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Resilient Business, Resilient World:

A Research Framework for Private-Sector Leadership on Climate Adaptation

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About This Report

Businesses can be agents of climate resilience, benefitting from the availability of resources, the security of supply chains and transport routes, the protection of workers and infrastructure, and the rising prosperity of consumers and shareholders. Alternately, businesses can suffer considerable strategic, operational, financial, reputational, resource, and legal harm from failing to properly account for climate risk and its relationship with other business risk vectors. When companies improve their understanding of climate risk, they open innovative routes to enhancing resilience and in turn derive benefit for their core businesses, their complex supply chains, and for the frontline communities managing climate change impacts across the globe.

This paper has two mutually supportive long-term goals:

- » **First, we aim to provide an accessible and actionable framework for climate-resilient business.** These are companies that are able to anticipate, avoid, accommodate, and recover from climate risks internally and across their supply chains.
- » **Second, and in tandem, we want to equip these companies to enable resilience in vulnerable communities around the globe.** Resilient companies contribute to resilient societies, moderating harm to socio-ecological systems and driving improved development outcomes. When pursued at scale, the actions of climate-resilient business lead to a resilient world, composed of people, an economy, and natural systems able to rebound quickly in the face of adversity.

To achieve the above goals, we have established the following key objectives for this paper:

- » **To equip business with a three-dimensional diagnosis of climate risk** by properly defining the three essential characteristics of climate risk, namely: existence of physical hazard(s), exposure to physical hazard(s), and vulnerability.
- » **To provide a foundation for how the private sector understands and responds to the nexus between climate risk and other business risk vectors**, including strategic, financial, operational, human resources, compliance, and legal risks.
- » **To present companies with a successful strategy for building climate resilience.** A successful strategy for climate resilience will need to include factors, components, and elements that together enhance the adaptive capacity of the company and enable greater adaptive capacity across the supply chain and within vulnerable communities. Strengthening the “capital assets”—specifically the human, financial, social, natural, physical, and political capital—the company can deploy is key to building resilience.
- » **To propose a role for the companies as potential agents of climate resilience** by identifying ways in which the sector can mobilize actions in support of the capital assets.

METHODOLOGY

The research approach has attempted to ensure an appropriate balance between strong evidence and actionable insights, based on the conviction that insights without analysis lack credibility, and analysis without a point of view quickly becomes inaccessible and impractical.

The research methodology for this paper consists of four elements.

- » **Comprehensive literature review:** This work has been informed by the best available research conducted on risk and resilience. This includes a comprehensive review of the natural science as compiled by the Intergovernmental Panel on Climate Change (IPCC). We have further drawn upon research conducted by multilateral development banks, international development agencies, governments, global non-profits, research institutes, universities, and companies specializing in risk.
- » **Semi-structured interviews:** Semi-structured interviews with leading thinkers in the field of climate resilience, as well as representatives from a cross-section of private enterprise, were conducted between October 2015 and December 2016. The insights harvested from these discussions have informed our understanding of climate risk; the nexus between climate change and other business risk vectors; the complexities of global supply chains; the differentiated vulnerability of frontline communities; the essential building blocks of climate resilience; the importance and characteristics of capital assets; and the best way to integrate and implement these capital assets in the private sector.
- » **Representatives from the following companies** participated in the semi-structured interviews: American Express, Morgan Stanley, Maersk Group, Novo Nordisk, Stora Enso, BP, Marks & Spencer, General Mills, Genentech, Hydro-Québec, Apple, Unilever, State Street Corporation, Standard & Poor's, Vodafone, Barclays, Burberry, Kingfisher, Franklin Templeton Investments, KKR, Oak Hill Capital Partners, BC Hydro, Port of Vancouver, REI, MEC, Nike, Carlsberg, Columbia Sportswear, Brooks Sports, Costco, T-Mobile, Polycom, Visa, West Elm, GAP, Cisco, Autodesk, Google, Facebook, LinkedIn, Salesforce, The Coca Cola Company, Telenor, and Lululemon.
- » **Focus groups:** Seven focus groups were convened to present initial and final research findings to a diverse set of stakeholders and solicit their review of the initial framework. These were held in Bangladesh at the Community Based Adaptation Conference in March 2016; in San Francisco in October 2016 at the offices of Autodesk with representatives from five other companies; in New York in November 2016 as part of BSR's annual conference; in Marrakech, Morocco in November 2016 at UNFCCC COP22; in Hong Kong at the China Club in March 2017; and in Johannesburg and Cape Town, South Africa in June 2017 with local partners NBI and KudosAfrica.

There are two target audiences we aim to reach with this research. They include 1) individuals situated within the private sector, including those situated within company sustainability departments, and; 2) practitioners and experts in the climate adaptation community, including those in academia, civil society organizations, and development agencies. This includes the more than 250 member companies in BSR's network across industries and areas of expertise.

ACKNOWLEDGMENTS

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ABOUT BSR

BSR is a global nonprofit organization that works with its network of more than 250 member companies to build a just and sustainable world. From its offices in Asia, Europe, and North America, BSR develops sustainable business strategies and solutions through consulting, research, and cross-sector collaboration. Visit www.bsr.org for more information about BSR's more than 25 years of leadership in sustainability.

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Executive Summary

Climate change represents a material and cascading risk to the private sector with profound implications across supply chains and in vulnerable communities. The private sector faces the impacts of climate risk on various aspects of the value chain, including on strategy, finances, operations, marketing, compliance, and human resources. And yet, companies have the capacity to be powerful agents of climate resilience across society if properly equipped with a sound diagnosis of climate risk and tailored strategies for enhancing adaptive capacity.

This report assesses and consolidates the best available knowledge from natural and social science in the field of climate resilience and presents an accessible and actionable framework for private sector leadership on climate change resilience inside individual companies, across complex global supply chains, and within frontline communities vulnerable to climate impacts.

Furthermore, it provides an approach for companies to properly identify climate risks. The private sector—which has largely been overlooked by the climate and development community—has been misdiagnosing climate risk by using a one-dimensional approach to deal with a three-dimensional problem. This limited view fails to account for the broad range of climate impacts on companies and can skew risk assessments, leaving organizations vulnerable to climate impacts. A better understanding of these vulnerabilities is becoming increasingly important. For example, the number of registered weather-related events has tripled in the last three decades, resulting in inflation-adjusted insurance losses of approximately US\$50 billion alone in the last 10 years.¹

BSR has developed a private sector risk and resilience framework that enables the private sector to understand the three elements of climate risk—the physical hazards of climate change—and how exposed and vulnerable their operations, supply chains, and the communities in which they operate might be to these climate impacts. We dive into the drivers of vulnerability and how a company can then develop climate resilience strategies to deal with these climate risks. In essence, we explore how to anticipate, avoid, accommodate, and recover from climate risks through tailored investments in six capital assets—natural, physical, human, financial, social, and political—helping to provide a holistic and comprehensive business-wide strategy to the impacts of climate change.

¹ Bank of England, 2015

Introduction

Climate change is “unequivocal, accelerating, and human-induced.”²

Growing concentrations of greenhouse gases (GHGs), unprecedented in at least the last 800,000 years, are changing the chemical composition of the atmosphere, leading to a range of climate hazards. The resulting impacts are likely to be “severe, pervasive, and irreversible,” with many changes “unprecedented over decades to millennia.”³

The Paris Agreement on climate change makes great strides reducing greenhouse gas emissions to avoid unmanageable climate change. Estimates from the United Nations Framework Convention on Climate Change (UNFCCC) suggest that the emissions reductions pledges agreed to in Paris would result in 2.7°C in global mean temperature rises by the end of the century, down from a projected 4.8°C of projected warming prior to Paris.⁴ However, this is still well above the 2°C global mean temperature threshold identified as the point at which dangerous and potentially irreversible climate change begins to take hold.⁵ As a result, responding and adapting to climate change remains one of the greatest challenges of the 21st century.⁶

Climate change represents a material and cascading risk to the private sector with profound implications across the supply chain. According to the World Economic Forum (WEF) 2016 Global Risk Assessment Report, climate change is the “highest impact risk to business” out of 29 risks that were reviewed.⁷ Moreover, research in the journal *Nature* calculates the impact of climate change on the market value of global financial assets to be US\$2.5 trillion and as high as US\$24.2 trillion under worst-case scenarios.⁸

² IPCC, 2007

³ IPCC, 2013

⁴ UNFCCC, 2015

⁵ IPCC, 2007

⁶ Adhikari & Taylor, 2012

⁷ WEF, 2016

⁸ Dietz et al, 2016

Research gaps are undermining private sector leadership on climate risk and resilience

Through our research, BSR sought to develop actionable analysis on risk and resilience for the private sector, and we discovered two important research gaps:

- » **The private sector is misdiagnosing climate risk**, which limits its capacity to build effective and comprehensive resilience strategies inside individual companies, across complex global supply chains, and within frontline communities vulnerable to climate impacts.
- » **The research conducted by the climate and development community largely overlooks the private sector** as a key influence target and potential agent of climate resilience. Strategies for climate resilience—built around six capital assets and prominent in the scholarly literature—are largely unknown in business. As a result, an existing and effective menu of options to build resilience is inaccessible, untailored, and unused.

The private sector is not prepared to manage climate risk and is therefore poorly equipped to enable broader societal resilience. A number of companies are beginning to address climate risks notably by building on existing business risk assessment activities and integrating adaptation initiatives into enterprise-wide risk management systems.⁹ However, the majority of businesses have been using a one-dimensional approach to deal with a three-dimensional problem.

The private sector is not prepared to manage climate risk and is therefore poorly equipped to enable broader societal resilience.

In recent research conducted by two business-focused organizations, BSR and CDP, 72 percent of suppliers stated that climate risks could significantly impact their business operations, revenue or expenditure, yet only half of these are currently managing this risk.¹⁰ Moreover, the semi-structured interviews and focus groups conducted for this research revealed that although most companies are aware of the existence of climate-related **hazards**, such as extreme weather events (the first dimension), and are often well-informed about their potential **exposure** to these hazards (the second dimension), they lack a fundamental understanding of **vulnerability**—the underlying weaknesses in their own systems that exacerbate risk (the third dimension). This limited view fails to account for the broad range of climate impacts on companies and can skew risk assessments.

Moreover, climate risk is dynamic and context specific. Most companies have failed to analyze the full impact of climate risk on business risk factors, including strategic, financial, operational, human

⁹ Crawford & Seidel, 2013

¹⁰ Chase et al, 2016

resources, compliance, and legal risks. They have further failed to map the full spectrum of risks across their entire supply chains, across temporal and spatial scales, and in the ways climate intersects with other trends and issues that affect business and society, including availability of natural resources, changing disease vectors, and migration.

Conversely, companies have the capacity to be powerful agents of climate resilience when they mobilize their innovations, products, services, and investments and harness their engagement with suppliers, workers, local communities, and decision-makers to support the enhancement of six capital assets. These capital assets - natural, physical, human, financial, social and political—are the key building blocks of climate resilience.

Climate risk and resilience have been the focus of scientific assessments for the past two decades; however, the climate and development community is largely overlooking and underserving the private sector.

In preparing this report, BSR examined resilience frameworks used by the Red Cross Red Crescent Climate Centre, Action Aid International, Overseas Development Institute (ODI), The UK Department for International Development (DfID), USAID, The World Bank, the Organization for Economic Cooperation and Development (OECD), the Food and Agriculture Organization of the United Nations (FAO), United Nations Development Programme (UNDP), the Australian Government, and the International Institute for Sustainable Development (IISD), in addition to guidelines for developing resilience frameworks published in peer-reviewed journals.

As the Overseas Development Institute has revealed, there is a growing use of so-called “capital assets” as “factors, elements, and components of resilience” across the bulk of resilience frameworks in the public sector and emerging from think tanks. The apparent alignment of frameworks suggests that resilience “results from the deployment of human, financial, social, natural, physical and political capital.”¹¹

Previous research tends to be theoretical, written primarily by natural scientists or public policy experts, and targeted specifically at development practitioners as the prime audience. This paper draws upon the analytical foundations of this previous research but departs from past work, as it is targeted at private sector actors with the deliberate intention of mobilizing businesses as agents of climate resilience through their products, services, innovations, decisions, and investments.

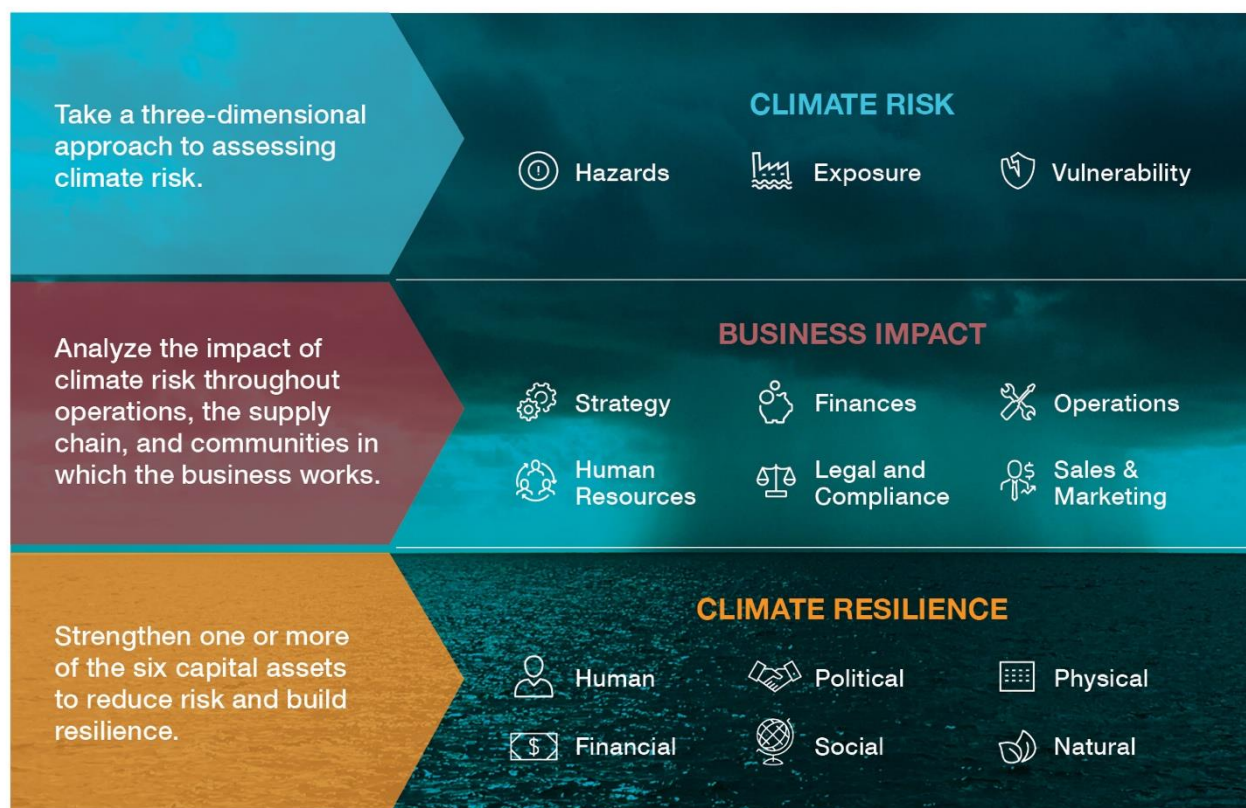
This report seeks to address these research gaps by consolidating the best available knowledge from natural and social science and creating an accessible and actionable framework for private sector leadership on climate resilience inside individual companies, across complex global supply chains, and within frontline communities vulnerable to climate impacts. The framework enables the private sector to adopt a three-dimensional understanding of climate risk encompassing the key drivers of vulnerability, as well as exposure to climate hazards and to anticipate, avoid, accommodate, and recover from climate risks through tailored investments in the six capital assets. The goal is a private sector capable of applying and adapting scientific, technical, and other knowledge and ready to enable economic and social advancement in developing regions of the world.

¹¹ ODI, 2016

Climate risk and resilience have been the focus of scientific assessments for the past two decades; however, the climate and development community are largely overlooking and underserving the private sector.

This paper walks the reader through the conceptual framework (Figure 1). The next section presents climate change as a material and cascading risk for business, ensuring deeper understanding of how this intersects with and implicates business risk vectors. The report then presents a menu of options for the private sector to utilize as it seeks to enable resilience inside individual companies, across complex global supply chains, and within frontline communities vulnerable to climate impacts. This is based on mobilizing investments in and ensuring access to six capital assets. The framework then translates and consolidates the state of knowledge on risk and resilience into an actionable framework for business. We present final thoughts and conclusions at the end of the report.

Figure 1: Conceptual Framework



A Material and Cascading Risk for Society and Business

Climate impacts are already widespread, consequential¹² and expected to increase in intensity and frequency.¹³ A comprehensive body of research covering the science,¹⁴ the economics,¹⁵ the development implications¹⁶, the impacts on biodiversity and ecosystems,¹⁷ and the consequences for human systems¹⁸ has emerged over the past decade. This section outlines the risks for the private sector.

Diagnosing climate risk for the private sector

Speaking at Lloyds of London in 2015, the Governor of the Bank of England Mark Carney drew on analysis from Munich Re and highlighted that, “Since the 1980s, the number of registered weather-related loss events has tripled, and inflation-adjusted insurance losses from these events have increased from an annual average of around US\$10 billion in the 1980s to around US\$50 billion over the past decade.”¹⁹ These losses are the result of increasing climate risk, which is determined by the existence of physical hazards, exposure to those hazards and underlying vulnerability.

Although most companies are aware of the existence of climate-related hazards, such as extreme weather events, and are often well informed about their potential exposure to these hazards, they lack a fundamental understanding of vulnerability, or the underlying weaknesses in their own systems that exacerbate risk. This view fails to account for the broad range of climate impacts on companies and can skew risk assessments—creating false alarm where a company may be relatively secure, or missing important vulnerabilities.

¹² IPCC, 2014

¹³ UNDP, 2007

¹⁴ IPCC, 2014

¹⁵ Stern, 2007

¹⁶ FAO, 2012

¹⁷ IUCN, 2008

¹⁸ UNDP, 2005

¹⁹ Bank of England, 2015

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— Mark Carney, Governor of the Bank of England

”

Below we explain the three dimensions of climate risk: the physical **hazards** of climate change, **exposure** to those hazards, and **vulnerability**.

Hazard refers to the possible future occurrence of natural or human-induced physical events that may have adverse effects on vulnerable and exposed elements.²⁰ There are many different taxonomies that capture the range, nature, and impact of climate hazards. Working in partnership with Bloomberg Philanthropies and ARUP, C40 classifies climate hazards in terms of five key groups of events:²¹

- » **Meteorological** refers to short-term or small-scale weather conditions and includes extreme temperatures, such as heat waves, extreme temperature variations between day and night, and precipitation events.
- » **Climatological** refers to long-term or large-scale atmospheric processes and includes drought and forest fires.
- » **Hydrological** refers to mass movement of water or a change in the chemical composition of water bodies and includes floods, storm surges, sea-swells, salt-water intrusion, and acidification of the oceans.
- » **Geophysical** refers to the mass movement of solid earth and includes landslides, avalanches, earthquakes, or tsunamis.
- » **Biological** refers to a change in the way living organisms grow and thrive and includes the spread of water-borne, vector-borne, and air-borne diseases, as well as the spread of pests affecting crops. Vector-borne diseases, such as malaria, dengue, and yellow fever are sensitive to temperature, humidity, and rainfall patterns. As temperature and precipitation patterns change, these diseases will spread to areas traditionally outside the disease vectors.

²⁰ IPCC, 2012

²¹ C40, 2015

Figure 2: The Three Dimensions of Climate Risk



Exposure refers to the inventory of elements in an area in which hazard events may occur.²² In other words, a hurricane moving slowly through the mid-Atlantic may be the result because of climate change, but it does little physical damage to human populations unless it makes landfall and passes through population centers. It is the presence of people; livelihoods; environmental services and resources; infrastructure; or economic, social, or cultural assets, combined with exposure to a hazard, that create climate risk.

A growing number of population centers are exposed to climate-related hazards. Rapid development over the past forty years means that South and East Asia are heavily exposed to hazards because of their large coastal populations in low-lying areas—populations that form the customer and employee base of the world, and which constitute many of the workers in global supply chains. A report prepared by the New Economics Foundation predicts that the “human drama of climate change will largely be played out in Asia, where over 60 percent of the world’s population lives, over half of those live near the coast, making them directly vulnerable to sea-level rise.”²³ Considering that in 2014, East Asia accounted for 60 percent of the container volume among the 100 largest ports in the world—equivalent to four times the volume of European ports and six times that of U.S. ports—the implications of climate-related hazards in the region for global value chains cannot be underestimated.²⁴

As the global population continues to grow, demand for land for housing, food production, and other uses will continue to push up against climate hazards, intensifying exposure. Rapid urbanization and the growth of megacities, especially in developing countries, will exacerbate this trend, particularly through the spread of informal settlements that are ill-equipped to deal with an increase in the intensity and frequency of extreme weather events.

²² IPCC, 2012

²³ NEF, 2007

²⁴ American Association of Port Authorities, 2014

Exposure to a climate-related physical hazard is a necessary, but not sufficient, determinant of risk. To be truly at risk from climate change, it is also necessary to be vulnerable.

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Vulnerability refers to the propensity of exposed elements, whether people, ecosystems, biodiversity, economic sectors, complex supply chains, or individual companies, to suffer adverse effects when exposed to climate-related physical hazards.²⁵ Indeed, the word “vulnerable” is derived from the Latin root “vulnerare,” meaning to wound.

For example, two factories next door to one another might be exposed to the same flooding, but if one has back-up generators in the basement and the other has back-up generators on the roof, then their levels of vulnerability to short- and long-term disruption are dramatically different. Similarly, if one factory community has access to healthcare and the other does not, then the former will be much more resilient to a climate change-driven disease outbreak than the other, thereby again mitigating disruption.

These examples reveal that the exposure to a physical hazard is critical, but the true determinant of climate risk is vulnerability. This is the third dimension of the three-dimensional diagnosis of climate risk that is essential to building resilience. Unfortunately, it is the element that is least understood in the private sector.

A material risk to business

Companies are slowly beginning to realize how climate change impacts business continuity and success in relation to a range of business risk vectors, including fundamental strategy and business continuity, financial risk, and operations (Figure 2 above).

The fact that today’s businesses are global is not news, but the extent of the globalization of trade and commerce—and the risks it presents—is far from understood. Foreign direct investment (FDI) inflows have increased a staggering 25-fold since 1980, rising from US\$54 billion to US\$1.23 trillion in 2014, as marked by shifts from manufacturing to services and from developed to developing and emerging markets. Indeed, South-South investments (that is, investments from one developing economy to another) have intensified, growing by two-thirds, from US\$1.7 trillion in 2009 to US\$2.9 trillion in 2013.²⁶

²⁵ IPCC, 2012

²⁶ WEF, 2016

The resilience of any individual business depends heavily on the resilience of its suppliers and purchasers, whose supply chains can span many countries.²⁷

Strategic risks refer to the danger that the company's strategy becomes less effective and the company therefore struggles to reach its goals. Climate might pose strategic risks, as some technologies may become obsolete while others take their place because of the need to drive greenhouse gas emissions reductions. Alternatively, new competitors spurred by changing markets for low-carbon climate resilient goods and services may respond to shifting consumer demand and address resource constraints linked to climate, thereby threatening profits and market position. High variability in the price of raw materials driven by exposure to climate hazards may dramatically change inputs vital to production. Reputational damage may result from a perceived failure to account for climate risk with implications for revenue, as customers and suppliers become hesitant to associate with a discredited brand. Large accounts may be at risk if significant procurers of goods and services begin to focus their purchasing on climate-friendly suppliers.

Financial risks refer to the possibility of a sudden financial loss due to climate impacts. This could take the form of immediate losses caused by a climate-related hazard or a broad threat to profits as a company's exposure to climate risk becomes known. It could also take the form of diminished capital availability and higher credit risk as investors and lenders refuse to make capital available to companies seen to be vulnerable to climate impacts or seen as not managing them adequately. Risks related to asset and commodity prices are particularly strong because of the impact of climate change on ecosystems services, food production, and real estate. And increasingly, central banks are looking closely at systemic risk—specifically the danger that the financial system globally or the financial system of one particularly vulnerable country could suffer severe harm because of cascading climate risks.

Analysis by Mercer estimates the cumulative global cost of climate change – related impacts on the environment, health, and food security will reach between US\$2 trillion and US\$4 trillion by 2030.²⁸ More recent assessments published in the journal *Nature* suggested costs to the market value of global financial assets to be as high as \$24.2 trillion under worst-case scenarios.²⁹

Operational risks deal with critical damage to infrastructure, production, quality of goods and services, and disruption to logistics. Utilities and telecommunications companies have been particularly exposed to infrastructure and operational quality risk as a result of climate hazards as illustrated by the Verizon example below. Food, Beverage and Agriculture (FBA) companies have suffered losses due to production shortfall risk.

²⁷ Ibid.

²⁸ Mercer, 2011

²⁹ Dietz, 2016

CASE STUDY

Impacts of Hurricane Sandy on Verizon

Hurricane Sandy ultimately cost more than US\$70 billion in damages in New York and New Jersey alone.³⁰ Verizon was one of the companies to suffer damage. Prior to October 2012, Verizon's telephone infrastructure depended on copper-based systems to support its landlines nationally, including in New York and New Jersey. However, this infrastructure proved to have underlying weaknesses, as copper wire dissolves in saltwater. The infrastructure vital to the business could not withstand the saltwater flooding caused by Hurricane Sandy. As a result, thousands of Verizon customers lost service, and the company lost approximately US\$1 billion. Ultimately, Verizon decided not to replace the copper wiring, but rather to install its wireless Voice Link as a solution to fortify both landline and wireless systems. Unlike copper-based systems, wireless systems like Voice Link are less susceptible to extreme weather events, such as flooding, and thus are a more reliable source of phone service. The company has also identified Verizon Fios, a system based on fiber optic cables, as another reliable alternative to copper-based systems that allows the company to ensure business continuity, safeguard its reputation, and avoid substantial losses from future extreme weather events linked to climate change.³¹

Human resource risks focus on two distinct aspects. Workplace safety risk involves threats to employee health due to climate-related events. Talent management risk is the growing concern that recruitment and retention of staff—and millennials in particular—will become difficult for companies that earn a reputation for being poor on climate resilience.

The bulk of evidence suggests that climate change is hardest on women. Women are often constrained by social and cultural norms that prevent them from acquiring appropriate skill-sets; restrict their access to assets (including land); prevent them from having adequate access to governance (including access to decision-making and information); place them in inferior social positions; and prevent them from acquiring education and appropriate healthcare. The 1991 cyclone in Bangladesh illustrates many of these issues. More than 90 percent of the estimated 140,000 fatalities were women; their limited mobility, skills set and social status exacerbated their vulnerability to this extreme weather event.³²

Reducing the vulnerability of workers in global value chains to climate, and in particular that of women workers, is crucial for companies. For instance, the garment industry employs just under 20 million workers in Asia and Southeast Asia, with employment in the sector increasing sharply in recent years: in Bangladesh by 40 percent, in Cambodia by 20 percent, in India by 48 percent, in Pakistan by 8 percent

³⁰ Lloyds, 2014

³¹ Cameron et al, 2014

³² Oxfam International, 2008

and in Vietnam by 52 percent in the period 2004-08.³³ What is more, women represent on average 68 percent of the workforce in the clothing industry, 45 percent in textiles, and 46 percent in the leather and footwear industries. In some countries, women can constitute as much as 90 percent of the employee population in these industries.³⁴

Compliance and legal risks refers to the growing body of climate and non-climate laws that are being used to drive transparency and accountability in both emissions reductions and climate risk. There is a growing danger that companies will face additional and unexpected regulations or may even fall short of interpretations of current laws if they fail to act decisively on climate change. This may include companies facing heightened liability risk for failing to properly care for socio-ecological systems within their zone of operations.

Many frontline communities that have suffered harm from climate change are directly and indirectly seeking compensation from those they hold responsible. For example, in a potential landmark legal case, the Commission on Human Rights of the Philippines (CHR), a constitutional body with the power to investigate human rights violations, accused 47 “carbon majors” of breaching fundamental human rights by failing to reduce emissions.³⁵ Also, in 2016, the U.S. Securities and Exchange Commission (SEC) began a federal investigation into whether ExxonMobil appropriately discloses the business risks of anthropogenic global warming, as well as how it values its assets and reserves.³⁶

Just as the private sector needs a three-dimensional understanding of climate risk to generate comprehensive strategies for resilience; the development and climate community need to learn the language, motivations, constraints, and potential of the private sector to harness their ability to be agents of climate resilience. Presenting climate risk in the language of business risk creates a vocabulary of arguments the private sector recognizes and provides access to the company divisions that will invest in the capital assets necessary for climate resilience.³⁷

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³³ ILO, 2014

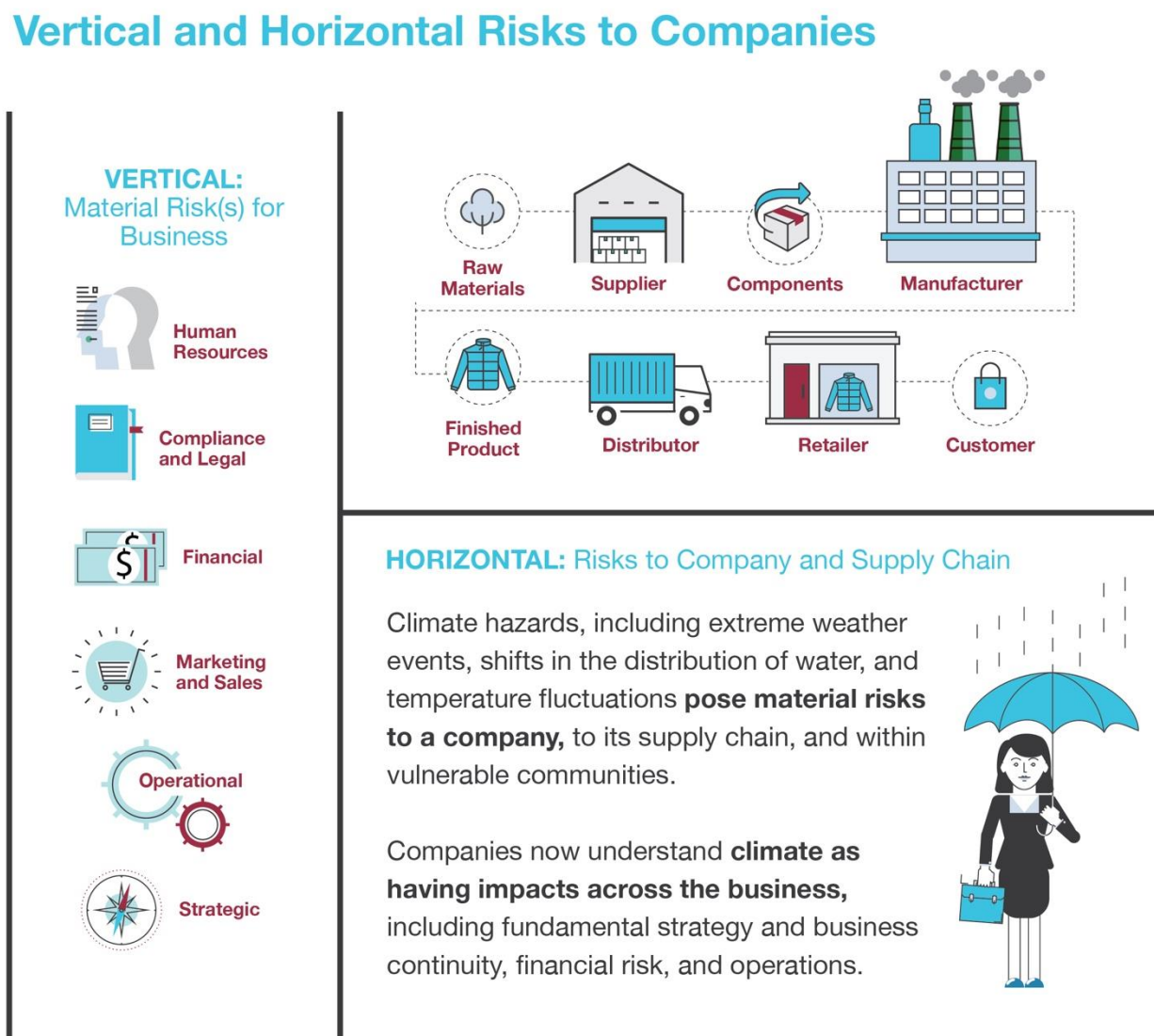
³⁴ Ibid.

³⁵ Vidal, 2016

³⁶ Supran and Oreskes, 2017

³⁷ Cameron, 2016

Figure 3: Vertical and Horizontal Risks to Business



Enabling Climate Resilience

Climate risk can be managed. The worst effects of climate change can be avoided through aggressive greenhouse gas emissions reductions that would hold global mean temperatures below 2°C and so avoid the worst impacts predicted by climate science. Existing risks, and those that will increase in intensity and frequency at less than 2°C, can be anticipated with the use of downscaled climate information and the increased availability of information and communications technology innovations and services. Some climate impacts can be absorbed and accommodated if adaptive capacity is strengthened, using six so-called capital assets: human, financial, social, natural, physical, and political capital (Figure 4).

In this section, we explore the concept of climate resilience, the essential building blocks for resilience, and the steps the financial sector and individual companies can take to enhance resilience inside the company, across the supply chain, and in vulnerable communities.

Figure 4: The Six Capital Assets that Enable Climate Resilience



Defining climate resilience

The Intergovernmental Panel on Climate Change (IPCC) defines resilience as “the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.”³⁸

A resilient business will therefore be able to anticipate, absorb, accommodate, and rapidly recover from climate events in its own operations and throughout its value chain. It will further contribute to resilient societies, which means moderating harm to socio-ecological systems and enabling people, an economy, and natural systems to rebound quickly in the face of adversity.

The WEF has described “a resilience imperative,” essentially an urgent need for new approaches to resilience that are accessible, actionable and collaborative.³⁹

This research proposes such an approach drawing upon a series of components that together enhance the adaptive capacity of the company and enable greater adaptive capacity across the supply chain and within vulnerable communities. These components are called “capital assets” in the climate resilience community.⁴⁰ According to research commissioned by Zurich Insurance group, they represent the critical assets needed to cope with climate impacts.⁴¹ Specifically, they consist of human, financial, social, natural, physical, and political capital and are considered the key building blocks of resilience.

To date, the bulk of climate resilience research has explored how these can be developed and deployed in the public sector. This research offers a framework for their use in the private sector, with benefits for individual companies, supply chains, and frontline communities.

Human capital refers to the skills and knowledge of available human resources, particularly in the workforce. A company might enhance human capital by investing in skills and training for the workforce in order to cultivate agents of broader household and community resilience.

For example, BSR’s HERproject⁴² is a collaborative initiative that strives to empower low-income women working in global supply chains. Bringing together global brands, their suppliers, and local NGOs, HERproject drives impact for women and business via workplace-based training and interventions on health, financial inclusion, and gender equality. Since its inception in 2007, HERproject has worked in more than 700 workplaces across 14+ countries and has increased the wellbeing, confidence, and economic potential of more than 800,000 women, with notable achievements on hygiene and reproductive health. A similar initiative training women workers in the supply chain on climate risk and resilience could greatly enhance adaptive capacity in frontline communities across the globe. Improving

³⁸ IPCC, 2012

³⁹ WEF, 2016

⁴⁰ ODI, 2016

⁴¹ Keating et al, 2014

⁴² <https://herproject.org/>.

human capital in this way can also increase access to finance, which, combined with community investments, can contribute to strengthening the financial capital of vulnerable communities, and hence their resilience.

Financial capital refers to the volume of available financial resources and access to financial goods and services. It concerns both the mobilization of increased financial flows in support of resilience and critical expansion of financial services to frontline sectors, companies and communities.

For example, Sompo Japan—the second largest property insurance company in the country, with almost 20 percent market share—launched a new weather index insurance product in Thailand in 2010 in response to increasing incidence of floods, droughts, severe storms, and sea-level rise threatening agriculture and tourism. Weather derivatives and weather index insurance products provide compensation and/or insurance payments when temperature and rainfall breach certain thresholds or when other extreme weather events occur. Though they gained popularity in the United States, and subsequently spread to other developed countries, they have not been widely available in many developing countries that are most vulnerable to climate impacts.⁴³

Investors and companies can also deploy effective and strategic financial capital to strengthen the other capital assets in crucial ways that enhance climate resilience.

Social capital refers to strong relationships, collaborations, and bonds of mutual support and cooperation that are essential for addressing a systematic global challenge like climate change. When reciprocal claims for support can be made within communities in times of stress, this adds considerably to adaptive capacity. Activities and businesses that strengthen social bonds and aid the spread of ideas and resources are considered extremely important elements of social capital.

A company might enhance social capital by establishing planning boards designed to evaluate risk and design strategies for resilience and including worker representatives on this board. On a larger scale, Facebook's Safety Check provides an opportunity for loved ones and first responders to learn about the location and well-being of people in the aftermath of natural disasters. Using this function, Facebook users near a disaster receive a notification asking to confirm that they're safe or to say that they weren't in the affected area. Those who choose "safe" generate a notification to their friends and followers, who can track how many of their friends were affected. Other social media companies could play a valuable role in strengthening social bonds and educating vast numbers of people about climate risk and resilience.

Natural capital refers to the full range of services provided by biodiversity and ecosystems services including land and water. For example, wetlands are vital to climate resilience as they protect upland areas, including valuable residential and commercial property, from flooding due to sea level rise and storms. They further prevent coastline erosion due to their ability to absorb the energy created by ocean currents.

According to research published by the Royal Swedish Academy of Sciences, coastal wetlands reduce the damaging effects of hurricanes on coastal communities with significant financial benefits. A regression model using 34 major U.S. hurricanes since 1980 determined that coastal wetlands in the U.S. currently

⁴³ Cameron et al, 2015

provide over US\$23 billion per year in storm protection services as these wetlands function as self-maintaining "horizontal levees."⁴⁴

Physical capital refers to the infrastructure, equipment, facilities, logistics, communications, utilities, and even genetic agricultural resources. Physical capital is vital in securing communities against extreme weather events that are increasing in intensity and frequency. Flood defenses are increasingly common in low-lying states and coastal regions. Climate-proofing of infrastructure is recommended in locations experiencing stronger storms. Moreover, investments in roads and bridges and stronger protections for utility services are vital for ensuring continued links across supply chains and between workers, employers, and consumers in the aftermath of climate-related events.

Companies wishing to build physical capital should ensure that their infrastructure is updated to account for changing exposure to physical hazards. The lessons learned by Verizon in the aftermath of super-storm Sandy, as presented earlier in this text, is an excellent case study in upgrading infrastructure to account for new risks.

Political capital refers to the access to decision-making to shape policy environments to enable resilience. Just as climate change undermines the realization of human rights, the strengthening of human rights is arguably the most important intervention to enhance resilience. Access to information enables vulnerable populations to anticipate climate-related events and take preventative action. Being more considered in decision-making enables marginalized communities to shape public policy in a manner that considers their specific vulnerabilities and addresses them. And access to justice enables communities to hold both the public and private sector accountable for failures to build resilience in a manner that is proportional.

Political capital is also critical to addressing the social, cultural, and economic inequalities that exacerbate risk to climate change, such as the differentiated vulnerability faced by women, indigenous peoples, and the urban poor.

The private sector can support the enhancement of political capital by being a proactive and courageous advocate for vulnerable communities; promoting access to decision-making, information, and justice; supporting good governance; and working with communities to overcome intersecting inequalities.

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⁴⁴ Costanza et al, 2008

Applying the Capital Assets

This research has resulted in an approach to understanding climate risk and enhancing climate resilience inside individual companies, across complex global supply chains, and within frontline communities vulnerable to climate impacts. Our approach allows for autonomous adaptation, as opposed to planned adaptation, initiated by a company, designed to reflect the self-interest of the company, but with significant co-benefits for other stakeholders up and down the supply chain and across the globe.

Autonomous adaptation as defined by the IPCC recognizes that efforts to build resilience can be taken without public intervention and can be made in response to social, economic, and environmental trends even without immediate climate risk.⁴⁵ These measures should simply represent good business practice to ensure security of supply chain, business continuity, workforce well-being, and the appropriate management of business risk.

Each company faces different climate risks influenced by the nature of its sector, its position in the supply chain, the nature of its workforce, and its location(s). Moreover, companies have different baselines and level of maturity in developing strategies to build climate resilience. Some companies are experienced and sophisticated on elements of climate risk but lack a full understanding of vulnerability. Others are starting the journey to resilience from the very beginning. The framework outlined here is tailored accordingly by offering a core set of activities and a set of options. The design allows the framework to be applied in its entirety or subdivided into smaller parts and addressed independently. This has several benefits. First, it builds on work the company might have already undertaken and therefore takes advantage of previous analysis where relevant. Second, it sequences activities to secure internal buy-in and to prepare the necessary steps for designing and implementing a comprehensive strategy. Third, it accommodates companies at different stages of maturity in assessing climate risks and building resilience to them. Fourth, it allows the company to choose a package that meets its budget and so reduces internal resistance to investing in resilience.

The proposed framework also has some key characteristics. It is designed to be diagnostic, identifying all the underlying weaknesses to which a company might be susceptible. It is further intended to be evaluative, assessing the degree to which existing approaches to resilience inside the company and across the supply chain are successful in achieving their objectives and surfacing ideas to strengthen them. The principal characteristic is that it is applied, meaning that actionable strategies and tools to enhance resilience by strengthening the six “capital assets” result from using the framework. Finally, it is agile, because climate risk is dynamic, companies are also constantly evolving, and so the approach is deliberately flexible and can be repeated as circumstances change.

⁴⁵ IPCC, 2014

BSR has created a set of steps and actions depending on where the company sits in its journey to address climate risk and resilience.

Figure 5: BSR's approach to climate resilience in the private sector



The first step is focused on developing a three-dimensional risk profile for addressing priority vulnerabilities inside the company. Work is undertaken to determine hazards (climate impacts) and geographical exposure to them. This involves an examination of internal company documents related to climate risks to establish company baseline. In addition, a landscape analysis of the state of knowledge from the natural and social sciences, drawing particularly on the science of the IPCC, national and local adaptation plans, selected meteorological reports, analyses from leading university research centers, and company data on the location of all operations is used to assess and analyze the company's exposure to hazards. Importantly, the work also focuses on determining vulnerability and prioritizing risks by conducting semi-structured interviews of key internal staff, covering how climate impacts affect strategy, finance, operations, human resources, and compliance/legal requirements, and understanding the communities in which the company operates.

The second step builds on the first, but instead maps climate risk across the full supply chain.

The third step concentrates on benchmarking and is designed to develop a comprehensive understanding of how peers are approaching climate resilience in order to learn from best practices and avoid common

failures. Companies like to know what others in their industry are doing in part because they do not want to be left behind and seen as laggards; often because they don't want to get out too far ahead of the rest; on occasion because they are looking for a leadership niche they can occupy for brand and reputational value; but mostly to learn about what works, implement the best approaches, and so shorten the learning curve at lowest cost.

The fourth step results in a holistic strategy for managing climate risk and enabling resilience inside the company, across the supply chain, and within vulnerable communities. Options for company investments and interventions are developed based on the capital assets framework and building upon the vulnerabilities surfaced in the earlier steps. The capital assets will often be weighted depending on the nature of the company. For example, a financial services company may address all capital assets but will inevitably have the greatest impact by concentrating on mobilizing financial products and vehicles, while improving access to financial services to frontline communities. Many information, communication and telecommunications companies (ICT), particularly those companies active in social media, will likely focus their attention on building social capital. And companies in the FBA sector will secure significant outcomes by addressing physical, natural, and human capital. The key is to build a tailored strategy that reflects the strengths and specializations of a given company.

The fifth step builds stronger internal capacity to execute on the resilience strategy. This recognizes that acceptance of the resilience strategy amongst executives within the executive management team requires coalition-building and that the implementation of the strategy will require partners across the company with very different motivations, constraints, and resources.

And finally, the last step crafts an influence and communications strategy for the company, recognizing that an effective policy enabling environment is a vital catalyst for corporate ambition and that leading companies will expect to reap a reputational/brand reward for being in the vanguard of climate leadership.

Conclusion

As it sits, climate change represents a material and cascading risk to the private sector with profound implications across operations and the supply chain on strategy, finances, operations, marketing, compliance, and human resources. Companies have the capacity to be powerful agents of climate resilience if properly equipped with a sound diagnosis of climate risk and tailored strategies for enhancing adaptive capacity. However, the bulk of climate knowledge is either written by scientists for other scientists, or by public policy specialists for government application, development agencies, and nonprofits.

This BSR research framework for private sector leadership on climate adaptation is one of the first of its kind. It takes a wealth of knowledge carefully crafted by development agencies, think tanks, academics, and civil society and translates that knowledge into specific solutions for individual sectors and companies. The framework is applied research, tailored and adapted to the specific needs of individual companies in unique sectors and co-created with those companies to maximize impact. By using this framework to properly diagnose climate risk and craft strategies for investing in six capital assets, the private sector can build resilience inside individual companies, across complex global supply chains, and within frontline communities vulnerable to climate change. With this framework, the private sector becomes a real and impactful partner in resilience.

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