung, 8 Micro., 7	Micro., 8 Samsung, 7	Samsung, 8 (+60)
Total points (% change)	37 (–)	47 (27%)	50 (6%)	52 (4%)	55 (6%)	60 (9%) (cumulative: +62%)

*Micro. is Microsoft.

Five technology companies, classified according to three-year performance on lowering the emissions intensity of their activities, addressing value chain emissions, and procuring/producing renewable energy.

¹³ See Chapter 2 for details about my approach for scoring each company's annual performance on each of the three metrics, which were weighted differently according to industry but whose combined point value was uniformly 20. I used a rolling average approach to capture the thrust of climate action while smoothing the data.

Table 5.1 conveys that four companies (80%) moved toward a more climate active sensibility, transitioning to higher types by 2015–2017. With three of those four landing in the disruptor or innovator camp by the last period, there was a high level of ambition among the type-changing companies.

Beyond the positive overall change in direction, the table also shows when and to what extent momentum was gathering. Between periods 1 and 6, there was a 62% increase in companies' cumulative score (as the last row shows). The 27% inter-period gain in period 2 (by far the greatest inter-period increase) is of particular significance as it occurred well before the December 2015 Paris Conference, widely interpreted as a watershed for private sector climate action. Further, considering the three US-based companies (Apple, Google, and Microsoft),¹⁴ the gains realized or sustained in period 6 also are significant as this period encompasses the beginning of the Trump presidency, which heralded a clear change in the climate-related political and regulatory winds in the United States.

Meanwhile, considering momentum at the company level, Table 5.1 shows that four companies never regressed to a lower type, making “sticky” progress toward more robust action. Importantly, while Google moved backward in two periods (regressing to the evolutionary camp in periods 4 and 5), it ultimately landed among the innovators. Had the timeframe of interest been extended to 2019 and two additional periods thereby been created (2016–2018 and 2017–2019), there likely would have been further evidence of “sticky” progress at the company level. Indeed, the post-script evidence to this project shows technology companies doubling down on commitments that were nascent in the timeframe captured by Table 5.1. For example, in 2019 Google set a record for the largest-ever corporate renewables procurement deal in an agreement that increased its

¹⁴ The United States represents by far the most important market for all four companies. See Omri Wallach, ‘How Big Tech Makes Their Billions,’ Visual Capitalist, July 6, 2020.

procurement by 40%;¹⁵ likewise, in 2019 Microsoft increased its renewable energy portfolio by 60% compared to 2018.¹⁶

In short, consistent with the first proposed feature of a new paradigm, once momentum toward a new sensibility and approach was achieved, it was sustained; the cohort overall never regressed.

To ground the data in concepts introduced in Chapter 1, Table 5.1 conveys these technology giants adjusting their interest sets, in the context of the climate “session” of the figurative global “summit,” during the 2010–2017 timeframe. During the first three periods of the session, Google was the sole company to adjust its interest set enough to make climate change a demonstrably higher priority. In period 4, something in the “discussion” appeared to change for Apple, which surged ahead to become the sole disruptor. Meanwhile, Infosys, which started in period 1 as a BAU, represented a company that initially may not have been particularly concerned about climate change but that perceived the need to be “at the table,” given the issue’s growing importance and recognition. Over time, it gradually adjusted how it approached the issue; by 2015–2017 it became an innovator.

Identifying new climate practices

This section analyzes the specific practices underlying the overall changes in companies’ approach; in particular, I explore how widespread specific climate-relevant practices were and consider whether companies became more deeply invested in them over time. As the previous section recalled from Chapter 2, the three practices of interest for technology companies were lowering the emissions intensity of a company’s activities (product),

¹⁵ Sarah Golden, ‘Google’s jaw-dropping renewable procurement proclamation,’ *GreenBiz*, September 19, 2019.

¹⁶ Oberhaus.

reducing value chain emissions (alignment), and producing/procuring renewable energy (investment).

To investigate how widespread each action was, I examined how many companies received *any* points for each of the metrics in each year; then, I calculated three-year averages for the six periods spanning 2010–2017. Table 5.2 shows the results, displaying as a percentage the number of company participants in each period.¹⁷

Table 5.2. Breadth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	93	33	60
2011–2013 (2)	100	40	73
2012–2014 (3)	87	47	87
2013–2015 (4)	73	60	93
2014–2016 (5)	53	67	100
2015–2017 (6)	53	73	100
Percent change between periods 1 and 6.	-43	+121	+67

The percentage of technology companies receiving a score for lowering their emissions intensity (product), addressing value chain emissions (alignment), and procuring/producing renewable energy (investment).

Table 5.2 conveys that companies increasingly addressed the major culprit in their carbon footprint, value chain emissions (the indicator behavior for the alignment metric).¹⁸ The decline in participation in product, meanwhile, indicates that fewer companies were reducing *direct* emissions, or the relatively small percentage of total emissions tied

¹⁷ As the research design described, receiving points on a metric signified that a company had made at least some progress on the relevant climate behavior or had not regressed significantly; companies received a score of 0 if they regressed significantly on the behavior.

¹⁸ For example, 75% of Microsoft’s emissions are “Scope 3,” or value-chain emissions, which include suppliers and end-users. See Dolsak and Prakash, ‘The Climate Leadership Race: Microsoft’s Climate Moonshot and Amazon’s Climate Pledge.’

to their own activities (e.g. powering corporate facilities and manufacturing products at their own factories). Thus, while the decline in participation in product was considerable, the increase in participation in alignment was much more significant. The next section will explore its importance by considering companies' level of *ambition* in addressing value chain emissions.

Capturing the sustained momentum on the alignment and investment metrics, Table 5.2 points to the “stickiness” and lock-in potential of the relevant practices, including, for example, working with suppliers to address supply chain emissions and entering into commercial relationships to produce/procure renewable energy. The lock-in potential of the latter behavior is of particular interest, as some of the technology companies that during the 2010–2017 timeframe rose to rank among the world's largest purchasers of green power (Apple, Google, and Microsoft) have not merely sustained but doubled-down on their green power purchasing ambition. As the next section will discuss, once a company becomes involved in producing or procuring clean energy, it is unlikely to reverse course (a logic reflected in Table 5.2).

Companies increased their participation in two practices (the indicator behaviors for the alignment and investment metrics), but how deeply invested were they? Table 5.3 conveys the percentage of companies receiving over half the available points on each metric. This data offers a first cut at establishing the extent to which companies were seriously invested in practices as opposed to doing just enough to be counted as “doing something.”

Table 5.3. Depth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	86	0	44
2011–2013 (2)	80	0	64
2012–2014 (3)	85	13	54
2013–2015 (4)	91	22	50
2014–2016 (5)	100	30	47
2015–2017 (6)	88	36	60
Percent change between periods 1 and 6	+2	n/a (36 pts.)¹⁹	+36

The percentage of technology companies receiving over half the available points for performance on lowering their emissions intensity (product), addressing value chain emissions (alignment), and procuring/producing renewable energy (investment).

Table 5.3 captures, first, a significant increase in deep participation in *alignment*. This shows that companies that were doing anything to address value chain emissions did progressively *more* over time, becoming more ambitious in how they sought to address the sources of the vast majority of their total emissions.

Apple offers an illustrative example. In 2014, reporting that the carbon footprint of its supply chain represented 72% of its total emissions, the company announced that it aimed to see ‘the same progress in our suppliers’ use of clean energy that we’ve seen in our own.’²⁰ By 2015, Apple was ‘working with suppliers to install more than 4 gigawatts of new clean energy worldwide, including 2 gigawatts in China by 2020.’ This effort, Apple projected, ‘will avoid over 30 million metric tons of carbon pollution, equivalent to taking over

¹⁹ As participation in alignment began at 0, it is not possible to calculate a percent change; therefore, 36 represents the “point increase.”

²⁰ Apple, *Environmental Responsibility Report: 2015 Progress Report, Covering FY2014*, 8.

6 million cars off the road for one year.’²¹ By 2017, Greenpeace reported that Apple had ‘made impressive progress’ since 2014 on helping its ‘entire global supply chain’ move toward 100% renewable energy use, having secured ‘commitments from 14 suppliers to power their operations with enough renewable energy needed to manufacture Apple devices or components.’²²

Second, Table 5.3 shows that with a 36% increase in deep participation in the investment metric, companies that produced or procured renewable energy became more ambitious in terms of the variants of the behavior they adopted. At one end of the ambition continuum is the purchasing of renewable energy certificates (RECs), which are ‘tradable instruments that represent the clean energy attributes of renewable energy and give the owner the legal right to claim renewable energy use from a specific source.’ By purchasing RECs, ‘businesses do not need to alter their existing power contracts,’ or in practice change their energy mix; in fact, a company can claim to be powered by 100% renewable energy when it is simply purchasing sufficient RECs to match its conventional energy use. In many cases, companies purchase a particular type, “unbundled RECs,” which means that their purchase does not enable new renewable energy projects to be built that otherwise would not have been built, a principle called additionality.²³

In contrast, at the high end of the ambition continuum, companies can enter into long-term power purchase agreements (PPAs) with renewable energy producers, which ‘are much stronger in terms of additionality than the purchase of unbundled RECs. The long-term contract to buy a project’s renewable energy is a critical factor in enabling the

²¹ Apple, *Environmental Responsibility Report: 2016 Progress Report, Covering FY2015*, 6.

²² Greenpeace, ‘Greenpeace Guide to Greener Electronics – 2017 Company Report Card,’ 1.

²³ For an overview of the different types of RECs and the principle of additionality, see Urban Grid, ‘What is a REC and how do they work?’, accessed March 13, 2021.

financing and construction of a new renewable energy project.’²⁴ The strongest PPA arrangement entails a company entering into an agreement with a supplier in sufficiently close proximity to the company’s facilities so that the company itself can use the energy it purchases.

Table 5.3 captures that those companies that reported using renewable energy increasingly were *actually* doing so, as opposed to buying unbundled RECs or otherwise offsetting emissions from their conventional power usage. In addition, companies that started small in terms of renewables purchasing or procurement became increasingly ambitious in terms of their efforts to effect larger-scale, extra-industry change. For example, by 2013 Google had committed ‘over \$1 billion to renewable energy project investments, signed agreements to procure over 260 megawatts (MW) of wind power near our data centers, and installed 1.7 MW of solar at our corporate headquarters,’ indicating that Google had invested in projects that were influencing its own power supply.²⁵ By 2016 Google reported,

*We’re also looking beyond our business to drive wide-scale adoption of renewable energy. We’re supporting new energy purchasing models that others can follow, such as our pioneering commitment to long-term contracts to buy renewable energy directly from developers...and our support of renewable energy purchasing programs with utilities. We’re also helping to green the power grid through...our \$2.5 billion in equity investment commitments for renewable energy projects.*²⁶

²⁴ Ibid.

²⁵ Google, ‘Expanding Renewable Energy Options for Companies Through Utility-Offered “Renewable Energy Tariffs,”’ April 19, 2013, 1.

²⁶ Google, 2016 *Environmental Report*, 26. Emphasis added.

By 2017, Google had signed 20 PPAs to purchase 2.6 gigawatts of renewable energy ‘that is new to the grid’ – meeting the standard of additionality – ‘generating emissions savings that are equivalent to taking more than 1.2 million cars off the road.’²⁷

As a check on the findings that Table 5.3 conveys, Table 5.4 shows the percentage of companies that, in a given period, received over half the available points on the heaviest-weighted metric, which depended on whether a company’s primary area of focus was hardware, software, or services.²⁸

Table 5.4. Depth of commitment to the most significant type of action, 2010–2017.

Year (period number)	Percentage
2010–2012 (1)	33
2011–2013 (2)	40
2012–2014 (3)	47
2013–2015 (4)	47
2014–2016 (5)	53
2015–2017 (6)	60
Percent change between periods 1 and 6.	+82

The percentage of technology companies receiving over half the available points on the most significant climate practice for their respective “branches” of the industry.

Showing the 82% increase in deep participation in the most significant climate practices, Table 5.4 captures that companies were making progress on actions that were least amenable to short-term change (for software and services companies, lowering the

²⁷ Google, *Environmental Report: 2017 progress update*, 14. Google has reiterated, ‘We take care never to buy “unbundled” or “naked” RECs...in which a renewable attribute is sold on an open market, independent of underlying physical energy.’ Google, ‘Achieving Our 100% Renewable Energy Purchasing Goal and Going Beyond,’ December 2016, 6.

²⁸ For hardware companies, the most important metric was alignment. For software and services, it was product. The rationale is provided in the appendix; contact the author for access: charlotte.hulme@yale.edu.

emissions intensity of their operations [the product metric]), or that posed especially complex challenges (for hardware companies, addressing value chain emissions [the alignment metric]).

This part of the chapter examined how companies behaved from 2010 through 2017 in order to evaluate the extent to which they coalesced around a new dominant design or paradigm of behavior. It showed the cohort progressing toward a more climate active sensibility (and achieving significant momentum early on, between periods 1 and 2), with 80% of companies altering their approach in a significant and decisive fashion and transitioning to a higher type over time (feature 1 of a new paradigm). It also found evidence of coalescence in the patterns of participation in specific practices; participation in two practices widened (feature 2) and participation in all three practices deepened (feature 3). Of particular significance was how companies' behavior had the potential to influence developments outside their industry; in applying the "additionality" standard to their procurement of renewable energy, for example, companies were the drivers behind renewables projects that otherwise would not have been built.

Part II: Patterns of emergent action

This part of the chapter explores how technology companies – which became increasingly climate active during the 2010s and, as Chapter 7 will explore, among the leading private sector climate actors overall – perceived the material importance of the climate issue. As I will show, this chapter offers strong support that the development of interest in this study – the new private sector pattern of response – was an emergent outcome, or one marked by an inconsistency between the attributes of the individual actors and the overall outcome. As I will show, technology companies did not see climate change as a high-impact

material concern; in fact, their outlook for robust action by states *declined*, while prospects for climate-related changes in consumer behavior remained consistently low.

Emergent action at the industry level

This section begins at the industry level, examining how the cohort of five companies perceived the material importance of climate change from 2010–2016.²⁹ After evaluating whether companies perceived risks and/or opportunities from climate-related regulation and/or changing consumer behavior – and if so, with what degree of certainty, on what time horizon, and with what anticipated level of financial impact – I assessed the annual “perception strength” and then calculated three-year averages. Table 5.5 presents the perception strength among the companies in each period spanning 2010–2016.³⁰ Tables 5.6 and 5.7 parse this data, separating perceptions concerning regulation and consumer behavior, respectively, providing a finer-grained picture of the concerns that were driving companies’ understanding of the material implications of climate change.

²⁹ As Chapter 2 discussed, 2017 is excluded due to changes in CDP questionnaires that compromised the data’s comparability with that from 2010–2016.

³⁰ Note that a company that perceived climate change to be *very* relevant overall (presenting high-impact risks and opportunities tied to regulation and changing consumer behavior) would score 100 in the “material impact” column in the tables, while a company that perceived it to be *not* relevant (presenting *no* major material risks or opportunities in either of the categories) would score 0.³⁰

Table 5.5. Material impact of climate change, 2010–2016.

Years (period number)	Material impact
2010–2012 (1)	28
2011–2013 (2)	25
2012–2014 (3)	25
2013–2015 (4)	23
2014–2016 (5)	22
Percent change between periods 1 and 5	-21

For technology companies, the percentage of climate-related risks and opportunities that were perceived to be a high-impact concern.

Table 5.6. Material impact of regulation, 2010–2016.

Years (period number)	Material impact, <i>regulation</i>
2010–2012 (1)	36
2011–2013 (2)	35
2012–2014 (3)	33
2013–2015 (4)	27
2014–2016 (5)	23
Percent change between periods 1 and 5	-36

For technology companies, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Table 5.7. Material impact of changing consumer behavior, 2010–2016.

Years (period number)	Material impact, <i>consumers</i>
2010–2012 (1)	20
2011–2013 (2)	15
2012–2014 (3)	18
2013–2015 (4)	20
2014–2016 (5)	20
Percent change between periods 1 and 5	0

For technology companies, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

What insights do Tables 5.5–5.7 provide about the possibility of a pattern of emergent action in this industry case study? Table 5.5 conveys that not only was climate change never widely perceived to be a high-impact material concern (with perception strength peaking at just 28%), but that perceptions of its significance moved in the “wrong” direction; the 21% decline is not what we would expect given the extent to which technology companies changed their approach to the climate issue (as shown in Part I). As Table 5.6 indicates, this development was driven by declining outlooks for bold state action (i.e. climate regulation offering major opportunities and/or imposing high costs). Meanwhile, Table 5.7 captures how for this industry the consumer-based alternative explanation for changes in the private sector’s behavior finds no traction; there was *no* net change in perceived prospects for climate-related changing consumer behavior, which remained a limited concern (at just 20%).

Considered alongside Part I’s findings, the tables strongly point to the pattern of emergent action. As Table 5.5 shows, companies *most* perceived climate change overall as a serious material concern in period 1; from period 2 on it steadily declined in importance.

Part I found that the breadth *and* depth of companies' participation in both the alignment and investment metrics increased significantly over time.³¹ In short, companies were participating neither extensively nor intensively in alignment (i.e. addressing value chain emissions) and investment (i.e. producing/procuring renewable energy) when they *most* saw climate change as a significant concern. Over time, as the issue became *less* of a material concern, participation in both kinds of actions became broader and deeper. This counterintuitive finding points to the inconsistency, or disjuncture, between perception and action that is the signature of emergence.

Emergent action at the company level

While the previous section offered support for the pattern of emergent action at the industry level, was there evidence of the pattern in the behavior of those companies that altered their approach in a significant fashion? Table 5.8 presents the perception strength data of the four companies that belonged to a higher type in the last period than in the first.³²

Table 5.8. Material impact of climate change for climate active companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
Apple	---	0	0	0	0
Google	0	0	0	0	0
Microsoft	0	0	0	0	0
Infosys	25	33	42	42	33

Among technology companies that moved toward a more climate active sensibility, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern.

³¹ To recall, breadth of participation in alignment increased by 121% and in investment by 67%. Meanwhile, *depth* of participation in alignment increased by 36 points (as the starting figure was 0, it was not possible to calculate a percent change) and in investment by 36%.

³² In Tables 5.8–5.10, Apple does not have a perception strength score for period 1 given that it did not participate in CDP disclosure during the reporting cycles covering 2010–2012.

Tables 5.9 and 5.10 address perceptions concerning the material impacts of climate-related regulation and those concerning changing consumer behavior, respectively.

Table 5.9. Material impact of regulation for climate active companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
Apple	---	0	0	0	0
Google	0	0	0	0	0
Microsoft	0	0	0	0	0
Infosys	50	50	50	33	17

Among technology companies that moved toward a more climate active sensibility, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Table 5.10. Material impact of changing consumer behavior for climate active companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
Apple	---	0	0	0	0
Google	0	0	0	0	0
Microsoft	0	0	0	0	0
Infosys	0	17	33	50	50

Among technology companies that moved toward a more climate active sensibility, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

Tables 5.8–5.10 show an inconsistency between how companies perceived the material importance of climate change and how they behaved; all four cases demonstrate the pattern of emergent action.

Beginning with the strongest example of the pattern, Apple was the most active climate performer, the only technology company to become a disruptor (and as Chapter 7 discusses, one of the few disruptors among all 34 sample companies). Table 5.8 conveys that for Apple, climate change never was a high-impact material concern; there were no

perceived prospects either for robust state action (in the form of regulation offering major opportunities or imposing serious costs) *or* for changes in consumer practices driven by climate concerns. Considering its exceptionally strong climate performance alongside a perception strength of “zero,” Apple’s case demonstrates the largest possible inconsistency between action and perception.

Google’s behavior also demonstrates the pattern of emergent action. Like Apple, it perceived *no* high-impact material risks or opportunities related to climate change. Also, like Apple, Google was a strong climate actor; it was the first to become an innovator in 2011–2013. But whereas Apple increased its performance by 143% between periods 1 and 6, Google only improved its performance by 18%, representing a more moderate case of emergent action.

Microsoft demonstrates the pattern, but to a lesser degree than Apple and Google. Like those two companies, it never perceived climate change to be of high material importance. But where Apple and Google were among the strongest climate performers, Microsoft only landed in the evolutionary camp; there was a relatively smaller disjuncture between its perception and action.

Finally, Infosys’ type change in period 5 (from evolutionary to innovator: see Table 5.1 in Part I), signifying a decisive move toward a more active climate sensibility, coincided with a 21% decline in strength of perception compared to period 4—a clear example of the inconsistency between action and perception that is the signature of emergence.

In this part of the chapter, I have demonstrated the pattern of emergent action at both the industry and company levels. I showed how there was an inconsistency in how this industry cohort moved toward a different climate approach and sensibility, as Part I explored, and how companies individually perceived the importance of the climate issue.

There was a stark disjuncture between how the most climate active technology companies (Apple and Google) perceived the issue’s importance and how they acted; these companies became among the leading private sector climate actors overall in the context of perceiving *no* prospects for robust, high-impact state action on the issue and *no* outlook for significant changes in consumer practices tied to growing climate concerns.

Conclusion

In early 2021, several months after notorious climate laggard Amazon announced its “Climate Pledge” – which included a commitment to utilizing 100% renewable energy by 2030 and achieving net-zero emissions by 2040 – Microsoft unveiled a plan ‘to shift to renewable energy for its buildings and data centers by 2025; become “carbon negative” by 2030;’ and, in an unprecedented move, ‘remove its historical carbon emissions from the atmosphere by 2050.’ Especially notable about its ambitious plan, observed *Forbes*, was that until ‘recently, Microsoft was considered somewhat of a climate laggard among the high-tech giants.’ This observation aligns with my findings in this chapter: to recall from Part I, Microsoft changed from a BAU to an evolutionary only in the final period, 2015–2017.³³

Microsoft and Amazon’s “dueling” announcements led *Forbes* to conclude that the ‘competition among the two Seattle-based tech giants seems to be headed in an unexpected direction: climate leadership.’³⁴ In fact, one of the key implications of this chapter’s findings is that, as of the early 2020s, it no longer *was* a very unexpected direction; by that point, a new dominant design or paradigm of behavior vis-à-vis climate change had developed among titans of the technology industry, some of which already were behaving as

³³ For example, Microsoft’s commitments concerning renewable energy to power its datacenters had been more modest compared to Apple and Google’s commitments in this area. Dolsak and Prakash, ‘The Climate Leadership Race: Microsoft’s Climate Moonshot and Amazon’s Climate Pledge.’

³⁴ *Ibid.*

leading actors in the issue area. What *was* unexpected, as this chapter has shown, was that technology companies became climate active in the context of *not* perceiving that climate change was a serious material concern, from either a regulatory or consumer perspective. They were responding to a particular condition in their environment; as Chapter 1 introduced and as Chapter 7 explores in the context of aggregate empirical findings, my argument is that this condition was states' abdication of leadership on a critical issue of transnational importance set to shape future global trends.

In the context of this study's overarching argument about the potential significance of powerful non-state actors "stepping up" in the context of non-traditional issues like climate change, one of this chapter's most salient findings was that companies adopted practices with the potential to influence the landscape beyond their industry, such as procuring renewable energy from projects that otherwise would not have been built. As the introduction considered, in 2017 Vandenberg and Gilligan observed that in the southeastern region of the United States – where most states 'have not only rejected state climate regulations, but also have litigated vigorously to prevent the federal government from enforcing national regulations that would reduce emissions from coal-fired power plants' – tech giants were undertaking actions distinctly counter to the prevailing regulatory climate, using their influence, for example, to push utilities to provide renewable energy for their own data centers and to encourage 'other electricity buyers to do the same.' In characterizing such efforts as occurring 'in a one-off, uncoordinated way,' Vandenberg and Gilligan were correct in one respect but not in another.³⁵ The tech giants' behaviors *were* uncoordinated, but they were not one-off, in the most important sense; these practices were part of a new paradigm of behavior, or dominant design for the future.

³⁵ Vandenberg and Gilligan, *Beyond Politics*, 5.

CHAPTER 6—Finance

‘The earth is shifting beneath their feet.’¹

Snapshot of the new dominant design

In 2020, Jim Cramer of CNBC observed, ‘Fossil fuels are done. We’re starting to see divestment the world over...You can tell the world’s turned on them, and it’s actually...happening very quickly...It’s going to be a parade [of divestiture by funds] that says look, “These are tobacco, and we’re not going to own them.”’²

Introduction

In January 2020, in his annual letter to company executives, BlackRock CEO Larry Fink wrote that climate change ‘has become a defining factor in companies’ long-term prospects’ and that the ‘evidence on climate risk is compelling investors to reassess core assumptions about modern finance.’³ In the letter, an annual “event” for Wall Street that has been described as ‘a bellwether for the financial services industry’⁴ and as having ‘the influence to change the conversations inside boardrooms around the globe,’⁵ Fink announced, ‘I believe we are on standing on the edge of a fundamental reshaping of finance,’ and set forth that BlackRock, which, with \$8.7 trillion in assets under management, is the

¹ The complete quote is as follows: ‘But while some fossil fuel companies cling to their market share, more investors and CEOs recognize that the earth is shifting beneath their feet.’ Michael Bloomberg and Carl Pope, *Climate of Hope* (New York: St. Martin’s Press, 2017), 199.

² Andrea Germanos, “‘They’re Done’: CNBC’s Jim Cramer Says Fossil Fuel Industry “In the Death Knell Phase,”” *Common Dreams*, January 31, 2020.

³ Larry Fink, ‘A Fundamental Reshaping of Finance,’ BlackRock, 2020.

⁴ Rob Kaplan, ‘What Larry Fink Got Right (And Wrong) In His 2020 Investor Letter,’ *Forbes*, January 24, 2020. See also Alicia Adamczyk, ‘BlackRock CEO says sustainability is the “top issue” for investors—here’s what that means for your money,’ *CNBC*, January 14, 2020.

⁵ Andrew Ross Sorkin, ‘BlackRock C.E.O. Larry Fink: Climate Crisis Will Reshape Finance,’ *New York Times*, February 24, 2020.

world’s largest asset manager,⁶ would immediately exit investments ‘that present a high sustainability-related risk, such as thermal coal producers.’⁷ That month, BlackRock also joined Climate Action 100+, an “investment pact” comprising investors managing assets of \$41 trillion, which ‘pressures the companies responsible for two-thirds of annual global industrial emissions to show how they will reduce carbon dioxide emissions’ and that treats climate change as ‘a systemic risk—one which investors cannot diversify away from.’⁸ Prior to 2020, BlackRock was notorious for undermining this particular organization’s efforts by voting against shareholder resolutions that it brought forth, which were aimed at holding fossil fuel companies to account on climate issues.⁹

What was the significance of Fink’s letter? For some, it represented ‘a seismic shift in the way mainstream finance is starting to think about climate change and investing’¹⁰ and marked a ‘major turning point’ for BlackRock, a climate laggard.¹¹ But for others, although the letter *did* represent ‘a significant change from just a year ago when Fink’s annual letter didn’t even mention climate change,’ its import would depend ultimately on whether BlackRock altered such behavior as using its ‘enormous financial leverage to support fossil fuel CEOs and spike climate-critical shareholder resolutions.’¹²

⁶ Michael Mackenzie, ‘BlackRock assets surge to record \$8.68tn,’ *Financial Times*, January 14, 2021.

⁷ Fink, ‘A Fundamental Reshaping of Finance.’

⁸ Jonathan Herz, ‘The Financial Sector Is Waking Up to Climate Change,’ Environmental and Energy Study Institute, February 11, 2020.

⁹ Patrick Greenfield and Jasper Jolly, ‘BlackRock joins pressure group taking on biggest polluters,’ *The Guardian*, January 9, 2020. See also Sierra Club, ‘BlackRock’s Big Problem Network Responds to BlackRock Joining Climate Action 100+,’ January 9, 2020.

¹⁰ Kaplan, ‘What Larry Fink Got Right (And Wrong) In His 2020 Investor Letter.’

¹¹ Ceres, ‘BlackRock CEO letter on sustainable investing is a game changer for the global investor and corporate community,’ January 14, 2020.

¹² Michael Brune, ‘What one of BlackRock’s biggest climate critics thinks about Larry Fink’s letter,’ CNBC, January 15, 2020.

In this project's context, Fink's letter was significant for articulating what I argue was the essence of the new dominant design for the future—or, the consensus position on climate change that had developed among some of the world's largest companies during the 2010s. From his place at the helm of a longtime climate laggard, in identifying the climate-driven changes with which his industry would have to contend imminently,¹³ Fink captured the disjuncture between how individual companies had long perceived the issue and what they understood to be the new imperative in terms of action.¹⁴

The letter was significant in another respect. In articulating the new climate consensus, Fink spoke less as a leader of one industry among many that would be affected by impending challenges to the high-carbon status quo, and more as a representative of the status quo *itself*. In other words, BlackRock was not just one company among many with deep ties to the old fossil fuel-centered dominant design: it effectively *was* the old dominant design—one of the trusses supporting the entire edifice of the high-carbon economy.

Thus, this chapter differs from the preceding empirical chapters, each of which has considered the extent to which a subset of incumbents, or companies embedded to varying degrees in the high-carbon economy, began loosening their ties to the old dominant design and adopting the new. The previous chapters considered a mix of “weak” incumbents, which have relatively weak bonds to the old dominant design (e.g. technology companies) and “strong” incumbents, which are tightly tethered to the high-carbon status quo (e.g. oil and gas companies). This chapter examines the behavior of six incumbent companies (four

¹³ As Fink put it, due to climate risks, in ‘the near future – and sooner than most anticipate – there will be a significant reallocation of capital.’ Fink, ‘A Fundamental Reshaping of Finance.’

¹⁴ While BlackRock only participated in CDP for 2015 and 2016, within this project's timeframe of interest, in both those years it reported *no* high-impact risks or opportunities related to climate change. BlackRock, 2016 CDP disclosure (covering 2015); and BlackRock, 2017 CDP disclosure (covering 2016). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

banks and two insurers) that are not just heavily invested in a certain piece of the high-carbon economy—they are linchpins of that economy.

The chapter is divided into three main parts. Taking a reverse chronological approach, the first presents a snapshot of the landscape in the late 2010s and early 2020s, presenting initial evidence that the status quo approach to climate change (the old dominant design) was under increasing pressure in the finance industry. The second part examines the behavior of six companies (AIG, Allianz, Bank of America, Citigroup, Deutsche Bank, and JPMorgan) to evaluate the extent to which the cohort moved toward a new climate approach over the course of the 2010–2017 timeframe.¹⁵ I show that all six companies behaved as BAUs as of 2010–2012 and that all but one (Allianz) remained BAUs in 2015–2017. Despite the cohort’s failure to make significant progress overall, however, I also show that all six companies improved their performance and select actors adopted practices that were “canaries in the coalmine” for where the industry was heading. In 2020, when Fink published the letter that sent ‘shockwaves’ through the business world,¹⁶ leviathans of global finance still were deeply entwined in the status quo—but had begun to behave as if there were new, permanent cracks in the old dominant design.

Finally, the third part examines whether there is evidence of the pattern of emergent action in this industry. As I show, the six companies never perceived climate change as being of high material concern – and as the decade unfolded its perceived importance *decreased* – yet they all made improvements in their performance. This case points to the

¹⁵ U.S. bank figures from Matthew Goldberg, ‘Top 15 largest banks in the US,’ Bankrate, December 10, 2020. Data on Deutsche Bank from F. Norrestad, ‘Leading banks in Europe 2019, by total assets,’ Statista, November 9, 2020. Data on Allianz from Statista Research Department, ‘Largest insurance companies in Europe from 2016 to 2019, by total assets,’ January 13, 2021. Data on AIG from Statista Research Department, ‘Largest insurance companies in the United States in 2019, by total assets,’ November 5, 2020.

¹⁶ James Vermillion, ‘The Climate Shockwave That Rocked Wall Street,’ Medium, August 19, 2020. See also CEO Leadership Alliance Orange County, ‘BlackRock’s Larry Fink Lays Out His Grand Challenge for CEOs,’ January 26, 2019.

disjuncture between perception and action that is the essence of an emergent pattern; given the scant material relevance these financial heavyweights accorded climate change, even the modest gains in performance they realized would have seemed unexpected. The third part serves also to underscore the context in which the new dominant design took shape. Simply put, in 2020 the finance industry found itself standing, in Fink's words, 'on the edge of a fundamental reshaping' due to climate change—despite that, from the individual perspectives of six heavyweight actors, climate-related material impacts had not provided decisive “pushes” or “pulls” toward that edge during the 2010s.

Part I: Sketch of cracks appearing in the old dominant design

In a 2015 speech to Lloyd's of London in which he warned, famously, that 'once climate change becomes a defining issue for financial stability, it may already be too late,' then-Governor of the Bank of England Mark Carney remarked that since the 1980s, 'the number of registered weather-related loss events has tripled' and that inflation-adjusted 'insurance losses from these events have increased from an annual average of around \$10bn in the 1980s to around \$50bn over the past decade.'¹⁷ Four years later, in 2019 – when Carney issued another clarion call, warning of climate change's potentially 'catastrophic impact'¹⁸ – Munich Re, the world's largest reinsurer, reported that 2017–2018 'was the worst two-year period for natural catastrophes on record, with insured losses of \$225 [billion].'¹⁹

¹⁷ Mark Carney, 'Breaking the tragedy of the horizon: climate change and financial stability,' speech at Lloyd's of London, September 29, 2015.

¹⁸ Herz, 'The Financial Sector Is Waking Up to Climate Change.'

¹⁹ Patrick Jenkins, 'Why climate change is the new 9/11 for insurance companies,' *Financial Times*, September 12, 2019. Note that a reinsurer provides financial protection to insurance companies, handling 'risks that are too large for insurance companies to handle on their own and make it possible for insurers to obtain more business than they would otherwise be able to.' See Julia Kagan, 'Reinsurer,' *Investopedia*, April 25, 2020.

Yet, despite increasingly dire warnings about climate-related economic losses,²⁰ during the 2010s heavyweights of finance appeared to be doubling-down on the high-carbon economy. For example, a 2019 study released by BankTrack and partner non-governmental organizations (NGOs) reported that 33 ‘major global banks poured \$1.9 trillion into fossil fuels since the Paris Agreement was adopted’;²¹ by 2020, BankTrack reported that 35 ‘global banks have not only been sustaining but expanding the fossil fuel sector with more than \$2.7 trillion in the four years since the Paris Climate Agreement.’²²

However, by the late 2010s and turn of the 2020s, amid their ongoing investments in the high-carbon economy and apparently unwavering belief in the durability of the old dominant design, major banks and insurers were behaving as if there were fissures emerging in their long-held approach to the climate issue. As of July 2019, for example, Chubb became the first U.S. insurance company to begin phasing out underwriting and investing in coal-based companies, a development that such NGOs as Insure our Future and the Sierra Club hailed, respectively, as a ‘gamechanger’²³ and as a signal that ‘coal is becoming uninsurable worldwide.’²⁴ While Chubb was the first U.S. insurer to establish a coal underwriting exclusion policy, by 2019 seventeen insurers worldwide representing 46% of the reinsurance market and 9.5% of the primary insurance market had announced such policies, with European companies like Zurich and Swiss Re in the vanguard.²⁵ By 2019,

²⁰ For example, in 2018 the Intergovernmental Panel on Climate Change estimated global economic damage related to climate change would be between \$54 and \$69 trillion by 2100. Cited in Chris Lafakis et al., ‘The Economic Implications of Climate Change,’ Moody’s Analytics, June 2019, 2.

²¹ BankTrack, ‘Banking on Climate Change – Fossil Fuel Finance Report Card 2019,’ March 20, 2019, 3.

²² BankTrack, ‘Banking on Climate Change – Fossil Fuel Finance Report Card 2020,’ March 18, 2020, 3.

²³ Valerie Volcovici and Shanti Nair, ‘U.S. insurer Chubb pulls back from coal,’ Reuters, July 1, 2019.

²⁴ Business Green Staff, ‘Chubb is first big U.S. insurer that won’t underwrite new coal plants,’ *GreenBiz*, July 3, 2019.

²⁵ Insure Our Future, ‘Insurers Withdrawing Cover From Coal Projects Double in 2019,’ December 2, 2019.

35 insurers had ‘divested coal from roughly \$8.9 trillion of investments – over one-third (37%) of the industry’s global assets.’ Just one year prior, in 2018, only 19 insurance companies (with \$6 trillion in assets under management) had taken action on divestment; as of 2017, only 15 companies (with \$4 trillion) had done so.²⁶ In other words, between 2017 – this project’s cutoff – and 2019, there was a 133% increase in the number of insurers that had divested from coal.

The trend away from unrestricted financing for coal extended beyond insurers; as a February 2019 report by the Institute for Energy Economics and Financial Analysis found, since the start of 2018, ‘[a]t least 34 coal divestment or restriction policy announcements have been made by financial institutions.’²⁷ In February 2020, one month after Fink wrote his letter to CEOs, even JPMorgan – the world’s leading fossil fuel bank by almost 30%²⁸ – announced a prohibition on financing for all new coal-fired power plants (previous restrictions were limited to new plants in developed countries) and on ‘direct finance for new oil and gas development in the Arctic.’ The announcement came ‘less than a week after the leak of a report written by two JPMorgan economists warning of “catastrophic consequences” if emissions are not slashed over the next 30 years.’²⁹

²⁶ Ibid. Another study found that ‘an additional 57 insurers committed to divesting some or all of their thermal coal investments in 2018 compared to 2016.’ See Don Jergler, ‘Survey from Regulator of Largest U.S. Insurance Market Shows More Coal Divestment by Insurers,’ *Insurance Journal*, November 29, 2018.

²⁷ Chubb announced that it would impose a 30% revenue threshold for companies in coal mining; it also would ‘stop underwriting for the construction of new coal-fired power plants.’ For existing coal plants, ‘insurance coverage for risks that exceed the 30% threshold’ would be phased out ‘by 2022, and for utilities beginning in 2022.’ Further, Chubb would ‘also not invest in companies that generate more than 30% of revenue from thermal coal mining or energy production from coal.’ Volcovici and Nair, ‘U.S. insurer Chubb pulls back from coal.’

²⁸ See Rainforest Action Network, ‘JPMorgan Chase Coal and Arctic Policy a Step Forward But Fails to Match its Responsibility as the World’s #1 Fossil Fuel Bank,’ February 24, 2020.

²⁹ Ibid.

While there is an urgent need to make coal uninsurable and to eliminate financing for coal-based businesses as coal is the ‘single biggest contributor to climate change,’³⁰ also vital is the need to mobilize capital to finance the low-carbon transition. According to a 2019 International Energy Agency estimate, ‘a low-carbon transition could require \$3.5 trillion in energy investment every year for decades—twice the current rate.’³¹ By the turn of the 2020s, heavyweights of global finance still were making insufficient low-carbon investments—but the quality and quantity of their investments differed appreciably in comparison to much of the 2010s. For example, in 2012, three years after the World Bank issued the first green bond (a type of bond designated for renewable energy and other low-carbon projects), ‘green bond issuance amounted only to \$2.6 billion’;³² by 2019, this figure surpassed \$200 billion.³³ Major banks that initially had underwritten *other* institutions’ green bonds began issuing such bonds of their own by the late 2010s; banks *themselves* were providing financing for low-carbon ventures, thus putting their own assets on the line, as opposed simply to securing financing for others.

Three of this chapter’s four sample banks followed a strikingly similar pattern of behavior in this respect, becoming active in green bond *underwriting* around 2013 but not in green bond *issuance* until 2020. The exception was Bank of America, the second largest U.S. bank, which in 2013 issued one of the first corporate green bonds.³⁴ For example, in 2013 and 2014 JPMorgan underwrote green bonds of \$1.1 billion and \$2.2 billion (and

³⁰ Julia Kollewe, ‘Coal power becoming “uninsurable” as firms refuse cover,’ *The Guardian*, December 2, 2019.

³¹ Mark Carney, ‘Fifty Shades of Green,’ *Finance and Development*, Vol. 56, No. 4 (International Monetary Fund, 2019): 12.

³² Troy Segal, ‘Green Bond,’ *Investopedia*, March 9, 2020.

³³ Nina Chestney, ‘Green bond issuance surpasses \$200 bln so far this year,’ Reuters, October 23, 2019.

³⁴ Bridget Boule, ‘2013 Overview: the Dawn of an Age of Green Bonds?’ Climate Bonds Initiative, February 6, 2014.

‘more than \$4 billion in green and sustainability themed bonds’ in 2015), but it was only in 2020 that the largest U.S. bank completed its ‘inaugural green bond issuance of \$1 billion.’³⁵ Likewise, in 2013 Citigroup underwrote its ‘first green bond for the International Finance Corporation’; in 2014 it underwrote ‘the auto industry’s first asset-based green bond issuance’; and in 2015 it ‘helped clients to raise nearly \$8 billion in green bonds.’ But it was in 2020 that Citigroup, the fourth largest U.S. bank, issued its ‘first USD-denominated benchmark green bond’ of \$1.5 billion.³⁶ Finally, from 2013 onward Deutsche Bank was active in green bonds; in 2014, for example, it helped Unilever to issue ‘the first ever sterling green bond’; in 2015 it became ‘bookrunner for the first green bond to come out of China’;³⁷ and in 2017 it supported the issuance of €10 billion in green bonds.³⁸ But it was not until 2020 that Germany’s largest bank ‘issued its maiden green bond, a €500 million issue.’³⁹

What is the significance of these developments? By the late 2010s the old dominant design, while still intact in the industry, *was* coming under growing strain; for example, it no longer was tenable to insure and invest in coal unconditionally, and financing the low-carbon future (specifically by investing one’s own assets) increasingly was treated as an important part of financial actors’ dealings. In short, my argument is that when Fink remarked in early 2020 that climate risk was ‘compelling investors to *reassess core assumptions* about modern finance’ and announced that the industry was on the cusp of a paradigm shift – ‘a *fundamental reshaping*’ – in

³⁵ JPMorgan Chase & Co., ‘JPMorgan Chase Issues \$1 Billion Inaugural Green Bonds,’ September 16, 2020.

³⁶ This followed its ‘inaugural Euro-denominated green bond benchmark issues in January 2019.’ Citigroup, ‘Citi Announces Inaugural USD-denominated Benchmark Green Bond Issuance,’ May 11, 2020.

³⁷ Deutsche Bank, *Annual Review 2014*, March 2015, 73; and Deutsche Bank, *Corporate Responsibility Report 2015*, March 2016, 59.

³⁸ Deutsche Bank, *Non-Financial Report 2017*, 2018, 24.

³⁹ ‘Deutsche Bank launches first green bond,’ Institutional Asset Manager, February 6, 2020.

essence he was acknowledging that, however broadly and deeply it was presently entwined in the high-carbon economy, his industry's grip on the old dominant design was weakening.

Part II: Climate action, 2010–2017

This part of the chapter examines how the six companies behaved during the 2010–2017 timeframe to assess changes in how the cohort approached the climate issue. Beginning at a macro-level of analysis, I show that only one company (Allianz) altered its approach to a sufficient degree to transition to a higher type over time. Shifting to a micro-level, I demonstrate that select companies adopted new practices that, although not widespread within this six-company cohort, were indicative of a slow-dawning recognition in the industry that old assumptions about the climate issue would not work going forward.

Identifying private sector climate actors

Table 6.1 classifies companies by type in each of six periods spanning the 2010–2017 timeframe. The classifications are based on companies' three-year average scores (listed after company names) for performance on three metrics: product, alignment, and investment.⁴⁰ In the column showing scores for period 6, I indicate parenthetically the percent change in each company's score since period 1 (Allianz's name is in bold to underscore that it changed types over time). The last row shows companies' cumulative score in a given period to capture potential gains in underlying momentum.

⁴⁰ See Chapter 2 for details about my approach for scoring each company's annual performance on each of the three metrics, which were weighted differently according to industry but whose combined point value was uniformly 20. Note that I used a rolling average approach to capture the thrust of climate action while smoothing the data.

Table 6.1. Company types, 2010–2017

Type (point range)	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)	2015–2017 (period 6)
Disruptor (16–20)						
Innovator (13–15)						
Evolutionary (9–12)						Allianz, 9 (+80)
BAU (0–8)	Citi, 6 Allianz, 5 BofA, 5 JPM, 4 AIG, 3 Deutsche, 2	Citi, 6 JPM, 6 Allianz, 5 BofA, 5 AIG, 4 Deutsche, 3	Citi, 7 JPM, 7 BofA, 6 AIG, 5 Allianz, 5 Deutsche, 3	Citi, 7 JPM, 7 Allianz, 6 BofA, 6 AIG, 5 Deutsche, 4	Allianz, 7 Citi, 7 JPM, 7 BofA, 6 AIG, 5 Deutsche, 5	BofA, 7 (+40) Citi, 7 (+17) Deutsche, 6 (+200) JPM, 6 (+50) AIG, 5 (+67)
Total points (% change)	25 (---)	29 (16%)	33 (14%)	35 (6%)	37 (6%)	40 (8%) (cumulative: +60%)

*BofA is Bank of America; Citi., Citigroup; JPM, JPMorgan; and Deutsche, Deutsche Bank.

Six banks and insurers, classified according to performance on offering green bonds or other vehicles for expanding the market for climate initiatives, incorporating climate-related standards in funding/insuring practices, and financing/investing in climate-relevant projects.

As Table 6.1 shows, only Allianz progressed toward a more climate active sensibility, transitioning from BAU to evolutionary in 2015–2017. In no other empirical chapter were *all* companies BAUs as of 2010–2012; likewise, finance was the sole case study industry in which *no* company became even an innovator by 2015–2017. As discussed earlier (and as Chapter 7 addresses more fully), the financial industry’s very low climate performance arguably is a function of its degree of embeddedness in the old dominant design; whereas many of the other companies in the sample set (i.e. in the automotive and energy-

intensive industries) are invested in a particular area of the high-carbon economy, only the six companies in this chapter can claim to be entwined in virtually every facet of it.

Despite the lack of positive change in terms of type, however, the last row of Table 6.1 captures that underlying momentum gathered over time. Between periods 1 and 6, there was a 60% increase in companies' cumulative scores. In other words, amid what appeared to be limited progress toward better performance, all companies made modest but measurable underlying gains, as the next section will examine.

Considering company level-momentum, Allianz and Deutsche Bank registered the most progress, making 80% and 200% gains, respectively, over time. The remaining four (all the American companies) made less progress, improving by 17% (Citigroup), 40% (Bank of America), 50% (JPMorgan), and 67% (AIG). While *overall* momentum increased most in 2011–2013 (period 2) and 2012–2014 (period 3), capturing changes occurring in the “pre-Paris Conference” context, it was in 2015–2017 (period 6) that Allianz became the only company to transition to a higher type. As the next section addresses, this transition was a function of its 2015 announcement that in light of ‘the two-degree target [enshrined in the Paris Agreement] and aware of the economic risks involved,’ Allianz would ‘stop financing coal-based business models,’ including through investment of proprietary assets.⁴¹

Identifying new climate practices

While the previous section examined overall changes in the six-company cohort's behavior and found limited evidence for the first feature of a new paradigm (companies' overall climate performance increasing), this section explores whether certain practices became

⁴¹ Allianz, 2016 CDP disclosure (covering 2015). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

more widespread over time and whether companies became more deeply committed to them.

To investigate, first, how widespread each kind of climate action was (feature 2 of a new paradigm), I examined how many companies received *any* points for each of the metrics in each year; then, I calculated three-year averages for the six periods spanning 2010–2017. Table 6.2 displays the results.

Table 6.2. Breadth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	83	22	89
2011–2013 (2)	89	17	100
2012–2014 (3)	94	17	100
2013–2015 (4)	94	22	100
2014–2016 (5)	89	28	100
2015–2017 (6)	89	33	100
Percent change between periods 1 and 6.	+7	+50	+12

The percentage of finance companies receiving a score for product, alignment, and investment.

While Table 6.2 indicates that participation in alignment increased significantly, it is important to emphasize that in fact there was a low level of participation in the practices for this metric: placing restrictions either on proprietary investments in coal (in the case of insurers) or on financing for tar sands and other “extreme oil” projects (in the case of

banks). Data shows that only one company, Citigroup, participated in every year from 2010 through 2017; it was only in 2015 that Allianz joined as a fellow participant.⁴²

Table 6.2 shows that from period 2 on, all companies participated in the indicator behaviors for the investment metric: investing in renewable energy (for insurers) and placing restrictions on financing for coal mining and/or coal power (for banks). Likewise, companies consistently integrated climate-related standards into their underwriting strategies (insurers) or provided financing for low-carbon projects (banks), the practices for the product metric. But how meaningful were companies' commitments to these practices? To consider the depth of action (feature 3 of a new paradigm), Table 6.3 shows the percentage of companies receiving at least 51% of the available points on each metric in order to begin to identify the degree to which companies seriously were invested in the relevant practices.

Table 6.3. Depth of climate action, 2010–2017.

Years (period number)	Product	Alignment	Investment
2010–2012 (1)	53	0	30
2011–2013 (2)	62	0	33
2012–2014 (3)	65	0	33
2013–2015 (4)	71	17	33
2014–2016 (5)	76	33	33
2015–2017 (6)	76	50	33
Percent change between periods 1 and 5	+43	n/a (50 pts.) ⁴³	+10

The percentage of finance companies receiving over half the available points on each metric.

⁴² Note that Bank of America received a point for the alignment metric in 2010 but not at any time thereafter. This a function of having to estimate its 2010 performance and determining that in 2011 its performance declined significantly.

⁴³ This figure represents a “point change,” as it is not possible to calculate a “percent change” with a starting figure of 0.

While Table 6.3 indicates that the alignment metric registered a significant increase in depth of participation, in fact, these figures reflect the behavior of just one company, Allianz. Of the two insurers included in the sample (the other being AIG), only Allianz developed a policy for investment of proprietary assets in coal, the indicator behavior for alignment (in the case of insurers). Although it was not until 2015 that Allianz unveiled such a policy, when it did it was relatively ambitious, clearing the 51% threshold for “deep” action. Allianz announced that it would ‘no longer invest proprietary assets in companies that derive more than 30% of revenue from coal mining, or generate over 30% of energy from burning coal. Equities amounting to €225 million have been divested by March 2016 while bonds amounting to €3.9 billion will be expiring.’⁴⁴ As a 2017 study noted, in addition to Allianz being among the first insurers to divest from coal, its 30% threshold for mining companies *and* utilities signified ‘a more comprehensive definition of coal companies than AXA, Zurich and other peers’ that also had issued divestment policies.⁴⁵

Meanwhile, Citigroup, the only other participant in alignment, did not meet the 51% threshold for deep participation on the indicator behavior for banks: restricting financing for tar sands/extreme oil projects. It had committed to phasing out financing for these kinds of projects but had not yet actually prohibited financing for specific projects.⁴⁶

Table 6.3 conveys that the product metric saw an increase in deep participation; data shows that this change pertained only to banks, as neither of the two insurers, Allianz and AIG, met the 51% threshold for deep participation on the relevant behavior: excluding coal underwriting. By 2013, all four banks had reached the 51% threshold for deep action

⁴⁴ Allianz, 2016 CDP disclosure. Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

⁴⁵ Casey Harrell and Peter Bosshard, ‘Insuring Coal No More: An Insurance Scorecard on Coal and Climate Change,’ November 2017, 16.

⁴⁶ BankTrack, ‘Shorting the Climate: Fossil Fuel Finance Report Card 2016,’ 30; see also p. 47 for more details on grading criteria.

on the relevant behavior: investing in low-carbon projects or providing vehicles for investment (e.g. green bonds). The three American banks were the first to invest deeply in this action (Bank of America and Citigroup met the 51% threshold from 2010 on while JPMorgan did from 2011 on), while the one German bank trailed slightly (Deutsche Bank reached the 51% threshold in 2013).

The data also shows significant gains in the amount of green capital that banks were mobilizing. For example, in 2015 JPMorgan was the underwriter for ‘over \$4 billion’ in ‘green and other social and sustainability-themed bonds’; by 2016 this figure was ‘more than \$5 billion,’ and by 2017 it was \$13.5 billion.⁴⁷ Similarly, in 2013, when it became active in green bond underwriting, Deutsche Bank highlighted its role as ‘one of two other lead managers for one of the first Green Bonds, supporting the European Investment Bank in raising CHF350 million [roughly 390 million USD] for renewable energy and energy efficiency projects.’⁴⁸ By 2017, Germany’s largest bank reported having ‘supported clients to issue more [than] about €10 billion in green bonds. Many of these transactions were of high strategic importance to the issuers, and moreover helped to advance and develop the green bond market itself.’⁴⁹

Finally, Table 6.3 shows that there was not a significant change in the depth of participation in *investment*. The data shows that from 2011 on the two insurers reached the 51% threshold for the relevant action – both Allianz and AIG were active in shepherding renewable energy projects as investors themselves and/or by de-risking projects to

⁴⁷ JPMorgan, 2016 CDP disclosure (covering 2015); JPMorgan, 2017 CDP disclosure (covering 2016); JPMorgan Chase & Co., *Environmental Social and Governance Report 2017*, 25. Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

⁴⁸ Deutsche Bank, *Corporate Responsibility Report 2013*, March 2014, 41.

⁴⁹ Deutsche Bank, *Non-Financial Report 2017*, 24.

pave the way for others' investments – but that *none* of the banks ever met the 51% threshold for commitment to restricting/reducing financing for coal mining/coal power.

There were several key instances of progress, however, that indicated how certain companies increasingly appreciated that existing approaches to financing for coal were untenable. For example, in 2016 and 2017 Deutsche Bank improved its performance on reducing financing for both coal mining *and* coal power (the latter of which often was a particular “sticking point”).⁵⁰ In 2016, Deutsche Bank explained that the company ‘and its subsidiaries will not grant new financing for greenfield thermal coal mining and new coal-fired power plant construction. Moreover, the Bank will gradually reduce its existing exposure to the thermal coal mining sector.’ Deutsche Bank underscored that it would ‘not be expanding our coal financing business, *even if market opportunities present themselves*. But we want to be even more ambitious and scale back our activities in this sector by up to 20% by 2020.’⁵¹ This was a potentially significant step for a company that from 2013 through 2015 was identified by BankTrack as the world’s number one financier of coal mining projects and that in 2013 appeared to plant its flag on the issue, stipulating that ‘we do not generally avoid doing business with the coal industry.’⁵²

While any gains in “deep participation” in the three metrics were positive, an important question is whether companies were becoming more deeply invested in the *most* relevant type of action, or the most heavily weighted metric; for insurance companies this

⁵⁰ For its 2013–2015 performance, Deutsche Bank received a BankTrack grade of C- and D+, respectively, for coal mining and coal power financing; see BankTrack, ‘Shorting the Climate: Fossil Fuel Finance Report Card 2016,’ 7. By the next cycle of BankTrack reporting, covering 2016–2018, its scores on both were C+ (representing a slight improvement on coal mining and a letter grade improvement on coal power financing); see BankTrack, ‘Banking on Climate Change – Fossil Fuel Finance Report Card 2019,’ 15. For the purpose of clarity, note that the periods referred to here (2013–2015 and 2016–2018) pertain to BankTrack’s reporting cycles, not to the three-year periods that I focus on throughout this project (2010–2012, 2011–2013, and so on).

⁵¹ Deutsche Bank, *Corporate Responsibility Report 2016*, March 2017, 4. Emphasis added.

⁵² Deutsche Bank, *Corporate Responsibility Report 2013*, 33.

was product (i.e. excluding coal underwriting), while for banks it was investment (i.e. restricting financing for coal mining and power). Uniquely among all the empirical chapters, *none* of the sample companies in this chapter received over half the available points on the most relevant type of action in any year from 2010 through 2017.

For example, the two insurers took markedly different approaches to incorporating coal standards into their underwriting strategies, but even Allianz, which was “climate active” compared to AIG, failed to enact sufficiently strict coal exclusion criteria to be classified as a “deep” participant. From 2010 through 2016, Allianz had no coal exclusion policy. In 2017, it announced that ‘in Property and Casualty Insurance, with effect as of May 2018, we will no longer provide insurance to single coal-fired power plants or coal mines, that are operational or planned.’⁵³ This was a potentially significant development; given that most ‘coal projects cannot be financed, built or operated without insurance,’⁵⁴ insurers are especially well-positioned to undercut the future of coal. But meeting the threshold for “deep” action would have required Allianz to be actively reducing insurance coverage for all coal projects and companies with coal mining operations.

Meanwhile, AIG, the fourth largest insurer in the United States,⁵⁵ had no policy for even partially excluding coal underwriting. By 2017, in fact, its stance toward climate-related underwriting barely had evolved since 2010.⁵⁶ Throughout the decade AIG

⁵³ This policy did not exclude companies ‘that generate electricity from multiple sources, such as coal, other fossil fuels or renewable energies,’ which would ‘continue to be insured, and individually reviewed on the basis of defined ESG criteria. However, our stated goal is to completely phase out coal risks also in the insurance business by 2040 latest.’ Allianz, 2018 CDP disclosure (covering 2017). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

⁵⁴ Kollwe, ‘Coal power becoming “uninsurable” as firms refuse cover.’ See also Noor Zainab Hussain, ‘Businesses Urge U.S. Insurers to Stop Insuring, Investing in Fossil Fuel Producers,’ *Insurance Journal*, September 18, 2020.

⁵⁵ Statista Research Department, ‘Largest insurance companies in the United States in 2019, by total assets.’

⁵⁶ In 2010, AIG set forth that underwriters ‘routinely evaluate the potential effect on greenhouse gas emissions when considering policy renewals.’ American International Group, *Annual Report 2010*, 153.

consistently acknowledged that ‘climate change potentially poses a serious financial threat to society as a whole, with implications for the insurance industry.’⁵⁷ But such recognition of climate-related risks did not lead to changes in its approach to coal, which is the ‘single biggest contributor to climate change’⁵⁸ and, compared to other fossil fuels, a low-hanging fruit for companies seeking to “start somewhere” on incorporating fossil fuel standards. Its 2017 annual report recycled language that AIG had been using since 2013 to discuss climate risks, with no mention of coal (see note 57).

Likewise, none of the four banks reached the threshold for deep participation in restricting financing for coal mining and power, the indicator behavior for the investment metric (the most heavily weighted metric for banks). Notably, had I treated these two sides of the coal “coin” separately, the results may have differed, as banks typically imposed relatively strong restrictions on coal mining compared to coal power. For example, for their performance in 2013–2015 BankTrack awarded Bank of America, Citigroup, and JPMorgan grades of B- for coal mining, indicating progress toward phasing out financing for this part of the fossil fuel economy. But during the same period, they received grades of D, D+, and C, respectively, for financing coal power, capturing how coal power was a sticking point.

While the banks’ low scores for participation in investment largely hinged on their poor performance on financing for coal power, three out of the four banks *did* improve in this area over time, even if their improvements were insufficient to warrant higher scores according to my methodology.⁵⁹ Deutsche Bank realized the most significant gains in its

⁵⁷ AIG used this language in all annual reports from 2013–2017. See, for example, American International Group, *Annual Report 2013*, 35, and American International Group, *Annual Report 2016*, 19.

⁵⁸ Kollewe, ‘Coal power becoming “uninsurable” as firms refuse cover.’ See also Hussain, ‘Businesses Urge U.S. Insurers to Stop Insuring, Investing in Fossil Fuel Producers.’

⁵⁹ For example, over time, on coal power financing Bank of America moved from a BankTrack grade of D to C-, and Citigroup moved from a D+ to a C-, indicating that both banks had introduced some prohibitions on financing for coal power projects where previously there were none. See BankTrack, ‘Shorting the Climate:

performance on coal power financing, advancing a full letter grade according to BankTrack’s methodology: from a D+ to a C+, signifying that it had gone from just setting ‘a minimum efficiency or technology threshold for new power plant financing’ to actually excluding coal power projects from financing.⁶⁰

This part of the chapter examined how companies behaved from 2010 through 2017 to examine the extent to which they coalesced around a new paradigm of behavior. It showed that the cohort overall did not progress toward a climate active sensibility (feature 1 of a new paradigm); just one company (Allianz) changed its approach decisively enough to change types. Yet, momentum *was* gathering. All companies realized gains and companies’ cumulative 60% increase in performance between 2010–2012 and 2015–2017 reflected such developments as one of the world’s largest insurers (Allianz) divesting from coal; Germany’s largest bank (Deutsche Bank) prohibiting expansion of its coal financing business, regardless of potential market opportunities; and the second largest U.S. bank (Bank of America) leading the expansion of the nascent green bond market as one of the first corporate issuers of a green bond and ‘the number one underwriter of green bond issuances.’⁶¹

Companies consistently participated in two practices (product and investment); however, they were not so much coalescing around a new set of practices (feature 2 of a

Fossil Fuel Finance Report Card 2016,’ 6; and BankTrack, ‘Banking on Climate Change – Fossil Fuel Finance Report Card 2019,’ 15.

⁶⁰ Deutsche Bank received a D+ on coal power financing for the 2013–2015 period and a C+ for the 2016–2018 period. Note that these periods refer to BankTrack’s reporting cycles; they do not align perfectly with this project’s three-year periods (e.g. this project considers 2015–2017 as opposed to 2016–2018). See BankTrack, ‘Shorting the Climate: Fossil Fuel Finance Report Card 2016,’ 7 (see p. 46 for grading criteria); and BankTrack, ‘Banking on Climate Change – Fossil Fuel Finance Report Card 2019,’ 15 (see p. 82 for grading criteria).

⁶¹ Bank of America, 2016 CDP disclosure (covering 2015). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

new paradigm) as sustaining certain practices that already were in place prior to 2010. One practice (product) saw meaningful change in terms of how deeply invested companies were in that area (feature 3).⁶² The pattern of behavior indicated that although in certain areas status quo approaches *were* under increasing pressure, companies ultimately were not departing meaningfully from “business as usual.” Banks were not phasing out all financing for coal-based businesses and insurers were not eliminating coverage for coal projects, actions that would have signified serious blows to the old dominant design.

Part III: Patterns of emergent action

In this part of the chapter, I show that the six finance companies never perceived climate change as being of high material importance—and its perceived material importance *declined* over time. In the context of Part II’s finding – that all companies realized improvements in climate performance (even if only one, Allianz, altered its approach sufficiently to transition to a higher type) – this industry case study demonstrates a strong pattern of emergent action.⁶³

Emergent action at the industry level

To begin, I evaluate how the cohort of six companies perceived the material importance of climate change from 2010– 2016.⁶⁴ After considering whether companies perceived risks

⁶² All three metrics technically registered increases in terms of companies’ depth of participation in these practices (as shown in Table 6.3), but, as discussed, the increase in alignment actually captures change in just one company’s behavior; meanwhile, the increase in depth of participation in the investment metric (3 percent) was negligible.

⁶³ As discussed throughout this study, the essential marker of emergence is a misalignment between inputs and outputs—or, in the context of each case study industry and company, between *perceptions* of climate change as a material concern and changes in climate-related *action*. The disjuncture as opposed to the absolute level of climate action is key.

⁶⁴ As in each empirical chapter, 2017 is excluded due to changes in CDP surveys, which compromised the comparability of the 2017 data.

and/or opportunities from climate-related regulation, changing consumer behavior, and physical impacts – and if so, with what degree of certainty, on what time horizon, and with what anticipated level of material impact – I assessed their annual “perception strength” and then calculated three-year averages. Table 6.4 presents the perception strength among the companies in each of the periods spanning 2010–2016.⁶⁵ Tables 6.5–6.7 parse the data, separating perceptions concerning climate-related regulation, consumer behavior, and physical impacts.

Table 6.4. Material impact of climate change, 2010–2016.

Years (period number)	Material impact
2010–2012 (1)	18
2011–2013 (2)	18
2012–2014 (3)	14
2013–2015 (4)	11
2014–2016 (5)	6
Percent change between periods 1 and 5	-67

For finance companies, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern.

⁶⁵ Note that a company that perceived climate change to be *very* relevant overall (presenting high-impact risks and opportunities tied to regulation, changing consumer behavior, and physical impacts) would score 100 in the “material impact” column in the tables, while a company that perceived it to be *not* very relevant (presenting *no* major material risks or opportunities in any of the categories) would score 0.⁶⁵

Table 6.5. Material impact of regulation, 2010–2016.

Years (period number)	Material impact, regulation
2010–2012 (1)	22
2011–2013 (2)	20
2012–2014 (3)	11
2013–2015 (4)	6
2014–2016 (5)	0
Percent change between periods 1 and 5	-100

For finance companies, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Table 6.6. Material impact of changing consumer behavior, 2010–2016.

Years (period number)	Material impact, consumers
2010–2012 (1)	3
2011–2013 (2)	8
2012–2014 (3)	8
2013–2015 (4)	11
2014–2016 (5)	5
Percent change between periods 1 and 5	+67

For finance companies, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

Table 6.7. Material impact of physical effects, 2010–2016.

Years (period number)	Material impact, <i>physical</i>
2010–2012 (1)	28
2011–2013 (2)	28
2012–2014 (3)	22
2013–2015 (4)	17
2014–2016 (5)	11
Percent change between periods 1 and 5	-61

For finance companies, the percentage of risks and opportunities related to the physical effects of climate change that were perceived to be a high-impact material concern.

Table 6.4 shows not only that climate change never was perceived to be of high material importance (with strength of perception “peaking” at 18% in periods 1 and 2) but that perceptions of its material importance moved in the opposite direction of what would have been expected given where the industry landed—a place where, in Fink’s words, it saw the need to reassess its ‘core assumptions’ on account of climate change.⁶⁶ As Tables 6.5 and 6.7 indicate, the overall development was driven by vanishing outlooks for bold state action and a declining sense of serious material impacts tied to the physical effects of climate change. Meanwhile, Table 6.6 demonstrates a trivial concern with the impact of changing consumer behavior, which registered at just 5% by period 5.

Emergent action at the company level

This section considers how each company perceived climate-related risks and opportunities in order to evaluate whether there is evidence of the pattern of emergent action at the

⁶⁶ Fink, ‘A Fundamental Reshaping of Finance.’

company level. Just one company (Allianz) altered its climate approach to a sufficient degree to transition to a higher type, but all companies made modest improvements in their performance; meanwhile, select companies made notable changes to aspects of their approaches, as Part II showed (e.g. Deutsche Bank’s progress on restricting financing for coal power).⁶⁷ By examining the perception strength of individual companies, we can appreciate how such progress, however limited, was occurring in the context of low or *declining* perceptions that climate change presented high-impact costs or benefits. Table 6.8 presents the strength of perception of each of the six companies.

Table 6.8. Material impact of climate change for individual companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
AIG	0	0	0	0	0
Allianz	17	17	17	17	17
Bank of America	0	6	11	11	11
Citigroup	22	22	11	17	11
Deutsche Bank	67	67	44	22	0
JPMorgan	0	0	0	0	0

Among individual finance companies, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern.

Tables 6.9–6.11 separate data on perceptions of serious material impacts from climate-related regulation, changing consumer behavior, and physical effects, respectively.

⁶⁷ Because only one company, Allianz, changed types over time, my approach to this part differs in this chapter compared to the previous three empirical chapters; in Chapters 3–5, I examined company-level perception data only for those companies that changed types at any point.

Table 6.9. Material impact of regulation for individual companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
AIG	0	0	0	0	0
Allianz	0	0	0	0	0
Bank of America	0	0	0	0	0
Citigroup	33	17	0	0	0
Deutsche Bank	100	100	67	33	0
JPMorgan	0	0	0	0	0

Among individual finance companies, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Table 6.10. Material impact of changing consumer behavior for individual companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
AIG	0	0	0	0	0
Allianz	0	0	0	0	0
Bank of America	0	0	0	0	0
Citigroup	17	33	33	50	33
Deutsche Bank	0	17	17	17	0
JPMorgan	0	0	0	0	0

Among individual finance companies, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

Table 6.11. Material impact of physical effects for individual companies, 2010–2016.

Company	2010–2012 (period 1)	2011–2013 (period 2)	2012–2014 (period 3)	2013–2015 (period 4)	2014–2016 (period 5)
AIG	0	0	0	0	0
Allianz	50	50	50	50	50
Bank of America	0	17%	33	33	17
Citigroup	17	17	0	0	0
Deutsche Bank	100	83	50	17	0
JPMorgan	0	0	0	0	0

Among individual finance companies, the percentage of risks and opportunities related to the physical effects of climate change that were perceived to be a high-impact material concern.

Considered in the context of Part II's findings, Tables 6.8–6.11 capture how, in key instances, there was a disjuncture between companies' change of behavior and their declining or unchanging perceptions of the material significance of the climate issue. Consider Deutsche Bank. As Part II showed, although Germany's largest bank did not improve its climate performance enough to transition to a higher type by 2015–2017, it made the most underlying progress of any company, improving its score by 200% between period 1 (2010–2012) and period 6 (2015–2017). This improvement largely was a function of the 2016 establishment of a policy for coal financing; to recall, Deutsche Bank announced that it had made the decision not to expand 'our coal financing business, *even if market opportunities present themselves*. But we want to be even more ambitious and scale back our activities in this sector by up to 20% by 2020.'⁶⁸ Notably, this decision was made during period 5, when, as Tables 6.8–6.11 show, Deutsche Bank was reporting *no* high-impact climate risks *or* opportunities—a stark change from the first part of the decade when the bank perceived that both climate-related regulation *and* physical effects were serious business concerns (see Tables 6.9 and 6.11, respectively). Instituting a coal financing policy during the period that concern about climate change's material impacts was at its nadir is exactly the type of disjuncture that is the signature of emergent action.

Tables 6.8–6.11 point to another case of the pattern of emergent action: Allianz, which in 2015–2017 became the only financial company to change types, transitioning from BAU to evolutionary. As the tables show, Allianz never altered its estimation of the financial implications of climate change. Its performance improved initially in 2015 due to its announcement that it would 'stop financing coal-based business models' and divest 'from equity stakes in coal-based business models in early 2016.'⁶⁹ Its performance further

⁶⁸ Deutsche Bank, *Corporate Responsibility Report 2016*, 4. Emphasis added.

⁶⁹ Allianz, *2015 Sustainability Report*, 9.

improved in 2017, causing its transition to an evolutionary, when it determined that ‘in Property and Casualty Insurance, with effect as of May 2018, we will no longer provide insurance to single coal-fired power plants or coal mines, that are operational or planned.’⁷⁰ When a company changes its approach to the climate issue despite *no* changes in its perception of its material importance, this suggests that there is another, broader factor behind its behavior. In this study, as Chapter 7 addresses more fully, my argument is that for a company like Allianz the “broader factor” underlying the growing sense that old assumptions about the issue would not work going forward was the recognition that states could not be counted on to play their expected role in addressing an issue of transnational importance set to shape future global trends.

In this part of the chapter, I considered evidence for the pattern of emergent action at the industry and company levels, showing, first, that the six-company cohort registered an overall 60% increase in climate performance (see Table 6.1 in Part II) amid a dramatic (67%) decline in the perception that climate change was a high-impact material concern. Second, the evidence showed especially clear examples of the pattern of emergent action at the company level in two cases: Allianz improved its climate performance by 80% and became an evolutionary despite unchanging assessments of the material importance of the climate issue; meanwhile, Deutsche Bank improved its performance by 200% despite that by 2015–2017 it perceived *no* high-impact risks *or* opportunities from climate-related regulation, changing consumer behavior, *or* physical effects.

⁷⁰ Allianz, 2018 CDP disclosure (covering 2017). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

In terms of this study’s overall argument about the variable or condition accounting for the private sector’s new pattern of behavior and sensibility toward climate change, an especially key finding in this part of the chapter was that companies’ outlook for bold state action on the issue (in the form of regulation entailing high-impact material costs or opportunities) vanished, dropping to zero by 2015–2017. A key alternative explanation for the pattern, as described in Chapter 1, found no support: changing consumer behavior was a non-issue.

Conclusion

Of the 34 sample companies in this project, none are so important as those in this chapter in terms of their role in accelerating the low-carbon transition. As discussed, only these six companies can claim to be entwined in virtually every facet of the high-carbon economy; once the linchpins of this economy change course, the “game” will change. As I have shown, during this project’s timeframe of interest, the cohort did not move decisively toward a climate active sensibility, but by the early 2020s something *had* changed among these climate laggards—even for JPMorgan, the world’s largest fossil fuel bank.⁷¹

In a vivid indication of how the landscape was changing for even the unlikeliest of actors, in 2020 commissioners of the U.S. Commodity Futures Trading Commission who had been appointed by the Trump administration – which was ‘consistently hostile to efforts to fight or even assess the risks of climate change’ – issued a report concluding that ‘the U.S. financial system is imperiled by climate change.’ The report’s ‘dozens of recommendations, some of them potentially controversial, such as adding the costs of climate

⁷¹ As discussed, in early 2020 JPMorgan announced a prohibition on financing for all new coal-fired power plants, a week after a report leaked in which two in-house economists warned of ‘catastrophic consequences’ of failing to slash emissions by 2050. See Rainforest Action Network, ‘JPMorgan Chase Coal and Arctic Policy a Step Forward But Fails to Match its Responsibility as the World’s #1 Fossil Fuel Bank.’

damage to the price of fossil fuels,' were unanimously endorsed by its authors, which included representatives from oil companies, banks, and investment firms. As one of its authors put it, the 'report's greatest significance...may be that it exists at all.'⁷²

As the final chapter considers, one of this project's major implications is that in a short period, some of the actors *most* invested in the old dominant design came to see that its days were numbered; in the span of a decade, what seemed 'an immutable trajectory' began to bend toward a 'new landscape.'⁷³

⁷² Jeffrey Dukes, 'Most surprising thing about a new report showing climate change imperils the US financial system is that the report even exists,' Yahoo, October 30, 2020.

⁷³ Doug Struck, 'Power pivot: What happens in states where wind dethrones King Coal?' *Christian Science Monitor*, August 21, 2020.

CHAPTER 7—Analysis and Implications

Introduction

This chapter evaluates the industry-specific findings of the four empirical chapters in their broader context in order to explore this study's central finding: non-state actors that individually do not appear inclined to alter their approaches vis-à-vis an issue of transnational importance can, through a decentralized and uncoordinated process, and in the context of states failing to provide leadership, come to move in a cohesive new direction, even becoming *de facto* leaders in the issue area. The chapter analyzes what the case study of private sector climate action implies about the new actors, issues, and dynamics that have the potential to reshape the landscape and context in which states will have to advance their interests in the 21st century.

The chapter is divided into four parts. First, I evaluate the empirical findings about how the private sector pattern of response to climate change developed, in terms of both the actors that adopted a more climate active sensibility and the specific components of the pattern. As I discuss, in a short period of time actors coalesced around a certain set of practices as the new paradigm of behavior, or dominant design; 82% improved their overall climate performance to a demonstrable degree, while 50% moved decisively toward a more active climate sensibility (captured by their transition to higher types).

In the second part, I discuss how in all four empirical chapters there was evidence at the industry- and/or company-level of the emergent pattern of action that Chapter 1 described: an inconsistency between how individual actors saw the material import of climate change and how they behaved. This finding strongly supports my argument that the new private sector pattern of response was emergent, or a second-order outcome that would not have been anticipated on the basis of how individual actors perceived the

climate issue. Part II highlights the evidence for this study's independent variable, or the condition that I argue explains why companies ultimately coalesced into a new pattern of behavior, like "geese" coming into a "V-formation" in response to certain conditions in their environment: namely, declining confidence in states' willingness to play their expected role vis-à-vis such a critical issue.

Part III examines a set of hypotheses about company- and industry-level determinants of emergent action, which anticipate that depending on their industry and/or head-quarter country certain corporate Great Powers will be more inclined to undertake action vis-à-vis an issue like climate change prior to perceiving strong material incentives for doing so. Part III shows that emergent action was most prevalent in the technology and finance industries. Within industries, with one exception (automotive), US-based companies accounted for the vast majority of emergent action, although the rate of emergent action increased most dramatically among Germany-based companies. I analyze what these findings suggest about the conditions that may make it more likely that actors will not just recognize the need for a new approach to non-traditional issues but will seize the initiative and take on a new role vis-à-vis these challenges.

Part IV concludes by discussing four of this study's key implications. These include both lessons specific to the case study of private sector climate action and broader insights about the consequences for global order of new actors developing an increasing ambition to act independently in the context of some of this century's most critical issues.

Part I: The development of a new dominant design

This part of the chapter draws together the empirical findings about the specific actors and practices that became part of the overall private sector pattern of response to the climate issue. It discusses each feature of a new dominant design, or paradigm of behavior, in turn:

- 1) companies' climate performance increasing over time,
- 2) more companies adopting a certain set of practices, and
- 3) companies making deeper investments in a certain set of practices.

As I discuss, the data indicates that companies coalesced around certain practices and became more deeply invested in them over the course of the 2010–2017 timeframe; with 82% of companies making demonstrable improvements in their climate performance and 50% taking decisive steps toward a more climate active sensibility, there is strong evidence that companies developed new understandings about the kinds of behavior necessary to succeed in a changing environment.

Table 7.1 presents each company's type (BAU, evolutionary, innovator, or disruptor) in each three-year period spanning 2010–2017. To recall, companies were classified based on scores for performance on industry-specific climate practices, captured by three general metrics: product, alignment, and investment. At the bottom of each box in the table, I indicate the number of companies belonging to that type to provide a snapshot of change over time in the type distribution. In the last column I indicate in parentheses the net percent change in each company's score; company names are in bold if they belonged to higher types in the final period than in the first. The last row shows the percent change in companies' cumulative score between periods to provide a snapshot of momentum.¹

¹ Note that within each box, companies are listed in descending order of score, with companies receiving the same score listed in alphabetical order.

Table 7.1. Company types, 2010–2017.

Type	2010–2012	2011–2013	2012–2014	2013–2015	2014–2016	2015–2017
Disruptor				Apple (1)	Apple Heidelberg E.ON (3)	E.ON (+64) Apple (+143) Walmart (+21) Heidelberg (+33) (4)
Innovator	Walmart (1)	Walmart Google Heidelberg (3)	Walmart Heidelberg Google J & J (4)	Heidelberg Walmart BASF E.ON (4)	Walmart BASF VW (3)	VW (+88) BASF (+18) BMW (+30) Google (+18) Infosys (+63) Tata Steel (+30) Thyssen. (+86) (7)
Evolution.	Heidelberg BASF Bayer E.ON Google BMW Daimler J & J Tata Steel (9)	BASF J & J BMW E.ON Infosys Bayer Daimler Tata Steel Apple Pfizer VW (11)	Apple E.ON BASF BMW Daimler Infosys Dow Bayer Pfizer VW (10)	BMW VW Daimler Infosys J & J Google Pfizer Bayer Dow Tata Steel (10)	BMW Daimler Infosys Google J & J Bayer Toyota (7)	Daimler (+20) Bayer (-9) Ford (+43) Pfizer (+100) Ultratech (+67) Allianz (+80) J & J (-10) Microsoft (+50) Toyota (+13) (9)
BAU	Infosys Toyota VW Apple Dow Ford Thyssen. Chevron Chrysler Citigroup GM Microsoft Ultratech Allianz Bank of A. Pfizer RWE Samsung Shell JPMorgan AIG Exxon Deutsche B. Reliance (24)	Dow Ford Microsoft Samsung Toyota Chevron Citigroup GM JPMorgan Ultratech Allianz Bank of A. Chrysler RWE Shell Thyssen. AIG Deutsche B. Exxon Reliance (20)	Citigroup GM JPMorgan Microsoft Samsung Tata Steel Toyota Bank of A. Chevron Chrysler Ford Ultratech AIG Allianz RWE Shell Thyssen. Exxon Deutsche B. Reliance (20)	GM Samsung Toyota Ultratech Citigroup JPMorgan Microsoft Allianz Bank of A. Ford Thyssen. AIG Chevron Chrysler RWE Shell Deutsche B. Exxon Reliance (19)	Ford GM Microsoft Pfizer Tata Steel Thyssen. Allianz Chrysler Citigroup Dow JPMorgan Samsung Ultratech Bank of A. Shell AIG Deutsche B. Chevron Exxon RWE Reliance (21)	Samsung (+60) Bank of A. (+40) Chrysler (+17) Citigroup (+17) Dow (-) GM (+17) Shell (+40) Deutsche B. (+200) JPMorgan (+50) AIG (+67) Exxon (+67) Chevron (-33) RWE (-20) Reliance (-) (14)
% change	(---)	+9	+3	+6	+5	+9 (cumulative: +37)

*Evolution. is evolutionary; Bank of A, Bank of America; Deutsche B., Deutsche Bank; J&J, Johnson & Johnson; and Thyssen., Thyssenkrupp.

Thirty-four companies classified according to climate performance.

Table 7.1 shows which of the 34 companies, representing four industry groups and six headquarter countries, changed their approach to climate change, when, and to what extent. It shows that, consistent with the first feature of a new paradigm, overall performance increased over time; once the cohort moved forward, it never retreated. By 2015–2017, 82% of actors had realized positive changes in performance, with 50% moving decisively toward a more climate active sensibility, transitioning to higher types. With 65% of the type-changers becoming disruptors or innovators, there was a high level of ambition among companies that significantly altered their climate approach.

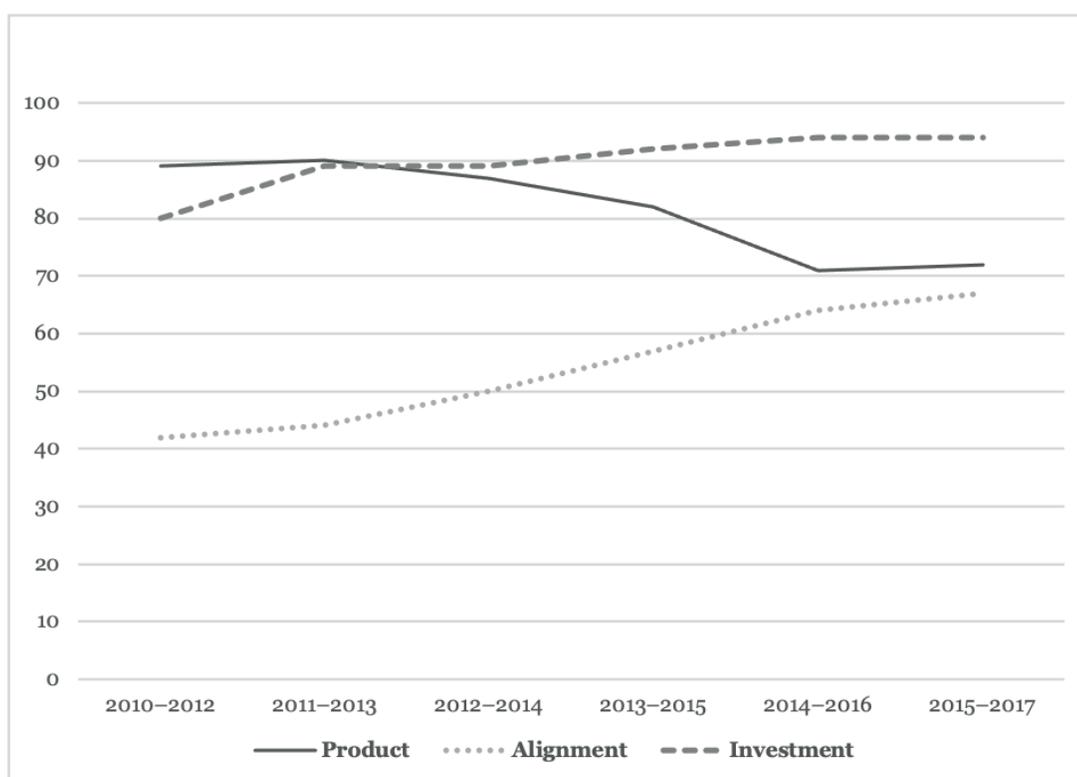
Table 7.1 captures when and to what extent momentum gathered over time. As the last row indicates, there was a 37% increase in companies' collective score between periods 1 and 6. The greatest inter-period increases occurred between periods 1 and 2 and periods 5 and 6. In terms of type-changes, 2015–2017 (period 6) was especially significant; the BAU cohort diminished by 33% (overall, from period 1–6, it decreased by 42%), while the innovator cohort increased by 133% (overall, from period 1–6, it increased by 600%).

The conventional wisdom holds that the December 2015 Paris Conference was a watershed for the private sector beginning to reckon with climate change in a serious fashion. While I address the Paris Conference's significance later in this chapter, the key point in the context of Table 7.1 is that the new private sector pattern of behavior was taking shape and gaining traction prior to that event. From periods 1 through 4 (i.e. from 2010–2012 through 2013–2015), encompassing pre-Paris activity, companies achieved 53% of the total gains realized over the 2010–2017 timeframe.

To examine whether there was evidence of the second feature of a new paradigm, I explored whether companies adopted a certain set of practices over time. For each three-year period in the 2010–2017 timeframe, I determined the average number of companies

receiving any score on each of the general metrics (product, alignment, and investment), which encompassed industry-specific practices.² Figure 7.1 displays the results, showing the breadth of action, or “participation,” in each of the three metrics. The figure shows as a percentage the number of companies out of 34 that received a score for each metric in each period.

Figure 7.1. Percentage of companies adopting climate practices, 2010–2017.



The percentage of companies receiving a score for addressing the carbon “profile” of goods/services (product), making current activities coherent with the low-carbon future (alignment), and investing in the low-carbon future (investment).

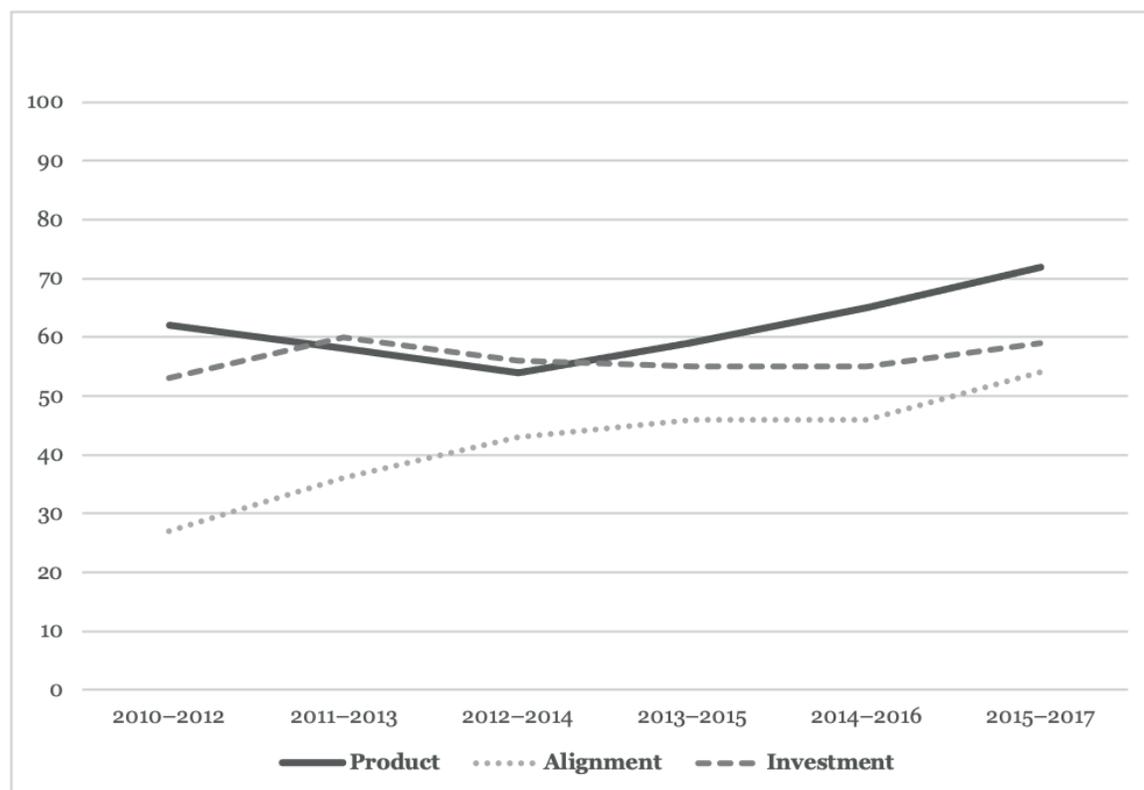
As Figure 7.1 conveys, rates of participation in product and investment were consistently high, never dropping below 71% and 80%, respectively; by far the most significant change concerned alignment, which saw a 60% increase between periods 1 and 6.

² To recall, if a company’s performance was sufficiently poor, it received a score of zero.

Increasing participation in alignment signifies that more companies became confident in the low-carbon future; as the empirical chapters discussed, the industry-specific practices encompassed by this metric are especially significant in that they can act as a bridge to the low-carbon future by altering companies' incentives to change their behaviors "here and now," anticipating a future when carbon carries a cost (the logic of carbon pricing); further, they can have significant second-order impacts (especially salient in the context of addressing value chain emissions). By capturing that the most significant gains in alignment occurred in the pre-Paris Conference context (in 2012–2014 and 2013–2015), Figure 7.1 conveys that more companies were becoming confident in the low-carbon future and beginning to behave accordingly *before* the event that has been assumed widely to be a turning point for the private sector appreciating the low-carbon future's likelihood.

While Figure 7.1 provided a snapshot of how *broadly* companies were participating in the climate practices captured by the three metrics, data in Figure 7.2 reflects companies' commitment to these practices, or how *deeply* they were participating. It shows as a percentage the number of companies receiving over half the available points for their performance on each metric.

Figure 7.2. Percentage of companies deeply invested in climate practices, 2010–2017.



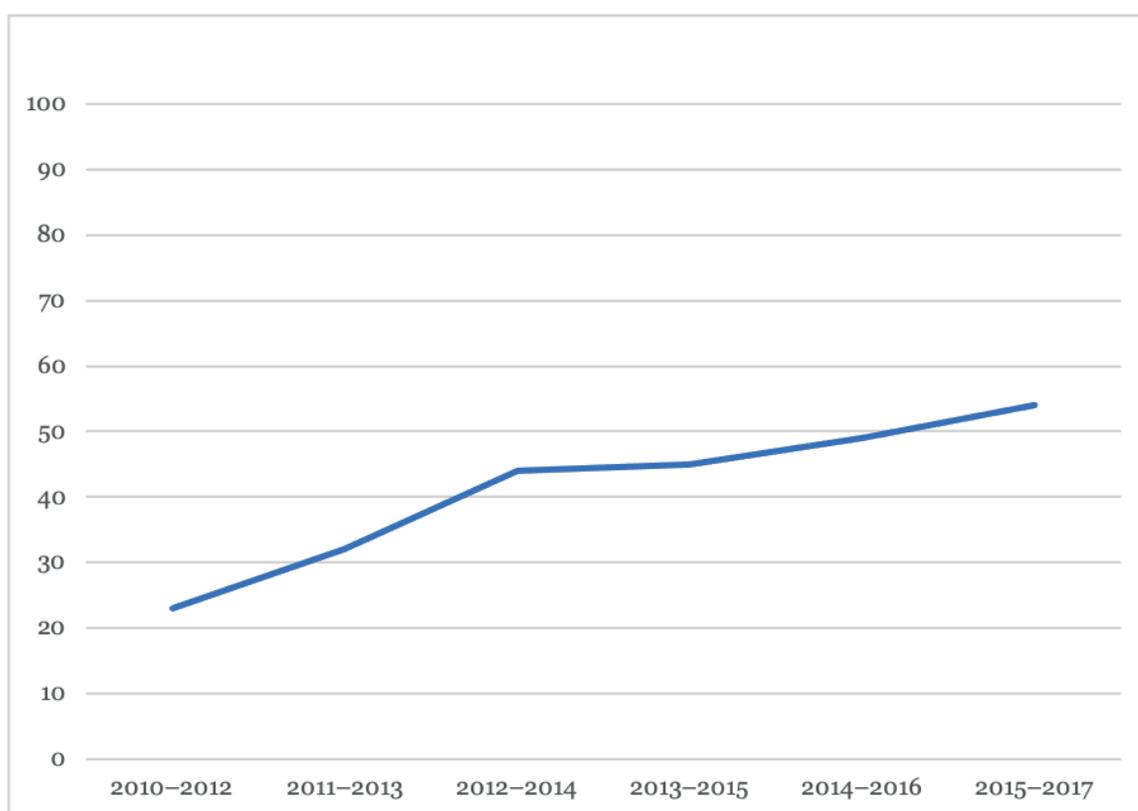
The percentage of companies receiving over half the available points for addressing the carbon “profile” of goods/services (product), making current activities coherent with the low-carbon future (alignment), and investing in the low-carbon future (investment).

Figure 7.2 shows that companies became more deeply invested in all three metrics; the most significant change related to alignment, with the percentage of companies deeply invested in this type of action doubling over time. Considered alongside the results presented in Figure 7.1, the key finding is that not only were *more* companies becoming confident in the low-carbon future but companies were becoming *increasingly* confident in this future. Particularly significant for this project’s argument about the key condition spurring companies toward a new climate approach (diminishing confidence in states’ willingness to act), the greatest gains in deep participation in alignment occurred not just before the Paris Conference but soon after the collapse of the 2009 Copenhagen Climate

Conference; specifically, in 2011–2013 there was a 33% increase in the number of companies undertaking relatively ambitious practices related to alignment.

Depending on the industry, different metrics are more or less significant in terms of what they indicate about a company’s level of climate ambition (as certain practices are more or less important for a given industry depending on its activities and the key sources of its climate impacts). As a check on the findings shown in Figure 7.2, Figure 7.3 shows the percentage of companies in each period that received over half the available points on the most important metrics for their respective industries.

Figure 7.3. Percentage of companies deeply invested in the most significant climate practices, 2010–2017.



The percentage of companies receiving over half the available points on the most significant climate practices for their respective industries.

Figure 7.3 shows the steady increase in the percentage of companies adopting ambitious and high-impact behaviors in especially crucial areas; in period 1 just 23% of companies were participating “in-depth” on the most important metrics of action for their industries, but by period 6 this number was 54%—significant progress in a short period of time. The two earliest inter-period changes (between periods 1 and 2 and periods 2 and 3) were the most significant (at 39% and 38%, respectively) by a considerable margin.³ Consistent with Figures 7.1 and 7.2, Figure 7.3 underscores how the most appreciable changes occurred early in the decade—not simply in the pre-Paris Conference context and prior to any fillip it may have provided for action, but soon after the collapse of the 2009 Copenhagen Conference and amid reverberations from the Great Recession when prospects for private sector climate action appeared especially dim.

This part of the chapter considered aggregate data showing how the 34 companies behaved during six three-year periods spanning 2010–2017 in order to assess changes in their climate performance and developments in their sensibilities vis-à-vis the issue. It showed strong evidence for the first feature or marker of a new paradigm; 82% of companies made progress in their performance, to varying degrees becoming part of the process ultimately producing the new private sector pattern of response, while 50% of companies altered their approach to a significant degree, moving decisively toward a more climate active sensibility (captured by their transition to higher types). It also presented evidence for two additional features of a new paradigm; over time more companies adopted two practices (alignment and investment) and became more deeply invested in three (alignment, investment, and product). Once the private sector moved forward in terms of level of climate activity and performance, it never regressed; overall, the circle of actors

³ The next highest inter-period change, between periods 5 and 6, was 10%.

adopting certain practices expanded (feature 2); and the investments that companies made in specific practices (feature 3) deepened over time.

In the context of this study's overarching interest in the new actors and issues that have the potential to reshape the global landscape, the findings in this part are significant for what they indicate about when, how, and to what extent 34 of the world's largest companies – and some of the most powerful economic actors overall – altered their behavior vis-à-vis this non-traditional issue area. In a short timeframe, companies representing different industries and headquarter countries increasingly moved in a new direction on the climate issue. Once the company cohort moved in a certain direction, it never retreated; a new understanding about the “rules of the game,” or about the kinds of behaviors necessary for success in a changing environment, locked in.⁴

The next part of the chapter presents aggregate data on the pattern of emergent action within specific industries to demonstrate that as companies coalesced around new practices and moved toward a more climate active sensibility, the key variable in their environment was declining confidence that states would play their expected role responding to this critical issue of transnational importance. Part II also discusses how a key alternative explanation for the private sector's behavior did not gain purchase in this study, as companies did not perceive intensifying consumer-driven pressure to change course.

Part II: Non-state actor responses to state abdication of leadership

In Chapter 1, I argued that in coalescing around a set of climate practices over the course of the 2010s, companies behaved much like a ‘leaderless flock of geese,’ sensing ‘some shift in conditions and sensing each other's intuitions,’ and changing direction.⁵ The essence of

⁴ The only micro-level exception to the macro-level pattern was the number of companies participating in the product metric, or the specific practices that the metric encompasses; see Figure 7.1.

⁵ Brooks, ‘Biden's Rise Gives the Establishment One Last Chance.’

my argument is that the new pattern of response, like a “V-formation” of geese, was an emergent outcome; the pattern reflected a certain way of seeing the climate issue despite individual companies not yet perceiving the issue in that light. In other words, the inputs did not exhibit the essential quality of the outcome, or the output; the whole was *different* from, not greater than, the sum of the parts.⁶ I proposed that the key “shift in conditions” was companies increasingly appreciating that states were unwilling to address effectively an issue long assumed to fall within their remit.

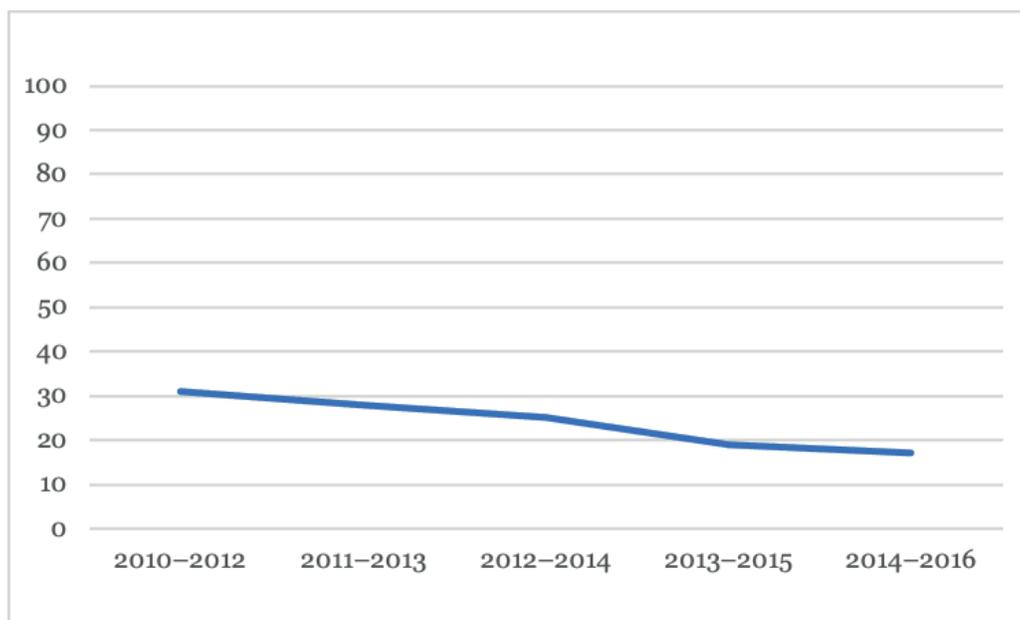
In this part of the chapter, I present aggregate findings about how the 34 companies perceived the material importance of climate change to establish that there was an overarching pattern of emergent action; in particular, I show that the driver behind this pattern was a decline in the private sector’s outlook for climate-related regulation entailing high-impact costs or opportunities. In other words, the critical variable or condition in companies’ environment was their declining confidence in prospects for bold state action on a risk that by the 2010s had gained increasing international recognition as not just one among many global challenges but as one likely to be a defining factor in the 21st century geopolitical, security, and economic landscape.

To recall, I gathered data from annual CDP surveys about how companies perceived the relevance of various categories of climate-related risks and opportunities. I only consider data for 2010–2016 as CDP’s methodology changed in 2017. As I show, companies’ perceptions that climate change was a high-impact material concern declined by 45% between 2010–2012 and 2014–2016; notably, perceived prospects for regulation declined by 67%. Meanwhile, outlooks for significant climate-related changes in consumer behavior increased by 31%—but what appears to be a considerable development in fact represents only a four percentage-point increase, from 13% to just 17%.

⁶ Jervis, *System Effects*, 12-13.

Figure 7.4 presents data on the 34 companies' perceptions that climate-related risks and opportunities (stemming from regulation, changing consumer behavior, and, for certain industries, physical effects) represented high-impact material concerns. Figures 7.5 and 7.6 separate perception data concerning climate-related regulation and changing consumer behavior to demonstrate that the diminishing level of concern with climate change overall was driven by a precipitous decline in companies' outlook for high-impact regulation.⁷

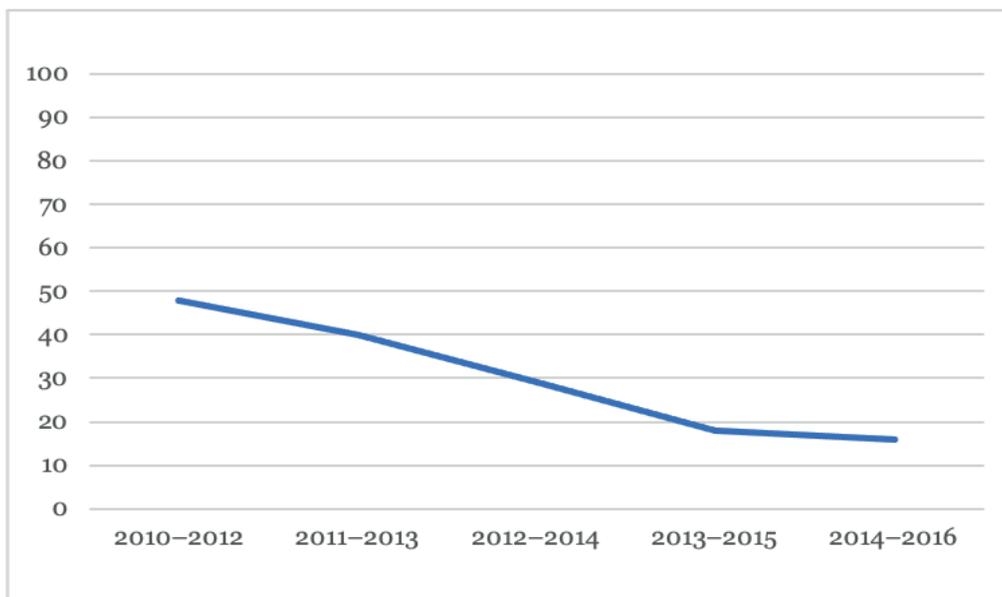
Figure 7.4. Perceived high-impact risks and opportunities related to climate change, 2010–2016.



Among 34 companies, the percentage of climate-related risks and opportunities that were perceived to be a high-impact material concern.

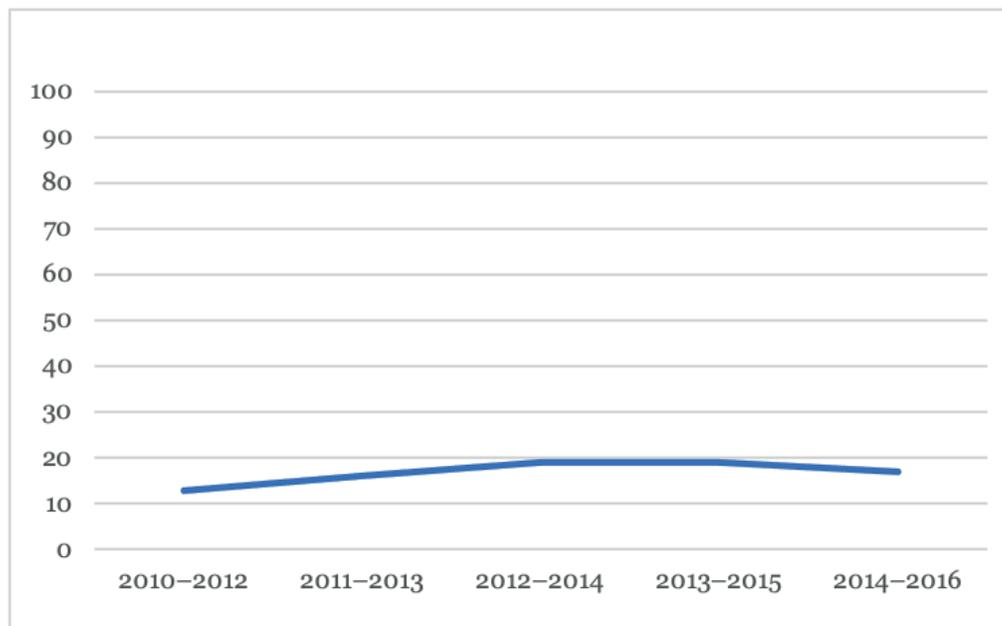
⁷ I do not present separate perception data concerning the physical effects of climate change as this category only pertained to select companies in the sample set, including banks, insurers, and oil and gas companies.

Figure 7.5. Perceived high-impact risks and opportunities from climate-related regulation, 2010–2016.



Among 34 companies, the percentage of regulatory risks and opportunities that were perceived to be a high-impact material concern.

Figure 7.6. Perceived high-impact risks and opportunities from climate-related changing consumer behavior, 2010–2016.



Among 34 companies, the percentage of consumer-related risks and opportunities that were perceived to be a high-impact material concern.

As Figure 7.4 shows, the perception that climate change was a high-impact material concern declined steadily, with the largest inter-period decrease (24%) occurring between 2012–2014 and 2013–2015. Distinguishing between the two factors of interest, first, Figure 7.5 captures that perceptions that climate-related regulation was highly relevant in terms of material impact dropped from 48% to 16% between 2010–2012 and 2014–2016; the steepest decline (38%) occurred between 2012–2014 and 2013–2015. Second, Figure 7.6 shows that in 2010–2012 just 13% of companies perceived that climate-related changes in consumer behavior presented high-impact risks and/or opportunities; by 2014–2016 this number still was only 17%.

The first implication is that if states intended for the “Paris moment” to signal their readiness to take bold climate action, this cohort of 34 companies apparently did not interpret it this way. In 2010–2012, companies were moderately confident in prospects for regulation that entailed major material costs and/or opportunities; in 2014–2016, during the “Paris” period – including the run-up to the conference, when key states were announcing their Intended Nationally Determined Contributions; the conference itself; and the ratification of the Paris Agreement – they were much less confident. While we lack perception data for 2015–2017, there likely was not a sudden turnaround in the outlook for high-impact regulation.

The second implication is that if companies began the decade registering changing consumer behavior as a limited factor in their assessment of the material importance of climate change, by 2014–2016 it was only marginally more relevant a concern. A UK-based representative for Shell summarized the limited importance of climate-driven changes in consumer behavior this way in 2018: ‘If you ask people whether they think climate change is important, they’ll all tell you it is. But if you ask them to change their lifestyles, then they

don't.⁸ While the focus in the remainder of this chapter is the regulatory aspect of companies' perceptions, as this is most pertinent to my central argument, this finding is key for appreciating that the main alternative argument, as described in Chapter 1, does not find support in the data.

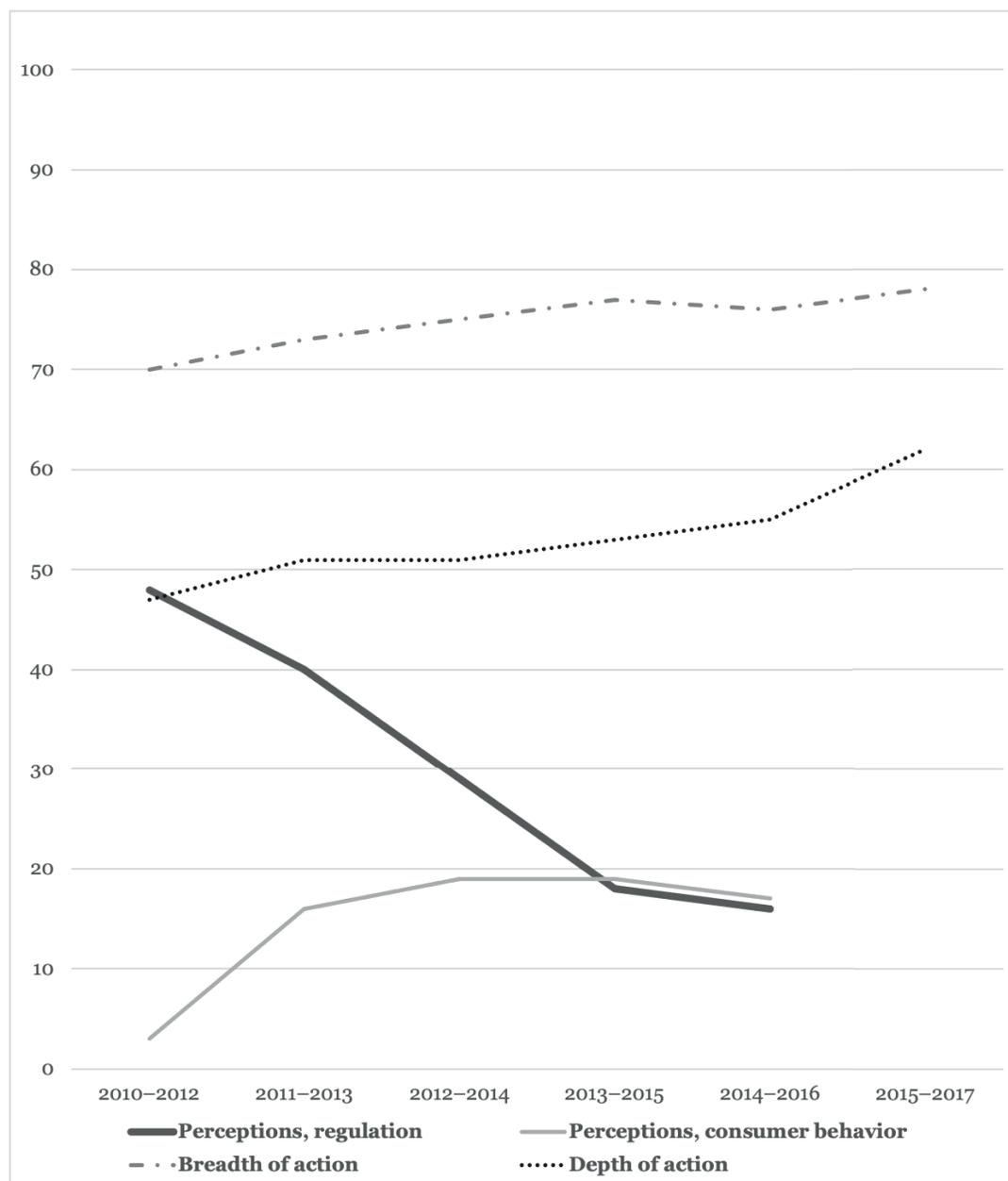
The data shown in Figures 7.4–7.6 would not constitute a major puzzle if there had been no meaningful changes in how the private sector approached climate change. As Part I of this chapter discussed, however, 82% of the company cohort, or 28 out of 34 of the world's largest companies, made demonstrable progress in their climate performance. Meanwhile, 61% of those (or 17 of 28) altered their approaches to a significant degree; their transition to higher types signified adoption of progressively more active climate sensibilities.

Figure 7.7 presents a snapshot of findings concerning the pattern of emergent action, or the inconsistency between how the 34 individual actors perceived the climate issue and how the cohort behaved. The figure draws together key insights from Part I concerning actors' adoption of certain practices ("breadth of action") and deepening investments in certain practices ("depth of action") with findings presented in this part concerning actors' perceptions of regulation and changing consumer behavior as serious material concerns.⁹

⁸ Interview 1. This interviewee pointed out, for example, that in 2016 political debates in the United Kingdom and the United States, 'energy and climate change didn't get a mention whatsoever. It's a non-issue.'

⁹ In Part I, in each period I looked at breadth and depth of participation for the three metrics (product, alignment, and investment) separately. Figure 7.7 combines the data for the three metrics for each period. Thus, for example, "breadth of action" for period 1 shows the average participation for product, alignment, and investment. Figure 7.7 does not include data on perceptions pertaining to the physical effects of climate change given that, as discussed in note 7, this category only pertained to select companies in the sample set, including banks, insurers, and oil and gas companies.

Figure 7.7. Inconsistency between companies' climate action and perceptions, 2010–2017.



Comparison of companies' adoption of, and investment in, climate practices, on the one hand, and perception of climate-related regulation and changing consumer behavior as high-impact material concerns, on the other.

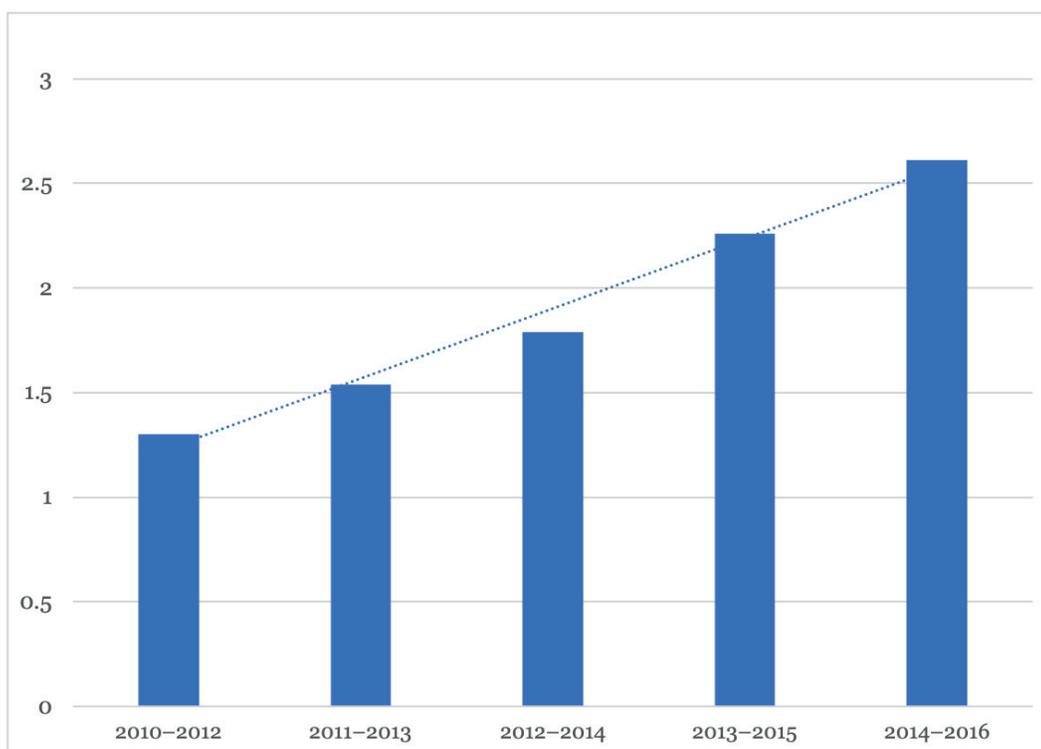
As Figure 7.7 shows, as companies were adopting new climate practices and becoming more deeply invested in them their perceptions of climate change as a high-impact material concern – particularly their outlook for bold regulatory action – declined significantly. In Chapter 1, I articulated a hypothesis concerning my theory’s expectation for why the pattern that Figure 7.7 captures developed as it did, accelerating over the course of the 2010–2017 timeframe. Hypothesis 1 (H1) proposed that the less the international landscape was characterized by prospects for concerted climate action, a proxy for states’ willingness to address an issue calling for a transnational response, the more the private sector will have behaved as a climate actor. The logic is that if companies believe that climate change will shape future global trends and pose major challenges to stability, they increasingly would have been inclined to “go it alone” on the issue the more it became clear that the collapse of the 2009 Copenhagen Conference signaled not just a temporary setback to concerted international action (i.e. based on a “top-down” model of mandatory emissions reductions) but a fundamental shift toward a “bottom-up” model that would not produce the kind of commitments that actually would make a difference (i.e. the “Paris model,” based on voluntary national contributions to a general goal and the hope that states would become more ambitious over time).¹⁰

Figure 7.8 compares the prevalence of emergent action across each period spanning 2010–2016. The numbers in the figure capture the relationship between amount of

¹⁰ The problem with an approach based on hopes for increasing ambition became apparent in 2020, the first year that states were supposed to submit new nationally determined contributions (NDCs) in accordance with the Paris Agreement’s signature “ratchet” mechanism, mandating that states submit increasingly ambitious NDCs every five years. As of March 2021, according to Climate Action Tracker, 113 countries (including Canada, India, and the United States) had not updated their targets; 10 countries (including Australia, Brazil, Japan, and Russia) all submitted new NDCs that did not include stronger targets. Just 31% of global emissions are covered by new NDC submissions. Climate Action Tracker, ‘CAT Climate Target Update Tracker,’ February 25, 2021.

climate action and strength of perception; in the y-axis, numbers above 1 capture emergent action (see the footnote for additional details).¹¹

Figure 7.8. Prevalence of emergent action by time period, 2010–2016.



For five time periods, the relationship between companies’ climate performance and the strength of their perception that climate change was a high-impact material concern. A score above 1 captures emergent action.

¹¹ These numbers represent ratios capturing the relationship between strength of climate action and strength of perception. If the number was 2, for example, this indicates that for every one “unit” of perception that climate change was a serious material concern, the industry was undertaking 2 “units” of action. If the number was 1, this would indicate that for every unit of perception there was a unit of action, showing a non-emergent pattern of behavior. Meanwhile, if the number was below one, this would indicate that action lagged behind what would be expected given the perceived material importance of climate change. These cases are interesting, as they raise the question of why certain industries/companies did not act when they seemingly “should” have.

Figure 7.8 shows that, consistent with H1's expectation, emergent action steadily increased, doubling over time. While the figure aligns with H1's expectation that emergent action would increase over time, data from semi-structured interviews that I conducted in 2018 confirms that the hypothesis anticipates *why* this was the case. At least for many companies, the increase was not a function of companies becoming convinced that states finally were prepared to take bold climate action; rather, it was grounded in the context of their waning confidence in states' willingness to lead on the issue in an effective fashion.

Interviewees from London to New Delhi emphasized that the Paris Conference was yet another disappointment in the bleak history of international climate meetings. Asked if the Paris Agreement had any impact as of 2018, a UK-based representative for E.ON replied, 'Not really, if I'm honest.' He explained that in the UK and parts of Europe, 'there's a perception that we're out front, and Paris is about getting everyone else to catch up....It's about getting the US on board, for example. Good luck with that.' From his perspective, 'Paris was almost a coordination exercise to get everyone pointing in the right direction, but we're not doing anything in the UK that we weren't doing before as a result of Paris, as a company or as a country.'¹² Notably, E.ON was one of the sample companies that became most active on the climate issue, becoming a disruptor in 2014–2016.

Speaking from the policymaking sphere, a European Parliament staffer for climate and energy issues characterized Paris as 'quite a vague agreement.' Since 'it's not legally binding and has no real commitments in it, it's a nice paper to look at, and everyone can be behind it a bit....Paris is fine, but nothing was reached if in the end [EU] Member States

¹² Expert on climate and energy policy and regulatory issues, Interview by author, November 12, 2018, Interview 12, London, United Kingdom. Emphasis added.

don't take drastic actions, which I don't think they are doing. Even in Germany, we aren't reaching our own targets.'¹³

Oil and gas company representatives were especially pessimistic about Paris. As an interviewee from BP in Germany observed, 'It looks like the Paris goal will not be met—we already are off track.'¹⁴ Germany was not alone; by the end of 2018, only seven states had undertaken actions compatible with the 2°C scenario under the agreement.¹⁵ A UK-based Shell representative reported that the company is 'absolutely' uncertain about the political and social feasibility of the global energy transition, and that Paris did not resolve these uncertainties:

I don't know how anybody could be sure given that the sum of the INDCs [Intended Nationally Determined Contributions] do not add up to anywhere near enough to deliver the Paris Agreement. And many countries basically almost ridiculed the IPCC's [Intergovernmental Panel on Climate Change] latest report as being too aggressive.¹⁶

Oil and gas companies were among the least climate active of the 34 sample companies (see Table 7.1); thus, their perspectives are especially valuable for appreciating the landscape and context in which others *were* becoming increasingly active.

Interviewees in India shared similar sentiments about the limits of Paris. A regulatory expert for Tata Steel saw India's ambitious Paris commitments as untethered to realities on the ground.¹⁷ Unconvinced that countries' commitments in forums 'really

¹³ European Parliament staffer and expert on climate and energy policy portfolio, Interview by author, October 12, 2018, Interview 13, conducted by phone.

¹⁴ Germany-based BP representative focused on external affairs, Interview by author, November 1, 2018, Interview 14, conducted by phone.

¹⁵ Of these, only Morocco and the Gambia had adopted behaviors compatible with the more ambitious 1.5°C scenario. See Amanda Erickson, 'Few countries are meeting the Paris climate goals. Here are the ones that are,' *The Washington Post*, October 11, 2018.

¹⁶ Interview 1.

¹⁷ In the run-up to the Paris Conference, India announced that by 2030, 40% of its total energy generation capacity would come from non-fossil fuels; it also pledged to cut the emissions intensity of its economy ('a

provide any mileage,’ he believes that they are ‘political statements that the governments of these countries are making, but then to translate them into action, it takes a hell of a lot of effort.’¹⁸ Notably, Tata Steel became an innovator in 2015–2017 (see Table 7.1). A C-Suite executive from Tata Power, meanwhile, said that while ‘the talk about the Paris Agreement was bold, on the ground some of the things they agreed to have not happened.’ For example, the ‘so-called hundred billion dollars every year from 2020 onward’ – funding that developed countries pledged to support the low-carbon transition in developing countries – ‘we don’t see that.’¹⁹ The conference ‘was a great photo opp,’ said a New Delhi-based entrepreneur in clean technology: ‘I think the intention was great, but if there’s no execution, eventually it just means nothing.’²⁰

Even for companies that accorded the Paris “moment” more import than, for example, E.ON or Shell (at least from the perspective of the interviewees cited above), evidence suggests its impact lay mainly in highlighting states’ *limitations*. For example, over the course of the 2010s Allianz (which, to recall from Chapter 6, was the only financial company to transition to a higher type) referred repeatedly to disappointing outcomes at international climate meetings and the need for the private sector to take an active role on the issue as a partner to government.²¹ From 2015 on Allianz couched its climate

ratio of carbon emissions per unit of GDP’) by up to 35% by 2030. Adam Vaughan, ‘India unveils climate change plan,’ *The Guardian*, October 2, 2015.

¹⁸ Regulatory affairs expert for Tata Steel, Interview by author, August 7, 2018, Interview 15, New Delhi, India.

¹⁹ Interview 6.

²⁰ Entrepreneur in clean technologies, Interview by author, August 4, 2018, Interview 16, New Delhi, India.

²¹ In 2010, for instance, Allianz noted, ‘*In view of the disappointing outcome of the Copenhagen Climate Change Conference in 2009, private companies will have to take a more active role in tackling climate change.*’ Allianz Group, *Allianz Sustainable Development Report 2010*, July 1, 2010, 23. In 2013, noting that Germany ‘has already achieved a great deal’ in terms of climate protection *and* that ‘it is disappointing that CO₂ emissions from electricity generation have increased over the past two years,’ Allianz stated that ‘in Germany and in other countries, the advantages of partnerships between the public sector and investors like Allianz are obvious.’ Allianz Group, *From Alternative Energy to Zero Emissions* (2014), 5.

“turnaround” (which, to be sure, was measured and gradual) in terms of Paris-related developments. For example, in 2015 it announced that ‘[d]uring the Paris negotiations, [the] Allianz CEO announced joining the Portfolio Decarbonization Coalition which convenes 25 investors aligning their portfolios with the low-carbon transition.’²² That year, Allianz unveiled a coal divestment strategy; by 2018, it had ‘significantly expanded’ its climate strategy, ‘sharpened the criteria for exclusion of proprietary investments in coal-based business models,’ and committed to align its ‘proprietary investment portfolio of approximately 700bn EUR with the Paris Agreement.’²³ But was Allianz interpreting Paris as a *departure* from previously disappointing international climate efforts—or instead as further *confirmation* that given states’ limitations the private sector needed to step up to spur the low-carbon transition? The evidence suggests the latter. The key points are that Allianz became climate-active post-Paris and that its assessment of the material impacts of climate change saw *no* change post-Paris, or indeed at any time during this project’s timeframe of interest.²⁴

In short, during the 2010s companies’ action increasingly “ran ahead of” their outlook for climate-related regulation or changes in consumer behavior. The evidence suggests, first, that companies that became more climate active were not motivated by the perception that Paris was a watershed for international climate efforts – quite the opposite – and second, that for those that were *not* climate active Paris did not alleviate uncertainties about the low-carbon transition’s viability or urgency, politically or societally.

²² Allianz, 2016 CDP disclosure (covering 2015). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

²³ Allianz, 2018 CDP disclosure (covering 2017). Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

²⁴ From period 1 (2010–2012) through period 5 (2014–2016), Allianz saw no high-impact material risks or opportunities from climate-related regulation or changing consumer behavior; it always saw high-impact risks tied to physical impacts. Post-Paris, in Germany, for example, Allianz became one of the select investors putting pressure on coal power, according to a Berlin-based energy sector expert. Interview 4.

This part of the chapter considered aggregate data on how the 34 companies perceived climate change as a material concern, showing that, contrary to the intuitive expectation, the cohort increased its climate performance and individual companies transitioned to more climate active sensibilities in the context of a *declining* outlook for states' leadership in the climate issue area. As the expectation for concerted international climate action diminished over the course of the 2010s, the prevalence of emergent action doubled. Leveraging illustrative data from interviews conducted in 2018, I showed how developments surrounding the Paris Conference might have served to clarify the overall direction in which states were heading, but did *not* convince companies that states were preparing to undertake ambitious policies or enact bold regulation. To appreciate the significance of the considerable increase in climate action during the 2010s, the interpretive key is knowing that companies were behaving this way amid their *loss* of confidence in states' willingness to act in a concerted and timely fashion.

In terms of this study's overarching interest in not just the new actors and issues but the new *dynamics* that have the potential to shape the 21st century landscape, the findings in this part are significant especially for what they indicate about how actors that individually do not appear inclined to alter their approaches to an issue can, through an uncoordinated process and in the context of states having abdicated leadership, come into alignment on the issue and move in a new direction.

Part III: New actors' ambition to address non-traditional challenges

Which companies became integral to the process by which the overall private sector pattern of action developed? Which actors not only recognized the need for a new approach to the climate issue but seized the initiative and took on a new role? The sections below address a set of hypotheses about factors that may help explain why, in specific cases,

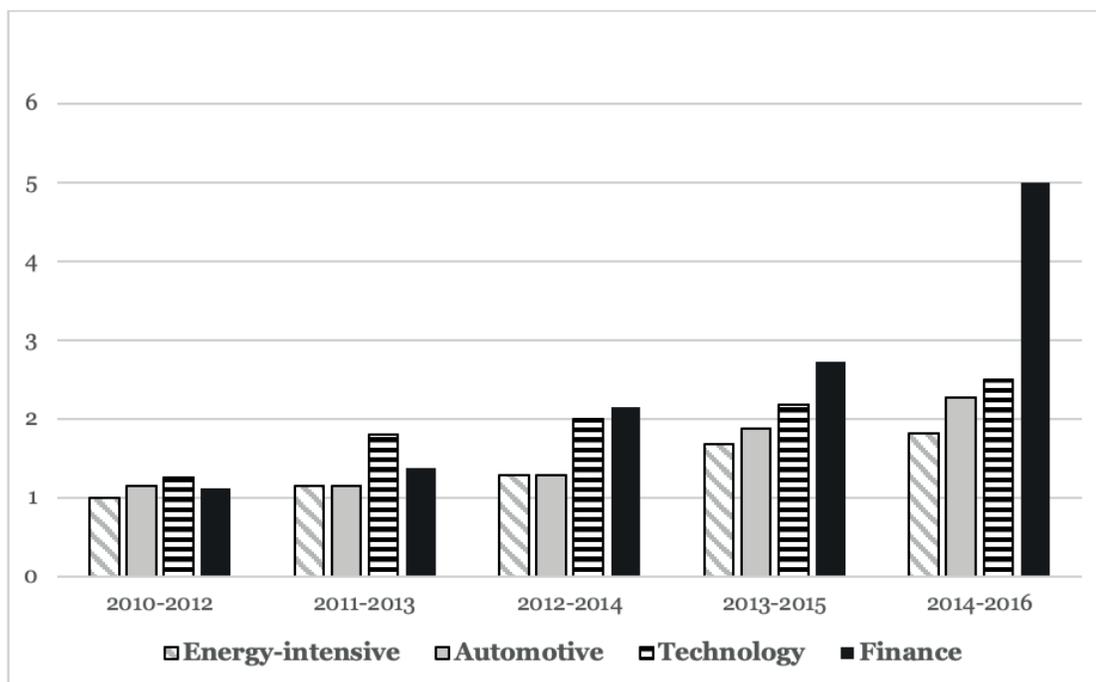
actors were especially ambitious in adopting new climate approaches prior to perceiving strong material incentives to do so.²⁵

Hypothesis 2: industry type

In Chapter 1, Hypothesis 2 (H2) proposed that emergent action is more likely within industries with relatively low energy intensities, as their business models are less dependent on the fossil fuel-centered status quo. In terms of this project's focus industry groups, H2 anticipates that there will be a higher prevalence of emergent action in technology and finance and a lower prevalence among companies in automotive and the various energy-intensive industries that Chapter 3 considered (such as steel, chemical, and oil and gas). Figure 7.9 shows the prevalence of emergent action in each industry group: energy-intensive, automotive, technology, and finance. The numbers on the y-axis reflect the relationship between action and perception; the higher the number, the higher the prevalence of emergent action, or the more companies' behaviors "ran ahead of" their assessments of the material impact of climate change.

²⁵ As Chapter 1 discussed, the process by which the overall private sector pattern of response developed was leaderless, but early and/or ambitious movers were critical as they helped to put in place conditions for a positive feedback dynamic *potentially* to be set in motion and belief in a new dominant design *potentially* to take root.

Figure 7.9. Prevalence of emergent action by industry, 2010–2016.



Among four industry groups, the extent to which there were inconsistencies between how companies behaved and how they perceived the material impacts of climate change. A score above 1 captures emergent action.

Figure 7.9 provides support for H2 from 2011–2013 onward. On average, emergent action in finance was 79% and 60% more prevalent, respectively, than in energy-intensive industries and automotive; in technology, it was 41% and 26% more prevalent, respectively, than in energy-intensive industries and automotive.

What spurred technology and finance companies to act often in the absence of strong material incentives? Technology companies in particular grounded their behavior in the context of their perceptions of states' failures to lead in the climate issue area. Consider the example of Microsoft. Although compared to Apple, for instance, its level of climate ambition was more modest, Microsoft was a strong emergent actor as it became an evolutionary despite *never* perceiving climate change to be a high-impact material concern

during this study's timeframe of interest.²⁶ In 2012, Microsoft announced, 'With *governments slow to act on the accelerating climate change challenge*, it is essential that leadership to drive a low carbon economy come from the private sector.' That year, it framed its decision to adopt an internal carbon price in these terms:

Rather than wait for policymakers to take this vital but elusive step, Microsoft is putting an internal price on carbon that will make each of its business divisions responsible for the cost of offsetting its carbon emissions, either through energy efficiency or by payment into a central fund that will be used to source renewable energy or purchase carbon offsets. This kind of "green accountability" could well become a model for other companies looking to remain competitive in the carbon-constrained economy of the future.²⁷

Likewise, in 2011, Infosys (India's second largest IT company) couched its goal of becoming carbon neutral by 2018 in these terms: "Trailblazing businesses *don't wait for government regulations to act.*"²⁸ Infosys started the decade a status quo-company (a BAU type); it progressed to evolutionary and, in 2015–2017, became an innovator.²⁹

The six finance companies in the sample set were low climate performers overall; to recall from Chapter 6, all improved their performance but just one (Allianz) moved decisively toward a more climate active sensibility and changed types. In Figure 7.9, the prevalence of emergent action among finance companies registers as very high because their outlook for high-impact climate-related risks and opportunities was exceptionally low. In other words, even the modest action they did take would have seemed unexpected, given the scant material relevance they accorded climate change.

²⁶ In its CDP disclosures for 2011–2017 (covering 2010–2016) Microsoft never reported any high-impact material risks *or* opportunities from climate-related regulation *or* changing consumer behavior. Database access through subscription. Contact author for more information: charlotte.hulme@yale.edu.

²⁷ *Microsoft Citizenship Report 2012*, 59. Emphasis added.

²⁸ Infosys, *Sustainability Report 2011–2012*, 32. Emphasis added.

²⁹ Infosys was a relatively strong emergent actor, with an "action-to-perception" ratio of 1.5. See note 11 for additional details about this ratio.

As noted, Allianz was the only financial company that developed into a moderate climate performer, becoming an evolutionary in 2015–2017. In 2010, echoing Microsoft, Allianz noted, ‘*In view of the disappointing outcome of the Copenhagen Climate Change Conference in 2009, private companies will have to take a more active role in tackling climate change.*’³⁰ As introduced in Part II, during the decade Allianz emphasized that the private sector had an indispensable role to play in the climate issue area; in 2013, for example, noting that the ‘*widespread hope to put a stop to climate change by means of global agreements has yielded few tangible results so far,*’ Allianz observed that the ‘*debt crisis has pushed climate change to the sidelines of the political and public agenda over the past few years. Yet time is running out.*’ Allianz underscored that ‘*at a time of scarce public funds, the necessary expansion of [renewable] infrastructure...is only possible with private investment.*’³¹

Notably, the two industry groups that were the strongest emergent actors, technology and finance, have the potential to exert a higher degree of extra-industry influence than the others (automotive and energy-intensive). Because they have such expansive reach (not only geographic and economic but also societal) extra-industry influencers arguably are better-positioned to “glimpse the future” and respond earlier than companies whose vision is more narrowly focused on their specific industries. Furthermore, extra-industry influencers potentially have more to gain in various domains from shaping future global trends; the audience that will see them playing such a role is much broader. For example, if HeidelbergCement is a climate leader, cement industry insiders might know it; if Apple is, people outside of the technology industry are much likelier to be aware of it.

³⁰ Allianz Group, *Allianz Sustainable Development Report 2010*, July 1, 2010, 23. Emphasis added.

³¹ Allianz Group, *From Alternative Energy to Zero Emissions*, 4. Emphasis added.

But the nature of the extra-industry influence of technology and finance companies differs in key respects, which helps to explain why the former companies *also* were among the strongest climate performers overall while the latter were much weaker.

Technology companies have unparalleled social currency and ubiquity; as Chapter 5 discussed, Apple has an ‘active installed base’ of 1.65 billion devices as well as 620 million subscribers on its platform,³² while Google has seven products with over one billion monthly users and processes two trillion Internet searches annually.³³ In contrast, in the context of this project, the key feature of finance companies’ extra-industry influence pertains to the industry not just being one among many with deep ties to the old fossil fuel-centered dominant design but rather, as Chapter 6 discussed, *embodying* the old dominant design, supporting the entire edifice of the high-carbon economy. Whereas technology companies have extra-industry influence *and* are weak “incumbents,” or have relatively weak “gravitational attraction” to the old dominant design, finance companies have extra-industry influence in supporting and enabling all other industries *and* are strong “incumbents” with tight bonds to the status quo.

While retail was not one of the focus industry groups, and Walmart (the world’s largest retailer) was considered only as a mini-case study in Chapter 2, the same logic applies in explaining why, like the technology companies, Walmart was both an emergent actor *and* one of the strongest climate performers overall. It is an extra-industry influencer by virtue of its sheer ubiquity *and* is a relatively weak incumbent given that its business model is not centered on fossil fuels.³⁴

³² Nellis, ‘Apple posts record profit as iPhone sales surge in China.’

³³ Balakrishnan, ‘Here’s how billions of people use Google products, in one chart.’

³⁴ While Walmart is a weaker incumbent than oil and gas companies, it is a stronger incumbent than technology companies given that its business model is based on consumption of material goods. In Walmart’s case, the relationship between amount of climate action and strength of perception was 2.3, indicating a high level of emergent action.

In short, when a company has both a high potential to exert extra-industry influence by the nature of its business *and* relatively weak bonds to the status quo (also by virtue of its business model), the conditions are most ripe for its behavior to follow a pattern of emergent action.

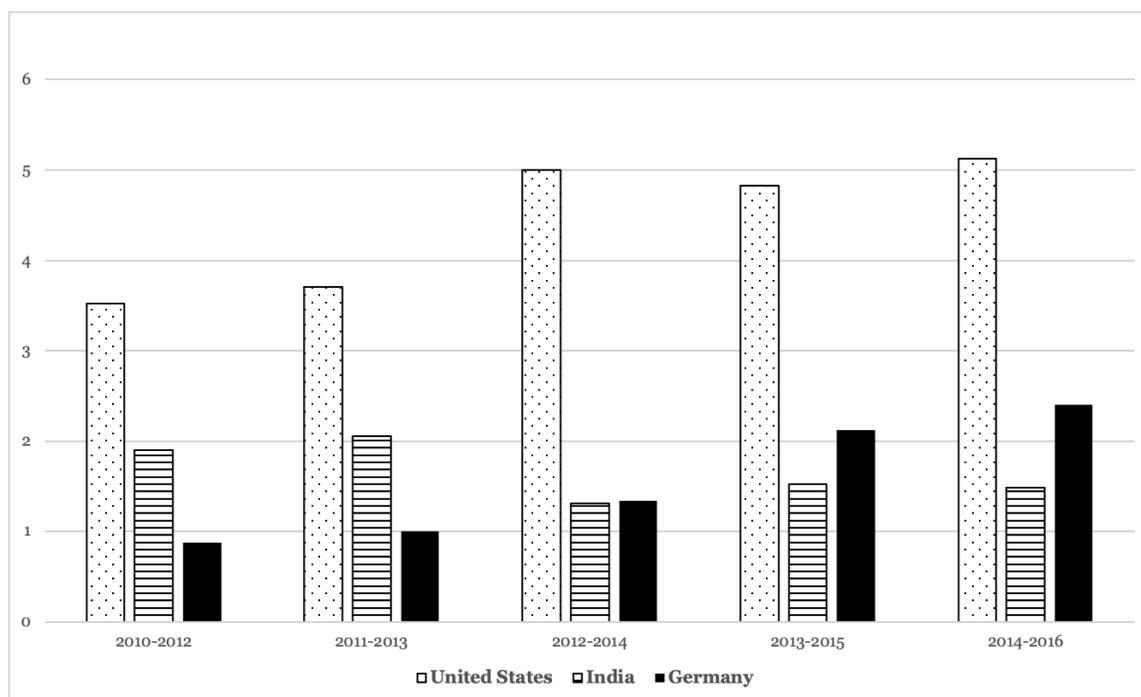
Hypothesis 3: headquarter country

According to Hypothesis 3 (H3), the phenomenon of emergent action will be a function of the behavior of companies in headquarter countries where the government historically has not been inclined toward high levels of climate policy and regulatory activity. A record of limited activity or abdication by the state on an issue that a company believes will inform future global trends may lead it to take action regardless of current perceptions of its material salience. By contrast, for companies headquartered in historically “climate active” countries, the expectation would be for the state’s continued leadership on the issue.

The three case study headquarter countries have different records of climate activity; Germany is at the high end of the activity spectrum and the United States and India are at the low end. If H3 correctly anticipates the relationship between a country’s record of climate activity and those companies that were the key drivers of emergent climate action during the 2010–2017 timeframe, there should be two observable implications. The first is that an upward trend in emergent action among US- and India-based companies should primarily account for the overall trend upward in emergent behavior (see Figure 7.8 in Part II). The second is that in the industries for which they are represented in my sample set, US- and India-based companies should behave in a more emergent fashion than Germany-based companies; in other words, there should be a larger gap between American and Indian companies’ behavior and their perceptions of the material importance of climate change than between German companies’ behaviors and perceptions.

To address the first observable implication, Figure 7.10 captures the trend in emergent action in each country. The absolute “amount” of emergent action (i.e. the numbers on the y-axis) should be discounted; the figure conveys only whether action trended upward in each case and by what relative degree.³⁵

Figure 7.10. Trends in emergent action by headquarter country, 2010–2016.

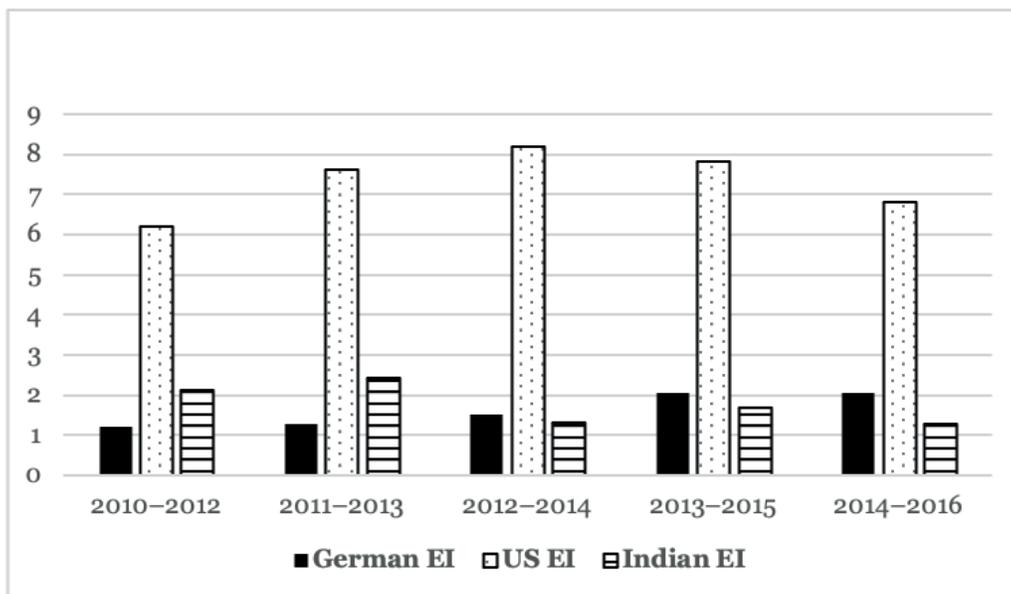


For three headquarter countries, the trend over time in companies behaving in a manner that was inconsistent with their perceptions of the material impacts of climate change. A score above 1 captures emergent action.

³⁵ The absolute amount of emergent action (the y-axis numbers) must be discounted because each country did not have equal “opportunities” to behave in an emergent fashion. As Figure 7.9 shows, emergent action was most prevalent in the technology and finance industries; as discussed in the analysis, companies in these industries inherently may be more inclined to behave in an emergent fashion due to the nature of their businesses. Due to this study’s focus on companies meeting a certain “resources and reach” threshold, Indian companies were not represented in the finance or automotive industry sample sets and German companies were not represented in the technology sample set; thus, compared to US companies, they each had relatively fewer “opportunities” for emergent action. The key point is that due to the composition of the sample set by industry, it is not possible to draw conclusions about the importance of home country for *absolute* amount of emergent action overall. But, as Figure 7.10 shows, it is possible to evaluate the overall trend in emergent action by country (i.e. upward, downward, or no change). Note that in contrast to Figure 7.9 (focused on industry group), Figure 7.10 includes data concerning Walmart.

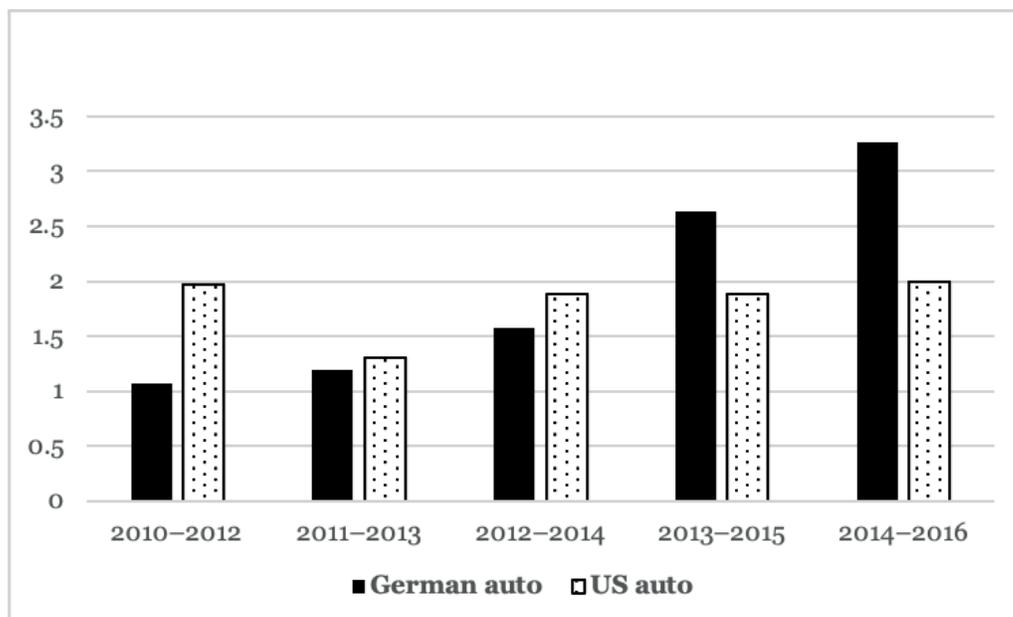
Addressing the second observable implication of H3, Figures 7.11–7.14 examine whether headquarter country was an important factor within each industry. In this case, the absolute “amount” of emergent action *does* matter and comparisons between countries *can* be drawn; countries are being evaluated only on the basis of the industries that they appeared in within the sample set (e.g. India is not penalized for there being no Indian finance companies in the sample set, and Germany is not penalized for there being no German technology companies in the sample set).

Figure 7.11. Country comparison of emergent action in energy-intensive (EI) industries, 2010–2016.



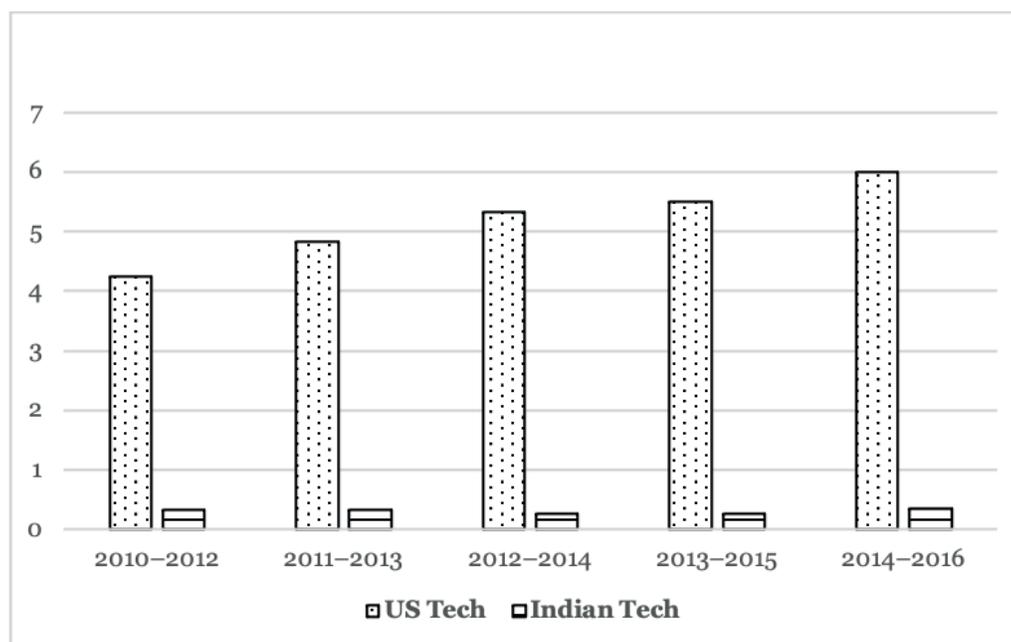
Comparison of the prevalence of emergent action by energy-intensive (EI) companies based in Germany, the United States, and India. A score above 1 captures emergent action.

Figure 7.12. Country comparison of emergent action in the automotive industry, 2010–2016.



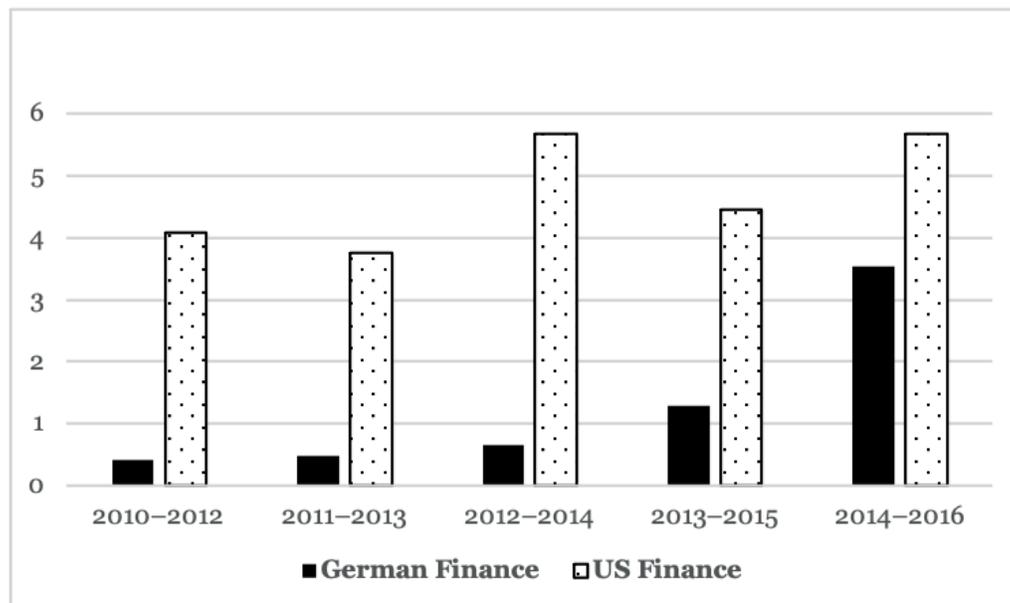
Comparison of the prevalence of emergent action by automakers based in Germany and the United States. A score above 1 captures emergent action.

Figure 7.13. Country comparison of emergent action in the technology industry, 2010–2016.



Comparison of the prevalence of emergent action by technology companies based in the United States and India. A score above 1 captures emergent action.

Figure 7.14. Country comparison of emergent action in the finance industry, 2010–2016.



Comparison of the prevalence of emergent action by finance companies based in Germany and the United States. A score above 1 captures emergent action.

Figures 7.10–7.14 point to two key findings. First, Figure 7.10 conveys that H3 was only partially correct in anticipating which countries would account for the overall upward trend in emergent action over time; there was an upward trend among US-based companies but no such trend among India-based companies. From 2012–2014 onward – or, beginning in the period when the Indian government adopted ambitious climate-related targets and began implementing policy and regulatory “pushes” related to its renewable energy objectives – Indian companies sustained their climate activity in the context of growing perceptions that climate change (specifically, climate-related regulation) was of high material importance. In other words, compared to periods 1 and 2, from period 3 on there was relative consistency between companies’ actions and perceptions.³⁶

³⁶ The government of India’s renewable energy push began in 2013, when then-Prime Minister Singh’s government crafted the ambitious target of 100 gigawatts of renewables by 2022 (representing a revision of the previous target of 22 gigawatts) and gathered momentum in 2014 when Prime Minister Modi announced it. During the 2012–2014 period, the prevalence of emergent action among Indian companies declined by 36%. Overall, among Indian companies there was a net 22% decrease in the prevalence of emergent action.

Meanwhile, Figure 7.10 conveys that in 2010–2012 Germany-based companies were behaving as H3 would have anticipated;³⁷ however, unexpectedly, they accounted for the most significant upward trend over time.³⁸ The German state historically has been climate active and in the early 2010s, with the *Energiewende* (“energy transition”) gaining traction in domestic policy,³⁹ it would have appeared that the government would continue leading in the issue area. But as the decade unfolded Germany’s claim to be an effective and ambitious climate leader was undercut by increasingly significant shortfalls in national climate performance.⁴⁰ Figure 7.10 shows that Germany-based companies, long accustomed to operating in the context of state leadership in the climate issue area, increasingly pursued more independent action; that is, they acted despite seeing diminishing prospects for bold state action and declining material incentives for doing so.

Second, Figures 7.11–7.14 capture that within all industries but automotive, head-quarter country was a critical factor; US-based energy-intensive, technology, and finance companies acted in a significantly more emergent fashion than their German and Indian counterparts.

³⁷ This is captured by the “ratio” of 0.88, which shows companies taking *less* than one “unit” of climate action for every “unit” of its perceived importance. Although, as note 37 discusses, we cannot compare the amounts of absolute emergent action among the three countries, we can look at these amounts on an individual country basis in the context of analyzing whether companies headquartered in each country were undertaking the level of action that would appear consistent with how they perceived the material importance of the climate issue.

³⁸ Whereas the prevalence of emergent action increased by 46% among US-based companies, it increased by 172% among Germany-based companies.

³⁹ The *Energiewende* is the ‘planned transition to a low-carbon, nuclear-free economy’ dating to the 1970s. ‘Germany’s *Energiewende* in brief,’ Clean Energy Wire, accessed March 14, 2021. For information about the *Energiewende* gaining traction, see Hanna Kuitten and Daniela Velte, ‘Case Study Report: *Energiewende*’ (Brussels, Belgium: European Commission, 2018): 5.

⁴⁰ In 2013, for instance, Chancellor Angela Merkel, seeking to protect German automakers, intervened to secure a five-year delay on tougher EU emissions standards for cars. BBC, ‘Germany delays EU limit on CO₂ emissions from cars,’ October 15, 2013. By 2017, the Berlin-based thinktank Agora *Energiewende* projected that Germany would miss its 40% emissions reduction target for 2020 by ten percentage points— ‘not a little bit off, but a huge miss,’ in the words of the thinktank’s director. Cited in Reuters, ‘Germany set to miss 2020 climate goals by far: study,’ September 2, 2017.

In this part of the chapter, I analyzed the trajectory of emergent action and found that while US- and Germany-based companies both contributed to the upward trend, the latter's contribution was particularly significant; over time, the prevalence of emergent action increased by 46% among US-based companies and by 172% among Germany-based companies. While American companies were consistently strong emergent actors, German companies, having long operated in the context of state leadership in the climate issue area, increasingly came into their own as climate actors amid diminishing perceived prospects for bold government action. Meanwhile, early on India-based companies were undertaking action that “ran ahead of” their material concerns with climate change—but once the government embarked on its renewables-related policy and regulatory push in 2013, their action increasingly aligned with their perceptions.

In the context of this study's overarching concern with the new actors and issues that have the potential to reshape the global landscape, this part of the chapter shed light on the particular kinds of corporate “geese” that may be *most* inclined to become part of a new “V-pattern” of response within a certain issue area. Actors that are early and/or ambitious movers in an issue area, changing their behaviors and adopting new sensibilities apparently prior to perceiving strong material incentives to do so, are integral to the process that can lead ultimately to a new “pattern of response” among uncoordinated actors. As Chapter 1 discussed, for there to be the possibility of a widespread sense that a certain new direction is the “right” one, or the one that represents the new dominant design for the future, some actors must move in that direction early and confidently.

Part IV: New actors, non-traditional issues, and 21st century global order

In a 2018 interview, physicist and co-founder of the Rocky Mountain Institute, Amory Lovins, argued that it is unsurprising that when ‘photovoltaics were only five percent or

less of German electricity production, the business model and over half the market capitalisation of the ten biggest utilities in Europe disappeared.’ In economic history, he explained, it is common to see such non-linear change, in which ‘the value of old businesses deflates very rapidly, while the output of the old technology stagnates and starts to fall, even when the replacement technology is only at the few percent level.’⁴¹ What accounts for such unexpected, hard-to-predict, and often abrupt change? Lovins observes that

both customers and investors can see these big shifts coming and start to adopt them rapidly if it makes sense and makes money. Capital markets in particular keenly sniff out disruption, and if they catch its scent—if they think that an old industry is already in or headed for the toaster—they don’t wait for the toast to get done before they decapitalise the old and invest in the new.⁴²

In this project, I showed that among 34 of the world’s largest companies a new paradigm of behavior vis-à-vis the climate issue area developed during the 2010s. Companies behaved as if they had “caught the scent” of “big shifts coming,” or as if a business-as-usual approach was increasingly untenable. But I also found, strikingly, that there was a *declining* perception that climate change represented a serious material concern.

What explains the new corporate climate sensibility and paradigm of behavior—what the president of the World Resources Institute has called ‘one of the true mind-shifts in modern commerce’?⁴³ This study showed that what the private sector caught the scent of during the 2010s was less climate change already having become a more urgent business concern and more the need for a different approach to an issue that states appeared unlikely to address in a timely and effective fashion.

⁴¹ Sören Amelang, ‘Disruption caused by energy transition is unstoppable – Amory Lovins.’

⁴² Ibid.

⁴³ Steer, ‘Seeing U.S. Business Opportunity in a Low-Carbon Economy.’

The case study of private sector climate action offers a window into a new world—one that the pioneers of the field of transnational relations did not yet glimpse. When Nye and Keohane considered the role of non-state actors with the capacity to ‘alter relationships between governments,’ they did not anticipate these actors addressing transnational challenges that governments were unwilling or even unable to address.⁴⁴ When Kaiser acknowledged ‘the increasing relevance of interaction[s] across boundaries that bypass governments,’ he concluded that ‘the nation-state remains the dominant unit in world politics.’⁴⁵ The developments that this study examined suggest that in terms of the non-traditional issues poised to shape the 21st century landscape, non-state actors not only can develop the ambition to act but also can come to play key, even dominant, roles in an issue area.

To conclude this chapter, each of the following four sections discusses an implication of this research. The sections progress from case study-specific lessons about private sector climate action to more general implications about the kinds of new actors and issues that have the potential to reshape the landscape in which states will have to advance their interests in the 21st century.

Climate consensus “makers” and “takers”

In this project, I focused on a particular class of private sector actor: companies with the resources and reach to be characterized credibly as corporate “nations.” Some of these companies behaved as “consensus makers” in the climate issue area; they shaped and were shaped by an ongoing process of forging a new consensus position about climate change and the low-carbon future. This position not only has begun to diffuse among some of the

⁴⁴ Nye and Keohane, ‘Transnational Relations and World Politics: An Introduction,’ 58.

⁴⁵ Kaiser, ‘Transnational Politics: Toward a Theory of Multinational Politics,’ 797.

most reluctant of behemoth companies that were on the outskirts of the climate “discussion” during the 2010s (e.g. climate laggards like BlackRock, which, as Chapter 6 discussed, began changing course in the early 2020s); it also has started to be taken up by companies *outside* of the “corporate nation” tier. The implication is that once the most powerful begin acting as if they have a different role to play vis-à-vis a new issue, others may begin to reconsider their own role. Consensus “takers” not only can come to more fully appreciate the *possibility* of behaving in new ways—they also may come to perceive the *necessity* of doing so.

Consider the case of the Indian private sector. While India was one of this project’s case study countries, ultimately only four out of the 34 sample companies were India-based given the high “resources and reach” threshold for inclusion. Nonetheless, the Indian private sector represents a potential pool of actors where conditions are ripe for the “taking up” of the new climate consensus—and where actors indeed appear to be involving themselves newly in the issue area.

Among Indian companies at the turn of the 2010s, there was widespread awareness of climate issues and the *need* for action. As a 2009 PricewaterhouseCoopers (PwC) survey of Indian CEOs found, the ‘awareness of climate change risk at the highest levels of India’s business world is more present than ever,’ and ‘the percentage of Indian CEOs who were somewhat or extremely concerned about the risk of climate change rose from 27% in 2008 to 52% in 2009...the largest increase of all risks that were polled in both years.’ But PwC *also* found that there was scant action, noting that ‘if the awareness of the need to act is growing, *the shape of a private sector response is yet to be determined*. Indeed, 60% of Indian CEOs said they had no climate change strategy in place a year ago.’⁴⁶

⁴⁶ Sophie Lambin and Larry Yu, ‘Indian CEOs poised to respond to climate change,’ PricewaterhouseCoopers, November 2009. Emphasis added.

But a decade later, powerful Indian businesses had begun to act as though the private sector had a key role to play in addressing climate change. As Mahindra Group Chairman Anand Mahindra put it in early 2020, ‘It is clear that *the world cannot continue to pursue a business-as-usual approach*, and nobody can solve the problem on their own. *Business, government and philanthropy must collaborate within and among themselves* to drive results quickly and at scale.’⁴⁷ His comment came amid the launch of the India Climate Collaborative (ICC), which includes 40 companies (including such industrial heavyweights as Mahindra, Tata, and Godrej), an initiative described as the ‘first-ever collective response by [Indian] philanthropy and industry leaders...for effective action toward a shared climate goal,’ and as an indication that a cohort of India’s most influential actors have ‘agreed that the issue can no longer be ignored.’⁴⁸ As journalist Nivedita Khandekar observed in the context of the ICC’s launch, after ‘decades of concentrating on economic development and insisting that global warming was mainly a problem for the more industrially-developed countries to solve, *Indian industry is at last facing up to dangers posed to its own future by climate change.*’⁴⁹

The Indian government has received credit on the global stage as a “climate leader” following its renewable energy push in the mid-2010s,⁵⁰ but addressing climate change was not the priority; advancing macro-economic objectives like energy security and energy access were the main objectives and renewable energy a means of advancing those objectives that also yields climate “co-benefits.”⁵¹ In short, it is an overstatement to say that New

⁴⁷ Nivedita Khandekar, ‘India finally takes climate crisis seriously,’ Climate Network News, March 18, 2020. Emphasis added.

⁴⁸ Alliance, ‘India climate collaborative launched by industry leaders,’ January 22, 2020.

⁴⁹ Khandekar, ‘India finally takes climate crisis seriously.’ Emphasis added.

⁵⁰ See Indian Express, ‘UN hails India, China for leadership role over climate change,’ January 13, 2018.

⁵¹ As a leading member of India’s negotiating team at the Paris Conference put it, ‘We’ve always seen climate change as being a co-benefit, and macroeconomic stability and urban air quality as being the main benefits.’

Delhi is leading on climate change *per se* or has developed a coherent national strategy vis-à-vis this challenge, providing heightened significance to the private sector potentially stepping up. Khandekar appreciates this point, noting in an article about the significance of the ICC,

Although there have been many individual initiatives in India on climate change, and there has been government support for renewables...*efforts so far have been fragmented.* State and national governments, individual departments, businesses, non-governmental organisations, and academics have *all worked separately, and sometimes in opposition to each other.*⁵²

In terms of this project, the key point is that in a context in which the government has not yet become an ambitious climate actor,⁵³ and in a country where the status quo on the issue area appears durable for the foreseeable future,⁵⁴ private sector actors are starting to re-think the need to become increasingly climate active.

A question for future research is whether and to what extent private sector actors in India and elsewhere become part of the ongoing process whose early days this project explored. Indeed, in the 2020 release of its annual survey of global CEOs, PricewaterhouseCoopers pointed to the onset of the second “wave” of the developments this study traced and analyzed, announcing, ‘The tide has turned on climate change. Organisations worldwide are starting to recognize its risks and even its potential opportunities.

We’ve typically thought that the world has inverted the benefits by saying that climate is the main benefit and there are other co-benefits. We think it’s the other way around.’ Interview by author, August 1, 2018, Interview 18, New Delhi, India.

⁵² Khandekar, ‘India finally takes climate crisis seriously.’ Emphasis added.

⁵³ For example, in 2014, as India pledged to invest \$100 billion in renewables over five years, Energy Minister Piyush Goyal announced that India ‘will be a renewables superpower.’ But in the same speech, he promised that coal-fired electricity generation would see ‘very rapid expansion in India.’ Damian Carrington, ‘India will be renewables superpower, says energy minister,’ *The Guardian*, October 1, 2014.

⁵⁴ India continues to expand infrastructure for coal, which provides 45% of its power requirements. See Samantha Gross, ‘Coal is king in India—and will likely remain so,’ Brookings, March 8, 2019.

Compared with ten years ago, CEOs today are far more likely to see the benefits of going “green.”⁵⁵

Non-state actors’ contributions to addressing 21st century challenges

This project has examined the phenomenon of private sector climate action without explicitly discussing what companies specifically “bring to the table” as climate actors. In addressing this issue and 21st century challenges more broadly, what is the private sector’s contribution relative to states?⁵⁶

Considering the climate issue specifically, Vandenberg and Gilligan argue that private sector climate action buys time for the government to, in essence, “get its act together.” As they wrote in 2017, reflecting on the U.S. context in particular, although ‘the climate problem will not be solved without government responses,’ private responses, including by corporate actors, ‘can bypass “solution aversion”—the resistance to climate change that arises from concerns about a big government response.’⁵⁷ It remains to be seen whether and when key states will “get their act together” on climate change, and whether ‘public opinion and public support’ will not just ‘catch up with the climate science’ but will force the issue onto the political agenda.⁵⁸ But ultimately, corporate actors *can* pave the way for ‘a more comprehensive government response, reduce the risk of catastrophic

⁵⁵ PricewaterhouseCoopers, ‘Navigating the rising tide of uncertainty,’ 23rd Annual Global CEO Survey, accessed March 13, 2021.

⁵⁶ An area for future research includes the question of whether new actors that *can* “fill the vacuum” left by states in the context of an issue area like climate change *should*. There is an important normative question of the desirability of unelected private actors like corporations wielding their vast power to influence public policy issues.

⁵⁷ Vandenberg and Gilligan, ‘Why private “actors” are taking center stage on climate change.’

⁵⁸ *Ibid.*

climate change, and cut the cost of climate mitigation,’ especially significant given that for decades states have offered little evidence of a willingness to confront the issue.⁵⁹

Companies also enjoy certain advantages over states in terms of their ability to act nimbly when confronting the kinds of complex new global challenges that climate change represents. The European Parliament staffer cited earlier in the chapter pointed to the relative ease with which companies can change course, given that they do not have to contend with a complex web of political (and societal) constraints:

Whenever you hear a minister in Germany talk about it [climate action], they talk about it as an [economic] opportunity...but then at the same time, we open a new coal power plant. Then it’s a bit contradictory sometimes...there are some success stories, but the overall magnitude of these success stories is still limited compared to hundreds of thousands of jobs linked to coal....*It’s easier for a company to switch and say that we are going to profit from this; for a country it might not really work.*⁶⁰

While governments have proven themselves relatively capable when it comes to mounting responses to traditional challenges (i.e. military in nature and centered around Great Power dynamics) that may manifest differently but require essentially similar responses, they often struggle to mount coherent responses to fundamentally different challenges using the most appropriate tools. Federal systems, where by design it is difficult for the state to act efficiently and boldly, are especially ill-suited to respond to the complex non-traditional problem sets poised to define the 21st century security landscape, challenges that call for new thinking, tools, and approaches. As Krasner has observed, in countries like the United States or India, where central institutions are weak, the ‘system makes obstruction easy, positive action difficult,’ and transformational change rare.⁶¹

⁵⁹ Ibid.

⁶⁰ Interview 13.

⁶¹ Stephen Krasner, *Defending the National Interest: Raw Materials Investments and U.S. Foreign Policy* (Princeton, NJ: Princeton University Press, 1978), 302.

By exploring how a new paradigm of climate action became more widespread and well-established during a short window, 2010–2017 – a period in which some states moved forward and then retreated on climate policy (e.g. the United States), others stalled and struggled to enact vital policies (e.g. Germany), and the international community abandoned efforts at transformational change – this project demonstrated companies’ unique contributions to addressing this non-traditional issue.

New actors developing the ambition to act without states

One of this project’s key findings was that over the course of the 2010s, some of the world’s most powerful companies perceived diminishing odds of high-impact climate regulation, “factoring out” prospects for bold state-led action in the climate issue area. Coupled with findings about changes in private sector action, this was a remarkable development—one that departs from the conventional wisdom that if states do not act on climate change, companies, the picture of the self-interested actor, will not act, and indeed will attempt to prolong for as long as possible what has been a very favorable status quo. It would have been unsurprising for companies to become more climate active if they thought climate change was becoming a much more pressing concern for states or if they anticipated that states, traditionally the “rule-writers” in the issue area, were planning to enact new and tougher rules. But what I found *was* surprising; even as companies increasingly “factored out” states in terms of their likelihood of writing tough new climate rules, they altered their approach—in many cases in a significant and decisive fashion.

The implication is that select private sector actors that long have had exceptional resources and reach are developing a heightened *ambition* to act in an arena that has been understood as the province of states. In the context of non-traditional global issues, these

actors (along with other non-state actors) increasingly are behaving not just as “supporting actors” in a state-directed drama—a dynamic that is only beginning to be appreciated.

As of this writing, the coronavirus pandemic, specifically as it has unfolded in the United States, offers a glimpse of how most observers still apply a Cold War-era lens to analyzing the relationship between national and non-state actors in terms of their respective roles in responding to transnational threats; others, however, are starting to think differently. Capturing a conventional understanding, a *TIME* article, responding to President Trump’s decision to mobilize companies to produce medical supplies in the pandemic’s early days, observed, ‘One aspect of the history is clear: *when business has successfully stepped up for national-security purposes, the federal government and the military have played a key role in coordinating the effort.*’⁶² Several months later, a contributor for CNN saw a much different lesson, articulating the dynamic (albeit in a national rather than global context) that this project explored. Arguing that the bungled national response was ‘not stopping Walmart – along with Kroger, Kohl’s, and city and state leaders and officials – from making the tough decisions that the President has shirked,’ he saw ‘growing indications...that *such centers of authority across the country are no longer waiting for cues from an indifferent President.*’⁶³ One of this study’s key findings is that non-state “centers of authority” around the world “are no longer waiting for cues” from states that, whether due to indifference or incapacity, have abdicated leadership and action on a critical issue of transnational importance.

In the climate issue area, the evolving “balance of power” between states and non-state actors reflects the heightened complexity of the 21st century global landscape, where

⁶² Olivia Waxman, ‘The U.S. Government Has Mobilized Private Companies to Face Crises Before. Here’s What to Know,’ *TIME*, March 24, 2020. Emphasis added.

⁶³ Stephen Collinson, ‘As Trump refuses to lead, America tries to save itself,’ CNN, July 16, 2020. Emphasis added.

there are ‘new challenges to the relationships and structures that provided stability in the past.’⁶⁴ As the director-general of the International Institute for Strategic Studies, John Chipman, wrote in 2016 in the *Harvard Business Review*, multinational companies no longer can assume, ‘in any region of the world, that the strategic status quo will be sustained by neat balances of power or unbreakable promises of foreign policy assistance from superpower states.’ In ‘*this new reality*, the most successful multinational companies will be those that make expertise in international affairs central to their operations, *adopting what can best be described as a corporate foreign policy*.’ A foreign policy in the traditional sense requires, among other things, ‘that a country define its interests...and cultivate an environment conducive to its success’; today, Chipman contends, companies ‘have to, in effect, “privatize” foreign policy.’⁶⁵

This study traced the process by which certain private sector actors “privatized” their approach to the climate issue in the context of declining confidence in states’ capacity to provide them with clear rules of the game (in the form of policy and regulation) necessary to ‘cultivate an environment’ conducive to their long-term success. In a striking illustration of how states could not settle on the rules of the climate and low-carbon game, casting companies into uncertainty and its costs, in 2018 a UK-based representative for E.ON reflected on how in the mid-2000s there was a view in his company that ‘there was some kind of future for coal-fired power stations.’ As a result, ‘there was a serious amount of money that was spent on upgrading [these assets]...to meet newer EU emissions regulations. *Not long after we made that investment, all the rules changed*, and suddenly that

⁶⁴ Henry Yarger, *Strategic Theory for the 21st Century: The Little Book on Big Strategy* (Carlisle, PA: US Army Strategic Studies Institute, 2006), 25.

⁶⁵ John Chipman, ‘Why Your Company Needs a Foreign Policy,’ *Harvard Business Review*, September 1, 2016. Emphasis added.

investment didn't look like a very good use of money.'⁶⁶ As Chapter 3 discussed, by 2016 E.ON had become, in its words, 'the first major European energy supplier to orient itself wholly around the new energy world' (and indeed was one of the few companies to become a "disruptor" by 2015–2017).⁶⁷

In coalescing around a new set of practices and moving toward a more climate active sensibility, companies did not *eliminate* uncertainty and unpredictability in the climate issue area. But by coming to agree on some of the "rules" of the new "game," or the kinds of the behaviors necessary for navigating a changing environment, they generated *more* certainty and predictability. By definition, a paradigm – an informal template or model for action – injects elements of stability and predictability into a landscape, offering actors reasonable indications of where others believe they are headed and how they plan to get there. In terms of the climate issue, which may be the "canary in the coalmine" for other non-traditional issue areas, the system became less vertical, with rules flowing from states to private actors, and more horizontal, as private actors themselves began making some of the rules.⁶⁸

Non-state actors reshaping the context for state action

When President Donald Trump did not attend the climate session of the 2019 G-7 summit, for many observers his empty chair seemed an apt metaphor for U.S. foreign policy under his administration.⁶⁹ But the incident captured a deeper lesson, namely, that when the

⁶⁶ Interview 12.

⁶⁷ E.ON, *Sustainability Report 2016*.

⁶⁸ The distinction between domestic and international law offers an apt analogy; while domestic legal systems are vertical, with governments making the rules and the subjects (constituents) following them, in international law the system is horizontal, with the subjects (states) making the laws that they themselves have to follow.

⁶⁹ Sonam Sheth, 'Trump never made it to the G7 climate meeting, and world leaders say they are giving up on bringing the US back into the Paris accords,' *Business Insider*, August 26, 2019.

national governments of even the most powerful states opt out of their place at the table to address global challenges that are not amenable to go-it-alone solutions, the conversation continues without them—and other actors can “take a seat.”

In an illustrative example of this dynamic, in 2021 a climate change adviser in the office of the mayor of New York City explained that in the context of the climate issue, ‘All the action has been happening in cities for four years. So really, the diplomats who are in these countries need to know that China sends people from the city level to New York and to these cities all the time.’ This adviser has become ‘a sort of local climate diplomat, meeting with environment ministers from half a dozen countries—without guidance from the State Department.’ As she put it, ‘We just figured it out on our own.’⁷⁰

The states that are most successful at navigating the complexities of the 21st century landscape will be those that appreciate that non-state actors are increasingly assertive, independent, and ambitious on the global stage—and that grasp how these actors, whether subnational heavyweights or ‘companies with more power than governments,’ can actually change the context in which states have to articulate and advance their security and interests.⁷¹ States that fail to do so may find themselves in a situation where, rather than impose their own ‘preferred order on the future,’ they must accommodate *themselves* to an order not of their making.⁷²

Perhaps nowhere is this possibility clearer than in the United States, where the new Biden Administration (in office two months as of this writing) announced that the climate crisis will be ‘at the center of United States Foreign Policy and National Security’ and made

⁷⁰ Michele Kelemen, ‘State Department Should Be More Diverse And Engaged Across U.S., Report Says,’ *Morning Edition*, NPR, March 3, 2021.

⁷¹ Khanna, *Connectography*, 58.

⁷² This phrase is borrowed from Layton, who writes that grand strategy ‘seeks to impose a preferred order on the future.’ Peter Layton, ‘The Idea of Grand Strategy,’ *The RUSI Journal* Vol. 157, Issue 4 (2012): 59.

clear that climate change will be considered across virtually every facet of American interests and across all the elements of power.⁷³ For example, the administration directed the Secretary of Defense to include climate risk assessment in the 2022 National Defense Strategy; appointed the first-ever National Climate Advisor; created the cabinet-level post of Climate Envoy; established a Climate Committee of the Federal Reserve; and created a national Climate Task Force assembling leaders from 21 federal agencies and departments ‘to enable a whole of government approach to combatting the climate crisis.’⁷⁴

The Biden Administration is behaving as though the United States must “catch up” to a new reality in order to secure its key interests. My research has shown that corporate global actors helped usher in this new reality by shaping one of its central elements – the consensus that due to climate-related imperatives the low-carbon future has been “pulled forward” in time – and did so in the context of an *absence* of state leadership. It is worth reiterating one of the recurring points in the preceding chapters: although the idea that the world is headed toward a low-carbon economy sooner rather than later due to climate risks is treated today as a foregone conclusion, it still was up for debate in the late 2000s and turn of the 2010s.

As of the early 2010s, states would have had little reason to expect that there would be a “new reality” in the climate issue area by the turn of the 2020s—much less that select corporate actors would have been some of its key architects. First, it is hard to overestimate the challenge of making any kind of meaningful progress on addressing climate change and advancing the low-carbon future without robust state action. Even in a

⁷³ U.S. President, ‘Executive Order 14008 of January 27, 2021, Tackling the Climate Crisis at Home and Abroad,’ US Government Publishing Office.

⁷⁴ The White House, ‘Fact Sheet: President Biden Takes Executive Actions to Tackle the Climate Crisis at Home and Abroad, Create Jobs, and Restore Scientific Integrity Across Federal Government,’ January 27, 2021.

situation where states *were* providing strong policy and regulatory tailwinds, monumental efforts would be required to overcome the inertia of the high-carbon status quo and to break free of strongly locked-in practices oriented toward a fossil fuel-based economy.⁷⁵ The entrenched political, economic, and societal interests vested in the status quo make meaningful change enormously difficult. It likewise is difficult to overstate the challenge of companies taking any kind of consequential action despite major uncertainties persisting in their environments. As Germany's largest bank (Deutsche Bank) characterized the landscape in 2017, "There is still a fairly high degree of uncertainty around key parameters of transition risks, for example, society's willingness and ability to reduce carbon emissions and the timing and severity of policy action, in particular."⁷⁶

Second, corporations are not immune to the kind of trade-offs that states face in deciding where and how to allocate resources as they determine which global risks to prioritize. If the existence of a 'clear and present danger' tends to 'concentrate minds,' as Gaddis has argued, climate risks typically do not manifest as such a danger.⁷⁷ They are uniquely complex, inherently uncertain, and relatively remote, and a more immediate and urgent risk seemingly always comes along; in the 2000s, it was the Global War on Terror and in the 2010s it was fallout from the Great Recession. While private sector actors are in a better position to respond to complex global challenges in a nimble and efficient fashion, at the onset of the 2010s, especially as the ramifications of the Great Recession

⁷⁵ See Unruh, who proposes that 'industrial economies have been locked into fossil fuel-based energy systems through a process of technological and institutional co-evolution driven by path-dependent increasing returns to scale.' This condition of 'carbon lock-in' produces 'persistent market and policy failures that can inhibit the diffusion of carbon-saving technologies despite their apparent environmental and economic advantages.' Gregory Unruh, 'Understanding carbon lock-in,' *Energy Policy* Vol. 28, Issue 12 (October 2000): 817.

⁷⁶ Deutsche Bank, 2017.

⁷⁷ John Lewis Gaddis, 'Surprise, Security, and the American Experience,' Interview with Brian Lamb, *Booknotes*, C-SPAN, May 16, 2004.

continued to unfold, states would have had every reason to assume that companies would have been preoccupied with more pressing challenges and that the climate change issue, if it registered at all, would get limited attention.

To illustrate non-linear change – the kind of unexpected, potentially transformative change that this project explored – Lovins observes that in looking at a photograph of ‘New York’s Fifth Avenue in the Easter Parade in 1900, you must look hard for the first car. Just 13 years later, you must look even harder for the last horse.’⁷⁸ At the start of the 2010s, as states surveyed the landscape and context in which they had to advance their interests, their environment was like Fifth Avenue in 1900—defined by certain actors and dynamics, with little indication of change on the horizon and little sign that certain non-state “Great Powers” would develop the ambition to act in the context of a new global issue area. But as this study explored, within a short period of time there was an unexpected change in the actors, practices, and dynamics shaping the terrain—and today the burden increasingly is on states to adjust to this new reality.

⁷⁸ Sören Amelang, ‘Disruption caused by energy transition is unstoppable – Amory Lovins.’

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