Chapter 29
Supply Chain Risk Management:
A Review of the Literature

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ABSTRACT

The importance of supply chain management (SCM) has been increasing recently and the concept of supply chain risk management (SCRM) has been gradually expanded. Since the concept of risk and uncertainty permeates all organizational functions, risk management would seem to be a crucial step towards safeguarding a company's competitive advantage. In the case of modern supply chains, which are composed of complex relationships necessitated by competitive pressures such as outsourcing and globalization, understanding and implementing risk management processes and initiatives at various levels of the chain is essential (Peck, 2006). The purpose of this chapter is to conduct an extensive and structured review of the supply chain risk management (SCRM) literature in order to understand the importance of the risk management concept in the context of organizational supply chains, identify gaps, and suggest future research areas in this important and growing field.

INTRODUCTION

Earthquakes, hurricanes, floods, fires, strikes, terrorist attacks, political crackdowns, economic downturns, and epidemics are examples of events and incidents that may tremendously disrupt any supply chain. Obviously, these events coupled with supply chain's inherent operational risks constitute the potential and current risks and uncertainties for Supply Chains (SCs). The impact of these disruptions in both the short and the long term will definitely threaten the continuity of businesses. The cases cited most often in regard to ineffective supply chain risk management (SCRM) are Ericsson's huge 400 million Euro loss due to fire at its semiconductor sub-supplier plant, interruption of freight at US borders in the aftermath of the September 11 tragedy, and the Asian financial crisis and consequent crises and bankruptcy of many businesses in the 1990s. Boeing, Pfizer, and Cisco are other examples of businesses that have suffered unexpected losses of more than US$2 billion each as a result of ineffective SCRM decisions (Hult, Craighead, & Ketchen, 2010).

Given the ascending nature of disasters and increasingly complex network of relationships among buyers and suppliers, the main objective of this chapter is to help the reader to better understand the importance of managing risk in supply chains by exploring the concepts of risk and risk management in general, implications of risk in supply chains, and risk management steps and risk sources in network environments.

RISK AND RISK MANAGEMENT

Risk

Risk is a multidimensional construct of which a single definition may not be appropriate in all circumstances (Zsidisin, 2003). The word may originate from the early Italian word *risicare* (Bernstein, 1996), the Arabic work *risq,* or the classical Greek word *risicum* (Norrman & Lindroth, 2004; Paulsson, 2007). However, different people have different understandings of risk depending on their risk perception (Khan & Burnes, 2007). Historically, the study of risk can be traced as far back as the seventeenth century when famous mathematicians Blaise Pascal and Pierre de Fermat attempted to apply mathematics to gambling. However, over the years with advancement in technology and movement toward globalization, views of risk have changed tremendously (Khan & Burnes, 2007).

Bernstein (1996) states that "the actions we dare to take, which depend on how free we are to make choices, are what the story of risk is all about" (p. 8). Explicit in this explanation is the important aspect of choice, and implicit is the notion of positive and negative aspects of risk. While the negative connotations of risk pervade the thinking and feeling of most managers (March & Shapira, 1987), some scholars stress the dichotomy of risk (Moore, 1983; Waters, 2007). However, when it comes to an organization's perception of risk, again the negative implications – primarily caused by technological advancements – override the positive (March & Shapira, 1987).

Risk Definitions

Risk is a difficult concept to define and could have different meanings depending on the area of research (Zhao, Huo, Sun, & Zhao, 2013; Wagner & Bode, 2008). Several important studies examine the concept of risk, including seminal works by Baird and Thomas (1990), Yates and Stone (1992), and March and Shapira (1987). However, the definition of risk most often cited in supply chain literature is that of March and Shapira (1987): "the variance in the probability distribution of outcomes, their likelihood and their subjective values" (p. 1404).

Based on classical decision theory, discussions about risk are instigated where it is considered to be a part of management, insurance, environmental, and psychological studies (Brindley & Ritchie, 2004; Peck, 2006). For example, Sitkin and Pablo (1992) define risk as "the extent to which there is uncertainty about whether potentially significant and/or disappointing outcomes of decisions will be realized" (p. 10). In the same vein, Peck (2006) states that "risk is the possible upside and downside of a single rational and quantifiable (financial) decision, usually illustrated with examples from gambling" (p.130).

Moreover, MacCrimmon and Wehrung (1986) consider risk to be comprised of three components: magnitude of loss, chance of loss, and potential exposure to loss. Similarly, Yates and Stone (1992)

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