



# CINCS Primer

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**A CINCS Primer on Supply Chain Risk Management**

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## Introduction

“Risk” is the potential of an event causing negative impacts. Every action is associated with risk, from riding a bike, to storing a pen in a shirt pocket, to walking through a construction site without protective headgear. The consideration of risks has become standard practice for businesses, where great sums of capital and earnings potential are at stake. There are many types of risks, but the most impactful are the risks that involve rare-occurring events with little to no historical data. The high degree of uncertainty of such risks leave businesses vulnerable and underprepared. Traditional risk management methods do not work because without historical data, there is no way to quantify these catastrophic risks.<sup>1</sup>

Risks triggered by geologic and weather events typically fall into this category. While technology is advancing rapidly, we still face limits in predicting and detecting the occurrence and magnitude of these events. Examples of these events include Hurricane Sandy in 2012 and the Fukushima disasters in 2011. The U.S. eastern seaboard and further in-land regions, based on historical data, had little reason to anticipate Hurricane Sandy’s destruction and resulting storm surge that amounted to \$65 billion in damage.<sup>2</sup> Following the earthquake and tsunami off the Pacific coast of Japan and a series of successive nuclear meltdowns, 80% of the automotive plants in the country suspended their production. This resulted in production capacity loss of hundreds of thousands of units for the companies who sourced parts or manufactured entire automobiles in the affected areas.<sup>3</sup> Even in an earthquake-prone geographic region like Japan, there was little anticipation of, or preparation for, the subsequent tsunami and nuclear meltdowns and their destructive magnitude.

Anthropogenic greenhouse gas emissions have triggered global climate change that will entail widespread and long-term impacts including sea level rise, increase in magnitude and frequency of

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<sup>1</sup> Simchi-Levi, D., Schmidt, W., & Wei, Y. (2014, Feb). “From Superstorms to Factory Fires: Managing Unpredictable Supply-Chain Disruptions.” *Harvard Business Review*. Retrieved from <http://hbr.org/2014/01/from-superstorms-to-factory-fires-managing-unpredictable-supply-chain-disruptions/ar/1#>

<sup>2</sup> National Climatic Data Center (2013, June). *Billion-Dollar Weather/Climate Disasters*. National Oceanic and Atmospheric Administration. Retrieved from <http://www.ncdc.noaa.gov/billions/>

<sup>3</sup> Simchi-Levi, D., Kyratzoglou, I., Vassiliadis, C. (2013). *Supply Chain and Risk Management*. MIT Forum for Supply Chain Innovation. Retrieved from <http://supplychain.mit.edu/events/Forum-PwC-Report>

intense weather events, altered climate patterns, and loss in biodiversity and soil productivity.<sup>4</sup> The Business Continuity Institute’s 2013 Horizon Scanning Survey, with results from 700 organizations in 62 countries, found that 54% of respondents were either “concerned” or “extremely concerned” about the impacts of adverse weather on their businesses.<sup>5</sup> Identifying precisely what will happen and which regions are vulnerable is subject to much uncertainty. At the same time, companies today participate in globalized markets by extending their production and business operation across the globe to minimize input costs and respond to demands. This means a U.S. based company can have their natural resources, raw materials, labor input, or whole physical assets located in other regions such as Asia or South America. Geographic distance and prevalence of outsourcing complicates supply chain management, creating a gap in oversight and understanding that makes it challenging to account for risks.<sup>6</sup> This primer explores what companies can do to minimize their exposure to supply chain risks and protect their investments while facing climate change and its impending impacts.

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<sup>4</sup> Niehörster, F. et al. (2013, June). *Warming of the Oceans and Implications for the (Re)Insurance Industry*. The Geneva Association. Retrieved from [https://www.genevaassociation.org/media/616661/ga2013-warming\\_of\\_the\\_oceans.pdf](https://www.genevaassociation.org/media/616661/ga2013-warming_of_the_oceans.pdf)

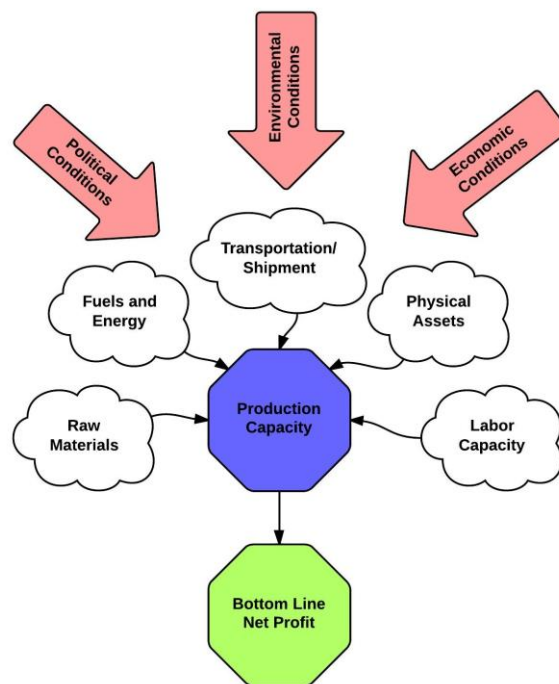
<sup>5</sup> Business Continuity Institute; BSI Group (2013). *Horizon Scan 2013 Survey Report*. Retrieved from [http://www.bsigroup.it/upload/Brochure%20UK/BCI\\_HorizonScan2013.pdf](http://www.bsigroup.it/upload/Brochure%20UK/BCI_HorizonScan2013.pdf)

<sup>6</sup> Bosman, R. (2006). *The New Supply Chain Challenge: Risk Management in a Global Economy*. FM Global. Retrieved from <http://www.fmglobal.com/pdfs/chainsupply.pdf>

**Question 1: In what ways can climate and geographic risks impact a company’s supply chains?**

**A:** As a company’s supply chains become increasingly global and complex, the company also faces increasing global exposure and diverse range of risks. These risks can be anything that disrupts the product’s path, starting at the raw materials stage and along all the way to the end consumer. Disruptions in a company’s supply chains can impact financial performance.<sup>7</sup> The myriad of considerations are diagrammed in Figure 1.

**Figure 1 Environmental, economic, and political conditions can interfere with many aspects of production along the supply chains, reducing production capacity and incurring losses in bottom line net profit.**



Accounting for risks in itself is not a simple process. Accounting for risks abroad is further complicated due to the physical distance from central management as well as differences in local environment that may be prone to regional economic and political instability.<sup>8</sup> Relying on international suppliers means having less direct control over the security of supplies and the price of goods and raw materials related to procurement. When production capacity is reduced due to inadequate and expensive procurement, the ripple effects lead to higher costs and lower output. This means a company would have to raise

<sup>7</sup> Simchi-Levi, D., Kyratzoglou, I., Vassiliadis, C. (2013), *op. cit.*

<sup>8</sup> Bosman, R (2006), *op. cit.*

prices while being unable to meet demands and contracted quotas. Without preparation or contingency options, this can damage reputation and competitiveness. Net profit and investor confidence can suffer as a result. Businesses responding to an annual supply chain resilience survey conducted by the Business Continuity Institute confirm that consequences to supply chain disruptions can include loss of productivity, customer complaints, damage to brand and reputation, and stakeholder/shareholder concern.<sup>9</sup>

Gap Inc., for example, contracts independent third parties to source and manufacture nearly all of their iconic apparel products. When cotton prices rose substantially in 2011, Gap was directly impacted because higher input costs slashed profit margins. Any significant increases in demand or issues with an individual supplier can put Gap at risk of manufacturing capacity loss. Replacing a manufacturer delays production and adds training costs to acquaint vendors with Gap's methods, products, and standards. Since Gap's independent suppliers manufacture products outside of their principal sales markets, third parties must transport these products a great distance. Delays in the shipment or delivery of Gap's products due to limited availability of transportation, work stoppages, port strikes, infrastructure congestion, or other factors, and costs and delays associated with transitioning between vendors, could adversely impact Gap's financial performance. Having to use faster but more expensive transportation methods such as aircraft could also adversely affect the company's margins.<sup>10</sup>

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<sup>9</sup> Glendon, L. and Bird, L. (2013). "5<sup>th</sup> Annual Survey: Supply Chain Resilience 2013." *Business Continuity Institute*. Retrieved from <http://www.zurich.com/internet/main/sitecollectiondocuments/reports/supply-chain-resilience-2013-en.pdf>

<sup>10</sup> Gap, Inc (2013). *2012 Annual Report on Form 10-K*. Retrieved from <http://quote.morningstar.com/stock-filing/Annual-Report/2013/2/2/t.aspx?t=XNYS:GPS&ft=10-K&d=596573974a8cec4c813e70d69a355d7a>

## **Question 2: Why should companies consider supply chain risks in sustainability reporting?**

**A:** Public companies in the United States are required by law to disclose financial and performance information, among which are “Risk Factors.” In 2010, the U.S. Securities and Exchanges Commission (SEC) issued an Interpretive Release on disclosure requirements relating to climate change, highlighting possible sources of climate impacts that may require disclosure by companies. While the Release is a “guidance” rather than a “rule,” it substantively put climate change in the mainstream of issues and established a framework for disclosure of financial and non-financial information. The Release also specifies four items within Regulation S-K that climate change disclosure would potentially fall under: Item 101 Disclosure of Capital Expenditures, Item 103 Disclosure of Legal Proceedings, Item 303 Management Discussion and Analysis, and Item 503 Risk Factors.<sup>11</sup> The Release outlines expectations from companies to report on physical, indirect, and material regulatory<sup>12</sup> risks that would make an investment in the issuing company speculative or risky, especially the risks related to climate change.

When faced with disclosure requirements related to risks, companies must choose between submitting obscure reports that are neither satisfactory nor substantive, or investing in thorough risk analysis and reporting. While there has been a modest increase in the rate of 10-K disclosure in recent years, a joint study by the SEC and Ceres found that this increase correlates with a trend towards simply mentioning climate change in the risk factors sections of the reports rather than providing meaningful details.<sup>13</sup> However, lower quality reports tend to be associated with lower performing and less credible companies, leading investors, customers and others to infer a greater focus on green-washing than true sustainability. Inadequate risk disclosure also suggests that companies have not taken steps to mitigate risks. Several studies over thousands of annual reports of public companies in the U.S. have shown that the first option is a popular choice. Four years after the aforementioned guidance was issued, a Davis Polk & Wardwell study found no significant impact on disclosures. A citizen researcher

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<sup>11</sup> Gerrard, M., & Freeman, J. (2014, Apr). Corporate Disclosure Considerations Related to Climate Change. In *Global Climate Change and U.S. Law* (2nd ed.). American Bar Association.

<sup>12</sup> As required by the US SEC, “materiality” is a fundamental principle of financial reporting. “Material” is any information that is important to the fair presentation of a company’s financial condition and operational performance. “Material” information should be disclosed to allow investors to make informed investment decisions. Sustainability Accounting Standards Board (2014). Retrieved from <http://www.sasb.org/materiality/important/>

<sup>13</sup> Coburn, J., Cook, J. (2014, Feb). *Cool Response: The SEC & Corporate Climate Change Reporting*. Ceres. Retrieved from <http://www.ceres.org/resources/reports/cool-response-the-sec-corporate-climate-change-reporting/view>

found that almost 75% of the companies failed to mention “climate change” or “global warming”. Of the 1,050 businesses that acknowledged climate change, most mentioned that operating costs may be affected by pending EPA regulations while very few actually discussed specific issues.<sup>14</sup>

The reality is that, given the SEC personnel and funding limitations, enforcement of the disclosure requirement is very limited. The most severe penalty for improper reporting of risks is the requirement to rewrite a report or to disclose additional information in the following year’s report.<sup>15</sup> SEC is simply not prioritizing the financial risks and opportunities of climate change as an important disclosure issue and thus not prioritizing improvement disclosure in financial filings.<sup>16</sup> This lack of regulatory enforcement from SEC, combined with the not yet realized value-add of reporting, companies have little incentive to do more than the bare minimum. However, companies are overlooking numerous studies showing that sustainability leaders outperform their peers on key financial indicators including stock price.<sup>17</sup> Increasingly, sustainability execs are finding allies in their company’s chief financial officers, who are beginning to grasp the relevance of sustainability. Reporting on risks requires companies to gather information about their processes and related impacts that may not have been considered or measured before. In addition to creating greater transparency about firm performance, new data can provide firms with knowledge necessary to reduce their use of natural resources, increase efficiency and improve their operational performance.<sup>18</sup>

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<sup>14</sup> Cohen, M. (2013). *Corporate Law and Climate Change Disclosures*. Harvard Environmental Law Review. Retrieved from <http://www3.law.harvard.edu/journals/elr/2014/01/06/corporate-law-climate-change/>

<sup>15</sup> Hirji, Z. (2013, Sept 19). Most U.S. Companies Ignoring SEC Rule to Disclose Climate Risks. *Inside Climate News*. Retrieved from [http://insideclimatenews.org/news/20130919/most-us-companies-ignoring-sec-rule-disclose-climate-risks?page=2&utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A%20solveclimate%2Fblog%20%28InsideClimate%20News%29&utm\\_content=Netvibes](http://insideclimatenews.org/news/20130919/most-us-companies-ignoring-sec-rule-disclose-climate-risks?page=2&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A%20solveclimate%2Fblog%20%28InsideClimate%20News%29&utm_content=Netvibes)

<sup>16</sup> Coburn, J. & Cook, J. (2014, Feb). Cool Response: The SEC & Corporate Climate Change Reporting. Ceres. Retrieved from <http://www.ceres.org/resources/reports/cool-response-the-sec-corporate-climate-change-reporting/view>

<sup>17</sup> Makower, J. (2012). “Why SSB Is a Game Changer For Sustainable Business.” GreenBiz. Retrieved from <http://www.greenbiz.com/blog/2012/10/01/why-sasb-game-changer-sustainable-business>

<sup>18</sup> Ernst & Young (2013). *Value of Sustainability Reporting*. Retrieved from <http://www.ey.com/US/en/Services/Specialty-Services/Climate-Change-and-Sustainability-Services/Value-of-sustainability-reporting>



### **Question 3: What values do stakeholders see in corporate supply chain risk reporting?**

**A:** In recent years, corporate shareholders have started to pay more attention to the social and environmental performance, or the *non-financial performance* of their investments. Businesses are being held to higher and higher standards of Corporate Social Responsibility (CSR), the continuing commitment to behave ethically and improve the quality of life of employees, their families, the local community, and society at large while contributing to economic development. Reporting on the *triple bottom* line of financial, environmental, and social performance enables companies to be transparent and demonstrate their CSR commitments to shareholders, investors, customers, and regulators—the stakeholders of their businesses.<sup>19</sup> Alongside growing demand for disclosure of environmental and social impacts, the number of surveys, questionnaires, and queries from stakeholders and various other media, public, and research entities has significantly increased. Unprepared companies do not have the ability to cope with such external pressure.<sup>20</sup> According to a survey by the GreenBiz Intelligence Panel<sup>21</sup>, stakeholder concerns have grown to include increased risk and the vulnerability to natural resource shortages, issues that directly impact supply chains.

A recent Ernst and Young (EY) study<sup>22</sup> found that almost two-thirds of the surveyed investors conduct some kind of evaluation of the non-financial information when making their investment decisions. Nine out of ten investors have found that non-financial performance information played a pivotal role at least once in their decision-making over the past year. Analysis of non-financial issues can no longer be dismissed as a niche, and therefore unessential, approach to investment. One U.S.-based third-party investment portfolio manager with US\$10-\$50 billion under management suggests that the younger generation of analysts and investors hold particular interest in environment, social, and governance (ESG) evaluation. Investors use this type of information as a good benchmark for risk. Investors are more likely to value information coming directly from the company itself through its

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<sup>19</sup> Ernst & Young Australia (2009). *Non-Financial Reporting*. Retrieved from [http://www.ey.com/Publication/vwLUAssets/Non-financial\\_reporting/\\$FILE/Climate%20change\\_Non%20financial%20reporting.pdf](http://www.ey.com/Publication/vwLUAssets/Non-financial_reporting/$FILE/Climate%20change_Non%20financial%20reporting.pdf)

<sup>20</sup> Ernst & Young Global Limited; GreenBiz (2013). *2013 Six Growing Trends In Corporate Sustainability*. Retrieved from [http://www.ey.com/Publication/vwLUAssets/Six\\_growing\\_trends\\_in\\_corporate\\_sustainability\\_2013/\\$FILE/Six\\_growing\\_trends\\_in\\_corporate\\_sustainability\\_2013.pdf](http://www.ey.com/Publication/vwLUAssets/Six_growing_trends_in_corporate_sustainability_2013/$FILE/Six_growing_trends_in_corporate_sustainability_2013.pdf)

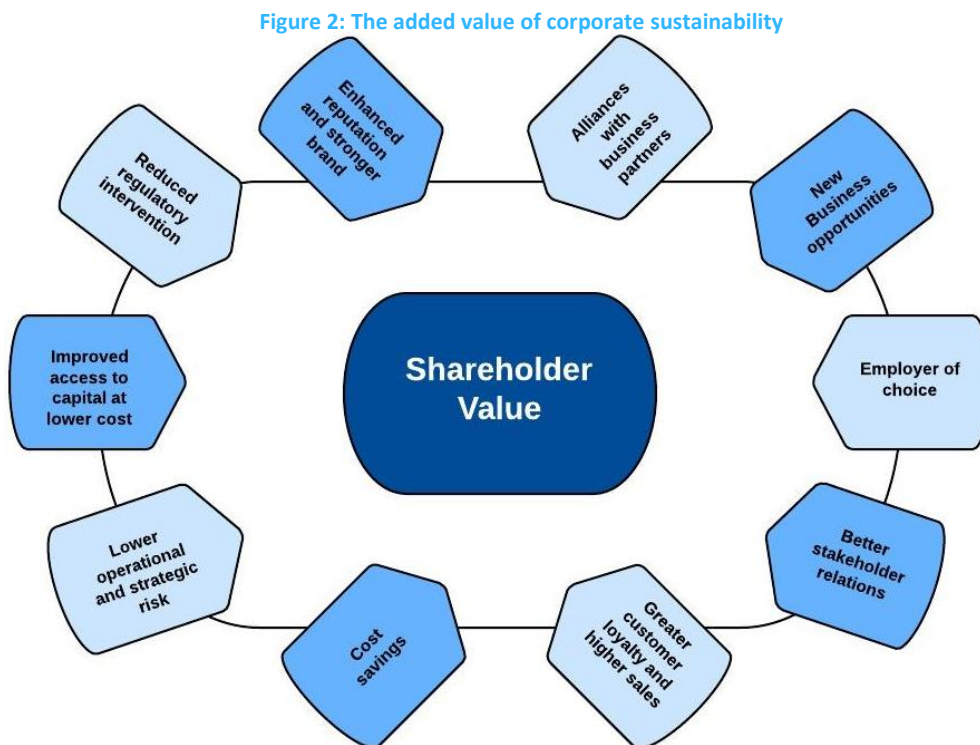
<sup>21</sup> The Panel consists of 3,630 executives and thought leaders in the area of corporate environmental strategy and performance. The online survey was sent to the Panel members via email, attracting 278 respondents currently employed by companies from 17 sectors with annual revenue greater than US\$1 billion. Approximately 85% of the respondents are based in the U.S.

<sup>22</sup> Ernst & Young Global Limited (2014). *Tomorrow's Investment Rules*. Retrieved from [http://www.ey.com/Publication/vwLUAssets/EY-Institutional-Investor-Survey/\\$FILE/EY-Institutional-Investor-Survey.pdf](http://www.ey.com/Publication/vwLUAssets/EY-Institutional-Investor-Survey/$FILE/EY-Institutional-Investor-Survey.pdf)

annual or integrated reports rather than an external source. Investors want to assurance that the information they receive is credible and reliable.

**Question 4: What is the value of supply chain risk management?**

**A:** Supply chain risk management and comprehensive sustainability reporting go hand in hand. Risk reporting requires companies to gather data and perform risk analysis on their supply chains. During this process, companies may come to realize supply chain risks they previously overlooked. In managing the supply chain risks, companies can better identify the areas of concerns as well as take the steps necessary to mitigate or adapt to the risk of disruptions in their supply chains, thereby providing the informational materials to be included in sustainability and 10-K reports to stakeholders. As shown below, an Ernst & Young Australia study<sup>23</sup> identifies the many drivers of added shareholder value to corporate sustainability. The compound effect of supply chain risk management and comprehensive sustainability reporting in enhancing shareholder value can be difficult to separate. Figure 2 and the explanations below show the advantages of high shareholder value.



<sup>23</sup> Ernst & Young Australia (2009), *op. cit.*

- ✓ **Lower operational and strategic risk:** Comprehensive reporting is a pathway for companies to start thinking about these issues and develop a systematic way to manage risk. Managing supply chain risk is good for all parts of business, from product design and development to operations and sales.
- ✓ **Improved decision making and high level engagement:** Reports and data believed to be trustworthy and credible are more likely to be used for internal decision making. In a 2012 global survey of corporate sustainability reporters, 88% indicated that reporting helped make their organizations' decision-making processes more efficient.<sup>24</sup> Internal robust reporting systems and controls play an important role in managing sustainability performance and impacts.
- ✓ **Cost savings:** Lower operational and strategic risk result in direct cost savings and cost prevention. According to a study by MIT Forum for Supply Chain Innovations, companies with mature supply chain and risk management capabilities do better in all surveyed aspects of operational and financial performance than immature companies. They are impacted less and recover faster than companies with immature capabilities.<sup>25</sup>
- ✓ **Enhanced reputation and stronger brand:** The industry's leaders in supply chain sustainability and reporting serve as the model for the rest and set the standards for competition. More than 50% of respondents to a 2013 study by Boston College Center for Corporate Citizenship and Ernst & Young reported that issuing sustainability reports helped improve company reputation.<sup>26</sup> A demonstrated commitment to sustainability and corporate social responsibility improve customer loyalty and increase sales.
- ✓ **New business partnerships and opportunities:** By identifying and averting risks, companies in various industries and across both private and public sectors can form beneficial partnerships based on common interests. For example, several companies relying on a particular region's commodity market can mutually benefit by collaborating on sustainability initiatives or by establishing working relationships with local authorities.
- ✓ **Employee loyalty and commitment:** A 2011 survey by EY and GreenBiz found that employees were a vital audience for sustainability reporting and issuing sustainability reports increased employee loyalty.<sup>27</sup>
- ✓ **Better stakeholder relations:** When companies take initiative to increase transparency and cooperation through reporting, they face less frequent regulatory intervention. At least 20 countries require or strongly encourage stock exchange listed firms to provide sustainability

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<sup>24</sup> Black Sun (2012). *Understanding Transformation: Building the Business Case for Integrated Reporting*. Retrieved from [http://www.blacksunplc.com/corporate/iirc\\_understanding\\_transformation/projet/BUILDING-THE-BUSINESS-CASE-FOR-INTEGRATED-REPORTING.pdf](http://www.blacksunplc.com/corporate/iirc_understanding_transformation/projet/BUILDING-THE-BUSINESS-CASE-FOR-INTEGRATED-REPORTING.pdf)

<sup>25</sup> Simchi-Levi, D., Kyrtzoglou, I., Vassiliadis, C. (2013), *op. cit.*

<sup>26</sup> Ernst & Young (2013), *op. cit.*

<sup>27</sup> *Ibid.*

reports.<sup>28</sup> Companies are also able to use their reporting processes as the basis for on-going dialogue with stakeholders to promote communication and mutual understanding.

- ✓ **Improved access to capital at lower cost:** Better sustainability reporting also results in improved access to capital. Firms that ranked highly for sustainability have Kaplan-Zingales Index scores that are 0.6 lower, indicating having few capital constraints, than firms not ranked highly.<sup>29</sup>

### **Question 5: What are some strategies for effective supply chain risk management?**

**A:** Disruptions to supply chains are inevitable. Yet, supply chain failure remains a key performance issue that, for many companies, is not being effectively managed. Various private consulting firms, academic institutions, and non-profit organizations have come together to identify and develop supply chain and risk management frameworks and processes to enable companies to address complex market challenges and achieve superior performance. In one particular study, the Massachusetts Institute of Technology Forum for Supply Chain Innovation conducted a survey to assess of how global companies address the challenges of supply chain risks and their impacts on business operations. The study devised a framework to evaluate companies' "capability maturity" based on their strategic management of supply chain and risks. Companies characterized by highly mature capabilities in both supply chains and risk management are more resilient and most able to effectively address supply chain disruptions, mitigate risk, outperform the market, and gain competitive advantage.<sup>30</sup>

The vital first step for a company to undertake is to invest in its own employees.<sup>31</sup> Use of a risk governance system and management process helps integrate consideration of risk and opportunity throughout an organization, from senior management to analytics and operations. It is necessary for companies with large operations and complex supply chains to designate expert risk management teams with specific missions to recognize business vulnerabilities and opportunities. These teams characterize major sources of risk to help companies build capacity and manage the risk of supply chain disruptions. This work contributes substantially as companies prepare comprehensive sustainability reports and readiness plans. Continuous improvement to the risk management process

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<sup>28</sup> The Hauser Center for Nonprofit Organizations: Initiative for Responsible Investment and Initiative for Responsible Investment. (2012). *Current Corporate Social Responsibility Disclosure Efforts by National Governments and Stock Exchanges*.

<sup>29</sup> Cheng, B., Ioannou, I., Serafeim, G. (2011). *Corporate Social Responsibility and Access to Finance*. Social Science Research Network. Retrieved from <http://dash.harvard.edu/bitstream/handle/1/9887635/cheng,ioannou,serafeim-Corporate%20Social%20Responsibility%20and%20Access%20to%20Finance.pdf?sequence=1>

<sup>30</sup> Simchi-Levi, D., Kyratzoglou, I., Vassiliadis, C. (2013), *op. cit.*

<sup>31</sup> Glendon, L. and Bird, L. (2013), *op. cit.*

is also critical to make it as robust and effective as possible.<sup>32</sup>

Some of the best conventional business practices that maximize efficiency and minimize costs can actually leave a company's supply chain vulnerable.<sup>33</sup> Simply focusing on increasing production capacity or strategically positioning additional inventory does not contribute to maturing the risk management process. Instead, companies should have a certain degree of flexibility in their operations and decision-making processes. This flexibility is necessary to simplify the product line, diversify sourcing, switch between products, etc. as needed to react to sudden shifts in demand and disruptions in delivery of supplies and products.<sup>34</sup>

A series of small disruptions can impact the supply chain just as much as one large catastrophic event. Thus the alignment of partners upstream and downstream in the supply chain throughout the life cycle of the product is very critical. Supply chains work best when each part works together, between the suppliers, the producers, and the customers. However, achieving collaboration and cooperation with supply chain partners is not always an easy task. Trust must be developed and terms on how to share the benefits must be agreed upon upfront, such as through formal contracts. Supply chain partners must make joint decisions and troubleshoot together. They also must share information about strategies, operations, and performance with each other. This can help reduce information distortion and increase synchronization, leading to less frequent disruptions.<sup>35</sup>

To reduce the probability of disruptions, companies must be aware of what is happening in their supply chains, including internal operations, customers, suppliers, location of inventory, capacity, and critical assets. For instance, companies should aim to understand market demand, customer expectations, pricing, sales, fulfillment, and distribution. In conducting this supply chain analysis, companies can also make a decision to balance between a "just in time" and a "stockpiling" supply chain structure in a way that would be most beneficial and protective against disruptions to their business.<sup>36</sup> A supply

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<sup>32</sup> Simchi-Levi, D., Kyratzoglou, I., Vassiliadis, C. (2013), *op. cit.*

<sup>33</sup> Hendricks, K. and Singhal, V. (2005). *The Effect of Supply Chain Disruptions on Long-term Shareholder Value, Profitability, and Share Price Volatility*. Retrieved from <http://www.supplychainmagazine.fr/TOUTE-INFO/ETUDES/singhal-scm-report.pdf>

<sup>34</sup> United Kingdom Environment Agency (2013, Nov). *Assessing And Managing Climate Change Risks In Supply Chains*. Retrieved from <http://www.acclimatise.uk.com/login/uploaded/resources/Climate-change-risks-in-supply-chains---report.pdf>

<sup>35</sup> Bosman, R. (2006), *op. cit.*

<sup>36</sup> Bosman, R. (2006), *op. cit.*

chain structure that is “just in time” provides the minimum inventory required to support operations until the next delivery of supplies, reducing costs associated with holding inventory while maximizing profits through a lean, efficiency-driven process. The “stockpiling” structure is typically used for a product with constant demand so that each new order is delivered in full when an inventory reaches a reorder level. “Stockpiling” is aimed at minimizing the joint costs of ordering and holding inventory. Companies operating on a “just in time” model are more prone to upstream supply shocks. “Stockpiling” can also have its own risk such as damage to stock amassed in vulnerable locations.<sup>37</sup> The key to success is linking the customer value proposition and sound supply chain operations with robust risk management.

### **Question 6: What are some challenges to supply chain risk management?**

**A:** There is great complexity within supply chain operations. According to a study by the MIT Forum for Supply Chain, in recent years a large majority of surveyed companies has observed an increase in dependency between supply chain entities (suppliers, partners, and customers), an increase in the frequency of changes in the extended supply chain network configuration, as well as an increase in the number of entities in the supply chain.<sup>38</sup> In this complex supply network, the risks often remain hidden and thus do not attract management’s attention.<sup>39</sup> When the company’s leadership assumes little or no value to risk assessment and reporting, no resources or effort will be invested. This means risk analysts have very limited and inconsistent support from management to thoroughly assess and analyze risks related to supply chains.

When companies do invest in identifying and accounting for risks, however, they face a second set of challenges related to finding and assessing data, especially related to their supply chains. This information gap can dominate any or all of the four tiers of a company’s business: raw resources, outsourcing, manufacturing, and processing. For example, suppliers assured Patagonia that their goose downs are ethically sourced, but the company found otherwise when they performed a thorough audit of their supply chains. This discovery led them to alter the terms of their contracts to

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<sup>37</sup> Lawton, J. (2011) “Long After the Floods, Supplies Chains Feel the Pain.” *Forbes Magazine*. Retrieved from <http://www.forbes.com/sites/ciocentral/2011/12/01/long-after-the-floods-recede-supply-chains-feel-the-pain/>

<sup>38</sup> Simchi-Levi, D., Kyratzoglou, I., Vassiliadis, C. (2013), *op. cit.*

<sup>39</sup> Brehm, D. (2013, Dec 16). “Hidden Risk In Supply Chains.” *MIT News*. Retrieved from <http://web.mit.edu/newsoffice/2013/hidden-risk-in-supply-chains-1216.html>

source only ethical goose downs that can be verified.<sup>40</sup> Companies must go the extra mile to obtain, audit, and verify—a complicated process that many would opt not to undertake.

In a world of full of constraints and possibilities of disruptions, companies face a wide pool of risk factors which makes it difficult to determine what information is most important and qualifies under the SEC as material for corporate disclosure.<sup>41</sup> There are a variety of tools and resources available, from private and nonprofit efforts to increase access to information and to raise transparency. However, these tools and resources, much like requisite information, remain scattered and incongruent. Thus companies can end up spending much time processing and digesting information without salient results.

### **Question 7: Who are the leaders in supply chain risk management?**

One American company with extensive multinational operational and supply chain networks and enormous global presence is The Coca-Cola Company. The iconic company that has been actively managing their risks and vulnerabilities by evaluating all suppliers according to a 10-point risk model to determine how frequently and to what extent to audit all individual suppliers. Coca-Cola finds it difficult in some locations to assess policy, economic, and social risks as well as obtaining watershed data to complete robust technical source vulnerability assessment (SVA)<sup>42</sup>. However, in other communities, the company can rely on public sector water managers to invest in risk-mitigation planning and water sustainability to lower the estimated risks. Coca-Cola along with 100+ other large organizations from nine different sectors participates in the Commodity Mapping Innovation Project and forms the Sustainability Consortium. The initiative strives to increase information and transparency in supply chains and create more sustainability products and sustainability standardization.<sup>43</sup>

Another example is General Mills, who worked with the World Wildlife Fund (WWF) and the Rainforest

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<sup>40</sup> DesMarais, C. (2014, Feb). "Patagonia, The North Face warm up to ethical goose down." *GreenBiz*. Retrieved from <http://www.greenbiz.com/blog/2014/02/10/patagonia-north-face-ethical-goose-down-jackets>

<sup>41</sup> Makower, J. (2012). "The New Sustainability Language: Materiality and Risk." *GreenBiz*. <http://www.greenbiz.com/blog/2012/06/11/new-language-sustainability-risk>

<sup>42</sup> Coca-Cola (2014). *2012/2013 Global Reporting Initiative Report*. Retrieved from [http://admin.csrwire.com/system/report\\_pdfs/1327/original/2012-2013-gri-report.pdf](http://admin.csrwire.com/system/report_pdfs/1327/original/2012-2013-gri-report.pdf)

<sup>43</sup> The Sustainability Consortium Website (2014). Retrieved from <http://www.sustainabilityconsortium.org>

Alliance to complete a comprehensive assessment of all the raw materials they purchase worldwide, measuring each against dozens of potential risk categories, including animal welfare, child labor, deforestation, economic sustainability, fertilizer (nitrogen) use, GHG emissions, soil loss, water quality and water use. According to the company’s sustainability report, the assessment helped General Mills identify ten priority raw materials that can have the greatest impact from a sourcing standpoint and focus on developing strategies for sustainably sourcing these materials.<sup>44</sup>

Ten years ago, AMR Research Inc.<sup>45</sup> began compiling an annual list that is known today as The Gartner Supply Chain Top 25. Predominant in the 2013 annual list are many familiar American giants: Apple, McDonald’s, Ford Motor, Johnson & Johnson, Colgate-Palmolive, Proctor & Gamble, Dell, Caterpillar, 3M, Walmart, Starbucks, Cisco Systems, PepsiCo, Coca-Cola, Nike, and Amazon. Cisco Systems, for example, optimizes its supply chain management best practices to such extent that it has its own Supply Chain Leadership Institute to offer instruction in areas such as new product development, product lifecycle management, logistics, and collaboration. The Gardner List is only one among many sustainability ranking lists and is certainly not a perfect and comprehensive compilation as it omits smaller companies and those in the energy, mining, shipbuilding, steel, telecommunications, logistics, and transportation.<sup>46</sup> The list does offer, however, insight into the supply chain management best practices in place at major companies and the revelation that the best companies in the world have the most resilient supply chains in the world.

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<sup>44</sup> General Mills (2014). *Global Responsibility 2013 Report*. Retrieved from [http://admin.csrwire.com/system/report\\_pdfs/1304/original/2013\\_global\\_respon\\_report.pdf](http://admin.csrwire.com/system/report_pdfs/1304/original/2013_global_respon_report.pdf)

<sup>45</sup> The study continues despite AMR Research being acquired by analyst firm Gardner Research in 2009.

<sup>46</sup> Blanchard, D.(2013, May). “Top 25 Supply Chains of 2013”. *Industry Week*. Retrieved from <http://www.industryweek.com/top-25>



## **Question 8: What can companies do to further enhance supply chain risk management and reporting?**

### **Supply Chain Focus**

As discussed earlier, there are ways for companies to take a more proactive role in reforming and managing their supply chains, such as restructuring, changing supplier contract requirements, conducting periodic audits, etc. These steps will benefit companies' bottom lines by maturing and enhancing supply chain risk capacities. More importantly, the above actions will contribute to standardizing data tracking and sustainability of supply chains for increased efficiency, economic value, and social and environmental benefits. To accomplish this, senior leadership must emphasize the importance of supply chains and be sure that they are considered in all areas of business planning and execution.<sup>47</sup>

### **Partnership Building**

As mentioned earlier, companies do not have to tackle supply chain challenges and climate risks by themselves. Beyond internal efforts to identify and address supply chain risks, companies may enter into partnerships within or across industries to increase information and work together toward common goals. Many initiatives even require joint efforts by corporations, civil society organizations, trade associations, and/or regulatory entities to succeed. One example of such initiatives is the commodity mapping of supply chains. Commodity mapping is gaining widespread attention as it is geared to provide detailed insight into key regions, helping companies identify risks and opportunities and to enact appropriate strategies.<sup>48</sup> The sharing of supply chain information, challenges, and strategies among the participatory entities is a key to increasing transparency and establishing standards.

### **External Consultation and Assurance**

A 2011 survey by Social Science Research Network on corporate reputation found that improving transparency and expanding reporting on positive sustainability initiatives were the two most

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<sup>47</sup> Ernst & Young Global Limited; GreenBiz (2013), *op. cit.*

<sup>48</sup> Makower, J. (2013). "Assessing Supply-Chain Risk Through Commodity Mapping." GreenBiz. Retrieved from <http://www.greenbiz.com/blog/2013/11/04/assessing-supply-chain-risk-through-%E2%80%98commodity-mapping%E2%80%99>

important ways for business to build public trust.<sup>49</sup> Voluntarily reporting of corporate climate change information has become widely used in recent years with investor support. The addition of 3<sup>rd</sup> party reviews of sustainability management processes, and the final disclosure reports issued therein, can further increase the robustness, accuracy, and trustworthiness of disclosed information.<sup>50</sup> The Global Reporting Initiative (GRI), for example, promotes the use of sustainability reporting as a way for organizations to become more environmentally and socially conscious while contributing to a viable economy. In doing so, the GRI aims to make sustainability reporting a standard business practice. According to the GRI Guidelines, an independent review considers whether sustainability reports and 10-Ks provide a reasonable and balanced presentation of performance and take into consideration the overall selection of content. GRI's Sustainability Reporting Guidelines are also freely available to the public. Obtaining external assurance can benefit a company by increasing the credibility of their reporting to the shareholders and customers as well as by helping identify areas for improvement to the current strategy.

Besides private consultation services on logistics, supply chain structuring, and risk mitigation strategies, companies can also look to various sources for guidance and support. Ceres is one such organization comprised of a network of investors, companies, and public interest groups which advocate for the adoption of sustainable business practices and solutions to build a healthy global economy. With the goal of helping companies to be more competitive while building resilience in their supply chains, Ceres partnered with Verité to create a Supplier Self-Assessment Questionnaire. The questionnaire helps companies engage their suppliers on environmental, social, and governance issues and to evaluate sustainability risks. Drawing from leading practices in the field, the questionnaire allows companies to engage their suppliers and to assess the sustainability of their supply chains.<sup>51</sup> Among the latest additions to the supply chain management toolbox is the Notre Dame Global Adaptation Index (ND-GAIN), highly valued by PepsiCo and other companies relying on agriculture and manufacturing outside the US. ND-GAIN uses 17 years of data to analyze 170 countries' vulnerabilities

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<sup>49</sup> Cheng, B., Ioannou, I., Serafeim, G. (2011), *op. cit.*

<sup>50</sup> Global Reporting Initiative (2013). *The External Assurance of Sustainability Reporting*. GRI Research and Development Series. Retrieved from <https://globalreporting.org/resourcelibrary/GRI-Assurance.pdf>

<sup>51</sup> Ceres (2014). *Supplier Self-Assessment Questionnaire (SAQ): Building the Foundation for Sustainable Supply Chains*. <http://www.ceres.org/resources/reports/supplier-self-assessment-questionnaire-saq-building-the-foundation-for-sustainable-supply-chains/view>

to global climate risks in order to identify which are most resilient and adaptable to climate disruptions and to provide operational strategies for supply chain management as well as for capital projects and community engagements.<sup>52</sup>

**Question 9: Moving forward, what are some considerations for supply chain risk management?**

Supply chain management traditionally focus on whether individual supplier facilities are complying with established standards or codes of conduct related to treatment of workers and/or environmental impacts. Such narrow management practice is no longer sufficient, especially when pitted against the grand scale of global sustainability challenges. New and innovative strategies in supply chain management are needed for companies to achieve resilience to the effects of climate change. “The ability to manage and respond to supply-chain disruptions is becoming one of the critical success factors of executives,” says Hau Lee, a professor of operations, information, and technology at Stanford University’s Graduate School of Business.<sup>53</sup>

Identifying and acknowledging risks is only the first step. To be meaningful, risk awareness should be translated into preparedness for a company. As a company’s supply chains become global and increasingly complex, so should its risk management process. While many surveyed companies say that sustainability risks are incorporated into their enterprise risk management framework, many fewer companies have actually run scenario analyses and appraised the costs and benefits of various responses. Issues that are tightly interconnected, such as the food-energy-water stress nexus, require a scenario-based approach that, at the very least, attempts to anticipate key tipping points that could quickly affect broad areas of a business. By neglecting to do scenario planning, companies fail to integrate risks and do not develop confident appraisals of costs and benefits of different adaptive responses.<sup>54</sup>

Obtaining an insurance policy has been the traditional safeguard measure to protect against uncertainty. However, in regard to supply chain risks, reliance on insurance for risk transfer without

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<sup>52</sup> Coffee, J. (2014, Apr 30). “Supply Chains In the Face of Changing Climate.” *Environmental Leader*. Retrieved from <http://www.environmentalleader.com/2014/04/30/supply-chains-in-the-face-of-a-changing-climate/>

<sup>53</sup> Brehm, D. (2013, Dec 16), *op. cit.*

<sup>54</sup> Ernst & Young Global Limited; GreenBiz (2013), *op. cit.*

addressing and mitigating the risks themselves means bypassing opportunities for sustainability and resilience, which can result in market failure.<sup>55</sup> Insurance should only be regarded as a last line of defense.<sup>56</sup> With climate change intensifying weather events in many areas worldwide, the risks are overtaking the costs insurance. Unlike scientific models, insurance companies have to anticipate and incorporate worst-case scenarios into their short-term risk paradigm. This means that insurance premiums may decrease in areas where companies' supply chains face little risk, but they may rise in areas where risk is higher. In certain areas, the risks will be so great that insurance may no longer be a practical defense.<sup>57</sup>

## Conclusion

Among the most costly disasters in the world, the series of severe floods in Thailand in 2011 damaged seven major industrial estates and disrupted local business. Over 14,000 companies across the world felt the impacts as major supply chain manufacturers were incapacitated by high flood water.<sup>58</sup> The risk of weather and geographic events adversely impacting a company's supply chains is real and will only increase amidst global climate change. In the face of a changing world, companies cannot settle for a business-as-usual approach to protect themselves from risk. Companies must aim to improve mandatory and voluntary reporting and to better manage supply chain risks. Only a robust and proactive approach will protect firms and eventually yield benefits, including long-term growth, resilience, sustainability, competitive advantage, and profit.

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<sup>55</sup> Niehörster, F. et al. (2013, June), *op. cit.*

<sup>56</sup> Bosman, R. (2006), *op. cit.*

<sup>57</sup> Stromberg, J. (2013, Sept). "How the Insurance Industry Is Dealing With Climate Change." *Smithsonian*. Retrieved from <http://www.smithsonianmag.com/science-nature/how-the-insurance-industry-is-dealing-with-climate-change-52218/?no-ist>

<sup>58</sup> United Kingdom Environment Agency (2013, Nov), *op. cit.*