Journal of Business Research 67 (2014) 1123–1135

Contents lists available at ScienceDirect

Journal of Business Research

Supply chain disruption management: Global convergence vs national specificity

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ARTICLE INFO

Article history:
Received 22 June 2012
Received in revised form 8 April 2013
Accepted 19 May 2013
Available online 12 June 2013

Keywords:
Supply chain disruptions
Cross-national
Universalism
Risk management

ABSTRACT

As the supply chain expands overseas, there is a growing need for managing supply chain disruptions from a cross-national perspective. This paper investigates whether or not supply chain disruption management (SCDM) can be universally applied. The universality of the SCDM framework is analyzed through the convergent versus divergent (national specificity) debate. On an empirical level, based on a unique sample of 1403 firms representing 69 countries all over the world and using the GLOBE framework, we compare the level of importance of the eight constructs of our framework and the patterns of relationship between the constructs, across eight country clusters. MANOVA analysis and multiple regression analysis were applied to obtain relevant empirical insights. Surprisingly, our findings suggest that while risk sources are different in the various countries, the implementation of SCDM practices is universal. These results support the existing tension between the convergence theory and the national specificity argument.

1. Introduction

Supply chain disruptions and related issues are considered the most pressing concerns facing firms competing in today's global marketplace (Craighead, Blackhurst, Rungtsunatham, & Handfield, 2007). A disruption can be defined as an unplanned and unanticipated situation in comparison with normal supply–demand coordination risks (Hendricks & Singhal, 2003; Kleindorfer & Saad, 2005; Wagner & Bode, 2006). Examples of these include the 9/11 terrorist attacks, the lightning strike at the Philips NV microchip plant in New Mexico, the bankruptcy of Land Rover's exclusive chassis supplier, or the shutdown of all air traffic due to a volcanic eruption in Iceland.

Academics and practitioners argue that in the last few years supply chains have become more vulnerable to disruption (Christopher & Lee, 2004; Craighead et al., 2007; Kleindorfer & Saad, 2005; Simangungsong, Hendry, & Stevenson, 2012). This is supported by findings coming from organizational scientists (Perrow, 1984), which indicate that accidents become inevitable or even normal in complex and tightly coupled technological systems. Given this theory, it is not surprising that lengthy and complex supply chains, working with faster speeds, have become more prone to disruptions. Hendricks and Singhal (2003, 2005) analyzed the effects of supply chain disruptions and empirically showed that these events have a significant negative impact on shareholder value and on operating performance (i.e., sales, operating income, return on assets). Their study also indicates that companies that experience a supply chain disruption suffer a 33 to 40% decline in stock price compared with industry peers over a three-year period.

The implications of supply chain disruptions in the entwined global operations have been evidenced in different kinds of industries over the last decade. Take, for example, the impact of the tsunami catastrophe that struck Japan in March 2011, one of the largest disruptions to global supply chains in modern history, which had important consequences for the electronics industry. Cisco, leader in the communication technology industry, was able to assess the impact of the tsunami for their 300 suppliers in 12 h thanks to their sophisticated supply chain disruption management strategies and therefore. As result, Cisco experienced practically no loss in revenue (Sáenz & Revilla, 2013). Another relevant example is Apple's ipad2, which went on sale just hours after the tsunami hit. Apple had to deal with subsequent shutdowns causing stock shortages and long delays in deliveries, which was frustrating for Apple's customers as well as its shareholders (Neville, 2011).

Extant research has not only highlighted the long-term negative effects of supply chain disruptions but has also contributed relevant insights into related issues such as supply chain disruption management (e.g. Kaku and Kamrad, 2011; Manuj & Mentzer, 2008; Sheffi & Rice, 2005; Simangungsong et al., 2012; Speier, Whipple, Closs, & Voss, 2011; Tomlin, 2006; Zsidisin, Melnyk, & Ragatz, 2005). Our research emphasizes the framework developed by Kleindorfer and Saad (2005), one of the few formal theory-building efforts on supply chain disruption management (SCDM), cited in almost all articles written in the field since its publication in 2005. This conceptual framework identifies three main concurrent tasks: specifying sources

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http://dx.doi.org/10.1016/j.jbusres.2013.05.021

of risk and vulnerabilities, assessment and mitigation, which, together, are known as SAM (Kleindorfer & Saad, 2005). But this framework has not considered the importance of deployment in a continuous loop in order to learn from previous experiences and be even more prepared for the inevitable next crisis (Jüttner and Maklan, 2011; Zsidisin et al., 2005). With an aim to integrate these two relevant contributions in the literature, we reframe the SAM framework developed by Kleindorfer and Saad (2005) and propose a comprehensive SCDM framework as the basis for our theoretical foundations.

As supply chains expand overseas (e.g.: supply chain tiers and sub-tiers located in different continents being threatened by different local events combined with global effects), there is a growing need for multi-country and cross-cultural research (Bhattacharyya, Datta, & Offodile, 2010; Naor, Linderman, & Schroeder, 2010). Understanding cultural differences becomes increasingly important since it can provide both the theoretical underpinnings and the practical implications for risk perception and subsequent ways of handling supply chain disruptions. Scholars have debated the effect of national culture on management practices (Naor et al., 2010; Rungtusanatham, Forza, Koka, Salvador, & Nie, 2005). In the management literature, the convergence hypothesis implies the institutionalization of supply chain behavior over regions when there is a risk of disruption. This means that supply chain disruption management involves a universal set of management practices and principles that goes beyond cultural boundaries. Conversely, the divergent or national specificity hypothesis argues that national culture produces values and that these value systems inhibit the cross-cultural transferability and applicability of disruption-management concepts and practices. Thus, even if supply chains face similar disruptions and adopt similar models, deep-rooted cultural forces could still enter into play in the way the disruptions are confronted. Consequently, any organizational practice is adapted to the social context, and different practices are found across nations.

Coinciding with this surge of interest in supply chain disruptions, there has been a substantial increase in studies applying different research methodologies in the past few years in order to understand the phenomenon and its managerial implications. The majority of the existing publications based their efforts on empirical qualitative studies (e.g., Blackhurst, Craighead, Elkins, & Handfield, 2005; Craighead et al., 2007; Johnson, 2001; Juttner, Peck, & Christopher, 2003; Khan, Christopher, & Burnes, 2008; Norrman & Jansson, 2004; Oke and Gopalakrishan, 2009; Smeltzer and Siferd, 1998; Svensson, 2000; Zsidisin, Ellram, Carter, & Cavinato, 2004; Zsidisin, Panelli, & Upton, 2000). Some other studies take advantage of available secondary data bases and archival data to analyze the impact of disruptions (Altay & Ramirez, 2010; Bhattacharyya et al., 2010; Hendricks & Singhal, 2003, 2005). In the extant literature, there is also research regarding modeling or simulation in this field (e.g., Cachon & Lariviere, 2005; Sodhi, 2005; Tomlin, 2006; Wang & Webster, 2007; Wilson, 2007). However, there is a deficit of academic work in terms of recent survey-based research (for exceptions, see Thun & Hoenig, 2011; Wagner & Bode, 2006), which would allow us to empirically and statistically validate theories in the field.

To address these research gaps, this study aims to investigate the universality of the management applicability in the supply chain disruption context. In doing so, we propose a inclusive SCDM framework that let empirically analyze the convergence vs. national specificity debate (Child & Kieser, 1979; Shenkar & Ronen, 1987) on two complementary levels based on a sample of 1403 firms. We compare both the level of importance of the constructs of our SCDM framework and the patterns of relationship between the constructs across eight country clusters, using the Global Leadership and Organizational Behavior Effectiveness (GLOBE) framework.

By doing this, we intend to contribute to both the cross-cultural literature and the supply chain management literature. First, although SCDM has gained attention in academia in the past, its management is still in an embryonic phase (World Trade Magazine, 2010). Executives are not adequately prepared to manage supply chain risks. Through the reframing of the SAM framework (Kleindorfer & Saad, 2005), we provide conceptual clarity for the universality of supply chain disruption practices. Second, we observe that the nature of previous SCDM work is mainly normative, anecdotal, or case study-based (Wagner & Bode, 2006) as opposed to theory-testing. While insightful, the conclusions drawn from these past studies are not as strong as we would expect. Consequently, there is a need for theory-driven empirical research (Oke & Gopalakrishan, 2009; Thun & Hoenig, 2011). In this respect, this paper simultaneously compares and contrasts SCDM practices across countries. Third, despite the growing body of cross-cultural studies, the debate regarding convergence vs. national specificity management practices has not subsided (Rungtusanatham et al., 2005). This debate has in fact become even more important in this era of globalization in which organizations are increasingly expanding across international boundaries (Naor et al., 2010). We base our analysis on a country cluster comparison using the GLOBE study, which provides the most complete data gathered over the last decade on national culture (House, Hanges, Javidan, Dorfman, & Gupta, 2004).

2. Toward a supply chain disruption management framework

The existing literature on supply chain risks shows that there are two fairly distinct categories of risks affecting supply chain design and management (Kleindorfer & Saad, 2005; Norrman & Jansson, 2004; Oke & Gopalakrishan, 2009): risks arising from the problems of coordinating supply and demand and risks arising from disruptions to normal activities. This paper focuses on the second category of risks—supply chain disruptions. Supply chain disruptions are defined in the literature as unplanned and unanticipated events that disrupt the normal flow of goods and materials within a supply chain (Craighead et al., 2007; Hendricks & Singhal, 2003; Kleindorfer & Saad, 2005; Svensson, 2000). As a consequence, these disruptions expose firms within the supply chain to operational and financial risks (Stauffer, 2003).

A great deal of literature has contributed to the current understanding of how to manage supply chain disruptions. Initially, studies analyzed risk sources and mitigation strategies together, suggesting that sources must be identified or understood first in order to propose adequate mitigation strategies (Oke & Gopalakrishan, 2009). Later on, research proposed integration of the sequencing of complementary tasks in order to efficiently manage a supply chain disruption (Oke & Gopalakrishan, 2009; Rao & Goldsby, 2009). Taking their fundamentals from the theory and practice of industrial risk management (Haimes, 1998), Kleindorfer and Saad (2005) proposed the so-called SAM framework in which three main tasks have to be sequentially completed as the foundation of supply chain disruption management. The three tasks are: specifying risk sources and vulnerabilities, assessment, and mitigation. Although the authors propose a sequence of the three above-mentioned tasks, they stated in their conceptual framework that it reflects the effective integration of the joint activities of assessment and mitigation (Kleindorfer & Saad, 2005, p. 54). Accordingly, we propose the integration of the assessment and mitigation tasks into one joint action, which we call disruption management.

Regardless of how extensively it is mentioned in the literature, this framework does not integrate how to close the loop that would (1) enable supply chain partners involved in disruption-management activities to continuously learn from past experiences, and (2) provide feedback on how to handle the sources and impose complementary corrective actions. Previous literature (Jüttner and Maklan, 2011; Zsidisin et al., 2005) has already pointed out that when supply chain disruptions occur, it is important that the firm learns from the experience. Thus, we propose an additional stage for the disruption management that we call "learning feedback".

Next, we justify the elements and their interrelations, which comprise our proposed conceptual framework for SCDM depicted in Fig. 1.