

Business Adaptation to Climate Change

This book seeks to advance the understanding of how businesses may adapt to climate change trends. Specifically, it focuses on two general research questions: First, how do businesses adapt to chronic slow-onset nature adversity conditions linked to climate change? Second, how do firms adapt to weather-related natural disasters exacerbated by climate change? In the first part of the book, the authors develop a conceptual framework in response to these questions. In the second part, they test this framework using multiple empirical studies involving large data analyses of: (a) the Western U.S. ski industry adaptation to warmer temperatures, and (b) the effect of natural disasters on foreign investment by multinational corporations around the world. This book will interest management and public policy students and scholars researching successful business climate change adaptation strategies, as well as business and non-profit organization leaders and policy makers involved in developing and promoting such effective strategies.

JORGE E. RIVERA is a Professor of Strategic Management and Public Policy and Tucker Fellow at The George Washington University's School of Business. He has published over 50 manuscripts and two books, including *Business and Public Policy* (Cambridge University Press, 2010) which received the 2011 Outstanding Book Award from the Organizations and the Natural Environment Division of the Academy of Management. Professor Rivera is founding co-editor of Cambridge University Press's Book series on Organizations and the Natural Environment.

CHANG HOON OH is William and Judy Docking Professor of Strategy at the University of Kansas School of Business. His research centers on non-market strategy in challenging environments, business continuity and sustainability, and globalization versus regionalization. He has published more than 55 papers in peer-reviewed journals. Currently, he is co-editor-in-chief of *Multinational Business Review*, a consulting editor of the *Journal of World Business*, and serves on the *Journal of International*

Business Studies and Journal of International Business Policy as a member of editorial review board.

JENNIFER OETZEL is the Kogod IB Professor and Professor of Strategic Management in the Department of Management in American University's Kogod School of Business. Her research focuses on understanding how firms manage major risks, such as natural disasters and violent conflict. She has published more than 35 articles, invited papers, and book chapters in outlets such as the *Strategic Management Journal*, *Organization Science*, the *Journal of International Business Studies*, and others. Professor Oetzel serves on the editorial boards of *Strategic Management Journal*, *Journal of International Business Studies*, and *Journal of International Business Policy*. Her research on natural disasters and managing risk has been profiled in the *Washington Post*, *Financial Times*, and other media outlets.

VIVIANE CLEMENT is an expert on climate change adaptation and resilience working on climate policy, strategy, and analytics. Her research (co-authored with Jorge E. Rivera) has appeared in *Business Strategy and the Environment* and *Organization & Environment*.

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Jorge E. Rivera , Chang Hoon Oh , Jennifer Oetzel , Viviane Clement
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Business Adaptation to Climate Change

JORGE E. RIVERA
George Washington University

CHANG HOON OH
University of Kansas

JENNIFER OETZEL
American University

VIVIANE CLEMENT



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To Caroline, the rainbow of my life. JR

*To Hyun Jung and Adrian, for their love, support,
and smiles. CHO*

To Caroline, for all her love and happiness. JO

*To Alex, Felix, and Leila, for being on this journey
together. VC*

And outside, the silent wilderness surrounding this cleared speck on the earth struck me as something great and invincible . . . waiting patiently for the passing away of this fantastic [human] invasion.

Joseph Conrad, *Heart of Darkness*, 1899

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About the Authors

Jorge E. Rivera is a Professor of Strategic Management and Public Policy and Tucker Fellow at The George Washington University's School of Business. He received his Ph.D. from Duke University in 2001. Prof. Rivera's research studies how nature's adversity conditions, and other external context factors are associated with corporate environmental strategies. He has also examined how participation in domestic and international voluntary environmental certification programs is associated with business competitiveness and environmental performance. He has written over 50 manuscripts, including several dozen journal articles, and two books printed by top strategic management and public policy publications. His former book, *Business and Public Policy* by Cambridge University Press received the 2011 Outstanding Book Award by the Organizations and the Natural Environment Division of the Academy of Management. His publications' findings have been mentioned in more than 30 news stories by national and international newspapers including *New York Times* and *Financial Times*. Professor Rivera is founding Co-Editor of the Cambridge University Press's Book series on Organizations and the Natural Environment. In 2012, Professor Rivera was the Chair of the Academy of Management's Organizations and the Natural Environment Division.

Chang Hoon Oh is William and Judy Docking Professor of Strategy at the University of Kansas School of Business. He previously was the William Saywell Professor in Asia Pacific Business at the Beedie School of Business, Simon Fraser University, Vancouver, Canada. He was the Inaugural Alan Rugman Visiting Fellow at the University of Reading for 2015/2016. He was a marketing manager of Samsung Electronics and Samsung Corporation and served his military service as an instructor, first lieutenant ROTC, in South Korea. Professor Oh received his PhD degree (2007) from the Kelley School of Business at

Indiana University-Bloomington. His research centers on non-market strategy in challenging environments, business continuity and sustainability, and globalization versus regionalization. His research has been supported by the Social Sciences and Humanities Research Council of Canada (SSHRC), Canadian International Resources and Development Institute (CIRDI) and the National Research Foundation of Korea (NRF). He also collaborated with World Wildlife Fund of Nature (WWF) and United Nations Development Program (UNDP). He has published more than 55 papers in peer-reviewed journals. Currently, he is Co-Editor-in-Chief of *Multinational Business Review*, a senior editor of *Journal of World Business*, and serves *Journal of International Business Studies* and *Journal of International Business Policy* as a member of editorial review board.

Jennifer Oetzel is a Professor of Strategic Management in the Department of Management at American University's Kogod School of Business. Dr. Oetzel received her PhD in Strategic Management (2002) from the University of North Carolina at Chapel Hill. Her research focuses on understanding how firms manage risk and specifically on how businesses can best manage violent conflict, natural disasters, and other discontinuous risks. She also examines how promoting economic and social development, and, in some cases, peace building can minimize business risk and positively contribute to the local/regional community and the overall business environment. Her overall body of research includes more than 20 articles and book chapters. Her recent research work has appeared in the *Strategic Management Journal*, *Organization Science*, and the *Journal of International Business Studies*, among other outlets. In 2015, she won a Best Paper Award at the 2015 Academy of Management Meeting, was a finalist for the Haynes Prize for the Most Promising Scholar at the Academy of International Business (2009), and has been twice nominated at the Strategic Management Society (SMS) for best paper awards. She has also received funding from the Social Sciences and Humanities Research Council of Canada for two ongoing research projects. Professor Oetzel serves on the editorial boards for the *Strategic Management Journal*, *Journal of International Business Studies*, *Journal of World Business*, and *Business & Society*.

Viviane Clement is an expert on climate change adaptation and resilience working on climate policy, strategy, and analytics. She holds a PhD from The George Washington University School of Business. There, her research used an interdisciplinary approach, drawing from concepts in ecology and socioecology to examine how organizations manage climate-related risks while considering local ecosystem dynamics. Her work (with Jorge E. Rivera) has appeared in *Business Strategy and the Environment* and *Organization & Environment*.

Foreword

Imagine, for a moment, that we are writing in the year 2050. Many regions of the world are reporting exposure to severe climate change impacts. Megacities in South Asia and Africa are experiencing deadly heat waves; crop-producing regions in India and Pakistan suffer from substantial crop losses, flooding is severely impacting livelihoods, infrastructure and industries in coastal regions, and several regions in the US and in parts of Australia are experiencing severe droughts and wildfires. The most severely affected cities and regions have adopted permanent water and food rationing.

Current investments in mitigation efforts alongside green recovery plans and a heightened awareness of global risks after the impacts of the coronavirus pandemic give hope that the worst impacts of climate change can be avoided and that humanity will not experience such devastating outcomes. However, when examining the latest scientific evidence, it becomes clear that the above-mentioned scenarios are not unrealistic. Even if we collectively manage to mitigate the worst impacts of climate change, human activities have already led to about 1.0°C of warming above pre-industrial levels. As the warming trend continues, adverse impacts associated with climate change will become more noticeable, leading to substantial and varied impacts on businesses and industries in the future – with changes to the products we consume, the services available to us, and the expectations of how businesses address climate change.

Not long ago the impacts of climate change on firms and industries were considered a fringe topic in business research and practice. In fact, when presenting my initial dissertation work on organizational adaptation and resilience to climate change, a senior colleague remarked that this topic would not be suitable for a PhD in business. (Due to a courage of conviction and some stubbornness, I prevailed and fulfilled my doctorate in this area.) These days, an increased awareness of the

adverse impacts of climate change, growing social movements, and popular dissatisfaction with political inaction, along with proactive examples of climate change policy implementation, have created a set of drivers that make it harder for business executives and policy makers (and perhaps also our colleagues in academia) to ignore the topic of climate change altogether, despite countervailing and vested interests aimed at preserving a “business-as-usual” scenario.

Given substantial debate about future impacts of climate change, the need for this book is obvious. The authors, Jorge Rivera, Chang Hoon Oh, Jennifer Oetzel, and Viviane Clement, have together drawn a timely and important contribution that examines the adaptation of businesses to the impacts of climate change. The acknowledgment that firms as well as various actors in society more generally need to adapt to climate change is not a fatalist admission that it is too late for climate change mitigation; rather, the consideration of adaptation means that businesses are aware of their own impacts on – and changing relationship with – their environment, which includes our climate system. Businesses are both part of the problem and part of the solution. Emissions from industrial activity have and continue to significantly contribute to climate change; however, businesses are uniquely positioned to support societal adaptation to climate change in terms of innovation, technology adoption, and business activities that generate positive societal impacts.

The main contribution of the book is that it advances our understanding of how businesses can adapt to climate change both in terms of gradual and slow-onset changes as well as changes in the frequency and intensity of extreme weather events attributed to and exacerbated by climate change. The authors draw together a convincing account of how businesses are impacted and can adapt, especially those operating in an international context and those in sectors directly impacted by climate change, such as winter tourism.

Scholars and practitioners will benefit from the rich material presented in the book that provides both conceptual foundations and empirical evidence for business adaptation to climate change. There is still little cross-disciplinary work that comprehensively integrates scientific findings into business thinking. I am therefore excited about the contribution of the book to the urgent debate on how businesses can adapt to climate change by developing conceptual ideas and

propositions and providing illustrative examples. The book provides a solid foundation to inform this important area of research and to create awareness of the significant impacts of climate change that will occur if we do not act decisively and make substantial changes now.

Dr. Martina K. Linnenluecke
Professor of Environmental Finance
Director, Centre for Corporate Sustainability and
Environmental Finance
Macquarie University, Sydney, Australia

Preface and Acknowledgments

As the planet suffers increasingly from global warming's detrimental effects, our book provides a seminal global analysis of business adaptation to climate change. We focus on two general research questions: First, how do businesses adapt to chronic slow-onset nature adversity conditions linked to climate change? And second, how do firms adapt to weather-related natural disasters exacerbated by climate change? To answer these questions, we develop a conceptual framework that seeks to understand how businesses respond to climate change-related natural disasters and slow-onset adversity conditions. To test our conceptual ideas and propositions, in the second part of our book we rely on multiple empirical studies involving large data analyses of: a) the Western U.S. ski industry adaptation to warmer temperatures, and b) the effect of natural disasters on the foreign investment of multinational corporations around the world.

Business responses to natural disasters seem to involve a dynamic that initially involves denial, advancing through indifference, delay, avoidance, and other forms of resistance, on to proactive preparedness. Finally, when the catastrophic consequences of natural disasters are felt, the business response pattern is one of last-minute haphazard adaptation measures. If a company survives, managers either develop an arrogance about their ability to confront the next disaster or decide that such catastrophic events are flukes of nature. The obstinate nature of this dynamic is much stronger for slow-onset, climate change-induced adverse conditions whose negative effects are imperceptible in the short term.

The resistance to prepare for and recognize the importance of climate change adversity conditions by businesses is also pervasive among the most prestigious academic business management journals. Almost all top academic business journal editors and the leaders of business academic societies symbolically stress the need to study and address “grand challenges” like climate change. In reality, business

response to climate change does not appear to be considered a legitimate area for business academic research given that very few papers addressing business responses (or lack of) to climate change actually get published in the premiere business research journals.

For the 1998 to mid-2015 period, only 32 out of 22,903 (0.15 percent) articles published in the top 23 elite business academic journals mentioned “global warming,” “climate change,” “greenhouse,” or “carbon” in the title, abstract, or key words.

The dearth of business and climate change articles in top academic business journals is of such magnitude that it has attracted attention by scholars specializing in examining academic publications trends. Diaz-Rainey et al.’s (2017) bibliographic study found that between 1998 to mid-2015, the top 23 elite business academic journals, by impact factor, published a total of 22,903 articles. Of those, only 32 (~0.15 percent) mentioned “global warming,” “climate change,” “greenhouse,” or “carbon” in the title, abstract, or key words. For this period, the most elite general management journals by impact factor – *Academy of Management Journal (AMJ)*, *Academy of Management Review (AMR)*, and *Administrative Science Quarterly (ASQ)* published just two articles out of a total of 721 (0.28 percent) mentioning “global warming,” “climate change,” “greenhouse,” or “carbon” in the title, abstract, or keywords (Diaz-Rainey, et al., 2017).

The tendency for climate change to be almost absent from discussion is even worse in other business academic disciplines for the same period. Within this timeframe, out of 8,737 articles published in the top three finance journals and top five marketing journals (by impact factor) zero mentioned “global warming,” “climate change,” “greenhouse,” “carbon” in the title, abstract, or key words. To be sure, given that these bibliographic analyses focused on the title, abstract, and keywords, the actual number of publications that study topics related to climate change is likely to be higher. For instance, for the 2011–2020 period, we identified five additional manuscripts published in the top four empirical general management journals (*AMJ*, *ASQ*, *SMJ*, and *Organization Science*) examining how natural disasters affect business strategies. Yet, to illustrate the extent of disregard, even if the number of climate change-related manuscripts published by elite business academic journals were a thousand percent greater, the proportion of articles examining climate change-related topics would still

be only 1.5 percent. Since 2015 there has been a small increase in the number of articles focusing on climate change related topics in top business academic journals, but the tendency to give marginal attention to this topic continues.

Acknowledgments. We appreciate the help of multiple people and organizations that allowed us to write this book. The support from George Washington University (GWU), American University, Simon Fraser University, and University of Kansas was critical for our research work. Professor Peter Tashman’s research questions, work, and findings about business adaptation to climate change spurred our research on the ski industry included in this book. At GWU, the School of Business’ Tucker Fellowship was key in allowing the extra time required to finish this book. Financial supports from Social Sciences and Humanities Research Council of Canada (SSHRC) were critical in conducting research on natural disasters and foreign investments. We thank Rui Wang for her support in editing the book’s citations and references. We would also like to thank attendees at the Academy of International Business and Academy of Management Meetings for their feedback on earlier versions of our research manuscripts.

Publication Acknowledgments

This book extends the theory development and empirical analysis from our publications examining business adaptation to natural disasters and slow-onset nature adversity conditions exacerbated by climate change. Previous versions of this research have been published in the academic journal articles listed below and they are reproduced with the permission of publishers.

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- Oetzel, J., and Oh, C. H. (2014). Learning to carry the cat by the tail: firm experience, disasters, and multinational subsidiary entry and expansion. *Organization Science*, 25(3), 732–756.
- Oh, C. H., and Oetzel, J. (2011). Multinationals' response to major disasters: how does subsidiary investment vary in response to the type of disaster and the quality of host country governance? *Strategic Management Journal*, 32(6), 658–681.
- Rivera, J., and Clement, V. (2019). Business adaptation to climate change: American ski resorts and warmer temperatures. *Business Strategy and the Environment*, 28, 1285–1301.