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Supply chain risk management in financial crises—A multiple case-study approach ☆

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ABSTRACT

Supply Chain Risk Management has become a key concern for organizations, which is even further emphasized by the current economic and financial crisis. Against this background, this paper investigates successful approaches and experiences by companies in dealing with this new reality, especially as it concerns the supply side. Using in-depth case studies conducted among eight European enterprises, we develop a set of propositions about how companies manage supply risks in financial crises, highlight how their risk management approaches have shifted, and illustrate how they are related to Enterprise Risk Management. Our framework is further differentiated based on whether firms are predominantly engaged in manufacturing or services—a factor influencing how supply chain risk is managed. Transaction cost economics serves as our main theoretical anchor. By rigorously grounding our research in both theory and empirical evidence, we provide valuable insight for both academia and practice.

1. Introduction

The financial crisis led to a steep increase of corporate insolvencies in 2008 and 2009, with an unprecedented large number of high-profile insolvencies and bankruptcies (e.g., Lehman Brothers, Washington Mutual, General Motors, CIT, Chrysler, Thornburg Mortgage, Indymac). Almost every region and every industry has been affected by the crisis in one way or the other, making the management of risk associated with the crisis an absolute necessity for firms. This is particularly emphasized for companies being tightly interlinked in a supply chain network comprised of multiple entities (most notably customers and suppliers) who themselves may severely suffer under the financial crisis. In addition, with the trend towards outsourcing and companies increasingly focusing on their core competencies, effective and efficient supply chain management has become a key component of corporate strategy, competitive advantage, and success (Narasimhan and Talluri, 2009); due to the scarcity of resources and the strained environment, this importance is even heighted during economic crises. Within this setting, the sourcing of products, services and capabilities can thus be endangered by supplier defaults (Wagner et al., 2009). Due to these developments and realities, supply chain risk management (SCRM) has become a key concern for industry to be better able to detect, predict, avoid or reduce the effects of supplier disruptions and defaults. The negative effect of supplier defaults has been shown by Hendricks and Singhal (2005), who reported a median decrease in operating income of 31.28% for firms that had experienced a supply chain glitch caused by suppliers. Overall, supply disruption costs today are higher than ever before (Aydin et al., 2009), necessitating the further investigation of SCRM.

Even without the financial crisis, SCRM has become a necessity for many firms. Globalization, improved infrastructure and information technology has led supply chains to become longer and more complex, resulting in higher supply chain vulnerability (Tang, 2006a, 2006b; Aydin et al., 2009). The importance of SCRM was for example illustrated by the results of a recent survey, which revealed that 90% of firms felt threatened by supply-side risks (Snell, 2010). However, at the same time, respondents in 60% of the firms noted that they were not confident or knowledgeable enough about supply risk issues (Snell, 2010). The further study of this topic, especially with the focus on the financial crisis, is therefore warranted and crucial.

While enterprise risk management (ERM) has been an important component of all facets of business (Wu and Olson, 2009a, 2009b, 2010a), its criticality is stressed for supply chain management. Since this aspect is outside the internal control of the enterprise, selecting and managing suppliers, while at the same

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time managing its associated risks, becomes crucial (Wu et al., 2010; Wu and Olson, 2008, 2010b; Tang, 2006a). The criticality and assurance of supply is even more emphasized in some industries with their increasing reliance on just-in-time deliveries and minimal inventories (cf. Tang, 2006b; Kelle and Miller, 2001), providing a heightened level of supply risk. For example, while the global automotive industry faced approximately 70 major insolvencies in 2007, the financial crisis made this number rise to 225 insolvencies in 2009 (Roland Berger, 2010). These developments, together with the heavy dependence on suppliers (Wagner et al., 2009), create major challenges for the entire industry. Even though it may be impossible to assess how well risk management systems would have been able to prevent these problems stemming from the financial crisis, we are interested in *how the financial crisis has altered SCRM approaches* applied by manufacturing and service firms. While it was prudent to conduct SCRM all along, the importance of it has certainly been propelled due to the financial crisis (Ariba, 2009). In addition, the crisis may have shifted *how* SCRM is approached, warranting further investigation.

While empirical research in SCRM and ERM is at an early stage, it is at the same time faced with an unprecedented environment of economic and financial turmoil. Within this context this research project is therefore one of the first to examine the effect of the financial crisis on SCRM practices. We consider SCRM as a crucial and fundamental element of the broader concept of ERM addressing the supply side, even though SCRM and ERM are often perceived as separate functions within the firm. We conduct this more focused investigation (i.e. the focus on supply-side risk management), since we believe that the complex area of ERM is most effectively management by the units that are most directly affected by it—these units are most likely to have detailed knowledge of how to potentially mitigate these risks. Overall, our specific research questions are as follows: *How did the financial crisis affect SCRM in business? How may these effects influence SCRM approaches of manufacturing and service firms differently? How are ERM and SCRM interrelated, both before and during the crisis?*

To address these research questions we pursue a multiple case study approach with eight European multi-national corporations; we specifically focused on industries that have been highly affected by the financial crisis. Our explicit focus was on how the current financial crisis may have forced these firms to alter their approaches. We begin with the confirmation of the notion that our current constrained environment has had an impact on how enterprise risk is managed. We then proceed with the more specific investigation of how the stages of risk identification, risk analysis, risk mitigation, and risk monitoring (i.e. the risk management process) may have changed. Using the theoretical anchor of transaction cost economics (TCE) we suggest a set of propositions that manifest themselves among our sample.

Within this context, our contributions are as follows. First, we analyze SCRM's adaptation to the unique present economic situation characterized by financial turmoil and uproar, especially as it relates to the supply side. We describe how firms react to the financial crisis, with their risk management systems mostly following a four-step SCRM process. Second, we portray how manufacturing firms differ from service firms in their SCRM approaches, also as a direct reaction to changes in the current financial crisis. Third, we focus on the change of the relationship between ERM and SCRM triggered by the financial crisis. And fourth, we examine these issues with the lens of transaction cost economics, grounding our empirical observations into this theoretical perspective. Overall, important contributions to both theory and practice are made.

The paper proceeds as follows. In Section 2 we review related literature, provide our theoretical foundation, and develop our research framework. Section 3 describes the research methodology, including the purposive selection of our cases, the data collection process, and our data analysis approach. Elaborating on the results, our analysis and interpretation in Section 4 establishes that SCRM is impacted by the current financial crisis, and develops propositions of how companies are reacting to this environment. Section 5 concludes, offering insights and implications for theory and practice, and provides avenues for future research.

2. Literature review, theoretical foundation and research framework

ERM has received considerable attention by both academic researchers and practicing industry professionals, and numerous action items and response strategies have been suggested (e.g., Wu et al., 2010; Wu and Olson, 2009a; Walker and Shenkir, 2008). Equally multifarious have been its definitions. For example, one frequently employed definition (e.g., Gordon et al., 2009; Makomaski, 2008; Moeller, 2007) is provided by COSO (2004, p. 2), who define ERM as "*a process* [that is] *effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.*" Similarly, Wu et al. (2009, p. 1) define ERM as "the integrated process of identification, analysis and either acceptance or mitigation of uncertainty in investment decision making."

Among the many risks an enterprise faces, *supply* or *supply chain* risks are especially important to manage, due to the increased importance of supply chain partners (Gottfredson et al., 2005; Narasimhan and Talluri, 2009). In the present research we therefore focus on SCRM. SCRM has been investigated from a variety of angles. For example, Li and Barnes (2008) developed proactive SCRM methods when sourcing from emerging markets, and Ellegaard (2008) looked at SCRM from the perspective of a small company. In addition, Kull and Closs (2008) considered the risk of second-tier supplier failures in serial supply chains, and Zsidisin and Ellram (2003) provided an agency perspective of supply chain risk. Additional illustrative recent research conducted in this area is present in Table 1, which summarizes the main objectives of the highlighted papers, their methodology, focus and perspective. Even though the field of SCRM is relatively new, the overview is not meant to be exhaustive rather, it is meant to provide an illustrative snapshot of the field. For a recent literature review of global SCRM the interested reader is referred to Manuj and Mentzer (2008).

The *International Journal of Production Economics* has also had a strong tradition of publishing research related to SCRM and its mitigation. As such, Wu and Olson (2008) used simulation to assess risk evaluation models within supply chains. Hallikas et al. (2004) presented methods for risk management in a complex network environment, and Tang and Tomlin (2008) illustrated the power of flexibility in mitigating supply chain risks. A comprehensive review of quantitative models for the management of supply chain risk was offered by Tang (2006b), who also developed a unified framework for their classification. Most recently, Lo Nigro and Abbate (in press) looked at risk assessment and profit sharing in business networks, and Trkman and McCormack (2009) developed a conceptual model for managing supply chain network risks. Furthermore, Sarkar and Mohapatra (2009) focused on the determination of the optimal supply base while considering supply disruption risks, and Oke and Gopalakrishnan (2009) provided a case study of managing disruptions in a retail supply chain.

Overall, SCRM has been regarded as crucial for the overall management of risks facing an enterprise (e.g., Beasley et al., 2008;