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## Crisis management practices and approaches: Insights from major supply chain crises

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### Abstract

Recent market trends, such as outsourcing and globalization, have made supply chains more exposed to disruptive external incidents, such as catastrophic man made events and natural disasters. Globalization favors the expansion of the supply chain across national borders; a fact that can transform even much smaller incidents to organizational crises (Manuj & Mentzer, 2008). More and more, stakeholders are being implicated in contemporary supply chains and when a crisis occurs it has to be faced timely, otherwise the consequences can get out of proportions (Randall & Farris, 2009). Lately, organizations try to make proactive planning to enhance decision making in the time of a crisis, but still no specific guidelines, either from literature or practitioners, exist about supply chain crisis management (Hittle & Leonard, 2011). In this paper, we try to identify specific processes and practices that make enterprises successfully confront supply chain crises or drive them to failure by studying major crises incidents as reported in the literature. In doing so, indicative case studies are studied and the business practices are examined, analyzed and discussed.

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### 1. Introduction

Today's unstable society is facing more and more unforeseen catastrophic events; be it natural disasters, such as the more recent Nepal earthquake, the Haiyan typhoon in Philippines (Ntalla & Ponis, 2014), or man-made disasters,

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such as the Gaza war taking place, which have increased the need for companies to confront them, while at the same time preserve their economic stability (Kahraman, 2008), safeguard their corporate reputation (Koronis & Ponis, 2012) and remain knowledgeable (Ponis & Koronis, 2012a) and resilient (Ponis & Koronis, 2012b). Definitions of crisis are present in the literature and vary extensively depending on the scientific field of origin. Crisis may be used to describe the urgency for response due to a specific incident or a simple change in certain facts (Rongier et al., 2012). More often, crises refer to man-made incidents and the term disaster is used to describe natural phenomena (Mukhopadhyay, 2005). The impacts of crises and disasters are usually considered as catastrophic and affect fundamental structures of a certain system. If the consequences are indeed harsh, urgent and crucial decisions have to be taken (Rosenthal & Charles, 1989). In this paper both terms are used interchangeably and initial definitions are provided in the text that follows.

Natural disasters are unpredicted phenomena, such as floods, storms, earthquakes that can cause severe damages to areas and, consequently, major disruptions and shortages to supply chains. For example, an earthquake may disrupt routes on the road or make certain supply or demand areas inaccessible. The current trend of globalized supply chains has made firms even more exposed and vulnerable to natural disasters (Smith & Pettley, 2009). Technological disasters refer to the failure of systems that are created by humans and can be categorized to industrial, pipeline, transport and structural hazards (Alexander, 2002). Incidents as fires, release of toxic substances and materials or explosions cause both environmental and infrastructural damages which disrupt a specific node of a supply chain. Finally, willful crises come as a result of man-made incidents and are categorized to terrorist and crowd incidents. Terrorist incidents may include explosive devices, hijacking or keeping hostages, whereas crowd incidents may be demonstrations, riots or strikes. Similarly, such crises can disrupt the normal flow of a supply chain. According to Perrow (2007), man-made crises with no ill intent fall within the technological crises category.

In this paper, we study supply chain crises as events that cannot be foreseen and may cause disruptions to the supply chain network. Events related to management such as the sudden raise of prices of specific key components or a supplier delivering poor quality products or failing to keep up with agreed time schedules and deadlines, are considered not relevant.

## 2. Methodology

The research presented in this paper builds upon the assumption that all types of supply chain crises can provide insights about the response actions of a supply chain after a crisis occurs, actions that may assist the firm's quick recovery after a crisis or may even make things worse. The first step of the study was the case study selection by reviewing the existing literature. Cases of companies leading or participating in a global supply chain network were selected first and second, the sample was further trimmed down to include large multinational corporations. In the end, nine case studies are assessed in this paper, all of them being large manufacturing global firms that faced a supply chain crisis. The second step of the analysis was the identification of the major operations and attributes that each firm used to create a dataset of characteristics. This dataset can provide indications about the decision making, that firms can use before and after the crisis to survive (Hittle & Leonard, 2011). In order to assess the case studies, secondary data were used by scientific and recognized publications as well as documentation from reports and news, describing the incident, the operating environment and the firm's strategy before and after the crisis. The secondary data were mostly based on scientific publications and in the case of missing information, websites and blogs were reviewed to deliver a complete and holistic picture of each case study.

Since the research presented in this paper is descriptive and exploratory in nature, content analysis was used as the major tool for analysis. The information attained from the case studies is grouped in the following categories to analyze the techniques that were used before and after crisis: (a) the case study profile (company, type of crisis, how the company was affected, impact of crisis and the final outcome), (b) the company's strategy before crisis, (c) the company's strategy after the crisis occurred and (d) the critical processes that led to the final outcome and impact of the crisis.

### 3. Analysis

The case studies included in this short paper, refer to crises of manufacturing supply chains with both successful and unsuccessful outcomes and varying trigger events. In that sense, one can argue that the case studies cannot be connected with each other. Nevertheless, the planning process, the main processes used in the supply chain and the outcome indicate that certain common practices do exist that can assist the recovery after a crisis. Content analysis was implemented to identify practices that positively affected the outcome of the crisis and practices that should be improved or altered, as they may constitute a skid to recovery. If the practices should be improved or avoided is discussed in the next section. Table 1, summarises the case studies' profiles including company names, the core crisis trigger event, the nature and quantitative impact of the crisis on the affected company and the crisis outcome in terms of successful or unsuccessful recovery.

Table 1. Case Study Profiles.

Company	Crisis Trigger Event	How the company was affected	Impact	Outcome	Identified Practices	Successful / Unsuccessful
<b>1. Nokia</b>	Fire on a supplier's plant	No supplier for specific component	None	Quick recovery	3, 10, 11, 12, 13	S
<b>2. General Motors</b>	Employees' strike on one supplier	No supplier for specific component	\$900 million loss, production decreased by 200.000 automobiles, dismissal of 177.000 employees	Severely affected	3, 6, 16	U
<b>3. Toyota</b>	Fire on a supplier's plant	No supplier for specific component	Production decreased by 14.000 cars/day	Quick recovery	1, 3, 5, 9, 10, 13	S
<b>4. Dole Food Company</b>	Hurricane Mitch	70% of acreages destroyed	\$100 million loss	Severely affected	3, 6, 11, 18	U
<b>5. Chiquita Brands International</b>	Hurricane Mitch	All banana crops in Honduras and Nicaragua damaged	\$50 million loss	Quick recovery	4, 12, 15	S
<b>6. Dell, Inc</b>	Taiwan earthquake	10% of PC memory chips destroyed	None	Quick recovery	2, 4, 5, 7, 13	S
<b>7. Ericsson</b>	Fire on a supplier's plant	No supplier for specific component	\$200 million loss, outsource of cell phone production	Severely affected	3, 17, 18, 19, 20	U
<b>8. Renesas Electronics Corporation</b>	Great East Japan Earthquake and tsunami	Facilities destroyed	\$610 million loss	Severely affected	2, 6, 10, 14	U
<b>9. Western Digital</b>	Thailand floods	Facilities destroyed	46 days production stoppage	Quick recovery	1, 4, 8, 9, 10, 15	S

The practices implemented in all case studies are presented in Table 2.

Table 2. Practices Used Before and After Crises.

#	Practices	#	Practices
1	push and pull strategy	11	technological innovation
2	pull strategy	12	capacity flexibility
3	sole supplier (or over 90% of supplying given to one specific plant)	13	quick response and decision making
4	multiple sourcing	14	insurance
5	close contracts with stakeholders and suppliers	15	proactive risk and crisis management that includes risk assessment, classification and planning in advance
6	cost cutting	16	promotion of profitability instead of employees
7	promotion of customers satisfaction	17	slow response
8	promotion of employees satisfaction	18	limited capacity
9	coordination of SC network	19	loose relationships with stakeholders and suppliers
10	collaboration management	20	lack of preparedness

The frequency of usage for each technique, indicates that some of them are linked to the successful or unsuccessful outcome of each case. Before analyzing how the practices can be interpreted and which ones need improvement or not, they are clustered to assist the analysis. Some of them refer to the strategy and the core motivation the company had before the crisis and some of them refer to the actions that were implemented afterwards.

#### 4. Discussion

The analysis of each process in each stage of a crisis reveals several issues in the companies' strategies and simultaneously unveils certain characteristics that have been proved helpful. The pre-crisis stage describes how each company had set up their strategy. Whether a firm was using a pull or push and pull strategy does not offer much evidence about the outcome. It is though admitted that low inventory can leave a company exposed to potential crises, as they will not be able to meet customer demand. A common pattern is observed to five of the case studies; having low inventory and a sole supplier for a particular component. Thus, a push, pull or mixed strategy cannot be determinant for the outcome, but the lack of alternative sources can indeed be devastating. Furthermore, having close relations with the suppliers can help a firm recover quickly, as in the case of Toyota and Nokia. Creating trust and long-term relationships with suppliers is not only about reassuring stable stock-prices, but also about relying to more than your-self when a disaster occurs. Sources are not only suppliers, but the capacities each company has too. Apart from the cases that had a sole supplier, cases studies that did not have alternative capacities were severely affected by the crises and could not recover easily.

Furthermore, the preparedness and if companies had incorporated risk and crisis management practices in their strategies is important. Western Digital, for example, had assessed potential crisis and was prepared about it, minimizing the scale of damages. Finally, insurance is often considered as a strategy that mitigates exposure to crises (Marley & Hill, 2014), but in the case of Renesas Electronics managed to cover only a small part of the damages. Of course, this fact does not indicate that firms should not insure their property, but that it is not a countermeasure alone.

The next cluster of processes deals with core values each company has, regarding their motivation and whether they appreciate more their profitability, customer satisfaction or employee satisfaction. It can be generally admitted that being profitable is what every company wishes and this is the criterion that segregates successful and unsuccessful outcomes. Nevertheless, when managers have to decide about cutting costs and neglecting contracts with employees or cutting costs and reducing their product quality, major dilemmas rise. General Motors, for example, decided to cut costs and fire employees, even if they had contracts that ensured them for a longer term. Finally, they had to pay even more to compensate them. Dell also after the crisis, decided to satisfy their customers, even if they had to increase their costs and use different components and finally got rewarded. So, trust should not only be built among the supply chain, but among the company and the smallest particles of the market network. This

process concerns a company's brand building, which is important and should not be neglected even in the harsh times of a crisis.

The last part of processes concerns the stage during and after the crisis. As aforementioned, cost cutting is often used to recover; sometimes successfully and sometimes not. Before taking the risk to reduce existing sources, all prerequisites should be thought extensively. During a crisis, it is difficult to think net and managers can take spasmodic actions, making proactive thought and preparedness indispensable for crisis management. Collaboration management and coordination of supply chain during a crisis can also become a pillar for recovery, but both of them cannot happen if close relationships among SC stakeholders do not preexist. Furthermore, technological innovation is important, as in Nokia's case that altered their devices to fit to different microchips than they did before the crisis. The last but most important part of this stage is how quickly a company responds to a crisis. The companies that responded rapidly managed to recover more quickly. Ericsson took decisions weeks after their supplier failed and when they realized that they had to take actions it was too late and they were paralyzed. Disasters deem for a strong leadership that will be able to handle a potential crisis and take quick and effective decisions.

## 5. Conclusions

The current research underpinned how certain processes of decision making before, during and after a crisis can affect the recovery of a company after a supply chain crisis. Collaboration management and keeping strong relationships with the major suppliers of the organization are crucial and require strong communication upstream and downstream in the supply chain. Cultivating links, and transparent relationships with the supply chain stakeholders can become the saving pillar to the company at the time of a crisis (Juttner, 2005). Toyota managed impressively to make 36 of their suppliers to cooperate and replace their supplier that failed to produce the components at the time of the fire. Selecting a single supplier was one of the main reasons of failure at the case studies and caused issues even in the cases of the organizations that recovered the disruption. Usually, organizations choose one single supplier for a specific component because they provide them a more competitive price. The costs though that may have to face during a crisis cannot be compared to the savings of a sole supplier (Hittle & Leonard, 2011). Flexibility in capacity was found also important for a quick recovery. Not all companies though are able to manage the costs for maintaining facilities that are not being used normally and they do not intend to use them in non-crises times. From a macro-economic perspective though, given the potential of a crisis, keeping underutilized equipment and facilities will result in a positive return of investment (Moustafa, 2006). Capacity flexibility can be also linked to multiple sourcing, where supply chain is diversified. Following both strategies can be economically prohibited, but similarly, considering the consequent costs of a crisis makes it a beneficial deal.

Brand building and keeping customers and employees satisfied will also remunerate a company long-termly. The most obvious decision when a crisis occurs is laying off employees and reducing product quality to cut costs. However, this is impulsive and such decisions must be thought more thoroughly.

Taking quick decisions needs a strong leadership not only in times of crises, but during the whole life cycle of the organization. Leadership is inextricably connected to the decision making and each organization should invest on it (Tang, 1999). Proactive crisis management is a huge process and there are specific management systems that deal with it. The typical crisis management practices are crisis assessment and evaluation and planning of different recovery scenarios in each case. Most of the case studies did not have any crisis management plans, but lately more and more companies adapt this concept (Juttner & Maklan, 2011). Western Digital was prepared for the flood and managed to recover extremely quickly. Nokia overcame the disruption from the fire in the Phillips plant, not only because they managed to change suppliers rapidly, but also because of the technological facilities they had that managed to alter the devices and accept different chips. The rest of the techniques identified do not indicate a specific relationship to the outcomes, as they appear once or in both outcomes.

The interesting comparison is about the case studies that concern the same event, but two different organizations, where one recovered and the other suffered from the consequences of the crisis. Those are, the fire in Albuquerque

with Nokia and Ericsson and the hurricane Mitch with Dole Food Company and Chiquita Brands International. Comparing those case studies the previous results are reinforced, as the differences in the decision making of the companies refer to having one or multiple sources, collaboration management, keeping close relationships with the stakeholders in the supply chain, capacity flexibility and proactive crisis management practices.

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