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

Constantin Blome a,1, Tobias Schoenherr b,*

a European Business School (EBS), Rheingaustr. 1, 65375 Oestrich-Winkel, Germany
b Department of Supply Chain Management, The Eli Broad Graduate School of Management, N370 North Business Complex, Michigan State University, East Lansing, MI 48824, USA

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A B S T R A C T
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.

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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 insolventcies 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 heightened 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 chain 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
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 insolvenies 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).


Overall, SCRM has been regarded as crucial for the overall management of risks facing an enterprise (e.g., Beasley et al., 2008;
This importance has been significantly heightened especially by the current economic crisis (Simkins, 2008), again due to the increased reliance on suppliers. While lessons can be learned from previous crises (e.g., Scholes, 2000), the present struggles, with one of the most severe financial downturns since the Great Depression, demand a new approach to risk management (Ariba, 2009; Power, 2009). The degree of an enterprise's interconnection with its suppliers today is also unprecedented in business history, presenting the supply side with a whole new host of challenges. In the remainder of the paper we will therefore focus on SCRM.

Despite this true significance of SCRM in economic crises, research in this area has been scarce. For example, out of the studies highlighted in Table 1, only one dealt specifically with the issue of SCRM within the context of economic crisis (Trkman and McCormack, 2009, p. 255). The authors illustrated in a case study...
that car manufacturers have been suffering from “unplanned supplier events such as shortages, declining quality or in some cases even supplier bankruptcies on a frequent basis.” Our study differentiates itself by the focus in its entirety on case examples, as well as the derivation of testable propositions. Even though all other listed contributions discuss supplier risk, supplier distress, and the like, research is deplete of how such a severe development like the financial crisis affects risk management. A financial crisis is different from single suppliers defaulting in a supply chain network, as the entire supply network, including the focal firm, may be distressed. Furthermore, one could argue that the financial crisis may not only negatively affect the focal firm; there can also be positive repercussions. For example, suppliers may have idle capacity and may thus be able to deliver with shorter lead times, resulting in a positive impact on the buying firm. As such, it is important to note that the financial crisis must be explained including both negative and potentially positive impacts on the buying firm.

Our primary theoretical foundation rests on the literature in transaction cost economics (TCE), which considers the expense incurred in an economic exchange. Building on the work of Coase (1960), Williamson (1981) developed this concept into a theory explaining the behavior of business exchanges. Characterized as a normative model, TCE can explain why some firms perform better than others in regards to transaction costs (Noordewier et al., 1990). TCE considers the three dimensions of asset specificity (i.e., transaction-specific investments), the frequency of transactions, and the environmental uncertainty present in the exchange (Williamson, 1979, 1985). From a supply chain perspective, TCE has been used to investigate topics such as sourcing (Murray and Kotabe, 1999) and outsourcing strategies (Williamson, 2008). Most recently it was also applied to the issue of SCRM (Ellram et al., 2008). Specifically, the authors noted that fixed set-up costs, which oftentimes include expenses associated with risk management activities, can outweigh the variable transaction costs in certain sourcing arrangements. We build on these theoretical foundations in the development of our propositions in a later section.

Against this theoretical background, our research framework rests on the definition of risk management provided by Wu et al. (2009). As such, we analyze SCRM in the current economic crisis in terms of the process steps that are followed. Specifically, we investigate how the stages of risk identification, risk analysis, risk acceptance/mitigation, and risk monitoring are impacted by the current financial stress and economic downturn, and shed light on the different reactions exhibited by manufacturing and service firms. In addition to these phases, we also investigate the link of SCRM and ERM, which has received very limited attention in extant research. Our research model is graphically depicted in Fig. 1. While we portray it as a one-dimensional process, it must be emphasized that this process is continuous, i.e. once the risk monitoring stage has been reached, the process of risk identification, analysis, acceptance/mitigation, and monitoring should start all over again.

3. Research methodology

As the financial crisis is a recent phenomenon whose effects on ERM, and more specifically on SCRM, are largely unknown yet, we chose an inductive multiple case study approach based on Yin’s (2009) principles. The benefits of case studies for this purpose have been illustrated in prior research, stemming primarily from their information richness and the ability to answer how and why questions (Eisenhardt, 1989; Ellram, 1996; Yin, 2009). Furthermore, the case study approach was judged to be the most appropriate due to the following reasons. First, ERM, and more specifically SCRM are in an exploratory stage, and even less is known on the effects of the financial crisis on procurement. Our research on how a firm’s SCRM is affected by the financial crisis is therefore in a nascent state, making case studies an ideal methodology. Second, case study research is also well-suited for the investigation of complex phenomena due to information-rich cases, which would be too complex for surveys (Yin, 2009). And third, the chance that respondents report SCRM efforts in a socially desirable manner in the present financial crisis is high. This is due to risk management being considered as being able to mitigate the negative effects of the crisis and potential supply chain disruptions. Case study research also enables the possibility to check for validity of responses due to the nature of personal communication and experienced interviewers. An overview of measures, which were undertaken in each stage of the present research to address the concerns regarding validity and reliability, is provided in Table 2.

3.1. Case selection

After two exploratory interviews at a manufacturing and at a service firm that were both impacted by the financial crisis, the differences of SCRM approaches pursued by predominantly service and manufacturing firms became apparent. These interviews also showed that the differences stemmed primarily from the dissimilar proportion of direct and indirect spend handled. This is indicative of the differences in supply chain structures, as well as the strategic importance of the procurement department. We therefore considered two different types of firms in our sampling, which differentiated themselves based on the nature of their procurement activities: whether the procurement function dealt predominantly with direct spend (most often manufacturing firms) or indirect spend (most often service firms). The procurement department served as the unit of analysis.

Using the framework developed above we applied theoretical sampling to select the case study sample (cf. Closs et al., 2008; Eisenhardt, 1989; Glaser and Strauss, 1967). The companies were purposefully selected in order to provide a wide range of perspectives. As such, large European firms were chosen that were judged to be especially affected by the current financial

![Fig. 1. Research framework.](image-url)
participate. A total of eight companies agreed to participate. Overall, these firms were judged to offer sufficient cross-case variance. In order to ensure theoretical saturation we collected two additional cases in the energy and fashion industry (Glaser and Strauss, 1967; Yin, 2009). An analysis of these two cases did not add significant insight on top of what had already been discovered, yielding it unlikely to derive new major insights from the conduct of further case studies. Table 3 provides overall demographic information of the eight firms. For reasons of confidentiality we will refer to these firms by generic monikers (e.g., BankingCo) instead of their real name.

### 3.2. Data collection

Data collection took place in two waves to investigate how the SCRM process evolved during times of financial crisis. The first wave took place between April and September 2009 and the second wave between August and November 2010. The interviews were conducted with at least one high-level purchasing executive, and up to two purchasing managers responsible for SCRM (see Table 4 for an overview of the interview partners). The interviews were conducted by two experienced case study interviewers who did not gather data on their own.

### Table 2

Measures taken to ensure the validity and reliability of the research (based on Gibbert et al., 2008; Yin, 2009).

<table>
<thead>
<tr>
<th>Reliability/validity criterion</th>
<th>Research phase</th>
<th>Design</th>
<th>Case selection</th>
<th>Data gathering</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability (demonstrates that the operations of a study can be repeated, with the same results)</td>
<td>• Develop case study protocol</td>
<td>• Selection based on theoretical sampling</td>
<td>• Provide the questionnaire to all interviewees before the interview</td>
<td>• Involve authors who did not gather data</td>
<td></td>
</tr>
<tr>
<td>Internal validity (establishes a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished by spurious relationships)</td>
<td>• Establish the theoretical framework prior to data analysis</td>
<td>• Record sampling criteria in case study protocol</td>
<td>• Record factors that might serve as alternative explanations</td>
<td>• Conduct coding checks for inter-rater reliability</td>
<td></td>
</tr>
<tr>
<td>Construct validity (establishes correct operational measures for the concepts being studied)</td>
<td>• Adapt constructs from previous empirical works to the field of SCRM</td>
<td>• N/A</td>
<td>• Use expert interviewers</td>
<td>• Triangulation of multiple data sources</td>
<td></td>
</tr>
<tr>
<td>External validity (establishes a domain in which the study’s findings can be generalized)</td>
<td>• Sampling within predominantly direct and indirect spend firms</td>
<td>• Clearly describe case firms and contextual factors</td>
<td>• N/A</td>
<td>• N/A</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3

Case study demographic information for fiscal year 2009.

<table>
<thead>
<tr>
<th></th>
<th>BankingCo</th>
<th>InsuranceCo</th>
<th>FashionCo</th>
<th>EnergyCo</th>
<th>LogisticsCo</th>
<th>ElectronicsCo</th>
<th>ManufacturingCo</th>
<th>AutomotiveCo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees at group level</td>
<td>50,001–100,000</td>
<td>10,001–50,000</td>
<td>10,001–50,000</td>
<td>50,001–100,000</td>
<td>more than 200,000</td>
<td>100,001–200,000</td>
<td>50,001–100,000</td>
<td>More than 200,000</td>
</tr>
<tr>
<td>Total headcount in purchasing</td>
<td>Less than 100</td>
<td>100–500</td>
<td>100–500</td>
<td>500–2000</td>
<td>More than 2,000</td>
<td>100–500</td>
<td>100–500</td>
<td>More than 2,000</td>
</tr>
<tr>
<td>Spend structure</td>
<td>Indirect spend</td>
<td>Indirect spend</td>
<td>Direct spend</td>
<td>Indirect spend</td>
<td>Direct spend</td>
<td>Direct spend</td>
<td>Direct spend</td>
<td>Direct spend</td>
</tr>
</tbody>
</table>


Table 3 provides overall demographic information of the eight firms. For reasons of confidentiality we will refer to these firms by generic monikers (e.g., BankingCo) instead of their real name.
researchers, who had done similar studies in the field of procurement before (Foerstl et al., 2010; Reuter et al., 2010). Typically, the first interviews were done in person at the site of the case firm; subsequent interviews were conducted via telephone for logistical reasons. Since a personal contact was established in our initial meetings, we felt the validity of the results as not being affected by utilizing phone interviews in subsequent interviews.

Detailed notes were taken during the interviews. Additional material, such as presentation slides and other documents (e.g., supplier self-assessment questionnaires, action-plans for subsequent supplier development), were used for triangulation. Immediately after the interviews, further notes were compiled about the overall impression of the interviewer. Overall, a thorough case firm; subsequent interviews were conducted via telephone for logistical reasons. Since a personal contact was established in our initial meetings, we felt the validity of the results as not being affected by utilizing phone interviews in subsequent interviews.

Table 4

<table>
<thead>
<tr>
<th>Company</th>
<th>Function of respondent</th>
<th>Interview number and duration</th>
<th>Interview mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>BankingCo</td>
<td>Chief Purchasing Officer</td>
<td>1/90 min</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Head of Supply Risk Management</td>
<td>3/150 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td>InsuranceCo</td>
<td>Chief Purchasing Officer</td>
<td>3/120 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>Head of Standards &amp; Tools in Procurement</td>
<td>2/90 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>Head of Strategic Procurement</td>
<td>2/90 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td>FashionCo</td>
<td>Manager for Quality in Vendor Management</td>
<td>2/150 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>Manager for Standard and Tools in Procurement</td>
<td>1/90 min</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Head of Vendor Sustainability Compliance</td>
<td>1/45 min</td>
<td>Telephone</td>
</tr>
<tr>
<td>EnergyCo</td>
<td>Chief Purchasing Officer</td>
<td>1/30 min</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Head of Strategic Sourcing</td>
<td>3/150 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td>LogisticsCo</td>
<td>Chief Purchasing Officer</td>
<td>3/120 min</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Head of Purchasing Region A</td>
<td>2/60 min</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Head of Standards and Tools in Purchasing</td>
<td>4/300 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>Category Manager A</td>
<td>1/60 min</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Category Manager B</td>
<td>1/60 min</td>
<td>Personal</td>
</tr>
<tr>
<td>ElectronicsCo</td>
<td>Strategic Sourcing</td>
<td>3/150 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>Head of SCRM</td>
<td>1/45 min</td>
<td>Telephone</td>
</tr>
<tr>
<td>ManufacturingCo</td>
<td>Chief Purchasing Officer</td>
<td>3/150 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>Head of SCRM</td>
<td>3/180 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td>AutomotiveCo</td>
<td>Head of Compliance</td>
<td>3/150 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>Head of SCRM</td>
<td>3/90 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>SCRM Manager</td>
<td>2/240 min</td>
<td>Personal and telephone</td>
</tr>
<tr>
<td></td>
<td>Category Manager A</td>
<td>1/60 min</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Category Manager B</td>
<td>1/60 min</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Category Manager</td>
<td>1/60 min</td>
<td>Personal</td>
</tr>
</tbody>
</table>

25 interviewees 51/46.5 h

Data analysis started with open coding of the collected information from the available sources; this provided a first structure. An iterative process was then used to identify key categories. As such, we first developed case profiles in order to carry out within-case analyses. After the interviewer had coded the cases, two scholars experienced in SCRM compared the classification results. In case of discrepancy, the case was jointly analyzed and coded to ensure consistency. This iterative approach improved our analysis and inter-rater reliability (Pagell and Krause, 2005). Having finalized the within-case analysis, cross-case analysis was conducted to detect communalities and differences in patterns of SCRM across the studied cases (Eisenhardt and Graebner, 2007; Yin, 2009). In the following we present these findings along the research framework introduced above, and develop appropriate propositions. Our primary theoretical anchor is transaction cost economics.

4. SCRM and its link to ERM in financial crises

Following our research framework outlined in Fig. 1, we utilize our case study insight in the following sections to develop a set of propositions. While these sections focus on the interpretation of the data and the development of propositions, an overview of some of our raw data and how our case study firms pursued each stage is provided in Appendix B. These data nicely illustrate and establish that SCRM is indeed impacted by the current financial crisis.

Examples of how the crisis impacted SCRM are numerous: Most obvious are the changes in the automotive industry where new teams, processes, information technology (IT) tools, etc. have been developed to deal with SCRM. The high number of supplier insolvencies had dramatic impact especially within the automotive industry. In the fashion industry, the crisis increased the need for SCRM dramatically, as suppliers are mainly located in Asia. Basing SCRM solely on monitoring financial data is therefore extremely risky; much more is needed in our increasingly complex environment. Sustainability-related issues on the supply side can serve as an illustrative example (e.g., the risk of suppliers using child labor, which is a very relevant topic in the fashion industry); these risks are not assessable based on the mere reactive monitoring of financial statements.

3.3. Data analysis

Data analysis started with open coding of the collected information from the available sources; this provided a first structure. An iterative process was then used to identify key categories. As such, we first developed case profiles in order to carry out within-case analyses. After the interviewer had coded the cases, two scholars experienced in SCRM compared the classification results. In case of discrepancy, the case was jointly analyzed and coded to ensure consistency. This iterative approach improved our
4.1. The impact of the financial crisis on SCRM

In our first propositions we suggest how the financial crisis has impacted the way firms are pursuing the four enterprise risk process stages of risk identification, risk analysis, risk acceptance/mitigation, and risk monitoring.

The first step, risk identification in supply chain risk management, is concerned with the comprehensive and structured recognition, determination, and collection of potential supply risks associated with a certain supply chain aspect (cf. Tummala and Schoenherr, forthcoming). This step establishes visibility of the potential risks and builds the foundation for the ensuing SCRM process. An examination of our data revealed that these motivations differ significantly among our sample firms (see Appendix B).

Overall, however, we observed that in the current constrained environment the focus of the supply risk identification phase is changing, which seems to be due to the shifting risk awareness based on the growing number of insolvencies. For example, a manager of EnergyCo stated: “Our firm has established a very ‘constricted corset’ of risk management measures to avoid supplier insolvencies due to the high risk awareness of the firm as a whole.” Risk awareness is essential for risk management (Power, 2009), and one can only be aware of and subsequently manage and try to mitigate these risks once one has identified these. All of our sample firms stated that the awareness of supply chain risks has increased especially due to supplier insolvencies. AutomotiveCo, ManufacturingCo, InsuranceCo as well as ElectronicsCo reported supplier insolvencies in the financial crisis as one of the major or the most important corporate risks. Consequently, some firms (ElectronicsCo, AutomotiveCo, and ManufacturingCo) decided to adapt the list of potential risks they track, especially for the financial dimension. Others, like EnergyCo and BankingCo, did not adjust, because they felt that their list of potential risks had already been complete. AutomotiveCo introduced a new cross-functional process to better identify supply chain risks, which is illustrated by the following statement of a category manager: “We are now several players in a team assessing supplier risks: internal clients, risk management and procurement. And sometimes we get the help of finance to provide financial supplier ratings.”

Other firms use a similar cross-functional process, but had established this process already before the financial crisis (e.g., FashionCo, ElectronicsCo). Risk identification efforts and comprehensiveness, thus, have increased in the financial crisis across firms.

Once risks have been identified, the necessary next step is to analyze each risk individually and to determine its potential consequences. In the risk analysis stage, the severity and likelihood of each risk is assessed, in order to provide more detailed input to the subsequent decision as to which risks to mitigate (Tummala and Schoenherr, forthcoming; Zsidisin et al., 2005). Even though the sample firms chose different approaches to assess the risks in detail, all reflected this concept. When analyzing the potential impact of risks, some firms in our sample explicitly determined the potential impact directly by using different scales (e.g., the value in € for BankingCo or a nominal scale for LogisticsCo) or indicators (e.g., EBIT effect for FashionCo, procurement volume for AutomotiveCo and LogisticsCo). When assessing the likelihood of supply risks, our sample firms used multiple criteria, like quality or delivery performance, to assess the probability indirectly (AutomotiveCo, ElectronicsCo), or used a direct probability rating based on equidistant scales (EnergyCo, ManufacturingCo, AutomotiveCo, LogisticsCo, and BankingCo). What changed during the financial crisis is the depth of analysis and the use of a multitude of indicators to predict supplier disruptions. Among all of our sample firms we found a heightened emphasis on the gathering of additional information and intelligence due to external threats, such as supplier disruptions. While some firms consulted external rating services, such as indexes from Dun & Bradstreet (e.g., AutomotiveCo, FashionCo, EnergyCo), others relied only on internal financial evaluations (e.g., ElectronicsCo used the z-score (Altman, 1968)). Yet others used a combination of both (especially our companies in or related to the automotive industry).

In any case, the proficiency of using financial indicators to examine the financial status of suppliers has increased significantly during the financial crisis. For example, a manager at EnergyCo noted: “Before the financial crisis we didn’t have a very professional assessment of our suppliers’ financials; now we have a very good system working.”

The resources spent on risk assessment increased drastically for all our sample firms. Even though all firms made use of supplier financial analysis, especially AutomotiveCo, FashionCo, and ManufacturingCo doubted the usefulness of external and especially balance-sheet related indicators, since they are considered as “logging instead of leading indicators” (AutomotiveCo). The overall consensus derived from our case studies confirmed again our a priori notion that the risk analysis stage of SCRM has achieved a higher level of comprehensiveness in the current economic crisis.

Once risks have been indentified and analyzed, acceptable levels of risk need to be established (risk acceptance) (Tummala and Schoenherr, forthcoming). In addition, risk mitigation plans need to be developed, should a risk be evaluated above the determined threshold value. Our case study observations revealed some interesting developments and a shift in company behaviors. In general, the firms in our study allowed the decentralized units in procurement – sometimes in combination with the internal clients – to decide on the appropriate risk measures and their acceptable levels (e.g., LogisticsCo, ElectronicsCo). Some firms, however, posited some upfront normed strategies depending on the outcome of the risk analysis. For example, ManufacturingCo required a mandatory response plan including a report to executive or line management in case of a major and severe risk. The financial crisis had, due to the cash restrictions of the focal firms, a disciplining effect on the risk mitigation strategies. As such, managers “were much more compliant with existing risk mitigation processes” (FashionCo) and risk mitigation measures were determined jointly with top management (e.g., AutomotiveCo, ManufacturingCo). Overall, the general risk treatment strategies were similar for the firms in our sample, and depended mainly on the importance of the supplier, as well as on the potential magnitude of the risk and the cash situation of the focal firm. Overall, the financial crisis encouraged firms to be more aware of their level of risk acceptance, as well as to plan their risk mitigation strategies.

Risk monitoring includes “monitoring developments in the supply chain that may increase or decrease risks on an on-going basis” (Zsidisin et al., 2005, p. 3413). In order to control risks, most of our sample firms incorporated risk monitoring into their regular supplier monitoring activities, shortened the assessment cycle, and increased the monitoring depth during the financial crises. Furthermore, we found the automotive and electronics industries being very careful in monitoring suppliers: AutomotiveCo reduced its monitoring cycle form a half-yearly cycle to a weekly basis for all first-tier and also some second-tier suppliers. The following statements illustrate well why so many resources are used for monitoring purposes: “Supplier disruptions are now corporate risk number 1. […] Risk management in the financial crisis is all about being very fast in reacting, since we lose millions of Euro if a strategic supplier goes out of business. The faster we know that the supplier defaults, the less money we will lose.”

Overall, six firms in our sample increased their monitoring frequency; only EnergyCo and BankingCo kept the same monitoring frequency as before the crisis.
These notions are also supported from the transaction cost perspective (Williamson, 1979, 1985). As such, the environmental uncertainty inherent in every exchange can be alleviated or at least mitigated by the identification and subsequent management of risk. The risk identification phase is however the most crucial, since risks that are not identified cannot be managed. Due to the multitude of supply chain failures in the recent past, primarily based on the current economic downturn, the investment in risk identification processes may therefore be prudent and outweigh the imposed burden. Doing business has become more complex and risky, primarily due to increased dependency on suppliers; this risk needs to be managed carefully. In addition, transaction cost economics can provide a useful theoretical anchor to explain the heightened importance placed on supply risk analysis within SCRM. Higher transaction costs may very well be warranted in order to make sense of the collected risk information in the prior stage, and analyzed in the current one. Since the threat of supply disruptions has become even more real, it seems wise to invest in these initiatives necessary to ensure the successful transaction. Our observations related to risk mitigation and monitoring can also be explained from a transaction cost perspective: Risk mitigation mainly addresses safeguarding of the transaction to achieve the lowest overall transaction costs. Especially in times of crisis the cost for safeguarding the transaction (e.g., investing in a distressed supplier) can be substantial, and hence transaction cost analysis not only has to incorporate risk management costs, but also the cost of damages in case of disruptions. In a similar way, the increased costs for monitoring suppliers can lead to decreased overall transaction costs, as early detection of supply chain risks can enable risk mitigation, and hence lower overall transaction costs, especially as the likelihood of supply chain disruptions has been increasing in the financial crisis. Based on our empirical observations and theoretical contemplations we propose the following.

P1. The current financial crisis increases the comprehensiveness of SCRM in each step of the SCRM process: (a) risk identification, (b) risk analysis, (c) risk mitigation, and (d) risk monitoring.

4.2. The impact on risk mitigation versus risk acceptance

Firms have different strategic options in SCRM. Two of these options are especially dominant in the financial crisis and seem to be central in the risk mitigation plans of firms. As such, companies can either try to avoid supply chain disruptions proactively, or they can accept the supply chain risk and suffer the negative impact if the risk materializes.

For some firms in our sample, their risk mitigation strategies have shifted more dramatically due to the financial crisis than for others. As such, on the one hand, EnergyCo and BankingCo stated that their general risk mitigation strategies and countermeasures have not shifted due to the financial crises. For example, a manager of EnergyCo noted: “Helping the supplier out financially is an extreme exception, before and during the crisis. As a conservative firm we just don’t do it.” Conversely, on the other hand, ManufacturingCo, AutomotiveCo and ElectronicsCo had to help several suppliers financially to keep the supply chain functioning. Even though less money is available to help suppliers, as explained by the supply risk manager of AutomotiveCo, the need to help distressed strategic suppliers is crucial. An expert of FashionCo stressed that helping suppliers must be more focused than before the financial crisis, since the possibility to help has decreased. However, for firms dealing primarily with indirect spend, it is still quite unusual to help suppliers financially. Still, this has also not changed during the financial crisis. EnergyCo, AutomotiveCo, FashionCo and LogisticsCo even admitted that the financial crisis was used to consolidate suppliers. At the end, the SCRM methods are very much based on the dependency level with the supplier. Overall, our case study observations suggest that buying firms primarily rely on monitoring suppliers instead of proactively avoiding supplier insolvencies, and hope that the suppliers will solve their problems independently. Specifically, buyers try to be very reactive when a supplier becomes insolvent. As a case in point, AutomotiveCo established a new team in SCRM which solely focuses on reactive risk management. This team travels to suppliers and mainly concentrates on shifting tools and materials from the insolvent supplier to a new supplier. In business, the most efficient and effective markets are used to conduct transactions. In the unexpected crisis that the world economy is struggling with at the moment, it may thus be more prudent for a buyer to accept the potential risk posed by financially weak suppliers. Rather than helping them out in the crisis, buyers tend to shift their production reactively to a secondary supplier. We have seen this shift especially among firms that focus on direct spend. It was less apparent among our firms with primarily indirect spend, since they were usually already focusing on the more reactive and less strategic approach of risk acceptance (due to the often low significance or importance of indirect items). We therefore suggest the following proposition.

P2. The current financial crisis fosters especially a risk acceptance (as opposed to mitigation) approach in direct spend firms. Indirect spend firms are already more focused on risk acceptance approaches and have not changed their behavior.

4.3. The contingency of manufacturing versus service firms

Besides having detected a greater focus on the four risk management process steps throughout, as postulated in proposition 1, a further pattern that emerged out of the data analysis was the difference in SCRM approaches taken by manufacturing versus service firms. Overall, we found that the emphasis on the four risk management processes was greater among firms procuring predominantly direct materials (manufacturing firms) than for firms producing primarily indirect items (service firms). As such, risk identification was of particular importance to our manufacturing firms dealing with primarily direct spend, due to the usually more immediate impact on the firm’s operations in case of faulty direct supply. This is very much in line with our discussion leading to proposition 1, as mainly manufacturing firms (ElectronicsCo, AutomotiveCo, and ManufacturingCo) had adapted the list of potential risks they track in their respective risk management process.

Similarly, risk analysis was pursued more rigorously by some of our direct spend (manufacturing) firms. Especially, AutomotiveCo, ManufacturingCo and ElectronicsCo extended their probability rating as part of their risk analysis to almost every single possible factor that can be used to predict supplier insolvencies, mirroring the importance of this risk. In contrast, FinanceCo – which had historically used a comprehensive set of indicators – and InsuranceCo had not changed the level of detail in analyzing supplier insolvency risk in the financial crisis.

We also observed in our sample that our direct-spend firms changed their supply chain risk monitoring to a larger extent as our service firms. For instance, FashionCo assessed suppliers at least half-yearly in workshops, in addition to separate audits. ElectronicsCo used predominantly a semi-annual approach; however, depending on the ‘value at risk’, also quarterly assessments were possible. Only two of the indirect spend firms (InsuranceCo and BankingCo) used a quarterly or semi-annual approach. This lack of supplier criticality for the business was illustrated in the following quote by a manager of InsuranceCo: “We don’t have any
raw material suppliers or other really non-substitutable suppliers; there is always plenty backup available."

These observations are also in line with transaction cost economics, which suggest that additional costs are especially then warranted when direct materials are involved, due to their increased potential to impact the proper operations of the company. We therefore forward the following proposition.

P3. The additional focus on supply chain risk identification, risk analysis, risk mitigation, and risk monitoring is especially prevalent for manufacturing firms as opposed to service firms.

4.4. The link between SCRM and ERM

ERM has gained importance over the last years and has been implemented in all of our case firms, even though in different organizational setups and with varying responsibilities. In all cases, a separate ERM unit existed in the finance department of the firm, with AutomotiveCo serving as an exception, in which ERM was part of the general planning process and hence was mainly triggered by the managerial accounting department.

We found in our sample two different approaches for the introduction of the SCRM process. In some instances, ERM requested the procurement/supply chain department to implement such a process (e.g., ManufacturingCo, ElectronicsCo, EnergyCo, InsuranceCo), and in other cases (e.g., BankingCo, FashionCo, LogisticsCo) the procurement/supply chain department initiated the SCRM process, which was later aligned with the ERM process. Interestingly, neither the origin of SCRM implementation nor the nature of the firm (manufacturing versus service firm) seemed to have an effect on the relationship between ERM and SCRM.

The alignment of SCRM with the rules of ERM and its process compliance were assessed, on average, on a yearly basis in all of our sample firms. A manager of InsuranceCo explained it in the following way: “We have a comprehensive ERM policy and procurement is part of that. Procurement has – like every other function – to prove that it complies with this ERM process.” This compliance is ensured by a variety of measures. Whereas AutomotiveCo, BankingCo, and EnergyCo are audited on a yearly basis, other firms like InsuranceCo and ElectronicsCo have to report in more frequent intervals their assessments. In other instances, procurement is using its own methodology, to also include non-financial measures (financial measures have been the primary domain of ERM in our sample), since SCRM suffers from unavailable or difficult-to-estimate data related to risk likelihood and severity. AutomotiveCo serves as an exception, not having a separate ERM function and SCRM being fully integrated into ERM.

Our sample firms do not possess common thresholds for risk reporting, an observation also prevalent for procurement. As a manager in ManufacturingCo noted: “Only the risks above this threshold level are of interest to ERM and will be reported.” Three of our sample firms reported that procurement almost never reaches these threshold levels and hence is of limited interest to ERM (BankingCo, ManufacturingCo, and EnergyCo). Overall, SCRM and ERM are aligned in most of our firms, even though, like one of the interviewees of EnergyCo mentioned: “SCRM and ERM are two completely different events.” Changes in the relationship between SCRM and ERM have been observed among our sample firms, in addition to the general increased level of risk awareness for firms that are more severely affected by supplier insolvencies. Based on these empirical observations we posit the following proposition.

P4a. The existence of an ERM system is a major antecedent for the implementation of a SCRM process.

P4b. The financial crisis has not influenced the relationship between ERM and SCRM.

5. Conclusion

SCRM and ERM have become a key concern for organizations, which is even further emphasized by the current economic and financial crisis. The present paper analyzed this issue based on eight in-depth case studies. Our empirical findings were corroborated by theoretical insight from transaction cost economics to develop a set of propositions characterizing the current state of SCRM in the ongoing financial crisis.

Within this context the contributions of this paper are manifold. First, we provided a general overview and assessment of the current state of SCRM in business. Second, more specifically, we analyzed SCRM’s adaptation to the present dire economic situation. We described how firms reacted to the financial crisis with the adaptation of their risk management systems. Third, we portrayed how manufacturing and service firms differed in their approaches toward SCRM in the current financial crisis with a special focus on the crucial part of risk mitigation. Fourth, we elaborated on the relationship between SCRM and ERM, which has not been addressed extensively in extant empirical research. And fifth, we examined these issues with the lens of transaction cost economics, grounding our empirical observations into this theoretical perspective.

Overall, based on eight in-depth case studies, we showed that manufacturing firms have adjusted their SCRM to a larger extent in the financial crisis. Even though both manufacturing and service firms are affected by supplier insolvencies due to the financial crisis, service firms seem to have a higher strategic flexibility due to the lower level of dependence on a single supplier. Hence, one can observe that service firms are mainly influenced by the financial crisis on the demand side, whereas manufacturing firms are affected by the demand and the supply side. Following this line of thought establishes SCRM as a strategic capability in manufacturing firms. As such, manufacturing firms should develop different SCRM capabilities for strategic and non-strategic suppliers. One could further argue that a SCRM approach focusing on proactive risk mitigation might not be plausible for service firms in case of existing sufficient substitutes. In general, the financial crisis had also a positive effect on firms in that SCRM capabilities had been further developed, which may help firms to be better prepared for a future crisis, but also for ‘usual’ supply disruptions. A systematic SCRM approach is thus crucial for the effective prevention of disruptions on the supply side. Furthermore, our case study illustrations suggested that changes in the different steps of SCRM are interlinked, since all steps have been affected by the financial crisis in a similar fashion. Hence it seems to be necessary to carry out all SCRM process steps rigorously, otherwise risk management cannot be successful (e.g., when an important risk has not been identified, or no appropriate measures have been taken to prevent such major risk). Interestingly, even though ERM is a major antecedent for the introduction of SCRM, it seems that SCRM is reinventing the wheel of risk management, as we found only very limited integration and knowledge transfer between SCRM and ERM. Even a major exogenous shock like the financial crisis seems to have no effect on the relationship between SCRM and ERM, perhaps showing that these processes possess a nature that is too distinct, or that they have not found a common basis to profit from each other. As both are relatively new disciplines, these insights provide exciting avenues for future research.

Our research has also important implications for practice. As such, we confirmed that SCRM and ERM approaches must be
adapted to the environment, in this case the financial crisis; if there is no fit to the context, SCRM is likely to fail. It seems that SCRM and ERM require dynamic capabilities in order to be able to be managed in appropriate ways, hence firms must invest in their human resources to enable employees to recognize changing environments and adapt quickly to trends. Therefore, it is not only a question of developing the capability of reacting quickly to single risk incidents, but also on a larger scale, of adapting the entire risk management process to serve as a foundation for SCRM; this will lead the latter to be most effective. For manufacturing firms, the criticality of this point for their long-term sustainability was especially stressed. Overall, developing a SCRM process is not an easy task, and significant resources are required. In addition, developing a business case can pose a challenge, as severities of avoided risks are difficult to estimate. Our cases also make it obvious that a proficient SCRM is not only achieved by tools and resources, but mainly by capabilities that must be dynamically adjusted. In addition, while the current crisis puts an emphasis on SCRM, such monitoring and management must constantly be conducted, even in times of no crisis.

Another important contribution to practice is that while SCRM and ERM are, to a large extent, well-aligned, they are not really profiting from each others’ expertise. It seems that a similar conflict of thoughts exist as one may envision for the integration between finance and purchasing/supply chain management departments. A missing common language and different assumptions and value propositions appear to be complicating the knowledge exchange. However, due to the increased importance of purchasing and supply chain management for the firm, as illustrated above, both functions should work toward a better integration with ERM. This integration could enable more effective risk mitigation, ensuring the long-term sustainability of the firm.

As with any research, the present study has limitations, which however – at the same time – provide some exciting future research opportunities. As such, although a structured and thorough approach was utilized to select case study firms, the results may only be applicable to the type of companies studied. Therefore, for further generalizability, future research is encouraged to replicate our study in different industries, as well as in different countries (our firms were solely based in Europe). As additional future research our propositions should be tested via a large-scale survey, not only in Europe, but also across other regions of the world. Further insight is also needed on the link between ERM and SCRM. While our study provided initial insight, additional research remains to be conducted, since companies are likely still going to increase their reliance on suppliers. And lastly, an insightful investigation will be the look at ERM and SCRM once the current financial crisis has ended. Are firms reverting to their old practices of SCRM, losing newly developed capabilities, or are valuable lessons learned in the crisis carried forward? It is our hope that the present research provides a starting point for these investigations.

Acknowledgement

We appreciate the help of Kai Förstl for helping with the data collection in the initial round of the interviews.

Appendix A. Sample questions of the semi-structured interview guide

See Table A1.

Appendix B. Overview of cross-case comparison

See Table B1.

Table A1

Questions related to the firm’s SCRM approach

- Risk identification: How does your organization become aware of new supply chain risks? Which functions are involved in this process? How is ERM involved in this process?
- Risk analysis: How is the assessment of supply chain risks integrated in the supplier management process? Which supporting tools are in place for risk analysis? Which functions are involved in the analysis process? Which scales do you use to assess supply risks (e.g., likelihood and severity)? Do corporate guidelines for risk assessment exist?
- Risk mitigation: How do you incorporate supply chain risk mitigation measures, or does your company not incorporate any measures? Who decides on different risk mitigation actions? How is this done? Which factors strongly influence the decision if and which risk mitigation actions will be pursued?
- Risk monitoring: Who is monitoring supply chain risks? Do you have a formal process for risk monitoring? How often does this process take place?
- Enablers and motivation: Which general SCRM guidelines do exist? How is SCRM integrated in your daily job? How and why did your firm start a SCRM process?
- Link between SCRM and ERM: Which reporting mechanisms and communication channels do exist? Which role does SCRM play in ERM? Which role does ERM play in SCRM? How is the alignment between SCRM and ERM in your company achieved? Does a separate ERM and SCRM function exist?

Questions on the effect of the financial crisis on SCRM, and the link to ERM

- General effect: Has your firm been affected by an increasing number of supplier insolvencies? How have resources for the risk management process and for potential risk mitigation activities changed?
- Risk identification: Which additional risks has your firm identified in the financial crisis? How did the increasing number of supplier insolvencies affect the risk analysis process?
- Risk analysis: How did the growing importance of financial risks change your risk assessment processes? Are new functions involved in the assessment process? Which new information do you use to assess these risks?
- Risk mitigation: Has your firm changed its policy of supply chain risk mitigation because of the financial crisis? Why did your firm change its risk mitigation actions? Which effect did this change have on your firm and the supplier base?
- Risk monitoring: How did the financial crisis and its associated risks change your supply chain risk monitoring behavior? Are new policies in place? What effect does this change in monitoring behavior have?
- Link between SCRM and ERM: How did the financial crisis affect the general perception of SCRM in your firm, and especially within ERM? How did the communication and information exchange between ERM and SCRM change in the last two years? Were new interfaces or communication channels between SCRM and ERM established?
<table>
<thead>
<tr>
<th>BankingCo</th>
<th>InsuranceCo</th>
<th>FashionCo</th>
<th>EnergyCo</th>
<th>LogisticsCo</th>
<th>ElectronicsCo</th>
<th>ManufacturingCo</th>
<th>AutomotiveCo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk identification</td>
<td>- Risk identification based on risks derived from Basel II</td>
<td>- Risks identified by regularly held workshops</td>
<td>- Risk identification is part of a detailed three-step supplier selection process</td>
<td>- Risks identified in workshops, ERM and legal regulations</td>
<td>- Risks identified by top-down process (lead by the CPO) with possibility to include additional risks per purchasing category</td>
<td>- List of potential risks provided by ERM</td>
<td>- List of potential risks provided by corporate risk management, additional risks are included in a decentralized fashion</td>
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<tr>
<td>Changes due to financial crisis</td>
<td>- Increased risk awareness</td>
<td>- Increased risk awareness; also: additional quick check of supplier risks at the beginning of the crisis</td>
<td>- Increased risk awareness, but no change in risk identification</td>
<td>- Increased risk awareness, but no change in risk identification</td>
<td>- Increased risk awareness</td>
<td>- Increased risk awareness</td>
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<tr>
<td>Degree of change</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Risk analysis</td>
<td>- Based on risk indicator analysis (ex-ante warning indicators) and scenario analysis (both required by Basel II); purchasing risk assessment</td>
<td>- IT tool-based risk analysis</td>
<td>- Risk analysis is integrated into supplier evaluation system</td>
<td>- Cross-functional risk analysis based on an IT tool</td>
<td>- Cross-functional risk analysis based on an IT tool</td>
<td>- Different weighting schemes dependent on the (sub-) category procured</td>
<td>- IT tool-based risk analysis</td>
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<tr>
<td></td>
<td>- Cross-functional risk analysis based on Excel templates</td>
<td>- Probability × impact matrix for risk analysis</td>
<td>- No IT tool-based risk analysis</td>
<td>- Financial checks of suppliers based on secondary data providers, plus an internal assessment for strategic suppliers</td>
<td>- Probability × impact × mean time to repair matrix for risk analysis</td>
<td>- Supply chain risks as an important part of company risk exposure</td>
<td>- Insolvency risks assessed based on a mix of internal and external financial and non-financial indicators</td>
</tr>
<tr>
<td></td>
<td>- Probability × impact matrix for risk analysis</td>
<td>- No probability × impact matrix for risk analysis</td>
<td>- Probability × impact matrix for risk analysis</td>
<td>- Probability × impact × mean time to repair matrix for risk analysis</td>
<td>- Probability × impact × mean time to repair matrix for risk analysis</td>
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<td>Changes due to financial crisis</td>
<td>BankingCo</td>
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<tr>
<td>Comprehensiveness of risk analysis increased, especially in regards to the assessment of suppliers' financial stability</td>
<td>Only limited change, as financial rating of supplier has already been extensive</td>
<td>Comprehensiveness of risk analysis increased, especially relating to the assessment of suppliers' financial stability</td>
<td>No change, only a financial &quot;quick check&quot; of suppliers at the onset of the crisis</td>
<td>No change, only a financial &quot;quick check&quot; of suppliers at the onset of the crisis</td>
<td>Comprehensiveness of risk analysis increased, especially relating to the assessment of suppliers' financial stability</td>
<td>Comprehensiveness of risk analysis increased, especially relating to the assessment of suppliers' financial stability</td>
<td>New risk analysis process initiated: continuous and cross-functional</td>
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<td>Short supplier “quick check” at the onset of the crisis</td>
<td></td>
<td></td>
<td>A larger range of internal and external indicators are analyzed</td>
<td></td>
<td>Combination of internal and external indicators (e.g., Dun&amp; Bradstreet) for the assessment of suppliers' financial situation</td>
<td></td>
<td>Financial risks are assessed by a separate financial audit team with the help of an exhaustive list of internal and external indicators</td>
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<td></td>
<td>Extra financial data for Asian suppliers are gathered as Western databases lack information</td>
<td></td>
<td>No systematic risk analysis of financial supplier risks before the financial crisis, now an intensive approach based on almost all available information</td>
<td></td>
<td>No systematic risk analysis of financial supplier risks before the financial crisis, now an elaborated approach exists</td>
<td></td>
<td>No systematic risk analysis of financial supplier risks before the financial crisis, now an intensive approach based on almost all available information</td>
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<td></td>
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<td>New risk analysis process initiated: continuous and cross-functional</td>
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<td>Degree of change</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Risk acceptance/mitigation</td>
<td>Follow-up actions are predefined according to the risk assessment</td>
<td>Risk management is mainly reactive</td>
<td>Every purchasing manager decides risk mitigation strategy on their own</td>
<td>Risk mitigation is mainly based on a broadening of the supplier structure</td>
<td>Risk mitigation is based on four general measures: risk prevention, risk reduction, risk transfer, and risk bearing</td>
<td>Proactive SCRM with suppliers with more than 100,000$ purchasing volume</td>
<td>For non-strategic suppliers, the goal is a reduction in their total number</td>
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<td></td>
<td>Financial help for suppliers does not exist</td>
<td>Main risk mitigation strategies are audits, phase-out and continuous improvement of supplier performance</td>
<td>Financial help for suppliers is unusual</td>
<td>Measures are determined by a global category team and are derived from the risk assessment stage</td>
<td>A wide range of risk mitigation strategies from currency hedging to collaboration</td>
<td>Helping out suppliers with cash is possible, even though it is the last resort</td>
<td>The predominant focus has historically been on risk acceptance (reacting to problems very quickly)</td>
</tr>
<tr>
<td></td>
<td>Main strategies include the building of secondary sources, as well as supplier relationship management depending on the importance of the product</td>
<td>Multi-sourcing used as a means to reduce risk impact</td>
<td>Financial help for strategic suppliers</td>
<td>Measures are determined by a global category team and are derived from the risk assessment stage</td>
<td>Helping out suppliers with cash is possible, even though it is the last resort</td>
<td>Financial support to supplier, if insolvency is looming, is inevitable in the short term</td>
<td></td>
</tr>
</tbody>
</table>

Changes due to financial crisis
- Only small changes, as the crises is used to consolidate the supply base
- Only a small number of suppliers affected by insolvencies
- The crises is used to decrease the number of suppliers and to pool spend volume with strategic suppliers
- Financial risks of suppliers are not relevant
- Due to own financial situation, only a reactive risk management possible
- The focus has changed; financial support has been utilized to a greater extent before the crisis
- Strong growth of efforts and resources to prevent the negative effects of insolvencies, since the number of insolvencies has increased
- Additional human resources have been necessary
- The portfolio of risk measures stayed the same, but the focus has shifted
- The crises is used to consolidate the supply base for non-strategic suppliers

Degree of change
2

Risk monitoring
- Risks are grouped according to “traffic light principles”: the higher the potential impact, the shorter the monitoring cycles
- Follow-up control is compulsory
- Supplier risk evaluation conducted twice a year

Degree of change
2

Changes due to financial crisis
- Only limited change, as the financial distress is more immediate
- No changes in depth of monitoring or its cycle time
- Monitoring of risks and suppliers is done within shorter cycle times, especially as it relates to payment terms obtained from suppliers
- No changes in depth and cycle time of monitoring, same structure of risk-prone suppliers as before the crisis
- As more suppliers are getting into financial distress, more suppliers had to be monitored on a regular basis
- Monitoring cycle times have been reduced significantly (up to monthly supplier checks)
- More involved and more expeditious monitoring, especially for commodities, MRO material and single sources; particular emphasis on the assessment of financial distress
- Monthly monitoring of suppliers financial distress

Degree of change
2

Score for degree of change: 1 = no change; 2 = minimal change; 3 = average change; 4 = substantial change; 5 = radical change.


