Deriving a research agenda for price risk management in manufacturing companies

Maria Fischl (maria.fischl@unisg.ch)
Institute of Technology Management, University of St.Gallen (Switzerland)

Abstract
The extreme price developments of various key input factors (e.g., copper, silver) are a growing concern of managers in manufacturing companies. To examine the research relevance of this topic, we conducted a structured literature review on price risk management in manufacturing companies. We analyzed 75 papers following a systematic literature review framework. Our findings indicate that price risks are barely addressed in the supply chain risk management as well as the strategic purchasing literature. Solely one of the articles reviewed deals explicitly with the management of price risks. Based on our findings, we derived a seven-point agenda for future research.

Keywords: price risk, manufacturing companies, literature review

Introduction
Increasing and volatile prices have always been an issue in the management of manufacturing companies. However, the attention of OM scholars and practitioners was primarily drawn on product markets (Markman et al., 2009). Factor markets and the purchasing function seemed to play a secondary role (Ellram and Carr, 1994). During the last years, this has fundamentally changed (Hallikas et al., 2011). Triggered by the extreme price developments of various industrial key input factors (Zsidisin and Hartley, 2012), a sprouting recognition for the importance of price risk management has developed. The KPMG Global Manufacturing Outlook 2011 confirms this: Price risks, such as volatility, nowadays rate among manufacturing companies' top management issues (KPMG, 2011). With regard to worldwide developments, such as the strongly growing population or the intensifying demand for natural resources and their secondary products (Tiess, 2010; Nötstaller and Wagner, 2007), it is most likely that this trend will continue. Many natural resources are not permanent available, scarcities will be an ongoing issue (Allwood, 2011; Seljom and Rosenberg, 2011) and price risk will further increase (Zsidisin and Hartley, 2012; Costantini, 2007). In addition, global manufacturing companies are more intertwined with and dependent on their suppliers than ever before due to the global outsourcing campaigns of the last years. The effective management of price risks is likely to turn into a crucial success factor. Thus, mangers see need for action.

One possible response that can be observed recently, is the formation of big global manufacturing companies to new inter-company alliances. The French Comité pour les Métaux Stratégiques (COMES) or the German Resource Alliance (RA) can be named as examples. Both coalitions were founded within the last two years. The sole objective which they pursue is the secure and cost effective supply of their coalition partners. To reach this target, they take a quite radical approach. They dare a total backward

integration. By engaging in mining projects, they strive for guaranteeing stable supply and prices. But what can companies do who do not want or cannot join one of those alliances? And which alternatives do exist to handle price risks effectively? In the light of the ongoing price risk debate as well as the obvious power shift in resource access and price control, a variety of those questions arises. It has to be clarified if they are worth further investigation within a research project.

A literature review is a suitable method to find out if a topic is relevant. It helps to avoid re-investigation of something that is already known (Baker, 2000). In the field of Supply Chain Risk Management (SCRM) and Strategic Purchasing (SP) several literature reviews have been conducted. The authors analyze articles along their methodological and theoretical foundation, their concepts of risk and uncertainty, their proposed tools and practices, and their research agenda (e.g., Chicksand et al., 2012; Colicchia, and Strozzi, 2012; Rao and Goldsby, 2009; Khan and Burnes, 2007; Jüttner et al., 2003). Khan and Burnes (2007) state that there is a "[…] need for broad and in-depth empirical research into how risk is managed in supply chains." However, to the best of our knowledge, there exists no literature review which focuses on a specific risk type and digs deeper to enter this field of empirical research. Besides, Tang (2006) explicitly mentions that there has not much work been done in the area of uncertain supply costs. Thus, we want to shed light on the following research questions:

(1) How are price risks addressed in the SCRM and SP literature?
(2) How are price risk management models operationalized in the literature?
(3) What are potential areas of future research?

Method

A literature review contributes to the rigor of research by uncovering and effectively using the existing knowledge base (Hevner et al., 2004). Vom Brocke et al. (2009) emphasize the importance of rigorously documenting the literature search process. They propose a five-step literature review framework which enables the reader to assess the quality of a review: First, the review scope has to be defined. Second, the topic has to be conceptualized and third, the process of the literature search has to be demonstrated. Having identified the relevant articles, a detailed literature analysis and synthesis follows. Based upon these findings, the last step, the derivation of the research agenda is conducted. Within this paper, we follow this procedure.

Preparation and literature search

Definition of review scope

For the definition of the review scope, vom Brocke et al. (2009) suggest referring to established literature review taxonomy. They name Cooper (1988) as suitable example. Cooper's taxonomy contains six constitutive characteristics (Table 1).

Table 1 – Taxonomy of literature reviews following Cooper (1988)

Characteristic	**Categories**			
(1) focus	research outcomes	research methods	theories	applications
(2) goal	integration	criticism	central issues	
(3) organization	historical	conceptual	methodological	
(4) perspective	neutral representation	espousal of position		
(5) audience	specialized scholars	general scholars	practitioners/politicians	general public
(6) coverage	exhaustive	exhaustive & selective	representative	central/pivotal

Each characteristic comprises certain categories. Whereas some are mutually exclusive (4 and 6), others (1, 2, 3 and 5) can be independently combined (vom Brocke

et al., 2009). The grey shaded categories mark the focal points of the literature review at hand: To get a broad overview, we focus on all categories that seem appropriate. We exclude the category criticism from the goal of this literature review as we aim at uncovering gaps, not criticizing literature. For organizing our literature review, we choose the methodological and conceptual structure, and exclude the historical one. Since the target of this literature research is the deduction of an agenda for future research, we take a neutral representation and concentrate on academic and practical audience with existing knowledge of the field. Concerning the coverage, we aim at reviewing a representative part of the SCRM and SP literature.

Conceptualization of the topic

After defining the review scope, vom Brocke et al. (2009) suggest to begin with a "broad conception of what is known about the topic and potential areas where knowledge may be needed". In first instance, working definitions of key terms should be provided (Zorn and Campbell, 2006). Concept mapping is proposed to identify key concepts and uncover relevant search terms (e.g., synonyms, homonyms) that can be used in the subsequent literature search (Rowley and Slack, 2004).

Accordingly, we began our study by searching for an appropriate definition for the term "price risk". As it turned out, the relevant literature seems to lack a grounded definition for this term. As additional test, we searched for "price risk" in different literature databases. However, we mostly got results ending up in the product market or in the finance literature. Hence, we restarted our investigation in a broader context and had a closer look on the general concept of "risk". The summaries of Rao and Goldsby (2009) as well as Wagner and Bode (2006) show that the construct of risk is broadly discussed in such fields as decision theory (e.g., Arrow, 1965), insurance (e.g., Knight, 1921), finance (e.g., Markowitz, 1952), marketing (e.g., Cox, 1967), and management (e.g., March and Shapira, 1987). Since risk is an elusive construct with a variety of meanings depending on the research focus, it is crucial to define the term appropriately (Baird and Thomas, 1990).

On a very general level, risk can be defined as the "[…] probability of variance in an expected outcome" (Spekman and Davis, 2004). Since we aim at examining price risks in a manufacturing environment, we concentrated our search for appropriate alternative price risk concepts on supply chains and the purchasing function. Jüttner et al. (2003) offer a suitable definition for the concept of supply chain risk. According to them supply chain risk can be defined as "[…] the variation in the distribution of possible supply chain outcomes, their likelihood, and their subjective values". Regarding prices as an outcome of focal units' activities in a supply chain, we can state that supply chain risks cover price risks in a manufacturing environment. For detailing the concept, we had an additional look at different supply chain risk types. Several authors (e.g., Christopher and Peck, 2004; Harland et al. 2003) provide classifications for supply chain risks. However, within our pre-study we found that price risks were not specifically mentioned as classification. Instead, they were described as phenomenon and related to different risk classifications, such as environmental risks (e.g., Rao and Goldsby), operational risks (e.g., Schlegel and Trent, 2012), financial risks (e.g., Cavinato, 2004) or supply risks (e.g., Tang and Tomlin, 2008). As we aim at investigating price risks that are traditionally handled by the purchasing function, the term "supply risk" seemed most suitable for the subsequent literature search. Supply risk is defined as an inbound-related risk which is caused by failures of the supply market or suppliers (Zsidisin, 2003). This covers also our view on price risks and therefore builds the basic term for our concept map (Figure 1). As we explicitly

concentrate on the purchasing function as interface between focal unit and suppliers we added the terms “procurement risk”, “purchasing risk”, and “sourcing risk” as detailed risks types to the concept map. Moreover, we combined the different risk types with the terms “strategy” and “management” as proactive and reactive responses to risk. Since we target to investigate the concept of price risk management in a manufacturing environment, we also added the synonymous terms “manufacturing” and “production”.

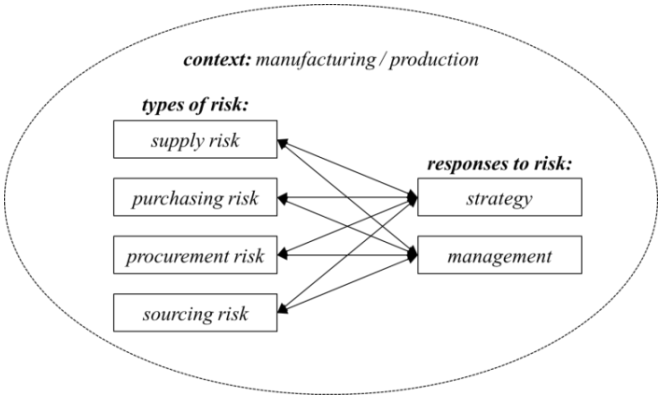


Figure 1 – Concept map for a literature research investigating the concept of price risk management in manufacturing companies

Giving structure to the subsequent literature analysis, we also had a closer look on existing SCRM frameworks. Several authors suggest frameworks for conducting supply chain risk management (e.g., Ritchie and Brindley, 2007; Hallikas et al., 2004). With regard to research question 2, we chose the recently developed approach of Manuj and Mentzer (2008). They suggest a five-step process consisting of (1) risk identification, (2) risk assessment and evaluation, (3) selection of appropriate risk management, (4) implementation of supply chain risk management strategy(s), (5) mitigation of supply chain risks and preparing for unforeseen risk events. The approach will be used to classify the articles found along the single steps in the subsequent analysis phase.

Literature search

The literature search process can be conducted in various ways. Vom Brocke et al. (2009) suggest a four-phase approach which consists of (1) journal search, (2) database search, (3) keyword search, and (4) backward/forward search. Each phase needs to be documented for ensuring reliability, and thus enabling to repeat the search process.

In phase 1, the journal search, it is proposed to focus on journals and conference proceedings that have typically been peer reviewed. As our access to conference proceedings is limited, we decided to focus solely on journals. In order to guarantee a certain quality level (Rowley and Slack, 2004), we only considered peer-reviewed journals within the search process. Moreover, we based our article selection on relevant journals according to Petersen et al. (2011) and Prasad and Babbar (2000). In phase 2, the databases were chosen. Having in mind that the databases should allow access to a great variety of OM journals, we decided for EBSCOhost, Emerald, Proquest, and ScienceDirect. During phase 3, the selected databases are queried on the basis of a key word search. Vom Brocke et al. (2009) advise the use of a precise (set of) search phrase(s) and demand precise documentation of the applied keywords. Table 2 shows the search phrases as well as the numbers of articles found. The key words were taken from the concept map and individually combined (Figure1). We conducted the search in all four databases as “All text” search. Concerning the covered time frame, we did not

set any time bounds in order to get a broad overview. For deriving the relevant articles (in bold), the total number of hits (in brackets) were deduced by an individual evaluation of titles and abstracts. As neither the databases nor the search terms are mutually exclusive, we removed double counts manually. The remaining articles are shown as net hits. Altogether, we identified 61 relevant articles by the keyword search.

Table 2 – Results of the keyword search

Database	"supply risk" AND strategy AND manufacturing	"procurement risk" AND strategy AND manufacturing	"purchasing risk" AND strategy AND manufacturing	"sourcing risk" AND strategy AND manufacturing	"supply risk" AND management AND manufacturing	"procurement risk" AND management AND manufacturing	"purchasing risk" AND management AND manufacturing	"sourcing risk" AND management AND manufacturing	"supply risk" AND strategy AND production	"procurement risk" AND strategy AND production	"purchasing risk" AND strategy AND production	"sourcing risk" AND strategy AND production	"supply risk" AND management AND production	"procurement risk" AND management AND production	"purchasing risk" AND management AND production	"sourcing risk" AND management AND production	**Net Hits**
EBSCOhost	**4** (120)	**5** (20)	**0** (12)	**1** (13)	**6** (137)	**5** (20)	**0** (12)	**1** (13)	**5** (154)	**5** (26)	**0** (18)	**1** (6)	**8** (173)	**5** (29)	**0** (21)	**1** (6)	**11**
Emerald	**21** (112)	**2** (9)	**3** (8)	**4** (13)	**21** (131)	**1** (10)	**3** (8)	**5** (13)	**21** (119)	**2** (9)	**3** (9)	**4** (12)	**20** (139)	**1** (10)	**3** (10)	1 (13)	**20**
ProQuest	**18** (190)	**3** (22)	**0** (12)	**4** (17)	**18** (219)	**4** (23)	**0** (13)	**4** (18)	**19** (245)	**3** (26)	**0** (14)	**5** (19)	**22** (273)	**2** (26)	**2** (16)	**5** (20)	**10**
Science Direct	**14** (335)	**2** (18)	**2** (16)	**1** (18)	**14** (327)	**2** (21)	**2** (18)	**1** (19)	**15** (505)	**2** (37)	**2** (30)	**1** (22)	**16** (507)	**3** (35)	**1** (27)	**1** (20)	**20**
Net Hits																	**61**

In accordance with the framework, we proceeded with backward and forward search. Backward search describes the process of reviewing sources that were cited in the articles we derived from the keyword search. Forward search, in contrast, is characterized by reviewing articles that have cited the articles derived from the keyword search (vom Brocke et al., 2009). In our research process, we focused mainly on backward search as most of our papers were published within the last five years. In the majority of the articles and especially in literature reviews, we found a vast number of cross references to the already inferred articles. Hence, we believe that we covered a rich part of the relevant SCRM and SP literature on price risks. The backward and forward search led to 14 additional articles. Altogether, we obtained a total sum of 75 articles by the literature search.

Literature analysis and synthesis

In the next step, we analyzed and synthesized the collected literature to answer the research questions and derive a research agenda. For structuring the analysis, we used a detailed matrix based on the three dimensions (1) price risk, (2) risk management, and (3) meta-information (Table 3). The first dimension shows how "price risks" are presented in the SCRM and SP literature. Along the described phenomenon, their classification, and the related drivers, we outline the frequency of occurrence of certain categories. In this way, we aim at answering research question 1 (How are price risks addressed in the SCRM and SP literature?). The second dimension draws on the supply risk management process according to Manuj and Mentzer (2008). As described in the conceptualization phase, we selected this risk management process to get a structured overview on the state of supply chain risk management in manufacturing companies in general as well as price risk management in particular. By highlighting gaps along the single risk process steps, we target to answer research question 2 (How are price risk

management models operationalized in the literature?). The third dimension gives a general overview on the articles. The three sub dimensions focus, goal, and audience are adopted from the literature taxonomy of Cooper (1988). The remaining Cooper characteristics were not taken into account since they are inherently covered by the search approach. The sub dimensions literature domain, type of literature, and research methods are an extension made by the authors to disclose the bandwidth of the literature. We emphasize that it is beyond the scope of this review to list all possible categories. Instead, we concentrate on relevant items which we found during the review process. Finally, we note that the shown categories are not mutually exclusive.

Table 3 – Matrix for literature analysis

Characteristics		**Categories**							
(1) Price risk	**Described phenomenon**	price change (3)	price/cost increase (22)	price/cost volatility (7)	price/cost fluctuation (6)	price escalation (2)	price/cost uncertainty (5)		
	Classification	environ-mental risk (2)	macro-economic risk (5)	supply risk (12)	procure-ment risk (2)	operational risk (1)	financial risk (1)	price risk (4)	price/cost uncertainty (3)
	Drivers	macro-economic changes (1)	socio-political changes (2)	exchange rates (3)	disrup-tions (2)	scarcities (3)	depen-dence on supply source (3)	inflexi-bility of supply source (1)	upstream price increase (1)	specu-lation (1)
(2) Risk management	**Strategic level**	risk identification (19)		risk assessment and evaluation (30)		selection of appropriate risk management (18)			
	Operational level	implementation of supply chain risk management strategy(s) (8)			mitigation of supply chain risks and preparing for unforeseen risk events (11)				
(3) Meta-information	**Focus**	research outcomes (46)	research methods (2)		theories (9)	applications (18)			
	Goal	integration (46)		criticism (3)	central issues (26)				
	Audience	specialized scholars (61)	general scholars (41)		practitioners/politicians (30)	general public (3)			
	Literature domain	supply chain risk management (66)			strategic purchasing (16)				
	Type of literature	journal article (69)	conference proceedings (0)		practitioner article (6)	book (0)			
	Research methods	literature review (15)	case study (18)	survey (11)	interviews (3)	conceptual (19)	illustrating (7)	mathematical modeling (5)	

We analyzed all 75 articles by this categorization approach. The number of articles assigned per category is presented in Table 3. 69 articles are journal articles. This is probably caused by the search restrictions we described in the previous section. Their main focus is on research outcomes (46 articles), followed by applications (18 articles), theories (9 articles), and research methods (2 articles). 46 articles aim at knowledge integration, whereas 26 articles emphasize central issues. Nearly all articles (61 articles) target specialized scholars. 41 hold also relevant information for general scholars, 30 for practitioners and only 3 for the general public. 66 articles can be assigned to the SCRM literature stream, whereas 16 articles can be related to SP. With regard to research methods, we found 19 articles which are conceptual. 18 use the case study method and 11 use a survey. The high number of literature reviews (15 articles) can probably be explained by the fact that SCRM is a relatively young research field with a variety of research opportunities whose research relevance has to be demonstrated.

Findings on the price risk discourse

About one third of the articles (29 articles) describe at least one price risk phenomenon.

However, most articles take a very broad and general view on supply chain risks. Only one practitioner article (Zsidisin and Hartley, 2012) was identified that concentrates on price risks and deals solely with this topic.

In accordance with our first impression, we found furthermore that the term price risk lacks a grounded definition or at least a clear assignment to one or more risk classifications. As table 3 shows, the described price risk phenomena were assigned to a multitude of risk classifications. This might be explained by the fact that price risks, like risks in general, are an elusive construct. Yet, we also found that the view on the price risk phenomenon is in most cases not clearly stated. Some authors name it as risk classification, some as risk source, and some associate it with risk consequences. The majority of authors, however, do not give any information on their view on prices risks. Even though various articles are devoted to the development of risk classifications, we have the impression that the link between risk source, risk, and risk effect is stuck on a conceptual level. Constructs, like that of Jüttner et al. (2003), or frameworks, like that of Peck (2005), provide a very good theoretical platform, but they require further investigation on a more detailed level. This is especially important for researchers who, following the call of Oke and Gopalakrishnan (2009), concentrate on the examination of specific risk types (e.g., price risks).

Answering research question 1, we can say that price risks, as many other specific risks types, are mostly treated as inevitable side effect or illustrative example of generic risks in the SCRM and SP literature. A more concrete examination and differentiation between risk cause, risk, and risk effect of specific risks might be worth further investigation and bring new insights for research as well as practice.

Findings on the management of price risks

Concerning price risk management in manufacturing companies, we found again only one publication (Zsidisin and Hartley, 2012) that exclusively deals with this topic. All the other articles take a more general supply chain risk management perspective.

With regard to the risk management process, we observed that the majority of the papers are concerned with the strategic level. 19 articles deal with risk identification, 30 articles with risk assessment and 18 articles with the selection of the appropriate risk management. Even though, there seems to be an extensive body of literature covering strategic issues, we belief there is still room for improvement: Almost all risk assessment and selection tools base, for example, on Kraljic's portfolio approach (Kraljic, 1984). Considering the rich toolbox of multi attribute decision making methods, we belief there are plenty of alternative assessment and decision making techniques imaginable that enable to look at risks in a different manner.

With respect to the operational level of the risk management process, we hold the opinion that generally more effort has to be put into this research area. Only 8 articles engage in the implementation of supply chain risk management. 11 articles treat the topic of mitigation and unforeseen risks. This goes hand in hand with a detailed examination of supply chain and price risk management in practice. During our analysis we observed that previous work is mainly focused on the development of conceptual models and frameworks. In line with Colicchia and Strozzi (2012) and Sodhi et al. (2012), we therefore believe the time has come to investigate which strategies and approaches are used in practice. In particular, the relation between context, used risk management strategies and their success in the sense of effectiveness has to be studied in order to find out which risk management strategies are appropriate for specific risks and risk situations. As none of the research methods seems to be overused (see Table 3),

researchers are free to break new ground with traditional as well as innovative research approaches.

Summarizing and answering research question 2, we can say that price risks are not particularly addressed in the management of supply chain risks. Thus, the general risk management approaches and models have to be revised and conceivably adapted to price risks. Besides, research of supply chain and price risk management in practice is far from saturation and requires further investigation.

Derivation of the research agenda

The literature analysis and synthesis led us to the research agenda that is "comprised of sharper and more insightful questions for future research" (vom Brocke et al., 2009). By targeting research question 3 (What are potential areas of future research?), we propose the following topics:

- Further investigation of the term price risk in the SCRM context: How can price risks be defined or classified within the SCRM literature?
- Explanation of sources, drivers, and effects of price risk: What are the sources, drivers and possible effects of price risks within manufacturing supply chains? Are there key sources or drivers that have to be monitored?
- Exploration of used supply chain and price risk management strategies: Which risk management strategies are used in manufacturing practice?
- Assessment of supply chain and price risk management strategies in practice: Which strategies are appropriate to manage specific risks, such as price risks? Which specific strategy-context combinations are successful and lead to robustness?
- Price risk management system: How can a price risk management system for manufacturing companies look like in order to mitigate possible downside effects?
- Consideration of supply chain and price risks in the decision making process: How can supply chain and price risks be integrated in managers' decision making processes? Besides the existing tools, which further tools can be used to support these processes?
- Tidying up the SCRM research field: How can researcher better differentiate between supply chain risks and specific risks within the SCRM literature? Which further frameworks, risk levels, classifications, typologies, taxonomies or terms have to be introduced to evolve with the growing SCRM field and refine the understanding of research objects targeted in the ongoing SCRM discourse?

Conclusion

The objective of this article was to analyze the body of knowledge on price risks and price risk management within the SCRM and the SP literature. Based upon an established framework, we have provided a structured literature review. We analyzed 75 papers along the price risk discourse and the management of price risks. By systematically recording and clustering named price risk phenomena, classifications and drivers, we were able to answer research question 1 (How are price risks addressed in the SCRM and SP literature?). Research question 2 (How are price risk management models operationalized in the literature?) was answered by an analysis along an established supply chain risk process. We found that current literature lacks depth in terms of empirical research and barely treats specific risks, like price risks. We subsequently deduced 7 topics for future research and therewith answered research question 3 (What are potential areas of future research?). To the best of our knowledge, this paper presents the first literature review in the field of SCRM and SP that

specifically concentrates on the management of price risks in manufacturing companies. Thus, we take an initial step to enter this field and provide a valuable foundation for future research. Nevertheless, there are also some limitations. The literature search is based on a database search and aims at targeting all relevant journals. However, there is no guarantee that all relevant journals or articles are included. The definition of the keywords, even though it was based upon a pre-study, is subjective. Different key words may result in different outcomes. Moreover, the selection of different categories within the analysis and synthesis phase may show other aspects and lead to different insights. Looking at future extensions, we believe that consideration of finance literature on price risk management might enhance the SCRM and SP field and provide valuable insights. With regard to the formation of new inter-company alliances, the effect of power shifts in resource markets might also be worth further investigation. Last but not least, we encourage researchers to conduct similar reviews on specific supply chain risks, to uncover gaps and to reveal differences as well as similarities in regard to price risks. In this way, we may jointly contribute to the development and refinement the evolving field of SCRM.

References (full list of the 75 articles reviewed can be provided upon request)

Allwood, J.M., Ashby, M.F., Gutowski, T.G. and Worrell, E. (2011), "Material Efficiency: A White Paper", *Resources Conservation and Recycling*, Vol. 55, No. 3, pp. 362-381.

Arrow, K.J. (1965), *Aspects of the Theory of Risk-bearing*, Yrjö Hahnsson Foundation, Helsinki.

Baird, I.S. and Thomas, H. (1990), "What is risk anyway?", in Bettis, R.A. and Thomas, H. (Eds.*), Risk, Strategy, and Management*, JAI Press, London, pp. 21-52.

Baker, M.J. (2000), "Writing a Literature Review", *The Marketing Review*, Vol. 1, No. 2, pp. 219-247.

Cavinato, J.L. (2004), "Supply Chain Logistics Risks: From the Back Room to the Board Room", *International Journal of Physical Distribution & Logistics Management*, Vol. 34, No. 5, pp. 383–387.

Chicksand, D., Watson, G., Walker, H., Radnor, Z. and Johnston, R. (2012), "Theoretical Perspectives in Purchasing and Supply Chain Management: An Analysis of the Literature", *Supply Chain Management: An International Journal*, Vol. 17, No. 4, pp. 454-472.

Christopher, M. and Peck, H. (2004), "Building the Resilient Supply Chain", *The International Journal of Logistics Management*, Vol. 15, No. 2, pp. 1-14.

Christopher, M., Peck, H., Rutherford, C. and Jüttner, U. (2003), *Understanding Supply Chain Risk: A Self-Assessment Workbook*, Department for Transport, Cranfield University, Cranfield.

Colicchia, C. and Strozzi, F. (2012), "Supply Chain Risk Management: A New Methodology for a Systematic Literature Review", *Supply Chain Management: An International Journal*, Vol. 17, No. 4, pp. 403-418.

Costantini, V., Gracceva, F., Markandya, A. and Vicini, G. (2007), "Security of Energy Supply: Comparing Scenarios from a European Perspective", *Energy Policy*, Vol. 35, No. 1, pp. 210-226.

Cooper, H.M. (1988), "Organizing Knowledge Syntheses: A Taxonomy of Literature Reviews", *Knowledge in Society*, Vol. 1, No.1, pp. 104-126.

Cox, D.F. (1967), *Risk Taking and Information Handling in Consumer Behavior*, Harvard University Press, Cambridge.

Ellram, L.M. and Carr, A.S. (1994), "Strategic Purchasing: A History and Review of the Literature", *Journal of Supply Chain Management*, Vol. 30, No. 2, pp. 10–19.

Hallikas, J., Karvonen, I., Pulkkinen, U., Virolainen, V.M. and Tuominen, M. (2004), "Risk Management Processes in Supplier Networks", *International Journal of Production Economics*, Vol. 90, No. 1, pp. 47-58.

Hallikas, J., Kähkönen, A.K., Lintukangas, K. and Virolainen, V.M. (2011), "Supply Management - Missing Link in Strategic Management?", *Journal of Purchasing and Supply Management*, Vol. 17, No. 3, pp. 145-147.

Harland, C., Brenchley, R. and Walker, H. (2003), "Risk in Supply Networks", *Journal of Purchasing and Supply Management*, Vol. 9, No. 2, pp. 51-62.

Hevner, A.R., March, S.T., Park, J. and Ram, S. (2004), "Design Science in Information Systems Research", *MIS Quarterly*, Vol. 28, No. 1, pp. 75-105.

Jüttner, U., Peck, H. and Christopher, M. (2003), "Supply Chain Risk Management: Outlining an Agenda for Future Research", *International Journal of Logistics Research and Applications*, Vol. 6, No. 4, pp. 197-210.

Khan, O. and Burnes, B. (2007), "Risk and Supply Chain Management: Creating a Research Agenda", *The International Journal of Logistics Management*, Vol. 18, No. 2, pp. 197-216.
Knight, F.H. (1921), *Risk, Uncertainty and Profit*, Hart, Schaffner & Marx, Boston.
KPMG. (2011). *Global Manufacturing Outlook: Growth while Managing Volatility*. Retrieved from http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/global-manufacturing-outlook/ Documents/growth-while-managing-volatility-survey.pdf. 08.12.2012.
Kraljic, P. (1984), "From Purchasing to Supply Management", *McKinsey Quaterly*, No. 2, pp. 2-17.
Manuj, I. and Mentzer, J.T. (2008), "Global Supply Chain Risk Management", *Journal of Business Logistics*, Vol. 29, No. 1, pp. 133-155.
March, J.G. and Shapira, Z. (1987), "Managerial Perspectives on Risk and Risk Taking", *Management Science*, Vol. 33, No. 11, pp. 1404-1418.
Markman, G.D., Gianiodis, P.T. and Buchholtz, A.K. (2009), "Factor Market Rivalry", *Academy of Management Review*, Vol. 34, No. 3, pp. 423-441.
Markowitz, H. (1952), "Portfolio Selection", *Journal of Finance*, Vol. 7, No. 1, pp. 77-91.
Nötstaller, R. and Wagner, H. (2007), "Reflections on Resource Consumption and Resource Policy", *Journal of Mining, Metallurgical, Materials, Geotechnical, and Plant Engineering*, Vol. 152, No. 12, pp. 383-390.
Oke, A. and Gopalakrishnan, M. (2009), "Managing Disruptions in Supply Chains: A Case Study of a Retail Supply Chain", *International Journal of Production Economics*, Vol. 118, No. 1, pp. 168-174.
Peck, H. (2005), "Drivers of Supply Chain Vulnerability: An Integrated Framework", *International Journal of Physical Distribution & Logistics Management*, Vol. 35, No. 3/4, pp. 210-232.
Petersen, C.G., Aase, G.R. and Heiser, D.R. (2011), "Journal Ranking Analyses of Operations Management Research", *International Journal of Operations & Production Management*, Vol. 31, No. 4, pp. 405-422.
Prasad, S. and Babbar, S. (2000), "International Operations Management Research", *Journal of Operations Management*, Vol. 18, No. 2, pp. 209-247.
Rao, S. and Goldsby, T.J. (2009), "Supply Chain Risks: A Review and Typology", *The International Journal of Logistics Management*, Vol. 20, No. 1, pp. 97-123.
Ritchie, B. and Brindley, C. (2007), "An Emergent Framework for Supply Chain Risk Management and Performance Measurement", *Journal of the Operational Research Society*, Vol. 58, No. 11, pp. 1398-1411.
Rowley, J. and Slack, F. (2004), "Conducting a Literature Review". *Management Research News*, Vol. 27, No. 6, pp. 31-39.
Schlegel, G.L. and Trent, R.J. (2012), "Risk Management: Welcome to the New Normal", *Supply Chain Management Review*, Vol. 16, No. 1, pp. 12-21.
Seljom, P. and Rosenberg, E. (2011), "A Study of Oil and Natural Gas Resources and Production", *International Journal of Energy Sector Management*, Vol. 5, No. 1, pp. 101-124.
Sodhi, M.S., Son, B.G., & Tang, C.S. (2012), "Researchers' Perspectives on Supply Chain Risk Management", *Production and Operations Management*, Vol. 21, No. 1, pp. 1-13.
Spekman, R.E. and Davis, E.W. (2004), "Risky Business: Expanding the Discussion on Risk and the Extended Enterprise", *International Journal of Physical Distribution & Logistics* Management, Vol. 34, No. 5, pp. 414-433.
Tang, C.S. (2006), "Perspectives in Supply Chain Risk Management", *International Journal of Production Economics*, Vol. 103, No. 2, pp. 451-488.
Tang, C. and Tomlin, B. (2008), "The Power of Flexibility for Mitigating Supply Chain Risks", *International Journal of Production Economics*, Vol. 116, No. 1, pp. 12-27.
Tiess, G. (2010), "Minerals Policy in Europe: Some Recent Developments", *Resources Policy*, Vol. 35, No. 3, pp. 190-198.
vom Brocke, J., Simons, A., Niehaves, B., Riemer, K., Plattfaut, R. and Cleven, A. (2009), *Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature Search Process.* Paper presented at the 17th European Conference on Information Systems. Verona, Italy, pp. 2206-2217.
Wagner, S.M. and Bode, C. (2006), "An Empirical Investigation into Supply Chain Vulnerability", *Journal of Purchasing and Supply Management*, Vol. 12, No. 6, pp. 301–312.
Zorn, T. and Campbell, N. (2006), "Improving the Writing of Literature Reviews through a Literature Integration Exercise", *Business Communication Quarterly*, Vol. 69, No. 2, pp. 172-183.
Zsidisin, G.A. and Hartley, J. L. (2012), "A Strategy for Managing Commodity Price Risk", *Supply Chain Management Review*, Vol. 16, No. 2, pp. 46-53.
Zsidisin, G.A. (2003), "A Grounded Definition of Supply Risk", *Journal of Purchasing and Supply Management*, Vol. 9, No. 5-6, pp. 217-224.