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Title:

The Samarco Accident in Brazil: Industry and Supply Chain Impacts

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Topics:

Topic 1: Operations Risk Management and Resilience,
Topic 2: International/Global Operations, and
Topic 3: Disaster Management

Keywords

Samarco Accident, Natural Disasters, Iron Mining, Steel Industry

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The Samarco Accident in Brazil: Industry and Supply Chain Impacts

Keywords: Samarco Accident, Natural Disasters, Iron Mining, Steel Industry

Topic(s): Operations Risk Management and Resilience, International/Global Operations, and Disaster Management.

Purpose:
Wassenhove (2006) proposes a framework to understand disasters and their impacts in supply chains. The author defines disasters as "a disruption that physically affects a system as a whole and threatens its priorities and goals." The same author classifies a disaster between natural and man-made, as well as slow or sudden onset. We also use other authors, such as Sheffi & Rice, 2005; Jüttner & Maklan, 2011; Lindell, Pratter & Peacock, 2007; and Ponomarov & Holcomb, 2009. These authors expand the understanding of disasters, exploring them in three phases: preparedeness, response, and recovery.

We base our research on data from the recent Samarco's accident in Brazil. Samarco Mineração, was a privately held Brazilian mining company founded in 1977 as a result from a joint venture of two giants global mining: Brazil's Vale S.A. and Australia's BHP Billiton. 99% of Samarco's production was exported to 36 ironwork facilities in 19 countries around the world, including China, Belgium, France, Germany, United Arab Emirates, United States, Britain, and South Korea (SAMARCO, 2016).

In 2013 Samarco´s production of iron ore pellets was about 25 million of metric tons, representing aproximately 44% of Brazilian production and 5% of world´s production. In November 2015, Brazil faced its worst environmental disaster as a result from the collapse of two mining dams from a Samarco facility that destroyed cities and rivers in thousands of kilometers and affected several supply chains and entire industries. Samarco's operation was entirely shut down.

The purpose of this research is to understand the impact of Samarco's accident on its supply chain and on the global supply chain of steel as a whole. To achieve this goal, we divided our research on two main phases. First, we map and describe Samarco's process to understand the impact of this event on Samarco's upstream and downstream supply chain. Next, we analyze data from the global industry of steel to understand its possible impacts in the world. We also explore Samarco's accident in Brazil under Wassenhove's (2006) framework.

Design/methodology/approach
We use primary and secondary sources of data. Primary sources comprised in-depth interviews with subjects directly and indirectly involved with Samarco before and after the accident. Secondary sources were core to this research at this point for two main

reasons. First, because this was the worst accident involving natural resources in Brazil's history so far, many secondary data were made available in journalistic media sources. Second, because it was so recent, not many scientific data were made available yet.

The unit of analysis was Samarco's supply chain. We investigated how the impacts of this disruption affected this firm's upstream and downstream supply chain, as well as what kind of short term and long term effects it could cause on the industry as a whole.

Findings:

The Samarco accident is already considered the worst 'natural' disaster ever happened in Brazil and one of the worst in the world. It completely disrupted several supply chains in dozens of cities. It completed shut down Samarco and is expected to keep it shut for at least two more years. Several major supply chain risks were identified, such as operational, financial, and reputational. After the accident in November 2015, Samarco lost its license and the right to operate in Brazil. The company faced long term operational, financial, and reputational disruption. And the main impact on the global operation was the reduction on the price of iron in the world, due to the existence of surplus in the capacity of steel production in the world.

Relevance/contribution

This study has academic and practical contributions. Academically, it contributes to the expansion of Wassenhove's (2006) framework to analyze disasters. A special contribution of this study is because it fits perfectly in neither of the proposed quadrants of Wasshenhove's framework. The Samarco's accident was man-made but at the same time slow and sudden onset. Although some sources questioned the impact of a small earthquake, it was man-made disaster because the rejects were storaged in those dams for more than thirty years, without a specific plan to solve the problem. It was slow because it took the damns thirty years to collapse, and sudden because it was not expected to happen at any point in time. This paper can also be expanded under the Kim et al (2015)'s supply chain structure as an example to understand how a disruption in a node can affect the resilience of the supply chain. It exemplifies a unique case, where a node and all of its links were taken, an entire supply chain was eliminated from the industry, and even though this was a major event, the supply network (industry as whole) was not severely impacted. Mainly due to the existence of surplus in the capacity of steel production in the world, as mentioned in the findings.

Practically, this study contributes to an additional perspective in analyze the impacts of this huge accident in different supply chains. As steel is a raw material for several different industries, examples include the automotive industry worldwide. We also consider that the effects could have been worse. However, they were not very large though because of two main factors. China, which consumes 60% of all steel produced in the world, has been showing a slowdown in growth over the last couple of years. Second, because there is surplus in the capacity of steel production in the world (in 2012 the rate of capacity utilization was around 80%), which generates ociosity in the iron steel industry in the world.

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