



A review of the literature on the principles of enterprise and supply chain resilience: Major findings and directions for future research



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ABSTRACT

The purpose of this paper is to investigate the research development in supply chain resilience. We undertake a literature survey to review the literature on enterprise and supply chain resilience. We aim to provide a platform for researchers and practitioners trying to identify the existing state of the work, gaps in current research, and future directions on the topic. For this purpose, we employed two methods to collect publications in supply chain resilience. First, we selected keywords and searched the relevant databases and journals. Next, we tracked the references of those papers collected in the first method to look for other publications published in conference proceedings and book chapters. As a result, a sample of 100 papers was collected, studied, and analyzed. We summarize our findings in several areas including enterprise and supply chain resilience definitions, supply chain resilience principles, and supply chain resilience strategies. Based on the assessment, we develop a framework for the principles of supply chain resilience that can be used as a basis for understanding supply chain resilience.

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1. Introduction

The past few decades have been notable for major changes in supply chains due to an increasing level of globalization and a higher rate of innovation. The growing role of global supply chains was associated with increased interconnectedness among suppliers and manufacturers, which led to higher dependency among firms in the supply chains and a higher level of supply chain complexity (Blackhurst et al., 2005; Wagner and Bode, 2006; Stecke and Kumar, 2009; Christopher et al., 2011). This, in turn, resulted in supply chains that are efficient during stable business environments, but are highly vulnerable to risks and disruptions.

Supply chains have faced challenges such as high demand variability, short life of products, and different expectations and requirements of customers; adapting to these challenges increased supply chain complexity and resulted in more instability and unpredictability (Stefanovic et al., 2009; Ghadge et al., 2012; Roberta Pereira et al., 2014). As a result of the negative consequences of supply chain disruptions, the academic and practitioner community emphasized the need to address the design of supply chains that are efficient while resilient to disruptions.

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Supply chain risk management (SCRM) is “the identification of potential sources of risk and implementation of appropriate strategies through a coordinated approach among supply chain risk members, to reduce supply chain vulnerability” (Jüttner et al., 2003, p. 201). SCRM is concerned with the assessment of sources of risk across the supply chain and the development of strategies to deal with them. A recent MIT Scale Network study found that approximately 60% of managers either did not actively work on SCRM or did not believe their company’s risk management practices were effective (Sáenz and Revilla, 2014). According to Fiksel et al. (2015), the main reason for the ineffectiveness of these practices is that traditional risk management relies mainly on risk identification and statistical information, while many risks are unpredictable and unknowable, and statistical information may not exist.

To address this issue, the idea of supply chain resiliency has received more attention in recent years. Fiksel et al. (2015) argued that resilience is an important capability that complements the traditional risk management processes in many companies. Melnyk et al. (2014) stated that resilience is the heart of current supply chain management thinking. Although the concept has been defined by many researchers, there is no comprehensive definition that provides a clear understanding of resilient supply chains. For some, resilience is reactive capabilities for use after a disruption; others perceive resilience as a more proactive effort toward being prepared for disruptions. Melnyk et al. (2014) mentioned that, in view of these divergences, the confusion surrounding the concept is not surprising. For now, we rely on the definition by Ponomarov

and Holcomb (2009), a definition that is commonly cited in the supply chain resilience literature: supply chain resilience is “the adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function” (Ponomarov and Holcomb, 2009, p. 131).

In this study, we aim to address two key questions in supply chain resilience: (1) What is the current state of research in supply chain resilience, and (2) What are the gaps in current research that future research should address? We address these research questions by reviewing the articles published in major academic and practitioner journals from 2000 to 2015. We recognize the year 2003 as a turning point on research in supply chain risk management. This view is based on the result of literature review studies on SCRM by Tang and Musa (2010) and Ghadge et al. (2012). Their findings indicated a sudden increase in the number of articles published in SCRM in 2004. We assume that those articles published in 2004 had been started in 2002 and 2003 after the September 11, 2001 attacks, which disrupted many supply chains around the globe.

The remainder of this paper is organized as follows. In Section 2, we provide a literature review of the existing studies of supply chain resilience. In Section 3, we present our research process. In Section 4, we first present several statistics about the characteristics of each research study. Then we provide an overview of the research in supply chain resilience definition, principles, practices, strategies, and measurement. In Section 5, we discuss major findings of this study and outline future directions.

2. Literature review

Three studies have conducted literature reviews on the topic of resilience. In the first study, Bhamra et al. (2011) provided a review of resilience literature in its widest context and later its application within the organization. Using keywords such as “Resilience” and “Resilient SMEs” (small and medium-sized enterprises) on databases and Google Scholar, they collected and analyzed 74 papers, in which 21 papers were on organizational resilience and only 9 papers were on supply chain resilience. They focused on the perspectives, concepts, and methodologies in the resilience literature. Their findings indicate that theory building has been the main focus of researchers within the area of resilience, and empirical studies are lacking. They suggested more focus on empirical methods such as case study and survey, which can significantly add to and validate theoretical constructs.

Ponis and Koronis (2012) reviewed 134 peer-reviewed journal articles. They investigated the concept of resilience in different areas and proposed organizational and supply chain resilience. They identified the antecedents of SC resilience as agility, flexibility, velocity, visibility, availability, redundancy, mobilization of resources, collaboration, and SC structure knowledge. Finally, Roberta Pereira et al. (2014) employed a systematic literature review approach to find the role of procurement in achieving supply chain resilience. Their research question was concerned with identifying the intra- and inter-organizational issues that must be addressed by procurement in order to create supply chain resilience. They studied 133 papers and limited their focus to 30 of those papers. They found enablers and barriers of supply chain resilience and interconnections between these factors, and investigated their implications in procurement activities. They presented two frameworks: intra- and inter-organizational issues from a procurement perspective to create supply chain resilience; and achieving supply chain resilience through intra- and inter-organizational issues.

Our study differs from previous work in several ways: first, instead of conducting the review on the concept of resilience in other disciplines, we have focused only on organizational and supply chain resilience practices using a comprehensive literature review. Second, our review is exhaustive and covers both practitioners’ and academic journals, book reviews, conference proceedings, and other related reviews and reports. Our study covers all publications from 2000 to 2014, collecting publications in two phases: using databases and journals to find articles in the first phase, and then tracking the references of those articles in the second phase. Finally, while previous studies on supply chain risk have primarily focused on large organizations, this study is the first to review the research on risk and resilience practices for small and medium size enterprises (SME) as well as supply chain resilience operationalization and measurement.

3. Research process

In this study, we conducted a literature survey to review the existing literature on supply chain resilience. A literature survey aims at understanding important issues and challenges in a given field, including the current status and theory development of the area (Tang and Musa, 2010). The approach used to collect the relevant publications was comprised of two stages: first, we searched databases and journals by using specific key words; next, we tracked references of the publications obtained in the first stage, to find the literature that we were not able to identify by using databases and journals. In preparing the sample for this study, we only considered the publications after year 2000. We further showed that using year 2000 as the starting point is justified, since the concept of resilience (especially supply chain resilience) was not discussed much before 2000. Fig. 1 presents the outline of the research process used in this study.

Phase 1: Search Databases and Journals. We believe that the quality of a literature review study is driven by the data sources that are used. In order to identify high quality research papers, in line with Ghadge et al. (2012), we decided to use the widely accepted quality rating published by the Association of Business Schools (ABS), UK, as Academic Journal Guide (AJG) 2015 for journals in three different domains of management: Operations Management (OM), Operations Research and Management Science (OR/MS), and General Management (GM) (The ABS Journal Guide, 2015). To identify and collect the published research in supply chain resilience, we used a number of major databases such as *Business Source Complete*, *Engineering Research Database*, *Taylor and Francis Online*, *Google Scholar*, *Emerald*

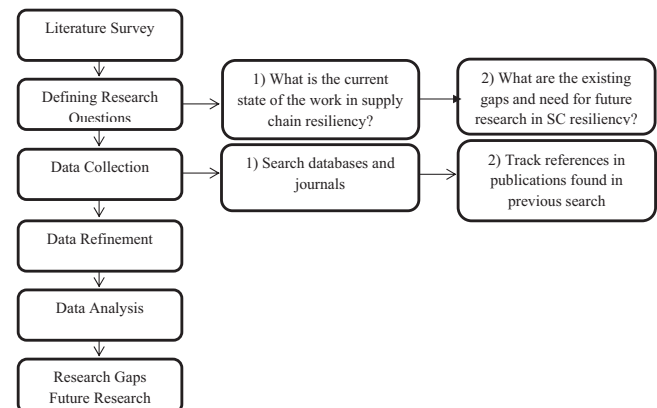


Fig. 1. Research process.

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