

DOCTOR OF BUSINESS ADMINISTRATION

Development of a risk-oriented strategic
sourcing (ROSS) framework for the
construction and electronics
manufacturing industries

Martin Kotula

2013

Aston University

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**Development of a Risk-Oriented Strategic Sourcing (ROSS) Framework for the
Construction and Electronics Manufacturing Industries**

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Doctor of Business Administration

ASTON UNIVERSITY

March 2013

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THESIS SUMMARY

Strategic sourcing has increased in importance in recent years, and now plays an important role in companies' planning. The current volatility in supply markets means companies face multiple challenges involving lock-in situations, supplier bankruptcies or supply security issues. In addition, their exposure can increase due to natural disasters, as witnessed recently in the form of bird flu, volcanic ash and tsunamis. Therefore, the primary focus of this study is risk management in the context of strategic sourcing.

The study presents a literature review on sourcing based on the 15 years from 1998–2012, and considers 131 academic articles. The literature describes strategic sourcing as a strategic, holistic process in managing supplier relationships, with a long-term focus on adding value to the company and realising competitive advantage. Few studies discovered the real risk impact and status of risk management in strategic sourcing, and evaluation across countries and industries was limited, with the construction sector particularly under-researched.

This methodology is founded on a qualitative study of twenty cases across Germany and the United Kingdom from the construction sector and electronics manufacturing industries. While considering risk management in the context of strategic sourcing, the thesis takes into account six dimensions that cover trends in strategic sourcing, theoretical and practical sourcing models, risk management, supply and demand management, critical success factors and the strategic supplier evaluation.

The study contributes in several ways. First, recent trends are traced and future needs identified across the research dimensions of countries, industries and companies. Second, it evaluates critical success factors in contemporary strategic sourcing. Third, it explores the application of theoretical and practical sourcing models in terms of effectiveness and sustainability. Fourth, based on the case study findings, a risk-oriented strategic sourcing framework and a model for strategic sourcing are developed. These are based on the validation of contemporary requirements and a critical evaluation of the existing situation. It contemplates the empirical findings and leads to a structured process to manage risk in strategic sourcing. The risk-oriented framework considers areas such as trends, corporate and sourcing strategy, critical success factors, strategic supplier selection criteria, risk assessment, reporting, strategy alignment and reporting. The proposed model highlights the essential dimensions in strategic sourcing and guides us to a new definition of strategic sourcing supported by this empirical study.

Keywords: Strategic sourcing, risk-oriented strategic sourcing, supply chain risk management, sourcing in construction industry, sourcing in electronics manufacturing industry

To my great-grandmother Klara Nowak,
my parents Ingrid and Christian and my sister Simone.

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1 CHAPTER ONE - INTRODUCTION

1.1 Research Background

Strategic sourcing has come to prominence in recent years, and in times of crisis attracts more management attention. New risks, particularly the financial crisis and supplier bankruptcies, but also product recalls, pirate attacks on container ships, natural disasters (volcano ash, tsunamis, hurricanes) and bird flu, have a huge effect on the supply chain, and consequently on operations management. What was unimaginable in the past, and therefore not considered within the sourcing discipline, has become reality over the past decade. This global wake-up call means complexity has increased significantly in the entire supply and demand chain. Besides this, economic and financial environments are more volatile and new economies, such as India and China, are now important markets.

The nuclear catastrophe in Fukushima in 2011 (Japan) and the volcanic ash in Europe in 2010 (Iceland) led to significant disturbances in the supply chain, and demonstrated how exposed companies are nowadays, particularly those with lean supply chains or that outsource large parts of their production using close supplier collaboration and just-in-time deliveries, often with long-term relationships with single suppliers (Kotula, 2011). In this context, the companies' risk exposure is extremely high and the whole value chain reliant on this single-supplier strategy. Nokia outlast with a multi-supplier strategy and gained a competitive advantage when a disruption in the supply of the core-component microchips occurred (Chopra and Sodhi, 2004). Therefore, companies need to consider risks and the potential impact on their supply base, meaning it is necessary to increase the understanding of how companies apply and consider risks in their strategic sourcing decision. There is little research with applied case studies and qualitative techniques to understand

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why and how companies 'ignore' certain risks or choose to stop the assessment process after supplier selection.

Although the sourcing function and long-term supplier relationships are undoubtedly significant, they often lack importance within companies and are not seen to improve business performance or the competitive advantage (Ramsay, 2001; Hult, 2002; Jennings, 2002; Kamann and Bakker, 2004; Su *et al.*, 2009). In many companies, a misalignment exists between the sourcing and the corporate strategy, or sourcing even competes with other departments, such as R&D or finance. Governance structures are weak and lead to under-performance, or at least a weak perception and leadership, within the company. Furthermore, recent research points out the importance of collaboration with suppliers and highlights weaknesses in many companies (Spekman *et al.*, 1999; Chan and Chin, 2007; Ganesan *et al.*, 2009).

However, the significance of a sourcing function is dependent on the total expenditure of a company, which can be calculated in relation to sales. For instance, if a company has a total spending in relation to sales of 50% in manufacturing or 85% in retail, the procurement function should play a relevant role within the business (Nelson *et al.*, 2001). The potential savings and cost improvements realised through sourcing decisions on that spending portion directly contribute to the profit and provide an argument for the importance of that function.

Strategic sourcing, in general, is a relatively new term in operations management and has its roots in strategic purchasing, which started in the 1990s (Cousins *et al.*, 2008). The starting point of the emerging purchasing focus is traceable to the 1970s, when purchasing was seen as an administrative function (Ellram and Carr, 1994; Cousins *et al.*, 2008). Porter (1980) highlighted the importance of the bargaining power of suppliers and

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its impact on the competitive strategy of a company: “Powerful suppliers can thereby squeeze profitability out of an industry unable to recover cost increases in its own prices” (Porter, 1980, p. 27). Possibly, this strong focus on the bargaining power of a supplier has led to the increased attention on purchasing practices.

Kraljic (1983), one of the founders and developers of the sourcing portfolio presented in Figure 1-1, considered the strategic importance and risk impact of supplied parts. This model provided one of the central techniques in supply management, which has often been applied in practice (Gelderman and Van Weele, 2003; Caniëls and Gelderman, 2005).



Figure 1-1: Kraljic (1983) portfolio

Many companies apply this model, which is also in accordance with the author’s practical experience in sourcing consultation. However, the model has been criticised because it originated from a conceptual paper in the *Harvard Business Review* and lacks qualitative or quantitative evidence.

Since that time, strategic sourcing has emerged and the number of publications has increased. However, the term strategic sourcing has different subjects or themes linked to it that builds the management practice. A review of 225 articles, conducted by Kausik and Mahadevan (2012), shows a focus on several areas and topics, including strategic issues (e.g. make-or-buy, outsourcing, global sourcing, etc.); supplier selection/evaluation (crite-

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ria, tools); purchasing methods (single vs. multiple sourcing, strategic sourcing practice); buyer-supplier relationships (structuring relationships); and e-procurement (strategic perception, technology implementation).

Although the literature review highlights multiple focus areas or topics in strategic sourcing, a clear definition is necessary in this research project. Previous authors have provided different definitions for strategic sourcing, as presented in the following Table 1-1:

Definition	Source
<p>“The principal objective of strategic sourcing is uncertainty reduction and improvement of flexibilities when faced with supply, competitive, and demand uncertainties. [...] sourcing operates at strategic level - acquiring, managing, and configuring supply chain structures extending from hierarchical supply bases to final customers and markets, to meet manufacturing and corporate strategic requirements. [...]</p> <p>Strategic sourcing is defined as the use of supplier competencies to achieve flexible goals through:</p> <p>Establishing relationships with suppliers with fast response capabilities to schedule or design change; and</p> <p>Formal incorporation of supplier technological capabilities in design, engineering, and manufacturing strategies.”</p>	<p>(Narasimhan and Das, 1999, p. 685 and p. 692)</p>
<p>“Strategic sourcing is more than simply reducing input prices. It is designed to align the capabilities of the supply base with the buyer’s market opportunities. [...] One of the important intended outcomes is a strategic partnership between a buyer and a supplier that will maximise their collective market presence and profitability.”</p>	<p>(Rossetti and Choi, 2005, p. 4)</p>
<p>“A systematic and comprehensive process that adds value to a company, which in turn helps to achieve the company’s long-term objectives.”</p>	<p>Chan and Chin (2007, p.1392)</p>

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<p>“[...] Realising these advantages requires shifting our view of purchasing from a tactical or clerically oriented activity to one focusing on strategic supply management. This type of management involves developing the strategies, approaches, and methods for realising a competitive advantage and improvement from the procurement and sourcing processes, particularly through direct involvement and interaction with suppliers.”</p>	<p>(Monczka <i>et al.</i>, 2011, p. xxvii)</p>
<p>“Strategic sourcing is an organisational procurement and supply management process used to locate, develop, qualify, and employ suppliers that add maximum value to the buyer’s products or services. The major objective of strategic sourcing is to engage suppliers that align with the strategic business and operational goals of the organisation.”</p>	<p>(Sollish and Semanik, 2011, p. 1)</p>
<p>“It is achieved by developing a set of practices through which certain flexibilities could be obtained to face these uncertainties. Strategic Sourcing enables an organisation to identify and select suppliers through long-term partnerships, by providing benchmarks, laying emphasis on supplier performance and providing feedback to suppliers. Moreover, in today’s business context organisations compete in a global environment and operate in multiple markets and geographical locations. This provides additional dimensions to strategic sourcing.”</p>	<p>(Kausik and Mahadevan, 2012, p. 79)</p>
<p>“Sourcing is the process of identifying, selecting and developing suppliers. Ideally, the process will be driven by procurement, which will involve key decision makers in the organisation such as operational and finance staff. [...] Strategic sourcing [...] continuously balances internal and external activities, services and know-how aligns business strategy, business processes and ‘product’ requirements balances the results that must be achieved and the future options available.”</p>	<p>(Lyson and Farrington, 2012, p. 359)</p>

Table 1-1: Definition of strategic sourcing

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This situation, therefore, requires a clear definition in this research project. Based on the findings and the author's experience, strategic sourcing is defined as follows:

Strategic sourcing is a systematic, long-term and strategic approach to identify, manage, partner or integrate key suppliers to realise an added value across the value chain and to increase the competitive advantage and business performance of a company by actively managing sourcing risks. It is aligned with the corporate strategy and traces market developments and trends.

Where purchasing is seen as more tactical, transactional or clerical, strategic sourcing is seen as a holistic, organisational, value chain approach.

This research project considers Germany and the United Kingdom to build and understand cross-country and cross-cultural perspectives. Both countries, as members of the European Union, have a comparable political make-up but differ in risk exposure and culture. Germany has a good infrastructure and many medium-sized companies collectively known as the 'Mittelstand', which forms the backbone of the country's industry, while membership of the European Monetary Union and use of the Euro brings exchange rate stability for the vital export market. Recent discussions about the membership of Greece, Portugal or Italy are relevant, but in this research project the monetary union is assumed to remain, even though the natural exchange rate risks are moderate for Germany. The opposite is the case for the United Kingdom. The island infrastructure limits its logistical flexibility and the country is greatly reliant on imports. Furthermore, the British Pound has appreciated significantly against the Euro since 2009, and this makes international trade more

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difficult, especially with European countries where the United Kingdom has a disadvantage.

Another consideration is the cultural differences between the Germans and the British, which have an impact on decision-making and the development of strategic sourcing practises. Recent studies support the differences in power distance, individualism and uncertainty avoidance (Littrell and Valentin, 2005). Germans need to avoid uncertainty and tend to have everything under control using solid structures, the so-called 'Ordnung' (Littrell and Valentin, 2005). This cultural attitude leads to different business behaviour and decision-making, respectively, in mitigating risk. Hence, this research project investigates whether the Germans and the British act differently, and if so, whether there are cultural reasons behind this.

However, the real application and implementation of sourcing practices vary across industries, as borne out by recent academic research. Van Weele (2010, p. 69) highlights the developments in a "six-stage purchasing and supply development model", where retailers are most effective in purchasing and automotive companies have a deep value chain integration, which is presented in Figure 1-2. Other industries are lagging behind in the development stage, with construction companies in particular seeming to be behind in the appropriate advancement of the purchasing functions. Manufacturing companies seem to inhabit the middle ground in this respect, especially those that focus on industrial goods. Therefore, the research in this thesis focuses on the construction sector and manufacturing industries (electronic goods) to increase the knowledge and understanding of the practices. Although the direct comparison of both industries is limited because the nature of business varies from contract manufacturing to site- and project-based construction, it highlights the

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current state of strategic sourcing development and increases understanding of risk management and its impact on the value chain.



Figure 1-2: Purchasing and supply development model (Van Weele, 2010, p.69)

The selection of relevant industries for this research project is primarily determined by the literature review, which is presented in Chapter 2. The findings show that 21 % of publications is without industrial relations respectively collaboration with sourcing professionals (37 of 131 articles; see Table 2-3). Therefore, to assess and compare different sourcing strategies, two specific industries have been selected to interact with practitioners and to allow for cross-industry and cross-case analysis. Therefore, “manufacturing and equipment” (World Bank, OECD terminology) or “Section D manufacturing” (Standard Industrial Classification) and “construction” (World Bank and SIC is identical) have been selected as target industries for this research project. The rationale is the maturity of sourcing practices in the area of manufacturing and less researched sourcing practice in construction, which is also supported by Van Weele (2010) and highlighted in Figure 1-2.

On one hand, manufacturing and equipment represent 21 % of the reviewed literature (28 of 131 articles; see Table 2-3 on page 82). It has the advantage of manufacturing processes, just-in-time deliveries, raw materials and need for agility. Furthermore, there is

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a high dependence on customers and potential demand volatility. Therefore, the research objectives could be validated in that sector.

On the other hand, the construction sector is selected as second industry. This sector has primary a project nature, which is very much dependent on tight scheduling and project management. It is under-represented in the sourcing research discipline and needs further evaluation for strategic sourcing. Furthermore, the scope, services and complexities are very different to the manufacturing products.

In summary, both industries have a significant Gross Domestic Product (GDP) contribution, although not being the most important sector in the selected countries they offer a good assessment base between and across these industries.

The intention of this doctoral thesis is to explore and elaborate on the current state of strategic sourcing, the established risk management practices and the recent developments in strategic sourcing within the construction sector and electronics manufacturing industry in the UK and Germany. Figure 1-3 shows the research project with the case study structure.

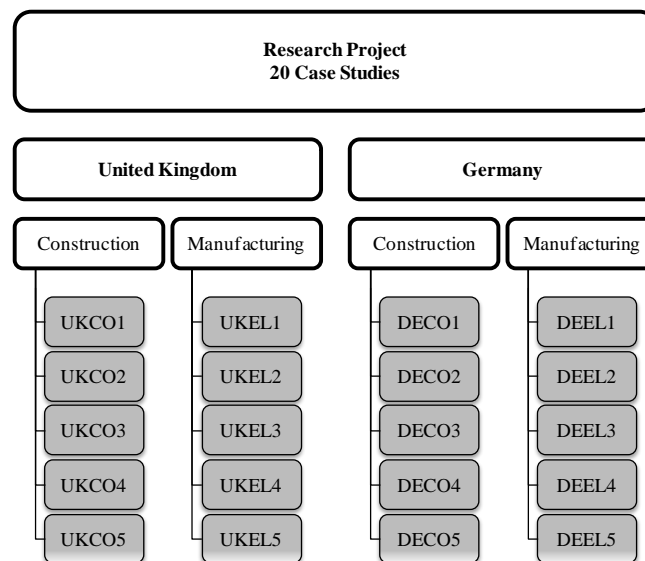


Figure 1-3: Research project case study overview

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It is based on the identified research gap, where:

- The sourcing discipline is still in its infancy and the value of sourcing in companies is undiscovered
- Strategic alignment within companies and across departments is not analysed in depth, and potentially competing departmental strategies could exist (i.e., competition between marketing, research and sourcing)
- Supplier relationship management, considering bargaining power and driving variables, is suggested in the literature, but not validated in detail
- The impact of risk management in highly volatile environments, given the higher degree of globalisation in strategic sourcing, remains largely ignored, especially, while the risk exposure increased, the prevention did not significantly change
- Some industries remain unconsidered in a research project (e.g., construction, logistics or power/energy companies)

1.2 Research Aim

The overall research aim is to develop a strategic sourcing framework from qualitative and explorative research. The field research and interaction with companies leads to deeper insights into practice and increases the understanding of the current state of strategic sourcing within companies, especially in the construction sector that is viewed as a laggard in sourcing development and generally ignored by operations management academics.

Based on the literature review, there is limited research executed in the area of 'strategic sourcing'. Although terms such as purchasing, procurement and buying are often used as synonyms, many companies and academics use strategic sourcing as the emerging

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definition for long-term strategic sourcing directions. Therefore, the literature review summarises the current state of strategic sourcing in academia to identify risk consideration, supplier selection criteria, critical success factors as well as trends, supply and demand management. These review findings show that the construction sector was not often targeted in academia, whereas the manufacturing industry is well-researched for strategic sourcing purposes.

Additionally, there are emerging risks that increase vulnerability in global sourcing and supply chain management, which exposed the companies to new risks and disruptions. Companies are reluctant to implement a risk portfolio or even identify their critical parts (Kotula and Reiß, 2011). In many cases, they claim the complexity of the academic models, which do not match the needs of the company (Van De Ven and Johnson, 2006). Therefore, this research focuses on the development of a strategic sourcing framework through qualitative studies, which can be applied by practitioners.

Furthermore, the objective of a Business Administration doctoral programme is to study the practical contribution of academic work. Therefore, a case study method was selected and a sample of twenty companies decided on to build a solid base for the appropriate assessment. These case studies and explorative works will lead to a better understanding of the requirements and to the benchmarking of different methods of strategic sourcing. The field research includes personal interviews, and incorporates the practical experience of the author, which will lead to the development of a strategic sourcing framework or model that companies can implement and which considers the issues raised in the interviews.

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1.3 Research Objectives

Based on the central research question—“**How do companies apply risk management in strategic sourcing?**”—the following four research objectives have been developed:

First, the objective is to trace the trend of development in strategic sourcing. The goal is to further verify the changes and trends to predict the future needs of business.

Second, the research identifies the critical success factors in contemporary strategic sourcing, especially in holistic supply and demand management, combined with external factors from markets and economies.

Third, it evaluates the theoretical and practical sourcing models in terms of effectiveness and sustainability.

Fourthly, the goal is to develop a strategic sourcing framework or model while considering risk factors. This is based on the validation of contemporary requirements and critical evaluation of the existing situation to propose a more effective and sustainable framework including the most relevant determinants.

The research question and the objectives form the foundation of this research project, and lead to the development of the conceptual framework presented in Figure 1-4. This shows several inputs, outputs and dependencies derived primarily from the literature review and the practical experience of the author.

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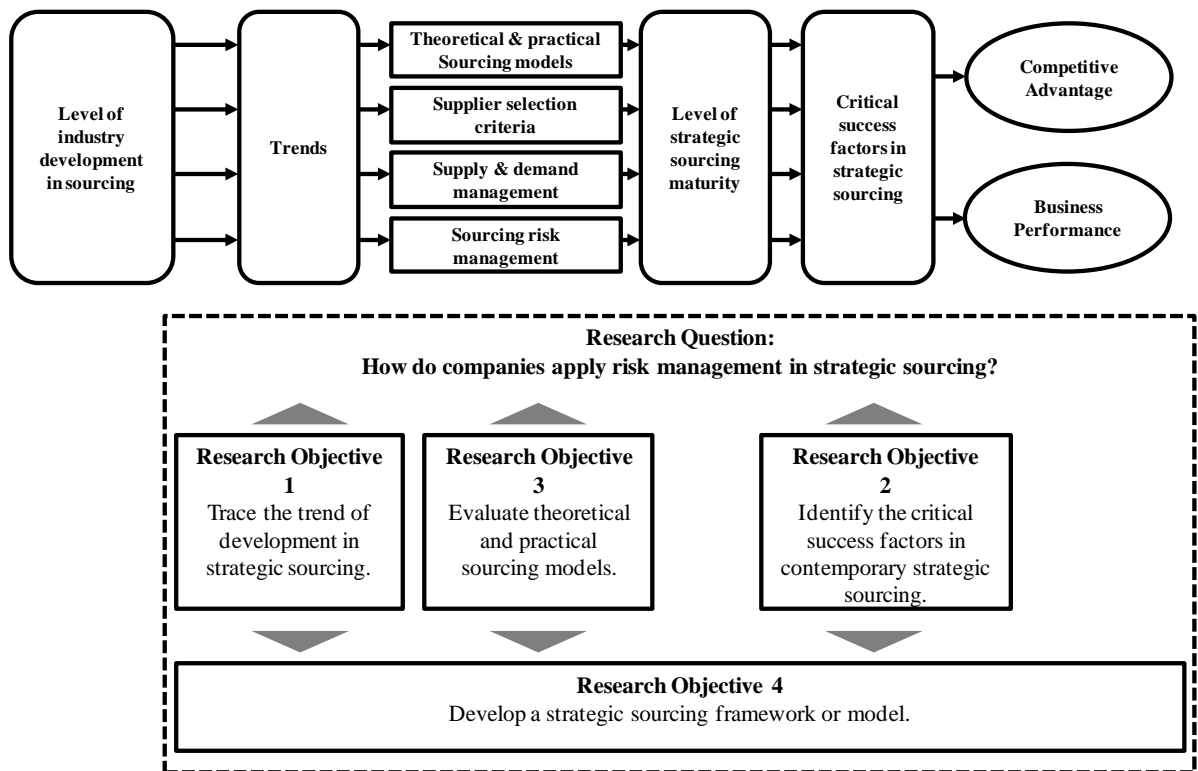


Figure 1-4: Conceptual framework for the research

In this context, the framework shows that the starting point is the level of industry development in sourcing. Based on the research of van Weele (2010) and Keough (1993), the assumption in this qualitative research is that the electronics manufacturing industry should display a higher level of strategic sourcing maturity than the construction sector. Furthermore, recent trends and economic developments influence the application of theoretical and practical sourcing models, supplier selection criteria, supply and demand management and risk management practices. These dimensions lead to the identification of strategic sourcing maturity within the company in question. Finally, analysis of the in-depth interviews and cross-industry analysis leads to the identification of critical success factors in strategic sourcing, and further determines the competitive advantage or business performance.

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1.4 Significance of the Study

Academic research has seldom explored sourcing practices in the construction sector. Delays and the extraordinary costs involved in the recent project at Germany's prestigious Berlin-Brandenburg international airport clearly demonstrate how project and sub-contractor management is essential in large projects. In addition, the construction sector remains underdeveloped from a sourcing point of view (Van Weele, 2010). Therefore, this study is important to increase the understanding of how companies apply, or have established, strategic sourcing methodologies in the construction industry. Furthermore, the electronics industry (non-consumer goods) was selected to provide the possibility of comparing a more mature sourcing industry with the construction sector, and to uncover how sourcing methods are established. The electronics industry has an assembly-line environment with a regular material flow. Many companies source globally, use different suppliers from across the world and apply just-in-time deliveries. This market trend leads several companies to optimise working capital and reduce stock, which increases risk exposure and the reliance on suppliers. The Fukushima catastrophe in 2011 caused significant market and supply shortages due to disrupted production and supply in Japan; one of the largest centres of the electronic component industry. The financial crisis of 2007 resulted in different kinds of problems, such as suppliers becoming bankrupt and companies with single-sourcing strategies facing enormous problems in implementing a new supplier. Thus, this research project contributes to the body of knowledge while incorporating recent findings (i.e., how companies dealt with external 'shocks' or if their supply chain was reliable enough to cover such risks).

For this purpose, a qualitative study was chosen to better understand the situation and interact with the interviewees. Although it is claimed qualitative research is unrepre-

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sentative and limits generalisation, it is essential in this research project to discuss and interact with interviewees to develop a new strategic model based on the research findings and the needs of companies; this cannot be achieved using a structured quantitative survey. Furthermore, the cross-country comparison of Germany and the UK presents differences in the adoption of methods or tools in sourcing as well as that countries are exposed to similar risks. In this context, cultural differences might play a significant role in the sourcing managers' attitudes.

The project contributes to academic research in several ways. One aspect is to trace and present the trends in strategic sourcing over the past decade, and the second is the identification of critical success factors in contemporary strategic sourcing. Furthermore, the development of theoretical and practical sourcing models will enhance the discipline. The primary goal is to develop a risk-mitigating and sustainable sourcing framework that can be implemented in academia and practice. The consideration of two countries will highlight differences in the adoption of, and behaviour related to, strategic sourcing and risk perception. Given that the construction sector is seldom targeted for sourcing research projects, the information gleaned from this research project sheds more light onto the discipline, which ideally will help it advance.

In addition to the contribution of the research, the relevance to practitioners and industries is that it will provide new insights into strategic sourcing, best practices and critical success factors. The assessment of two countries highlights potential differences in the adoption of sourcing methods and presents the cultural diversity present in two leading world economies. The research findings present how companies act with regards strategic sourcing, and consider whether critical success factors are implemented uniformly or if they vary across countries. In addition, the comparison of the manufacturing and construc-

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tion sector identifies differences in their sourcing behaviour and in risk perception due to the different nature of the businesses. Furthermore, the sourcing framework is based on interviews and case study findings, and can be adopted for practice. The findings allow companies to assess their methods and realign their processes if required to add further value or provide a competitive advantage.

1.5 Thesis Overview

This chapter describes the thesis overview highlighted in Figure 1-5: Thesis overview), and presents the structure and context of the work.

Chapter 1 presents the overall introduction to the thesis, including the problem statement, the research aim and objectives and the significance of the study.

Chapter 2 explains academic approaches, reviews the latest literature in the field of sourcing and presents the latest developments while highlighting the knowledge gaps that provide the basis of this research project. Several sources were used to produce the literature review. The subject 'sourcing' was used in the title search and the most-cited articles used (Citation Index). To achieve a solid overview of the subject, 131 academic articles were reviewed and analysed.

Chapter 3 presents the methodology and research design applied in this research project through the theoretical foundation. The chapter explains a selection of qualitative research methods in accordance with the realism paradigm to increase the understanding of the process and explore the application of strategic sourcing. Furthermore, this chapter presents the sampling of companies, industries and theory selection, extracts of survey data and interview transcripts and the applied research ethics guidelines.

Chapter 4 presents the findings of twenty case studies within the electronics manufacturing industry and construction sector in the United Kingdom and Germany, executed

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between 2010 and 2012. The aim of the multiple case studies is to present an explorative approach, using semi-structured interviews, to increase the understanding of strategic sourcing. Within the interviews, six aspects were considered based on the literature review and in accordance with the research objectives: 1. trends, 2. sourcing models, 3. sourcing risk management, 4. supply and demand management, 5. critical success factors and 6. strategic sourcing criteria. Further, cross-industry and cross-country analysis is performed. It highlights and discusses the analysis to identify differences and commonalities in strategic sourcing practices to determine critical success factors.

Chapter 5 discusses the strategic sourcing state across countries and industries and leads to the presentation of the risk-oriented strategic sourcing framework, which is founded on the previous analysis in chapter 4. Further, the developed framework is applied by using data and interview findings from one company to provide sufficient evidence.

Chapter 6 is the final section of this research project and presents the conclusions, contributions to academia and practice, limitations of the research and directions for future work. Through this holistic qualitative study, deep insights are gathered that lead to the development of a strategic sourcing framework that considers risk factors and that can be applied and implemented in academia and practice. Although the generalisation of qualitative research is limited, this research project provides multiple insights into both strategic sourcing and how companies apply and evaluate risk management in practice.

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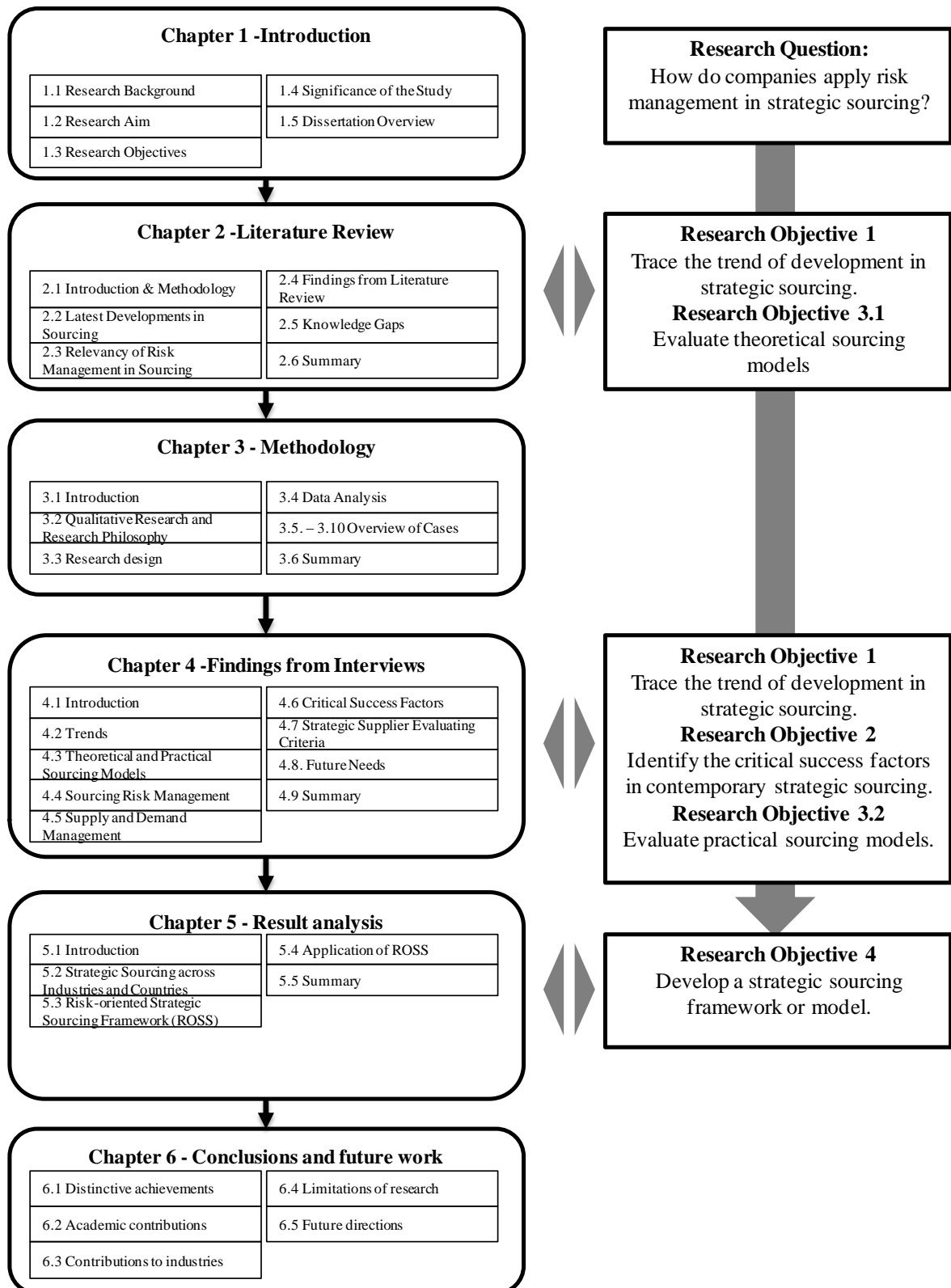


Figure 1-5: Thesis overview

2 CHAPTER TWO - LITERATURE REVIEW

2.1 Introduction & Methodology

This section presents the results of a holistic literature review on strategic sourcing using the Scopus Elsevier ® database. The applied methodology is presented in Figure 2-1, and the research algorithm presented in *Appendix B: Scopus Search Query for literature review*.

The first search was carried out using the search term 'SOURCING' in the article title only, covering the previous 15 years (1998–2012). Based on the early stages of the sourcing discipline, which began in the 1990s, this selection covers a solid base and the current state of the discipline. This first research identified 790 articles that met the search criteria.

Second, the searching was limited to academic journal articles written in the English language; third, the field was filtered to social sciences and focused on business and operations management. Fourth, the list meeting the search criteria was further filtered to the relevant topics, excluding themes like economics (tariffs, customs), geopolitics and archaeology.

Fifth, based on the list the abstracts and key words were used to identify relevant articles on strategic sourcing as defined in Chapter 1. The sixth and final step of literature review preparation was the check of further references within the reference list of those selected articles, which was necessary to ensure that no other relevant papers were omitted from the search. The final list comprised 131 articles; Figure 2-1 shows the methodology applied in the literature review.

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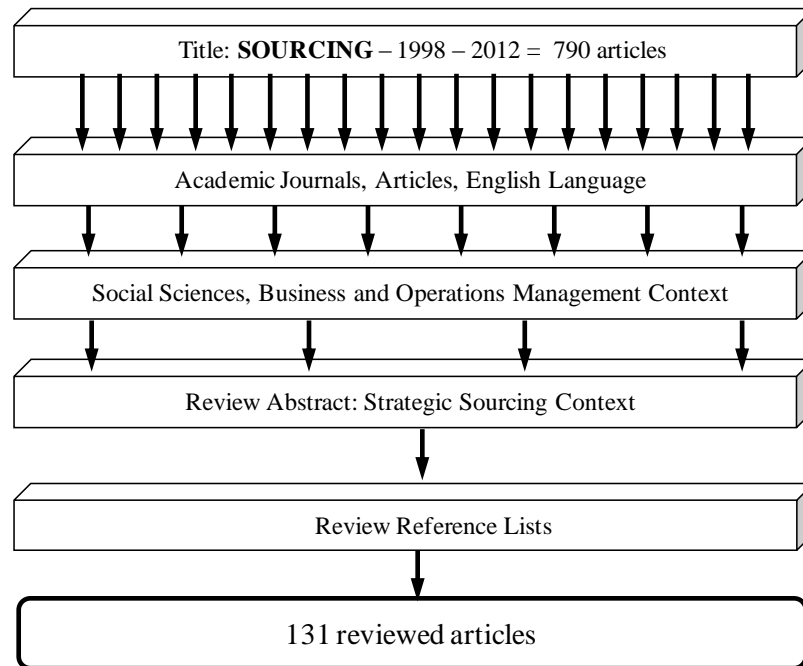


Figure 2-1: Literature review method

This research and review approach is limited and narrowly defined to strategic sourcing. The terminology of sourcing is widely used, as is also synonymous with supply management, procurement or purchasing, which means this review should identify how authors use sourcing, define the context and get an impression of the current state of the subject matter. Therefore, articles using purchasing, procurement or supply management are not considered in this review. The primary goal is to identify the topics considered when talking about sourcing and to assess them alongside the practitioners' views of strategic sourcing in companies.

These articles are predominantly published in the following journals, which are presented in Figure 2-2:

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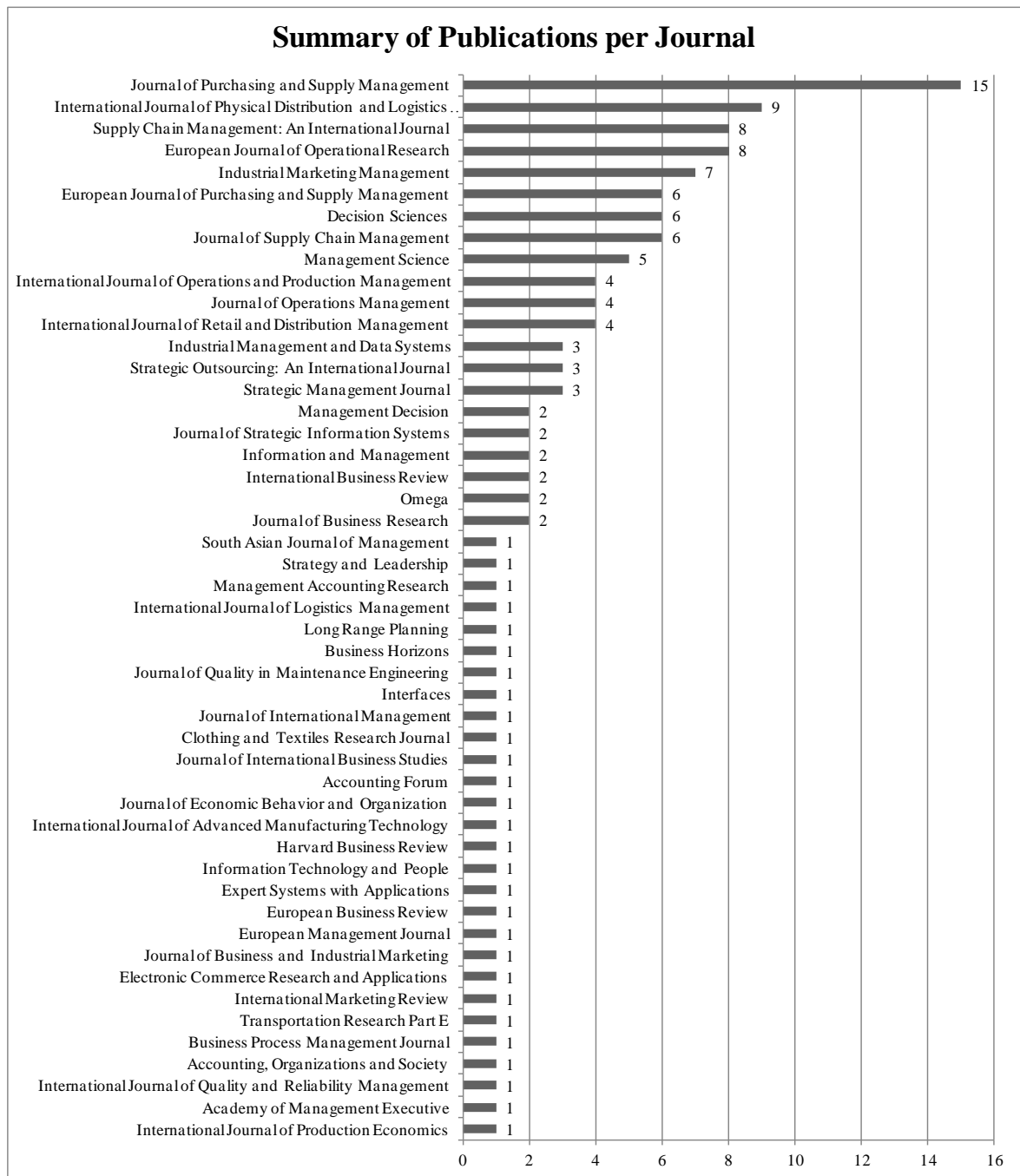


Figure 2-2: Academic sourcing journals included in study

Previous publications have already addressed literature reviews on sourcing. In particular, Shook *et al.* (2009) review the ten most important theories being applied in sourcing and recommend the application of theory in academia and business. Pagano (2009)

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presents a literature review on relational capabilities in global sourcing, while Kausik and Mahadevan (2012) present a literature review on strategic sourcing from 1997–2010. Here, the authors list 225 papers, but the research methodology lacks rigour and the researchers cannot justify how they select papers and how they interpret and define strategic sourcing. The authors state that they used different key words, but it is not clear which were used. In the review, Kausik and Mahadevan (2012) explain that they identified six articles published in the *Journal of Purchasing and Supply Management*, but the authors of the current research project have identified 13 articles by using ‘sourcing’ in the title search and checking a similar period.

Therefore, this review provides additional knowledge and specific contributions, and presents a transparent view of the research process and methodology. Furthermore, it analyses the articles and presents the most relevant topics in strategic sourcing. We can see that the peak number of articles was 17 in 2009. Whereas at the beginning of the 2000s only a few articles were published, the frequency increased over time to more than ten publications per year. Figure 2-3 shows the development and article distribution, although it can be concluded that the attention has only slightly increased.

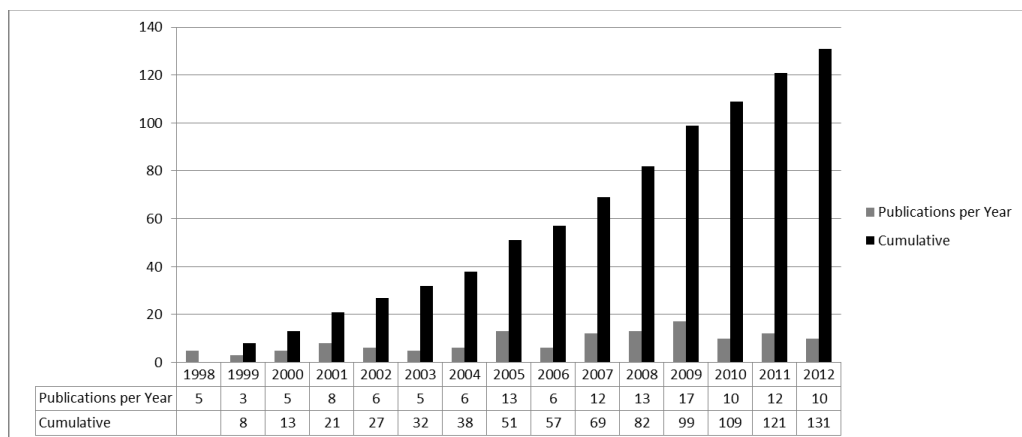


Figure 2-3: Literature review and number of publications

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Furthermore, the reviewed articles are clustered into different dimensions for better understanding and to establish the different research areas academics have investigated over the years. For this purpose, the cluster and selection criteria are defined in Table 2-1.

Research area	Criteria
Global sourcing	<ul style="list-style-type: none"> • Worldwide sourcing (e.g., China, Asia, BRIC) • Global supply networks
Make-or-buy (in- or outsourcing)	<ul style="list-style-type: none"> • Evaluation of make-or-buy processes, in- or outsourcing concepts and models • Concurrent- or bi-sourcing
Decision-making	<ul style="list-style-type: none"> • Multi-criteria decision-making models to select suppliers, allocate quantities, make-to-order concepts • Methodology and processes in decision-making
Strategic sourcing characteristics	<ul style="list-style-type: none"> • Determination of strategic sourcing • Evaluation of the impact and influence on competitive advantage
Electronic sourcing	<ul style="list-style-type: none"> • Electronic auctions and platforms • Electronic data exchange and collaboration/integration with suppliers
Best practice and trends	<ul style="list-style-type: none"> • Best practices in form of publications around success factors and empirical studies • Publications covering trends
Single vs. multiple	<ul style="list-style-type: none"> • Strategies, criteria and methods to use single vs. multiple-sourcing strategies
Sourcing organisation	<ul style="list-style-type: none"> • Organisational aspects such as central or decentralised organisations
Products and services sourcing	<ul style="list-style-type: none"> • Specific sourcing practices around modularity concepts, services sourcing or products
Sourcing risk management	<ul style="list-style-type: none"> • Risk management and concepts • Supply chain agility
Sustainable and ethical sourcing	<ul style="list-style-type: none"> • Sustainable, green or ethical sourcing practices
Cooperation models/alliances	<ul style="list-style-type: none"> • Using supplier collaboration models or buying alliances
Supplier relationship management	<ul style="list-style-type: none"> • Principles and attributes to establish and manage supplier relations covering the bargaining power

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Research area	Criteria
Reviews	<ul style="list-style-type: none">• Literature review papers• General reviews or research papers

Table 2-1: Literature reviews focus areas

2.2 Latest Developments in Sourcing

The dominant areas in sourcing focus on: global sourcing, make-or-buy, in- or out-sourcing questions and decision-making. These dimensions represent 49% of the reviewed articles and the majority of the discussed topics (see Table 2-2). Global sourcing covers the holistic sourcing decisions in foreign countries, such as near- or offshoring or low-cost country sourcing. Make-or-buy decisions and in- or outsourcing are the second largest research area, while the third largest covers decision-making processes, where several heuristic and computational models are applied to determine, for instance, the right number of suppliers or supplier selection frameworks.

The remaining dimensions primarily evolved over time as the research field broadened and new sub-areas emerged. Global sourcing is the leading dimension, with academics arguably motivated by the increasing trend of companies approaching global sourcing markets.

It can be concluded that the research area has broadened in recent years (see Figure 2-4), and from a strategic point of view the development and application of appropriate sourcing strategies is essential in corporate development.

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Topic	No. of articles	%
Global sourcing	31	23.7%
Make-or-buy (in- or outsourcing)	18	13.7%
Decision making	15	11.5%
Strategic sourcing characteristics	12	9.2%
Electronic sourcing	9	6.9%
Best practice and trends	7	5.3%
Single vs. multiple	7	5.3%
Sourcing organisation	7	5.3%
Products and services sourcing	6	4.6%
Sourcing risk management	6	4.6%
Sustainable and ethical sourcing	4	3.1%
Cooperation models/alliances	3	2.3%
Supplier relationship management	3	2.3%
Reviews	3	2.3%
Total	131	100%

Table 2-2: Research areas in sourcing literature

Number of Publications	Year															
Research Area	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Global Sourcing	2		2	4	1	2	2	1		3	1	3	2	6	2	31
Make or Buy (in-/ outsourcing)			1	2	1		1	4		1	1	2	2		3	18
Decision Making			1	2	1	1	1	1			2		2	3	1	15
Strategic Sourcing Characteristics	1	1				1	1	1	2	1	2	1			1	12
Electronic Sourcing							1	2	2	2	1	1				9
Best practice and trends					1					3	1	2				7
Single vs. Multiple	2								1	1		1	2			7
Sourcing Organization		1									2	3	1			7
Products & Services Sourcing					2	1		1		1					1	6
Sourcing Risk Management											2	1		2	1	6
Sustainable and ethical sourcing								1	1				1		1	4
Cooperation models/ Alliances			1					1			1					3
Reviews												2			1	3
Supplier Relationship Management		1						1				1				3
Total	5	3	5	8	6	5	6	13	6	12	13	17	10	12	10	131

Figure 2-4: Published articles by research area

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2.2.1 *Global sourcing*

The most discussed topic is global sourcing and global supply networks, a category that accounted for 31 (23.7%) of the 131 articles identified. The area is wide-ranging and covers sourcing decisions in foreign countries, such as near- or offshoring or low-cost country sourcing. Bozarth *et al.* (1998) develop four sourcing strategies: 1) information exchange, 2) multiple sourcing, 3) formal contractual relationships and 4) informal partnering. These are differentiated depending on whether companies source domestically, internationally, reactively and proactively or through global sourcing networks.

Samli *et al.* (1998) highlight that governance structures and initiative planning are relevant to global sourcing, and that companies executing global sourcing have more formal and contractual supplier relationships. Meanwhile, Zeng (2000) presents a conceptual paper on sourcing strategies in which he focuses on four key strategies—multiple sourcing, single sourcing, network sourcing and global sourcing—with a specific focus on sourcing from China. Companies acting and competing in global markets must focus on global sourcing, especially if the competition increases, product life cycle shortens and technological advances are rapid.

Li *et al.* (2000) argue that companies tend to focus on cost, supply and operational issues when making a global sourcing decision, but not on consumers. In particular, companies should consider the ‘country of design’ rather than the country of assembly. Lowson (2001) uses hierarchies to determine sourcing strategies: generic strategies, strategic positioning, operations strategy and operations management. Many companies simply ignore some of the hidden costs in their global supply chain, and therefore the assumed cost advantage ultimately might not pay off. Although sourcing from Asia is highly attractive, particularly the low costs, buyers need to consider flexibility, supply chain agility, cus-

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tomers service levels, lead times, process times, inventories and uncertainties. Many retailers accept up to 25% higher costs to trade-off with increased flexibility and agility.

Cho and Kang (2001) survey 148 US apparel companies to evaluate global sourcing practices, analysing: a) the challenges and risks of global sourcing, b) logistic support, c) cultural differences and d) regulation. One of the findings relates to the difference in practices and results between different service levels, including better service, delivery or product availability when sourcing women's and children's clothes globally. Furthermore, companies with large import volumes received better services from suppliers, but faced challenges in regulation and quotas. Cultural differences can pose a problem for companies who have minimal experience: "India or China provided significantly higher benefits in competitive advantage (accessing lower priced goods, obtaining better value for money, and enhancing competitive position) than did Taiwan or Korea" (Cho and Kang, 2001, p. 558).

Nellore *et al.* (2001) claim that global sourcing is contrary to a lean production strategy, and urge companies to make cautious decisions by considering the product's complexity and criticality. In addition, Hult (2002) concludes that the structure of the global process (centralised, formalised, specialised) has a significant effect on activities and relationships. "Sustainable competitive advantage (composed of entrepreneurship, innovativeness, and learning) have an impact on both the cycle time of the global sourcing process and the firm's overall business performance" (Hult, 2002, p. 31).

Trent and Monczka (2003, p. 607) present an integrated global sourcing approach and built a "five-level continuum" to highlight the emergence of global sourcing excellence. The authors show that over three to five years, 54.5% of the participants strived for global sourcing execution but only 16.1% reached that level. However, firms cope with

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several problems, where the availability of highly skilled people, required information and a global supply base are the most critical factors. In this context, the authors argue that managers ignore the long-term sustainable impact on global sourcing decisions and focus instead only on quick wins and minimal costs.

Zeng (2003) focuses on global sourcing strategies in the aviation sector, and shows that the supply chain structure is critical in information exchange and decision-making. Furthermore, he develops a global sourcing process matrix that covers strategic, tactical and operational levels in the first dimension, and material, information and cash in the process flow as the second dimension.

Jin (2004) proposes mixed global and domestic sourcing strategies due to the uncertainty of demand, manufacturing information technology, local sub-contractor clusters and long-term supplier relationships, while Kotabe and Murray (2004) argue for new hierarchical governance structures and changing cooperation models with suppliers due to changing environments. Companies should exploit their own capabilities and benefit from new capabilities, technologies and knowledge through their strategic partnerships. “An effective global sourcing strategy calls for continual efforts to streamline manufacturing without sacrificing marketing flexibility” (Kotabe and Murray, 2004, p. 13).

The custom-clearance practices of India, and their impact on import uncertainty from a global sourcing perspective, are investigated by Sawhney and Sumukadas (2005). In a case study survey, the authors evaluate buyer-buyer collaborations in global sourcing, which mitigates risk through reducing time in import clearance. Although buyers can borrow raw materials from competitors to cover shortages in the supply, they have to provide evidence that the raw materials were definitely delayed in the clearing process.

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Akesson *et al.* (2007) prove different strategies (direct vs. through agency) are available in low-cost countries and Eastern Europe, and conclude that instead of a single-supplier strategy, which has an impact on risk and lead times, companies should adopt at least a dual-supplier strategy. Ruamsook *et al.* (2007) execute a survey with 160 respondents to analyse low-cost country sourcing behaviour and identify potential new markets. The authors look at 14 specific operational factors and conclude that Brazil, Mexico and Thailand are the best low-cost source countries.

Nassimbeni and Sartor (2007) present a case study research project on global sourcing, with a particular focus on the significant cultural aspect of supplier relationships and state different approaches, such as direct, intermediate (through a third party) or imposed-sourcing strategies (legitimate presence) should be considered. Furthermore, companies face several obstacles in protecting technology and intellectual property.

Meanwhile, Steinle and Schiele (2008) highlight the limits of global sourcing, and conclude that not every material category is suitable. Surprisingly, the proposed global sourcing approach applies to industry-standard supplies only, whereas specialised and general supplies should be sourced from domestic suppliers. There are limited cost advantages in global sourcing if taking into account transportation costs, on-time delivery, weak specification compliance leading to reworking and the loss of short-term flexibility. One of their main claims relates to the insufficient use of total-cost calculations for sourcing decisions.

The decision framework of Fredriksson and Jonsson (2009) considers country characteristics, network structures and relationships as key categories, which are split into eight dimensions: layering and tiering, plant roles, business relationships, operational dependencies and transaction costs, infrastructure, culture, human capital and policies and regulation.

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Tsai *et al.* (2009) investigate responsiveness in a global sourcing context with 118 multinational companies. Global responsiveness, as in the ability to react on a global basis to emerging environmental changes, is a driver in the global value chain (Tsai *et al.*, 2009, p. 617). Young *et al.* (2009) develop a landed cost model with a focus on price, transport, customs, inventory, overheads and risk. Based on the feedback from ten panel companies, some of the variables are difficult to determine because the information is not available to managers. However, inventory costs, overheads and risks have not been considered in sourcing decisions in the past.

Platts and Song (2010) research global sourcing decisions in China and its total cost impact, finding that companies lacked a real understanding of the total costs involved in global sourcing decisions; an in-depth case study shows an average price deviation of 50% between the real total cost and the quoted price. In addition, Weber *et al.* (2010) provide a case study involving Siemens Healthcare and discuss the total cost of ownership calculation, which is based on activity costing. Several additional cost factors must be considered in low-cost country sourcing, and management support is necessary due to the additional effort and cost in supplier management. Tough, global sourcing is suitable for products of low-to-medium complexity in large quantities.

Kusaba *et al.* (2011) argue that many companies lack experience in global sourcing and require a profound sourcing strategy on a category level with an understanding of risks, benefits and the cost impact. In general, the process requires specific skills to evaluate in- vs. outsourcing, near- vs. offshoring, the organisational change impact and the relevant investments. Successful low-cost country sourcing has an impact on several performance variables, such as financial savings, supply chain performance and product quality.

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In their study, Maltz *et al.* (2011) analyse multiple attributes in global sourcing decisions and develop a perceptual map to support decision making while focusing on intellectual property protection, low labour costs and low/high reliability (e.g., orders on time). The general finding is that sourcing managers do not assess all cost components. “Moreover, sourcing managers seem to implicitly make a trade-off between lower labour costs and better intellectual property protection” (Maltz *et al.*, 2011, p. 803).

Lewin and Volberda (2011) develop an offshore-decision model, which considers task characteristics, management internationalities (first mover, strategic, top down, etc.), global provider industries, social, economic and technological changes, industry pressures, and national institutional configuration. Moreover, Tunisini *et al.* (2011) conclude that local sourcing suppliers face strong competition, and companies change their international sourcing strategies; they use local suppliers with high flexibility, efficiency, production/delivery performance and knowledge/innovation capabilities.

Schiele *et al.* (2011) investigates savings realisation in global sourcing by executing 134 workshops with practitioners. The study shows that the realised savings were on average 3.4%, instead of the often-expected two-digit figures. In addition, Wang *et al.* (2011) evaluate the motives of Australian firms when sourcing from China, and find that although the majority of firms benefitted and ensured competitiveness, the expected cost reductions are not fully utilised and companies face several hurdles. These include hidden costs, loss of secrets and IP rights, the opportunistic behaviour of suppliers, quality issues and performance problems.

Hultman *et al.* (2012) present a case study of IKEA and its global sourcing and supply network interactions. “Global sourcing decisions need to be understood and coordinated across supply networks, rather than purely within individual companies. Suppliers

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that are under pressure from their customers to develop or expand global sourcing should capitalise on the customer's potential influence within the wider supply network” (Hultman *et al.*, 2012, p. 19).

Finally, Lee and Yin (2012) focus on changing shareholder value through offshoring and outsourcing; foreign affiliate companies tend to have a higher proportion of outsourcing and realise an equivalent cash margin, where the main problem is increasing the wealth return on assets for shareholders and reducing costs.

There is a good balance with regards quantitative, qualitative and mixed methods, leading to good researched basis in this section. Samli *et al.* (1998) concludes that many companies are still using global sourcing as an opportunistic approach to decrease costs, but does not provide evidence of the financial impacts from the surveyed companies. However, the study findings may have changed in the meantime, while more companies tend to source globally. Trent and Monczka (2003) identified cost savings up to 15% through global sourcing and companies aimed to increase their global spend, but also remind of the potential risk and managers' lack of consideration of sustainability aspects. Furthermore, Nellore *et al.* (2001) argues against the benefits of global sourcing and its compatibility with the lean management philosophy. The key differentiator between Asia and Eastern European suppliers are clearly lead times (Akesson *et al.*, 2007). Following the findings of Platts and Song (2010), companies lack a real understanding of total costs in global sourcing decisions. Schiele *et al.* (2011) even identified in 134 workshops that the average savings from global sourcing are only 3.4%. Therefore, global sourcing is not the 'holy grail' in realising savings.

Equally, Steinle and Schiele (2008) point out disadvantages in transport costs, loss of flexibility, loss of competition, specification compliance, on-time delivery and rework-

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ing leading to additional costs. In addition, Lowson (2001) argues that companies accepted higher costs to be more flexible and have appropriate supply chain agility, customer service levels, lead times, process times, inventories and uncertainties. Similarly, Kotabe and Murray (2004) discuss the general pitfalls in global sourcing, such as logistics, economies, trends and long-term relationships. In this context, Nassimbeni and Sartor (2007) specifically look at sourcing typologies from China, where buyers have to consider cultural, normative, protection of technology and intellectual property and logistical problems, and the typical “guanxi” behaviour (relationship, interpersonal skills) (Nassimbeni and Sartor, 2007). Indeed, if meeting volatile demand and short lead times to customers, global sourcing is not an appropriate method while companies need to trade-off between agility and costs (Jin, 2004). On the other hand, Ruamsook *et al.* (2007) identified other attractive global markets, such as Brazil, Mexico and Thailand.

The global sourcing approaches are established and increasing constantly. However, the decision to source globally implies certain pros and cons. Finally, if considering recent developments in Asian countries leading to labour cost increases, customs regulation, property rights or sustainability issues, it is in the end a question of whether the “sourcing pendulum” may swing back to Europe to meet the heightened expectations of customers in lead times and customisation. On the other hand, if considering the behaviour of competitors and the availability of suppliers in certain regions, it is a question of whether a company can really choose a different supply market if all of the high-tech suppliers are based in Asia. Therefore, companies need to consider the risks, the agility and the cost and adjust their sourcing strategies appropriately.

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2.2.2 *Make-or-buy (in- or outsourcing) decisions*

There are 18 articles (13.7%) dealing with make-or-buy and in- and outsourcing decisions. Furthermore, the emerging concurrent or bi-sourcing concept, which is a combination of make-or-buy strategies, is highlighted, allowing for examples of the optimum leveraging of internal and external capacities. Fong *et al.* (2000) present a study on concurrent sourcing, which allows for a lower stock level if suppliers have different lead times and purchases are split equally. Although the study involves one stock item and replenishment only, the results may allow for a further optimisation of working capital.

Novak and Eppinger (2001) develop a statistical model to evaluate make-or-buy decisions based on product complexity, which together with union and platform increases the likelihood of vertical integration, and where sunk costs decrease it. Additionally, Tayles and Drury (2001) introduce a flow chart to support decision-making in outsourcing and urge managers to align them with the corporate strategies. In their model, the authors raise several points, including whether the component is strategically core or non-core, the costs to make vs. buy, capital spend/investments and supplier and resource availability.

Jennings (2002) develops a model to support outsourcing decisions in qualitative studies. A make-or-buy decision should be based on an assessment of the impact on competitive advantage, competitive environment, capability, cost, supply environment and technologies. Furthermore, Hui and Tsang (2004) develop a matrix to support decision making in facility management sourcing that considers insourcing, out-tasking, outsourcing for cost savings and outsourcing for capability as appropriate strategies. In addition, companies need to consider the operational implementation and should maintain relationships or partnerships with service agents.

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Watjatrakul (2005) focuses on resources and specific assets, and argues that high specificity leads to insourcing, while low specificity leads to outsourcing. Gottfredson *et al.* (2005) propose a portfolio approach to support make-or-buy decisions, which considers the uniqueness of business processes vs. the proprietary nature of processes. Furthermore, the cost per transaction and the company's ability to perform the function require assessment.

In their study, Gottfredson and Philips (2005) spot the core versus non-core question, but reinforce the need to consider all functions within a supply chain. Operational integration seems to be a critical hurdle, and companies fail to measure the success of an outsourcing decision or project. Therefore, to be able to make suitable and sustainable decisions, companies need to understand their strengths, weaknesses and relative costs. Park and Kim (2005) point out that outsourcing costs will increase over time, but will save money in the early years when compared to an in-house solution. Furthermore, outsourcing will improve the service level and provide higher quality.

Parmigiani (2007) analyses the strategies of make, buy and concurrent sourcing, and highlights concurrent sourcing as an option to strengthen a competitive advantage through reduced dependency on suppliers, or alternatively to influence suppliers' knowledge in fast-changing technology markets. Meanwhile, Safizadeh *et al.* (2008) investigate in- and outsourcing within the financial services industry, and empirically analyse whether service customisation and volume influence decision making for the in- or outsourcing of applications. There are heterogeneous sourcing practices across the board, but companies prefer in-house sourcing if customisation requirements are high or the process demands a higher level of services.

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Cho (2009) studies the backward integration questions within the retail business and the global sourcing context, finding that high sourcing spend and a long-term prospect (e.g., demand) are significant criteria for backward integration to realise economies of scale and amortise relevant fixed costs. In addition, in cases where country risks and asset specificity and uncertainty is high (e.g., required skills, knowledge, time, training to build own capabilities), backward integration is not supported.

Parmigiani and Mitchell (2009) focus on make-and-buy strategies with complementary goods to be more flexible in operations and utilise capacities when using a company's own and suppliers' production capacities. Furthermore, such a strategy offers the advantage of learning from suppliers. The authors identify several companies that already use concurrent sourcing, particularly to cope with demand uncertainty and to access suppliers' skills. Martin *et al.* (2010) empirically analyse the situation of supply chain sourcing in remanufacturing and its drivers for make-and-buy decisions, and identify intellectual property, operational assets and remanufacturing frequency as drivers for make decisions. Surprisingly, brand reputation, product complexity or volume uncertainty do not drive in-house remanufacturing.

Mols (2010) analyses the economic explanation of concurrent sourcing, and in this context recommends that managers do not view this strategy as a choice of two alternatives in make-and-buy. Such a combined strategy safeguards or solves specific problems, for example, demand volatility, quality or new technologies. More recently, Benaroch *et al.* (2012) look at the effect of sourcing flexibility on service outsourcing for transaction-based services. The authors draw up two regimes relating to different cost structures, and recommend considering demand volatility, the complexity of the process (skills requirements) and the back-sourcing flexibility within the decision-making process.

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Beladi and Mukherjee (2012) investigate the bi-sourcing question (make-and-buy strategies) and support the view that the combination of inside and outside production often provides added value to customers. Due to greater competition in the input market, the input price should decrease, thus reducing the incentives for the company. Finally, Oke and Kach (2012) analyse the link between sourcing and collaborative strategies leading to operational performance. The authors develop an equation model, based on a sample of 476 small manufacturing companies, and conclude that sub-contracting, outsourcing and collaborative approaches positively relate to operational performance. Furthermore, operational innovation is important to smaller companies given its potential to improve financial performance.

Make-or-buy respectively in- or outsourcing decisions are the second most common discussed dimension in this review. The broad range of conceptual, qualitative and quantitative papers show the “maturity”, and the importance of such a decision can have a significant impact on the company, if for instance considering IT or manufacturing outsourcing. Different models and criteria were developed and tested in case study research.

Concurrent sourcing offers more manufacturing flexibility and strengthens the competitive advantage (Parmigiani, 2007; Parmigiani and Mitchell, 2009) and can even be used to solve capacity problems caused by volatile demand (Mols (2010)). Beladi and Mukherjee (2012) support the bi-sourcing approach, which adds value to customers, albeit the argument is based on a simplified equation model with relatively narrow assumptions about the environment. However, the competitive advantage and its long-term impact must be considered and verified in a longitudinal study. Jennings (2002) developed a model based on literature, which supports the outsourcing decision and focuses on concerns such as the impact on competitive advantage, costs or the supply market with a long-term focus

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and a potential market change. Although the model was not tested, there is still a risk in a mid-term perspective when suppliers can become competitors (Rossetti and Choi, 2005). Watjatrakul (2005) argues that major assets or high specificity with a potential uncertainty in the environments lead to in-house management (make). Conversely, Oke and Kach (2012) provide evidence for operational performance improvements through outsourcing in companies. Nevertheless, Park and Kim (2005) argue that outsourcing becomes more expensive over a mid-term perspective, although it is cheaper in the first years. However, when considering IT services the quality improved (Park and Kim, 2005). In addition, Gottfredson and Phillips (2005) criticise many companies for lacking appropriate management and measurement of outsourcing projects. Tayles and Drury (2001) present findings from case studies and highlight the complexity of the process if considering uncertainties. Similarly, Cho (2009) presents findings from the US retail sector where the backward integration of global suppliers is relevant. However, from a long-term perspective a backward integration is not supported where country risks and asset specificity uncertainty is high (required skills, knowledge, time, training to build own capabilities).

In summary, the research findings support the importance of outsourcing or make-or-buy questions in adding further value to the company and strengthening its competitive advantage. However, the decision and evaluation process needs to consider certain criteria and factors. Nevertheless, risks must be considered and the long-term impact on supply markets, suppliers or demand should be reflected.

2.2.3 *Decision-making*

There are 15 articles (11.5%) dealing with multi-criteria decision-making to select suppliers, allocate quantities, make-to-order concepts and processes. Decision-making is a complex process within almost all company departments, and includes consideration of the

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stakeholders' needs. In addition, several authors propose various heuristics, algorithms or mathematical models to best allocate quantities or select a supplier. King and Malhotra (2000) develop a framework to support information systems (IS) sourcing decisions, where the framework relates to a general decision between the internal market and outsourcing. Furthermore, the framework considers short-term operational impacts (efficiencies, cost savings, productivity, SLAs), mid-term impacts (performance, control, risk sharing) and long-term impacts (learning, core competencies).

Quayle (2001) analyses factors that influence sourcing decisions. Although there is always the question of single- or multiple-sourcing, the study identifies seven determinants that influence the decision: "Organisations' policy to single source and its importance in the sourcing decision, poor delivery, increased price demand, the state of the market, the importance of continuity and security of supply, and the importance of achieving a price reduction and reducing purchasing costs" (Quayle, 2001, p. 58).

Serel *et al.* (2001) study the use of long-term capacity reservation contracts, and highlight that although a long-term contract with a preferred supplier offers several advantages, the use of dual suppliers leads to lower stocks and higher flexibility in practice. Kern *et al.* (2002) identify benefits and potential risks for businesses and economies that have a relationship with application service providers, similar to the 'old-fashioned' IT outsourcing of applications. Managers need to consider the potential for high-dependency on the application service provider, which may increase over time and lead to cost disadvantages or even a later insourcing. However, the demand and the product life cycle of the specific software should be considered.

Zeng and Rossetti (2003) develop a five-step framework for evaluating logistical costs that focuses on weight-based, value-based and frequency-based criteria, while

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Murthy *et al.* (2004) propose a decision-making framework to improve make-to-order decisions through computational modelling in an auction and traditional bidding environment.

Wouters *et al.* (2005) investigate the adoption of total value of ownership in the sourcing decision, and argue that the total cost of ownership is limited and should be extended to a total value of ownership analysis considering the value of the service and the technical, economic and performance impact. “Top management support is required, but first the purchasing strategy must show a clear commitment to value-based purchasing” (Wouters *et al.*, 2005, p. 186).

Meanwhile, Burke *et al.* (2008) simulate the supplier-selection decision based on the given quantities to be delivered. The maximal capacity with the cheapest supplier based on single sourcing should be utilised if the supplier is capable of delivering the requested quantities; otherwise, multiple suppliers must be used. Sledgianowski *et al.* (2008) analyse the decision within an IT sourcing project for an enterprise resource planning system. Within outsourcing projects the decision process is vital, and the case shows that the active involvement of (top) management in vendor selection, negotiations, liaison and monitoring is a critical success factor.

Tsai *et al.* (2010) present a multi-criteria decision-making approach to the sourcing strategy, and compose a model based on a decision-making trial and an evaluation laboratory method in combination with the analytic network process. Meanwhile, Yue *et al.* (2010) analyse sourcing partner selection in a make-to-order manufacturing environment. The authors consider several variables (e.g., quantities, delivery date, fixed/variable costs) to simulate the probabilities of finishing the purchase order on time and the costs involved.

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In their study, Apte *et al.* (2011) apply the set covering problem into a pricing model for strategic sourcing, and find that based on total confidence in performance level and costs, the US Air Force could realise higher savings by applying the model. Ho *et al.* (2011) present a quality function deployment (QFD) and analytic hierarchy process (AHP) approach to strategic sourcing and supplier selection. The suggested methodology includes the involvement of relevant stakeholders within the company to ensure that supplier selection is aligned with business objectives. The authors review different approaches and propose a pair-wise comparison model covering six evaluation criteria: cost, delivery, quality, management, technology and relationship.

Pazirandeh (2011) researches a conceptual paper on vaccine supply chains within humanitarian networks, with quality, service, delivery, cost, risk and compatibility seen as basic criteria in strategic sourcing. Furthermore, within a decision framework the following criteria should be considered: availability of local suppliers, development of local suppliers, global suppliers, quality criteria, demand, capacity and investments in infrastructure.

Finally, Tereyağoğlu and Veeraraghavan (2012) analyse sourcing decisions in a market environment of conspicuous customers, and in their model stress that companies sourcing at a higher cost produce less quantities, which can lead to a scarcity strategy.

Few quantitative studies exist in the area of decision-making; the field is dominated by conceptual and computational models focusing on a small number of decision variables and suppliers. Although the field is rather theoretical and the real implementation of such models not tested in practice, the models and consideration of them can be helpful in practice, particularly if these models support decision-making and can be utilised by buyers. However, the decision in reality depends on multiple and complex criteria (King and Malhotra, 2000; Wouters *et al.*, 2005). Furthermore, Quayle (2001) provides a quantitative

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study from the UK and Switzerland and argues for the buyers' dilemma in making decisions that are subjectively driven (for instance the need for safety). Furthermore, the author points out that almost one-third of the companies apply single-sourcing strategies, which may increase the risk of exposure and influence supply flexibility. If considering these findings, the application of objective, computational models in practice is not well established. Specifically, the research by Kern *et al.* (2002) and King and Malhotra (2000) considers complex decisions in the IT area and discuss risks being implied with an outsourcing decision. In summary, the consideration of risks in a decision-making process is not well established.

2.2.4 Strategic sourcing characteristics

There are 12 articles (9.2%) analysing strategic sourcing characteristics, with the main intention to highlight the importance and influence of strategic sourcing in gaining a competitive advantage. Anderson and Katz (1998) present a conceptual paper on strategic sourcing with a primary focus on total cost of ownership. Based on sourcing levels and clear processes, companies should focus on a) creating an annual plan, b) developing requirements, c) devising sourcing strategies, d) evaluating suppliers and e) developing supplier relationships. Furthermore, the authors present five levels of strategic sourcing maturity: user buy, leveraged buy, linked buy, value buy and integrated sell.

Narasimhan and Das (1999) empirically support the positive influence of strategic sourcing on manufacturing flexibilities, as buyers can increase manufacturing performance and reduce costs through strategic sourcing. Companies should execute regular self-assessments and consider their capabilities, skills and abilities (Freytag and Kirk, 2003). For instance, competencies in high compliance for future corporate business activities and high internal competency levels should be maintained and further developed within the

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company, whereas activities with low competency values should be improved, outsourced or liquidated.

Talluri and Narasimhan (2004) develop a framework for strategic sourcing by combining data envelopment analysis (DEA) models, the suppliers' performance and the metrics of strategic capabilities. In their study, Rossetti and Choi (2005) discuss and criticise the misapplication of strategic sourcing. Through short-term and cost-driven decisions, suppliers were squeezed and this led to direct competition with suppliers in the aviation sector. Strategic sourcing is a complex process, and buyers must understand the supply market risks, possess appropriate skills and answer difficult strategic questions relating to the company's sales, while continually demanding developments.

Kocabasoglu and Suresh (2006) investigate strategic sourcing characteristics by surveying 140 US manufacturing firms, and uncover the importance of the status of purchasing, internal coordination, information sharing with key suppliers and key supplier development. Many purchasing functions are seen to execute volume bundling and negotiations, and the authors argue for empowering the sourcing function with the relevant tools, making strategic decisions and managing supplier relationships.

Sandholm *et al.* (2006) introduce a system to drive costs down, increase "expressive competition" (p. 57) as a paradigm shift and build sourcing networks. The authors recommend offering suppliers more flexibility in bidding and allowing the most competitive pricing to be based on the suppliers' solution. Alternatively, Cox *et al.* (2007) urge consideration of the relationship between sourcing and the brand marketing strategy, which is not common in sourcing practices. Furthermore, sourcing personnel need to understand the strategic and operational options, particularly the changes in power, internal capabilities, market structures and bargaining power.

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Khan and Pillania (2008) present the key dimensions in strategic sourcing with empirical validation, where partnerships, flexibility, supplier selection and trust are essential. The authors provide evidence for the importance of strategic sourcing, and its positive correlation with the company's performance. Kim *et al.* (2008) analyse the two-sided sourcing strategy between a Japanese electronics original equipment manufacturer (OEM) and new suppliers, which are seen as incumbent in the sourcing strategy. The researchers argue for separating the two-sided strategy in technological change and volume, and for considering power dominances and dependencies.

Su *et al.* (2009) analyse how strategic sourcing and supplier selection influences competitive advantage and business performance. Based on the study's findings, the supplier selection process has an impact on gaining a competitive advantage, and strategic sourcing positively influences business performance. In this model context, the authors use variables to define strategic sourcing: long-range plans in accordance with companies' strategic plans, long-range plans with key suppliers and established sourcing strategies.

Furthermore, Chiang *et al.* (2012) show that strategic sourcing and strategic flexibility are significant influences on the agility of supply chains. The determination of strategic sourcing by strategic purchasing, supplier development, internal integration and information sharing has a greater influence on a firm's supply chain agility than flexibility.

The review of the strategic sourcing characteristics section reveals it to be at a more mature stage, based on quantitative and mixed studies. Several authors focus on the significance of sourcing to a company and present the key dimensions.

Therefore, it can be summarised that strategic sourcing is significant to a company. However, the dimensions to be considered are at least: supply flexibility, supplier relation-

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ship management including trust and key suppliers' development, the need to improve internal collaboration with other functions and sharing information.

In particular, Cox *et al.* (2007) argue for better collaboration between marketing and sourcing and the consideration of material supply risks to the competitive position of the company. Similarly, Rossetti and Choi (2005) claim that buyers do not fully understand the market risks of suppliers. Furthermore, the authors criticise the practices of squeezing suppliers and not considering the long-term impact of bargaining power and supplier behaviour, especially as the supplier may become a competitor. The case study at Procter & Gamble highlights that companies still rely on new tools to increase supplier competitiveness and obviously to squeeze costs down (Sandholm *et al.*, 2006). Although the advantage of that tool is the consideration of suppliers' capabilities, capacities and innovation, it is worth questioning whether such collaboration considers a long-term partnership approach.

Finally, Su *et al.* (2009) underlines the relevance of strategic sourcing to business performance and supplier selection to competitive advantage. The study is US-based, within the apparel sector only and lacks evidence through financial underpinnings, but argues that the sourcing functions must be aware of their significant role.

2.2.5 Electronic sourcing and auctions

There are nine articles (6.9%) focusing on electronic sourcing and auction concepts. Emiliani (2004) researches the benefits and implementation of online reverse auctions and finds that a reverse auction does not offer real benefits for buyers or sellers. Companies primarily focused on unit price reductions and ignored the total-cost-of-ownership (TCO) impact. Arnold *et al.* (2005) argue that many buyers underestimated or even ignored the related effort of electronic reverse auctions. In general, potential savings on the product price ranged up to 50% with improvements in cycle and processing time.

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Consideration of strong processes, knowledge, the right auction design and conditions were success factors in an electronic auction.

Saeed *et al.* (2005) argue that electronic collaboration with suppliers (inter-organisational systems) improves process efficiencies and different performance objectives, while Engelbrecht-Wiggans and Katok (2006) show in a laboratory study on reverse auctions that a hybrid process combined with reverse auctions and negotiations decreases buyers' total costs.

Hartley *et al.* (2006) present survey results from 164 managers and conclude that the biggest barriers for non-adopters of electronic auctions are security concerns in information systems. Associated with this, Gattiker *et al.* (2007) present a laboratory case involving 117 students to evaluate trust perception between buyers and suppliers in electronic sourcing. The study shows electronic sourcing as a medium of communication influences sellers' trust, which can be enforced through face-to-face negotiations.

In a computational model, Sharp (2007) simulates the operational risk in electronic sourcing when a company outsources essential processes. For this purpose, the author selects four factors (financial, legal, reputational and competitive risk) and uses three core processes (website ordering, computer-based stock control and delivery) in the model. The simulation shows no difference whether all processes are in-house or partly external.

Amelinckx *et al.* (2008) contribute to the electronic sourcing theory by focusing on reverse auctions. The developed conceptual model considers two organisational antecedents (top management support and organisational commitment) and three project-related antecedents (project team e-sourcing expertise, cross-functional team, procedural fairness). Furthermore, the supply market competition, suppliers' e-readiness and expertise were found to be relevant in a successful project.

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In addition, Tunca and Wu (2009) develop a mathematical model to support decision-making in reverse auctions. The model differentiates between single and two-stage processes and single versus multiple-supplier sourcing strategies, with the authors proposing a two-stage process if production scalability is high. On the contrary, limited or reduced scalability leads to inefficient processes.

The electronic sourcing field is mainly driven by qualitative studies, and although the field has gained more attention in recent years, the context of strategic sourcing is under-researched. It is arguable that the importance of supplier-buyer relationships is essential to strategic sourcing, but companies and academia do not discuss these topics. These relationships relate to trust, and a laboratory study by Gattiker *et al.* (2007) highlights that electronic sourcing affects trust, which can only be developed by face-to-face negotiations. However, electronic sourcing is in general increasing process efficiency (Saeed *et al.*, 2005), the collaboration with suppliers (Saeed *et al.*, 2005), price reductions through auction (Arnold *et al.*, 2005), but companies remain concerned about security issues in adapting electronic sourcing (Hartley *et al.*, 2006) or operational risks (Sharp, 2007). Where Emiliani (2004) argues that auctions do not offer real benefits and reduce total costs, Arnold *et al.* (2005) argue the contrary. Similarly, Engelbrecht-Wiggans and Katok (2006) support the phenomenon of price reductions by using electronic auctions. However, this approach can be criticised due to their laboratory case structure and without a real business case.

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2.2.6 *Best practice and trends*

There are seven articles (5.3%) discussing best practices or trends in the form of publications considering critical success factors, quantitative studies or discussion papers. Von Corswant and Fredriksson (2002) present a global survey and identify that product costs had become more important in 1998 than they were in 1988, together with delivery precision, customised products and product-related services. Freytag and Mikkelsen (2007) discuss six managerial challenges in strategic sourcing and highlight that relationships, supplier selection, performance management and supply-base dynamics will provide new challenges.

Chan and Chin (2007) and Chan *et al.* (2007) present a quantitative study of the Hong Kong toy industry, and highlight the importance of governance and leadership in a best practice sourcing function as one of the key success factors. Alternatively, visionary leadership, supplier management and continuous improvement are seen as vital criteria. In this context, a conflict exists between the perception that best practice criteria are important and the proper implementation of those criteria.

Edgell *et al.* (2008) highlight different trends in IT sourcing across continents, concluding that globally cost-driven outsourcing, post-signature support, governance, supplier management, pharmacy and life science outsourcing and green IT have become more important. Oshri *et al.* (2009) review the global sourcing trends in IT sourcing and forecast a continuing increase in outsourcing, meaning business outsourcing will overtake IT outsourcing. Although companies tend to prefer near-shore sourcing, India will remain the most popular country for outsourcing, according to the authors. Finally, Sharma and Loh (2009) identify three dominant trends in business services sourcing: local sourcing and im-

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provement through re-engineering, leveraging and outsourcing to a service provider and the relocation of services to offshore countries.

The majority of the findings presented in this chapter relate to quantitative studies with the possibility for generalisation, except the conceptual papers by Oshri *et al.* (2009) and Sharma and Loh (2009). Although, Chan and Chin (2007) and Chan *et al.* (2007) researched a narrow industry, the findings from 205 companies offer a good base to determine the relevance and state of strategic sourcing. Their study supported the significance of strategic sourcing to the company and its competitive advantage, essentially the business performance. However, one may claim that due to cultural changes and the industry specifics, the findings cannot be applied to Europe or the US. The identified trends partially relate to conceptual papers and some to quantitative studies. Corswant and Fredriksson (2002) identified only three of eight trends, which were support by automotive companies. The advantage of the study is the consideration of the suppliers' and buyers' view, especially the trends of customisation and product costs, which are becoming important. Whereas Edgell *et al.* (2008) focus on global sourcing (mainly outsourcing) trends, Freytag and Mikkelsen (2007) consider managerial challenges. Although both sets of researchers used secondary data and studies to discuss the upcoming trends, the identified trends are partially in line with the development in academia and practice.

2.2.7 *Single vs. multiple sourcing*

There are seven articles (5.3%) evaluating and assessing single or multiple sourcing strategies, which represents one of the core considerations in supplier selection. Research by Larson and Kulchitsky (1998) supports single sourcing and supplier certification, which leads to higher quality and lower total costs. Furthermore, the supplier-buyer cooperation increases if the buyer-supplier dependence remains unchanged. Several mathematical

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models are developed to support decision-making and trade-offs, but qualitative factors and the strategic impact cannot be considered using such models.

On the contrary, Quayle (1998) supports the tendency for multiple-sourcing strategies where prices need to be reduced. However, single sourcing is an appropriate method to improve delivery performance. The decision to select the supplier, if a clear policy is not implemented, is a classical “buyer’s dilemma” (Quayle, 2001, p. 56). In a buyer’s market, sourcing professionals tend to implement single-sourcing strategies if there are delivery problems, price increases or relevant corporate policies. Otherwise, they tend to use multiple sources to benefit from price reductions or supply security.

Cachon and Zhang (2006) develop a numerical model to determine strategic choices in sourcing and reducing total costs, and analyse two strategies: late-fee mechanism with penalties for delays and the lead-time mechanism to focus on in-time deliveries. Both strategies are appropriate methods to reduce total costs. Burke *et al.* (2007) develop a numerical model to support decision-making in single- and multiple-source strategies, and argue for applying single sourcing only if suppliers’ capacity is greater than the demand. However, in their study, Yu *et al.* (2009) conclude that single or dual sourcing can be effective depending on the risk exposure the company is willing to take and the probability of delivery disruption.

Chung *et al.* (2010) study the dual-sourcing strategy within a decentralised supply chain, where one supplier offers higher flexibility in delivery and inventory and the second supplier offers a cheaper price with limited flexibility. In general, the authors claim that a single-source strategy is more beneficial to the buyer, but also show the trade-off between flexibility and price that supports, in certain cases, a dual- or multiple-supplier strategy.

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Costantino and Pellegrino (2010) evaluate the sourcing decisions of single and multiple suppliers by considering default risks and applying a quantitative model to support decision-making. In their computational model, the authors apply the real options approach, and the Monte Carlo simulation, to support the decision-making process.

Despite some conceptual papers on simplified models to support decision-making, the approach to single or multiple sourcing varies. Although, such models contribute particular knowledge, the complex decision-making process may require more variables. In addition, other factors, such as internal stakeholder buy-in, need to be considered. Where Quayle (1998) argues in support of multiple sourcing and increasing supplier competition to reduce prices, the findings of Larson and Kulchitsky (1998) support single sourcing, which leads to quality improvements. Chung *et al.* (2010) also support single sourcing, leading to lower purchase prices, which is contrary to Quayle (1998). However, the findings show the trade-off between flexibility and price. In this context, it can be concluded that single sourcing offers some advantages but equally leads to lower flexibility (higher risk) and reduced supplier competitiveness.

2.2.8 Sourcing organisation

There are seven articles (5.3%) analysing organisational aspects such as centralised or decentralised sourcing functions. Arnold (1999) looks for the optimum degree of centralisation and develops an analytical model to support the decision, which incorporates the dimension of the company's internationalisation and the degree of purchasing centrality. This leads to three basic organisational models: coordination, central purchasing and outsourcing.

Moses and Ahlström (2008) find that different departments within a company have contrary objectives or sourcing goals, and are not necessarily aligned. Due to the complex-

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ity of this process, which involves many stakeholders, the decision documentation, criteria, assumptions, project plan and a list of priorities are critical. Hartmann *et al.* (2008) present an explorative study of eight companies' sourcing organisations. Global enterprises managed categories, even fully central or guided centrally, whereas transnational organisations were more decentralised in organisational terms. The chief procurement officer has to focus on different control mechanisms to monitor corporate goals, planning and key performance indicators.

Shao and Ji (2009) conclude that optimal unique pricing exists in centralised purchasing structures, while in decentralised structures the pricing is in line with the Nash equilibrium and substitute products are overpriced, which leads to weaker performance. Trautmann *et al.* (2009a) study the integration of global sourcing organisations, finding that the integrative approach is supported through high uncertainty in category characteristics, supply market environments and the high complementary interdependence of purchasing units and its subsidiaries.

In addition, Trautmann *et al.* (2009b) present a purchasing portfolio approach to assess global synergies by adapting the Kraljic Model (Kraljic, 1983). The authors apply a two-by-two matrix and build three evaluation categories: economies of scale (degree of volume aggregation vs. supplier delivery scope), economies of information (purchase complexity vs. supply risk) and economies of process (transaction volume vs. process complexity). Finally, Driedonks *et al.* (2010) conclude that sourcing team effectiveness depends greatly on both the corporate culture and whether the company has a team management perspective. Thus, if employees have the relevant skills and experience to work in a team environment with the appropriate governance structures, this leads to empowerment and the enhancement of collaboration/teamwork.

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The leading question in sourcing is whether to centralise, coordinate or decentralise. The research by Arnold (1999) looks at the optimum degree of centralisation by considering the internationalisation of sourcing and the company's structures, whereas Trautmann *et al.* (2009b) focus on volume synergies, information and processes. Both papers are based on case studies with a narrow focus on specific circumstances. Moses and Åhlström (2008) provide a useful longitudinal case study and highlight the problems in internal stakeholder management. The problem of internal stakeholder management and alignment of sourcing strategies with corporate goals is a question of corporate culture, given that culture and governance are drivers for team effectiveness (Driedonks *et al.*, 2010). However, considering the papers on organisational design, the definition of the appropriate organisational set-up is difficult for a company because little is known about most efficient organisations.

2.2.9 Products & service sourcing

There are six articles (4.6%) considering sourcing practices around products or services. Gadde and Jellbo (2002) present a five-dimensional framework to analyse system sourcing, which is also known as modular sourcing. The approach considers the system's definition, manufacturing activities, customers' and suppliers' capabilities and developmental activities. The authors conclude that companies with strong integration in external networks through system sourcing are more successful.

Salvador *et al.* (2002) set out a qualitative study on product modularity and its challenges in operational performance. Consideration of the design of modularity in product architecture is recommended, and should be assessed in the early supplier selection phase. Meanwhile, Svensson (2003) analyses the structure of inbound and outbound logistics within the Swedish vehicle industry, finding that companies have greatly optimised their

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outbound logistics, with fewer suppliers than in inbound logistics. This leads to additional optimisation potential for sourcing managers.

Cox *et al.* (2005) analyse sourcing strategies in indirect procurement among 124 organisations through semi-structured interviews. Although companies see a need to manage indirect spending, appropriate management is not established and this spending lacks internal customer buy-in, has a high degree of maverick buying and is extremely fragmented. These categories lack strategic sourcing methodology, environmental services, mailing/distribution, legal services, external manufacturing and infrastructure maintenance.

Speklé *et al.* (2007) consider the internal audit sourcing decisions of 66 Dutch companies, and find that where larger firms seek to have an internal auditing department, smaller firms look to the external supply. Furthermore, companies integrate or establish an internal function if company-specific knowledge and intensive collaboration with the management is required.

The service-sourcing process is the focus of Selviaridis *et al.* (2011), where service orders are changed and (re)-shaped on a regular basis. In the research, they identify five factor categories that determine the service changes: sourcing capability, complexity, supplier expertise reliance, relationship continuity and adaptive interactions.

A focus on specific categories or services in sourcing has emerged since 2002. Cox *et al.* (2005) provide evidence that the sourcing function does not control the whole spending of a company and lacks internal buy-in. This interesting finding is based on a holistic quantitative survey, which does not allow the interviewee to comment on certain questions. However, buyers tend to have a long-term sourcing focus (Cox *et al.*, 2005; Speklé *et al.*, 2007) and have to deal with a complex field in services orders. Selviaridis *et al.* (2011) discuss the complexity of services sourcing and changed orders caused by supplier de-

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pendence or weak capabilities in sourcing. Conversely, Gadde and Jellbo (2002) claim that companies with greater levels of integration and which apply modular sourcing are more successful, and argue for generic strategies such as outsourcing, supply base consolidation and relationship building. In this context, the authors lack evidence to highlight how success is defined and measured. Furthermore, it is unclear whether the phenomenon is applicable to other industries. On the other hand, a high dependency and the bargaining power of a supplier may cause risks to the company. Salvador *et al.* (2002) concludes that modularity and product variety has an impact on optimisation; however, the design and supplier selection phases are critical. Considering these papers, the research questions are specific on product and category level, which are largely based on case study research. It seems that while companies do not cover indirect products in sourcing functions, the integration or perception of sourcing is still emerging.

2.2.10 Sourcing risk management

There are six articles (4.6%) associated with sourcing risk management and concepts to increase supply chain agility. Although risk factors were considered as far back as Kraljic's matrix (1983), the consistent application in practice has been weak. Desouza (2008) highlights the need to consider security (risks) in strategic sourcing efforts. Many companies are weak in the evaluation of strategic and operational risks for security reasons. Security should be considered and deliberated over in supply agreements, for instance: 1) devise frameworks to evaluate security risks, 2) how do we monitor outsourced projects for security breaches? 3) how do we resolve security disputes among partners? and 4) how do we build incentives for security?

Li and Barnes (2008) analyse proactive supply risk management when sourcing from emerging markets in five manufacturing companies and identify the following simi-

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larities in managing risks: supplier questionnaire, technical reviews, risk mitigation plan, employing local-based procurement staff, using a total cost model (and highlighting hidden costs) and finally having a strict product qualification process.

Deane *et al.* (2009) develop a multi-criteria model to mitigate environmental and density risk in global sourcing while considering the supplier and the location, and then generate a matrix on a component/single-part level to identify the appropriate number of suppliers. Christopher *et al.* (2011) look at managing global sourcing risks in a multiple and cross-industrial UK case study. “Global sourcing trends are making supply chains longer and more fragmented and this is exposing firms to greater costs and risks” (Christopher *et al.*, 2011, p.77).

Meena *et al.* (2011) consider the variables—the probability of the supplier’s failure, capacity and capacity-specific compensation—in an analytical model, while PrasannaVenkatesan (2012) develops a linear programming model to trade-off between total costs and delivery reliability. For this purpose, the author uses price, exchange rates and demand risks to simulate different scenarios.

The field of sourcing risk management is in a nascent stage and dominated by qualitative and conceptual papers. Although Desouza (2008) does not provide evidence, the author argues that many companies fail to consider security risks in outsourcing.

Specifically, Christopher *et al.* (2011) highlight that managers are aware of risks but lack the implementation to tackle them. The UK case study findings build a relevant foundation for this research project, which is supported by Li and Barnes (2008) who argue that companies typically apply proactive risk management. However, these findings relate to five companies in manufacturing and focus on low-cost countries without cross-country and cross-industry comparison.

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In summary, it can be stated that risk management in the context of sourcing is understudied. Global risks increase, and the global sourcing practice leads to complex supply chains, lean management, lower stocks and a higher risk of exposure (Christopher *et al.*, 2011). Hence, risks in single-sourcing strategies, make-or-buy decisions or sustainable value may occur and have to be considered in strategic sourcing, which is not yet reflected in the literature.

2.2.11 Sustainable and ethical sourcing

There are four articles (3.1%) investigating sustainable, green and ethical sourcing practices. Park and Stoel (2005) consider socially responsible buying within the apparel industry and conclude that the corporate ethics and social responsibility culture determines the degree to which it is practised. Therefore, it is important that the management communicate core ethical values.

Pretious and Love (2006) find that some companies will use intermediary companies or agents to “excuse” their direct relationship with a “low-cost” supplier and avoid potential conflicts. Although there is a danger of damaging the brand reputation and shareholder value, the majority of companies seek for cost advantages and take the risk instead.

To further develop a portfolio approach for sustainable sourcing, Pagell *et al.* (2010) present an extension of the Kraljic (1983) portfolio. The authors reveal that companies see many parts as strategic, and do not differentiate between leverage and strategic, and thus compose a portfolio on supply risk and threat to the triple bottom line.

Schneider and Wallenburg (2012) propose a framework that considers economic, social and environmental dimensions, and which is clustered into company-specific profiles: social activists, social economists and social environmentalists (Schneider and

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Wallenburg, 2012, p. 253). Furthermore, the sourcing function has to increase its understanding within stakeholder management.

Sustainable sourcing is attracting limited research interest and is dominated by qualitative research, despite it being an important topic in businesses (e.g., the Bangladesh catastrophe facing the apparel industry). The US-based quantitative study by Park and Stoel (2005) highlights the subjectivity and beliefs of buyers, which is highly dependent on corporate ethics and core values. Similarly, Schneider and Wallenburg (2012) argue for a company-specific attitude to sustainable sourcing. If such standards are not industry standards, the companies with stronger criteria are exposed to higher costs or may lose their competitive advantage. In summary, sustainable sourcing practices are mainly dependent on corporate strategy and values, where the sourcing function has to collaborate with other functions. The importance is increasing and one significant supplier failure can have a major impact on finances and shareholders, which companies need to be aware of.

2.2.12 Cooperation models/alliances

There are three articles (2.3%) studying strategic alliances and cooperation models with the supply base. Essig (2000) investigates the application of purchasing consortia to gain a competitive advantage. Although consortia sourcing is rarely applied in practice, it can offer a profound strategy for many companies. Murray *et al.* (2005) research strategic alliance-based sourcing from firms in China, and the quantitative survey supports the view that companies can perform better through strategic sourcing if product innovation and technological uncertainty are at low levels. Furthermore, demand uncertainty and the differentiation of products do not affect the sourcing performance.

Dubois and Fredriksson (2008) discuss “Triad Sourcing” in supply networks, a strategy, mainly enforced by the customer, which leads to a collaboration of normally

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competing suppliers. This strategy could prove challenging for each of the three participants, but the buyer has to focus on and balance the different interests of the suppliers.

The status or the generalisation of the cooperation models can be founded on the survey by Murray *et al.* (2005); however, it considers only firms from China. The major question of whether alliances or cooperation models lead to a competitive advantage or to improved business performance is not yet answered. Where Essig (2000) provides a conceptual paper and lacks practical evidence or empirical findings, Dubois and Fredriksson (2008) use a single case study within the automotive industry. Alliance-based sourcing or cooperation models are a strategic sourcing option, but is not an adequate method for strategic parts and suppliers ((Murray *et al.*, 2005).

2.2.13 Supplier relationship management

There are three articles (2.3%) associated with supplier relationship management. Spekman *et al.* (1999) present ten sourcing principles to manage suppliers effectively: 1) integration of suppliers, 2) information sharing, 3) develop trust, 4) organisational effective alignment, 5) commodity teams, 6) global sourcing, 7) total cost, 8) rationalize supply base, 9) let suppliers manage it and 10) finally leverage technology.

Wagner *et al.* (2005) explore the supplier development and relationship management, finding that category management was the most frequently used approach to develop suppliers. In combination with rationalisation programs, category management led to longer, better-established, supplier-buyer relationships. In general, the supplier's treatment relied on the buyer's attitude and personality.

Narasimhan *et al.* (2009) summarise from simulations with students that price is a driving variable and a sign of the supplier-buyer relationship. If the product price increases

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due to an increase in the suppliers' margin, the buyer tends to increase investments and look for alternatives to reduce dependency.

However, the findings on supplier relationship management in a sourcing context are explorative. While the research by Narasimhan *et al.* (2009) involves a laboratory study with students and without professional buyers, the findings support the dominant role of prices. Spekman *et al.* (1999) provide insights into important dimensions of supplier relationship management. However, it can be claimed that the consideration of buyers and suppliers in the sample size may dilute the findings. Finally, the establishment and treatment of the supplier-buyer relationship mainly depends on the subjective valuation of the buyer. This is in line with the findings in sustainable sourcing, which also depends on the subjectivity of buyers. Companies need to establish guidelines for buyers and increase objectivity in supplier relationship management.

2.2.14 Reviews

There are three articles (2.3%) reviewing the literature within the sourcing context. Shook *et al.* (2009) review the ten most important theories being applied in sourcing and recommend their application in academia and business. These are: transaction cost economics, resource dependency view, resource-based view, institutional, systems, network, agency, strategic choice, sociocognitive and critical theory.

Pagano (2009) presents a literature review on relational capabilities in international sourcing. The author focuses on multinational companies and analyses 47 articles before concluding that the companies must adjust their processes with the degree of international sourcing to improve their capabilities and coordination.

In addition, Kausik and Mahadevan (2012) present a literature review on strategic sourcing from 1997–2010. The authors list 225 papers and conclude that global sourcing,

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the reliability of global supply chain networks and strategies to cope with disruptions are important for future research. Furthermore, they analyse that 53 (23%) articles used a case study methodology, with a survey used in 46 (20%) articles. This study, however, indicates that the research state remains explorative.

The identified review papers highlight the importance for future research within the sourcing area. Where Shook *et al.* (2009) discussed the most common theories in a sourcing context, the applicability to businesses or companies is not discussed. In certain cases, companies may adopt behaviours to different theories (e.g. transaction cost economics vs. resource based view etc.). Although the review by Kausik and Mahadevan (2012) shows different dimensions in strategic sourcing, the rigour within the methodology in paper selection and research criteria can be asserted. However, the research offers a broad overview of the current state of sourcing, which remains dominated by qualitative studies and a focus on strategic issues (global sourcing/outsourcing, supply chain strategies and make-or-buy). Finally, Pagano (2009) provides a review of a narrow field of international sourcing and supports the dominance of qualitative studies conducted in the US.

2.3 Relevancy of Risk Management in Sourcing

The reflection on risk management in combination with ‘sourcing’ has been evaluated in the literature review and presented in Chapter 2.2; however, consideration of risk management in the context of strategic sourcing is under-represented. Therefore, an additional literature review on the latest developments in supply chain risk management will provide further knowledge and secondary information with regards the research question and its focus on strategic risks in sourcing. The selection of a strategic supplier may lead to risk exposure impacting directly on the company’s reputation, brand value and reliability.

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Recently, discussions regarding the responsibility of sourcing functions have increased in considering catastrophes at suppliers' sites such as in Bangladesh in 2013, where a production site collapsed and impacted brands like GAP and H&M. Alternatively, the case of Apple Inc. and its suppliers' behaviour and employee treatment generated public attention and criticism. Firms tend to outsource the production of products to low-cost countries and "the hidden perils of these approaches are often not considered, especially within the context of enterprise risk management" (Monczka *et al.*, 2011, p. 224). Supply chain disruption can have a major impact on a company. Although it is difficult to quantify, a study involving 519 supply chain problems presented the effect on the stock market, where the companies lost 10.28% in shareholder value (Monczka *et al.*, 2011). Furthermore, "supply chain disruptions were perceived to be the single biggest threat to their companies' revenue streams" (Monczka *et al.*, 2011, p. 226). Baird and Thomas (1985) argue that long-range decisions always imply a risk component, which is central to the nature of strategy formulation. "In strategic decisions a condition of risk usually exists because these decisions, by definition, involve uncertain outcomes that in the long run are important to firm survival" (p. 231).

Therefore, considering the key developments in supply chain risk and enterprise risk management is necessary to evaluate the importance of risk management in line with the research question. Narasimhan and Talluri (2009) present a review of risk management in the supply chain within an editorial. Furthermore, Tang (2006) provides a classification of articles in supply chain risk management, together with Tang and Musa (2011), who apply citation analysis in their review. These review papers provide a starting point to uncover developments in supply chain risk management.

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Although the Kraljic (1983) model covers the dimension of supply security and profit impact, many companies were not aware of such an impact on their business. Kraljic (1983, p. 110) states: “A company’s need for a supply strategy depends on two factors: (1) the strategic importance of purchasing in terms of the value added by product [...] and (2) the complexity of the supply market gauged by supply scarcity, pace of technology and/or materials substitution [...]”.

Walker (1988) discusses the importance of sourcing relationships and their impact on a company’s performance and strategic risks. “Supplier relationships involving higher value inputs and operations have higher levels of strategic risks, since failure by the supplier leads to greater decline in the performance of the firm” (p. 62). The author classified three types of risk: appropriation, technology diffusion and end-product degradation. Specifically, the appropriation of goods and services directly influence the company’s competitive advantage and operations. However, “strategic risk associated with supplier relationships increase the costs of managing them. These costs are borne by the firm, in the sense that potential supplier behaviour that directly detracts from the ability of the firm to implement its strategy [...] reduces the firm’s long-term viability” (p. 66).

Welch and Nayak (1992) encourage companies to focus on the replenishment of such electronic products. If, for example, a company is producing specific electronic parts and using specific capacitors, they must ensure during the production time and the life cycle that the related specification is not dependent on a single supplier or technical specification. The example is found in a capacitor that has been on the market for a year and is now moving into the decline phase. When a single-sourcing strategy is established, and no substitute or alternative products approved, the company is running into high risk, which is even higher if the situation involves custom-made products.

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Anderson and Katz (1998, p. 7) propose a strategic sourcing methodology and created a portfolio to segments spend in accordance with procurement complexity and revenue impact/business risk. “Leaders in procurement have strengthened their focus on value growth by stressing the segments of their buy that have the most impact on potential revenue generation or present the greatest risk to corporate performance.”

Clarke and Varma (1999) argue for implementing an integrated strategic risk management to ensure superior performance and manage risks proactively, where “risk management is a strategic business process” (p. 415). The authors claim that risk has two major elements: stake (financial gain/loss, reputation, strategic position) and uncertainty (data, processes, risk trade-offs). Companies can gain a competitive advantage if their uncertainty and stake management competencies are well established. Finally, the authors classify risk areas into operational risks (operational control risk, project risk, transaction risk, systems risk), counter party risk (credit, continuity of demand and supply), market risk (demand, equity interest rate, foreign exchange etc.) and event risk (reputation, legal and regulatory, disaster and political).

Zsidisin *et al.* (2000) reveals that only three out of nine companies performed a formal risk assessment or used contingency plans during sourcing. In many cases there was a trade-off between time and money, especially if the risk never occurred. The companies even ignored other risks, such as economic situations, currency fluctuations or criminal acts.

Sanders and Manfredo (2002) apply the value-at-risk (VaR) methodology to purchasing within the foodservice industry. The authors highlight the importance of raw material volatility and its monetary exposure to companies. From a strategic perspective, the VaR

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concept allows for evaluation and likelihood in price escalation clauses in long-term supply contracts, or for identifying the purchasing portfolio risk.

Harland *et al.* (2003) present different types of risks classified as: strategic, operations, supply, customer, asset impairment, competitive, reputation, financial, fiscal, regulatory and legal risks. These lead to different types of losses: financial, performance, physical, psychological, social and time loss. Based on the definition, strategic risks “affect business strategy implementation”, whereas operational risks affect the “firm’s internal ability to produce and supply goods/services” (p. 53).

Chopra and Sodhi (2004) present a conceptual paper on supply chain risks, their categorization and mitigation. The authors highlight the importance of risk management, where risks can cause serious problems in disrupting or delaying supply, information, cash-flow, damage sales or increase costs. In this context, managers need to balance supply-chain risk with its reward relationships.

Cousins *et al.* (2004) differentiate between two risks, technical and strategic, where strategic risks cover the supplier-buyer relationship (dominance, sole sourcing) and technological cover the product-buyer relationships (unique technology, process, single source).

Hallikas *et al.* (2004) investigate the risk management processes across strategic, long-term supply networks that lead to a competitive advantage. The authors considered four risk dimensions: a) demand, b) fulfillment, c) cost management and price and d) weaknesses in resources. In general, companies operate in many networks and perceive risk differently; however, they may become too dependent on, and exposed to, each other. In this context, risks are related to company’s objectives, such as growth, profits or future positioning.

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Although Blackhurst *et al.* (2005) focus on disruption risks, the authors highlight the significant impact of supply risk management for serving customers on time and increasing costs. The monetary quantification of risks is missing within companies, while the complexity of supply networks and the risk exposure through global sourcing is increasing.

Jüttner (2005) discovered in a quantitative study that 40% of the companies did not have risk plans for their suppliers. Several drivers, such as a focus on efficiency instead of effectiveness, globalisation of the supply chain, focused factories, centralised warehousing, outsourcing or supply base reduction, form part of the supply chain strategy and have been confirmed by managers as the main causes of disruptions. “Strategic choices and design decisions may build specific vulnerabilities into a supply chain” (p. 206).

Kleindorfer and Saad (2005) distinguish between two risk categories, where one arises from coordinating supply and demand and the other from disruptions. The authors provide key drivers in disruption risks management: corporate image, regulatory compliance, liability, community relations, employee health and safety, customer relations, cost reduction and product improvement across the extended supply chain.

Rossetti and Choi (2005, p. 1) highlight the negative side of strategic sourcing, where a company is focused on long-term relationships and squeezing suppliers, which leads to a highly competitive environment. “[...] there is serious long-term risk associated with firms becoming strategically integrated with suppliers and then mistreating them for short-term gains”.

Tang (2006) argues that there are different risk dimensions that need to be considered from a strategic and tactical perspective across supply, product, demand and information management. Meanwhile, Wagner and Bode (2006) conclude that demand-side risk is driven by strong customer and supplier dependence. Furthermore, supplier dependence is

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driven by single and global sourcing. Specifically, single-sourcing strategies increased the risk, whereas global sourcing increased risks in the supply chain and the upstream networks.

Khan and Burnes (2007) state that “managing supply chain risk is an important activity for most organizations” (p. 210), especially while globalisation increases. However, compared with the well-developed risk management practices in the financial area, it “is less well understood and less well developed” (p. 211) in supply chain management.

Juha and Pentti (2008) point out that risk management and toleration were often independent and varied across companies in a decentralised setting. The authors recommend that all potential risks should be considered and assessed instead of focusing merely on delivery and quality risks.

Research by Manuj and Mentzer (2008) highlights the increasing risks posed by cost reduction initiatives in the supply chain. Such decisions “must be linked with sourcing and marketing decisions to optimise supply chain operations” (p. 212). In this context, the authors classified four risk dimensions in global sourcing: supply risks, demand risks, operational risks and other risks.

In addition to academia, the Association of Insurance and Risk Managers (AIRMIC) propose a methodology for risk and business continuity management, which is comprised of risk analysis (identification, description, estimation) and risk evaluation. Furthermore, risk reporting, decisions, risk treatment, residual risk reporting and monitoring is recommended (AIRMIC, 2002). However, these recommended approaches are broad ranging, and holistic risk management must be linked to strategic sourcing.

In summary, strategic risk management in the context of strategic sourcing is relevant and has an impact on business performance and competitive advantage. Risk man-

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agement must be considered in strategic sourcing, as unacceptable quality, late or unfulfilled deliveries, non-compliance or other potential risks cannot be reduced to supply or disruption risks only. Instead, they have a significant impact on the company's survival from financial, market-share, shareholder value, customer, competitors, reputation, legal or brand perspectives. Therefore, risks must be considered in a strategic sourcing context.

2.4 Findings from Literature Review

This section will present the findings and latest developments in sourcing, and relates to the first research objective. The first findings identify the research with a certain industrial slant, and the analysis shows that some articles and research referred to a specific industry; however, 28% of published articles are not related to specific industries (see Table 2-3).

The second largest research section is multiple industries, primarily used in quantitative studies where surveys target different companies across two or more industries. The third largest section, which encompasses 21% of the literature review, is manufacturing industries, companies that produce a variety of goods ranging from electronics, plastics and metals. The remaining industries include retail, automotive and banking.

In summary, approximately a third of the research does not have a link to specific industries, a quarter deals with multiple industries and a fifth focuses on manufacturing industries. Therefore, manufacturing is clearly still attracting researchers' interest. This may be a result of the 'classical' phenomenon in operations management where production, assembly lines and just-in-time deliveries are important, and sourcing plays a dominant role. Surprisingly, however, the construction sector was not targeted specifically, and no explorative insights noted in any publication. Therefore, this research project will fur-

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ther contribute to the existing body of knowledge by investigating the construction sector and electronics manufacturing industry.

<i>Industry</i>	<i>No. articles</i>	<i>%</i>
None	37	28%
Multiple	31	24%
Manufacturing	28	21%
Retail	9	7%
Automotive	7	5%
Aviation /aerospace	5	4%
Apparel	5	4%
Consumer goods	2	2%
Banking /insurance	2	2%
Defence	1	1%
Facility	1	1%
Chemistry	1	1%
Food	1	1%
IT/IS	1	1%
Total	131	

Table 2-3: Industry attractiveness

Another perspective in this analysis covers the applied research methods. Qualitative studies clearly dominate the research field, accounting for 44% of the analysed articles (see Table 2-4). This is followed by the quantitative method with 21% of the analysed articles, while conceptual papers with an analytical nature and model building, such as heuristic decisions, make up another 20%. This high proportion of qualitative studies clearly supports the ‘explorative’ stage of the strategic sourcing field in academia. It is also in line with the argument of Edmondson and McManus (2007) that qualitative research methodologies apply to ‘nascent’ stages, where little theory exists.

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<i>Method</i>	<i>No. Articles</i>	<i>%</i>
Qualitative	57	44%
Quantitative	27	21%
Conceptual	26	20%
Mixed	18	14%
Review paper	3	2%
Total	131	

Table 2-4: Applied methods in reviewed articles

Although the discipline is still at an explorative stage, strategic sourcing can have a significant and positive impact on business performance; Hult (2002), Kotabe and Murray (2004) and Su *et al.* (2009) all state that sourcing can influence the competitive advantage and business performance. However, sourcing practice is in its infancy, a fact supported by a number of the publications, mainly qualitative and explorative research studies. It seems that for many companies, the value of sourcing remains undiscovered.

Furthermore, Spekman *et al.* (1999), Chan *et al.* (2007) and Hartmann *et al.* (2008) point out the importance of the strategic alignment of sourcing and the corporate strategy. In many companies, the sourcing department seems to operate independently from corporate goals or with competitive objectives that differ from other departments (Moses and Åhlström, 2008). This weakness is a significant risk to the company, as operations across departments are misaligned and a strategic gap exists. However, there is limited research on the best practices for alignment and cooperation across departments, and the real impact of alignment on the business.

In addition, supply risk management and alignment with the supplier increase complexity. If companies spend 50% of their revenue, they are highly exposed and depend on their supply base. A failure may affect a company in several ways, such as financial, mar-

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ket-share, shareholder value, customer, competitors, reputation, legal or brand perspectives. The case of Mattel ® and the polluted toys obtained from a Chinese supplier led to a product recall of 19 million toys, the largest recall in history. This subsequently led to public attention, damage to the company's reputation, concerned customers and had an impact on revenue, profit and shareholder value (Story and Barboza, 2007). The collapse of a supplier's production site in Bangladesh, resulting in more than a thousand deaths, caused a public outcry and affected several textile brands, such as GAP, H&M, Zara, Wal-Mart, Carrefour and Marks & Spencer (Alderman, 2013). The government, unions and public attention forced the companies to take responsibility and to invest into preventive safety at suppliers sites; however this action is voluntary (Alderman, 2013). Therefore, risk management is essential in sourcing decisions, especially if entering long-term contracts (Kraljic, 1983; Walker, 1988). While the appropriate consideration influences strategic risks, leads to a competitive advantage and affects business performance (Anderson and Katz, 1998; Clarke and Varma, 1999; Harland *et al.*, 2003; Hallikas *et al.*, 2004; Blackhurst *et al.*, 2005), the consideration and evaluation of risks should be mandatory in sourcing. However, many companies lack the real implementation and preparation provided by contingency plans (Zsidisin *et al.*, 2000; Chopra and Sodhi, 2004; Li and Barnes, 2008; Meena *et al.*, 2011). The findings are surprising because at the same time companies' exposure increased due to new risks including cyber-attacks, viruses, terror attacks and the financial crisis, particularly given the increasing globalisation trends and the use of low-cost country suppliers, leading to complex and lean supply chains (Wagner and Bode, 2006; Khan and Burnes, 2007). It seems that companies are unprepared for such risks, or need to trade-off between the cost and rewards of risk management if a risk never occurs (Zsidisin *et al.*, 2000; Chopra and Sodhi, 2004).

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The evaluation or consideration of risks in sourcing was proposed by Kraljic (1983) and Walker (1988); however, a research gap exists in providing sufficient evidence regarding how risk management is considered in strategic sourcing.

Therefore, further research is required to validate and establish appropriate supply risk management tools. Generally, there are different views on single or multiple sourcing. Quayle (1998) and Hallikas *et al.* (2004) argue that single sourcing minimises risk; Wagner and Bode (2006) argue against it. In general, there is a question of the effort being worthless when a risk never materialises. Initially, it might not pay off, but if a risk materialises and the company is prepared, or even if a scenario exercise is executed, the company may gain a further competitive advantage over their competitors. When a supplier's plant burned down, Nokia reacted more flexibly and faster than competitors and gained an additional market share (Tang, 2006). Nevertheless, risk management forms a central pillar of strategic sourcing (Kraljic, 1983), with some authors even arguing for sharing and balancing risks with the supplier (Hallikas *et al.*, 2004). This approach could prove beneficial if they build a learning network to manage common risks. For instance, exchange rate volatility can be managed together with common recall standards so that failures in production can be improved. In summary, highly volatile and changing environments increase uncertainty, thus appropriate risk management is necessary.

One of the most common topics in sourcing literature is global sourcing. In practice, it is a 'hot topic', but continuing through a growing phase. Trent and Monczka (2003) state that 54.5% of surveyed companies strived for global sourcing excellence, and this is particular common in the apparel industry (Cho and Kang, 2001; Akesson *et al.*, 2007). The global logistics networks ensure on-time delivery, and sourcing from low-cost countries leads to cost advantages in the product or manufacturing costs. However, there are

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also critical voices in the global sourcing context, claiming it restricts flexibility and that the price advantage is lost through logistic costs and customs. Nellore *et al.* (2001) argue that even global sourcing cannot be seen as “lean” in terms of production, and Akesson *et al.* (2007) propose not sourcing from Asian countries if the company in question offers no skills or experience. The total cost approach is weak, and companies need to improve in the development of appropriate tools and frameworks (Platts and Song, 2010; Weber *et al.*, 2010; Schiele *et al.*, 2011). Changing environments and risks influence global sourcing operations, especially when it comes to innovation and intellectual property protection (Maltz *et al.*, 2011). Companies must consider these risks and take mitigating action.

Despite the lack of experience and capability, many companies see inadequate information and a limited supply base as key challenges (Trent and Monczka, 2003). Although they want to increase their spending quota in global markets, they have limited capabilities. Samli *et al.* (1998) argue that in companies with a high share of global sourcing (more than 50%), the approach is systematically planned and supported by top management. However, companies have been known to rethink their strategies and the degree of globalisation and, according to Cho and Kang (2001), such strategies must be carried out on a product commodity level and therefore the global sourcing approach should not be generalised. In addition, these strategies largely depend on the industry. In the retail sector, the global sourcing share might be large, but it may be relatively low in the public sector. It is also not clear in the research whether companies or academia monitor the degree of global sourcing with second-tier suppliers.

The literature has not considered the sustainability view of global sourcing from an ecological and economic perspective. In terms of corporate social responsibility, global sourcing has also experienced some negative headlines, specifically with regards the pro-

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duction environment or the engagement of children. In addition, security and protection of intellectual property patents must be considered if a company wants to commence with a global sourcing journey.

Furthermore, one of the common methods in strategic sourcing and decision-making is the total cost of ownership approach proposed by many authors (Anderson and Katz, 1998; Larson and Kulchitsky, 1998; Spekman *et al.*, 1999; Emiliani, 2004; Wouters *et al.*, 2005). However, Wouters *et al.* (2009) claim this approach is seldom applied in practice, while some authors argue for considering the uniqueness of a company, the characteristics or even to adapt strategies on the product level (Cho and Kang, 2001). This situation is also supported by different trends in sourcing if comparing, for instance, the automotive and retail industries (Corswant and Fredriksson, 2002; Edgell *et al.*, 2008; Ganesan *et al.*, 2009).

In summary, the research within the sourcing discipline remains stable in view of the number of publications per year. Although the research has broadened to other emerging topics, it remains in an explorative stage with a primary focus on qualitative research. The inter-relation with industries is high at 72%, whereas only 28% of articles have no industrial focus (see Table 2-3). The most common approach is a selection of multiple industries, while some specific industries, such as public services, construction or logistics, have not attracted a specific research focus over the past decade.

2.5 Knowledge Gaps

The knowledge gaps relate to the limited use of quantitative or mixed-method research approaches. Although many theories are highlighted as relevant, the research is limited to the application of theory in a business environment. Furthermore, the selection of

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specific industries is important, and the majority of research is conducted across multiple industries or without a specific business link. For instance, limited information exists on the public sector, power supply/energy companies, logistics or construction companies. Specifically, research on strategic sourcing in companies in a monopoly or oligopoly market is weak.

The knowledge gap can therefore be summarised as follows:

- The majority of research covers no, multiple or individual manufacturing industries. Other industries, such as construction, are under-represented in strategic sourcing
- The sourcing discipline is in its infancy, and the value of sourcing is yet to be discovered by many companies
- The value of strategic sourcing and its impact on a company's business performance or competitive advantage is undiscovered in several industries
- Strategic alignment within companies and across departments is not analysed in depth and potentially compete depending on individual departmental strategies (i.e., the competing goals of sales, marketing, research and sourcing)
- Despite the potential impact of risk management in highly volatile environments, and given a higher degree of globalisation in strategic sourcing while the risk exposure increases, prevention strategies did not significantly change or were not implemented
- Furthermore, evaluation of costs and effort in risk and contingency management is compared with its potential value

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- Sustainability aspects in strategic sourcing are becoming more important and require further academic evaluation

2.6 Summary

This section covers the first research objective as it presents the latest developments in sourcing. This literature review of 131 articles outlines concepts and the research state of 'sourcing' over the past 15 years. The reviewed papers were analysed and clustered into categories frequently used in the sourcing context, before being separated into 14 dimensions ranging from global sourcing to sustainable sourcing and review papers. The review of risk management highlighted the importance of the topic in the sourcing context. Furthermore, this review highlights the applied research methodologies and their connection to theory. Due to the large number of qualitative studies found among the academic journal articles, it can be concluded that the research remains at an explorative stage. Finally, the literature review summarises existing knowledge gaps that provide the fundamental basis, guidance and rationality for this research project.

3 CHAPTER THREE - METHODOLOGY AND RESEARCH DESIGN

3.1 Introduction

This chapter introduces the applied methodology and research design. In the first section, the research paradigms and qualitative research methodology are presented from the realism and post-positivism perspective. The application of qualitative research in this research project is linked to the guiding ‘how’ and ‘why’ questions, with the objective to increase understanding (‘Verstehen’) and explore the field of strategic sourcing in the UK and Germany across the construction sector and electronics manufacturing industry. For this purpose, a case study design involving twenty companies, five per country and sector, was selected. Furthermore, the research design highlights the sequential and iterative phases of this research project. The rationales for selecting the appropriate theories, countries, industries and companies are discussed, while the nature of the data and the applied research ethics highlighted. In section 3.5, the case studies and characteristics are introduced. Finally, the data analysis includes discussion on the usage of NVivo software as a research database, the approach to coding and the validity concepts required to ensure the quality of the research project.

3.2 Qualitative Research and Research Philosophy

There are different world views and paradigms in philosophy used to understand the social world. One of the primary goals of research is to contribute new knowledge by applying a systemic and interrelated research process. Within the field of scientific research, researchers are directed by their original beliefs about the world; within the process

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of knowledge generation, three world views are known, as shown in Table 3-1 (Guba, 1990; Lee and Lings, 2008):

Ontology	<i>Relativists</i>	Ontology focuses on the nature of reality and its different means of comparison. It is a set of beliefs based on what the reality actually is.
Epistemology	<i>Subjectivist</i>	Epistemology reflects the kind of knowledge gained from your own beliefs and experiences. It is the definition of what we can know about reality.
Methodology	<i>Hermeneutic, dialectic</i>	Methodology is the means and approach of execution of a research project. Basically, the differentiation is qualitative, quantitative and mixed methods.

Table 3-1: The world views

Further to the highlighted basic world views, different paradigms exist. Guba (1990) and Lincoln *et al.* (2011) define the four alternative inquiry paradigms: positivism, post-positivism, critical theory and constructivism. This concept was extended with the participatory paradigm of Heron and Reason (1997), as shown in Table 3-2:

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Element	Positivism	Post-positivism	Critical Theory	Constructivism	Participatory
	Based on: (Guba, 1990); Lincoln <i>et al.</i> (2011, p.100)		Based on: Heron and Reason (1997, p. 289)		
Ontology	Naive realism – ‘real’ reality, but apprehensible	Critical realism – ‘real’ reality, but only imperfectly and probabilistically apprehensible	Historical realism – virtual reality shaped by social, political, cultural, economic, ethnic and gender values; crystallised over time	Relativism – local and specific co-constructed realities	Participative reality – subjective-objective reality, co-created by mind and given cosmos
Epistemology	Dualist/objectivists; findings true	Modified dualist/objectivist; critical tradition/community; findings probably true	Transactional/subjectivist; value-mediated findings	Transactional/subjectivist; co-created findings	Critical subjectivity in participatory transaction with cosmos; extended epistemology of experiential, propositional and practical knowing; co-created findings
Methodology	Experimental/manipulative, verification of hypotheses; chiefly quantitative methods	Modified experimental/manipulative; critical multiplism; falsification of hypotheses; may include qualitative methods	Dialogic/dialectical	Hermeneutical/dialectical	Political participation in collaborative action inquiry; primacy of the practical; use of language grounded in shared experiential context

Table 3-2: Basic beliefs of alternative inquiry paradigms

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The above-stated paradigms and world views build the foundation for the definition of Healy and Perry (2000, p.119) and are presented in Table 3-3. They introduce ‘realism’ as a paradigm and base their ontological and epistemology findings on the post-positivism paradigm of Guba (1990). Although the authors use a different definition in their methodological approach, both argue for and allow qualitative methods.



Table 3-3: Paradigms in scientific research (Healy and Perry, 2000, p. 119)

Figure 3-1 (Healy and Perry, 2000, p. 121) shows the broad range of methods applicable within the realism/post-positivism paradigm and balances the research emphasis of measurement and theory building.



Figure 3-1: Range of methods and paradigms (Healy and Perry, 2000, p. 121)

This research project and the author's emphasis (i.e., belief) is in accordance with the realism paradigm. From an ontological perspective, the aim is to increase the understanding of strategic sourcing and its risk management. Although several theories and tools exist in 'reality', it could be assumed that from a rational perspective companies should apply them even if certain reasons mean they do not. Based on the author's practical business experience as an executive, consulting companies do not apply the best-known practices in many cases, or ignore critical success factors, due to a lack of knowledge, cultural differences, management support or change management. This leads to a belief that the reality is 'imperfect' and 'independent'. Epistemologically, this research project and the author's beliefs match that of 'the modified objectivist', while the knowledge is specific to the circumstances of the companies. A generalisation of findings is partially possible; however, the author takes post-positivism within interpretivism as the social paradigm to explore the field.

Both qualitative and quantitative techniques are adequate to solve the research problem. Sandelowski (2000, p. 247) points out that the main difference between them is

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“their attitude toward and treatment of data”. Subsequently, Healy and Perry (2000) present a combination of the emphasis to contribute theory and data to guide the methodology, and the paradigm view (see Figure 3-1). Furthermore, Edmondson and McManus (2007) highlight the importance and appropriateness of the research question to choose the best method, and suggest the primary determining variable in the decision is the existence of theory. They suggest a differentiation between “nascent” (little theory exists), “intermediate” (few theories exist) and “mature” (many theories exist) stages. Typically, qualitative research is conducted at nascent stages, where quantitative is decided on in mature stages and both variants available within the intermediate stage (Edmondson and McManus, 2007). Based on the classification of qualitative research types, Tesch (1990) highlights the guiding questions, stating that the tough researcher who is interested in the “comprehension of the meaning of text/action” should consider an interpretive case study design (Tesch, 1990). Johnson *et al.* (2007, p. 124) define the three sub-types “Qualitative Dominant”, “Equal Status” and “Quantitative Dominant” and explain the primary driver is the researcher’s preferences and believes. Similarly, Teddlie and Yu (2007) use the same differentiation and introduce Zones A to E. Morgan (2007) summarises the different approaches in Table 3-4, where the Pragmatic Approach represents the mixed research design in the author’s terminology (Morgan, 2007, p. 71).



Table 3-4: Key issues in social science reserach (Morgan, 2007, p. 71)

Dubois and Araujo (2007) analyse the status of case research in purchasing, where qualitative research is utilised to understand complexities and focus on specific aspects. In the 1990s, research was carried out involving single in-depth cases, but with some weaknesses in methodology; however, the methodology has improved over the years and become more standardised. “Disciplines can benefit from the development of strong exemplars and [...] case studies can often serve that purpose, acting as a reference points for theory development, as well as classic instances of particular phenomena” (Dubois and Araujo, 2007, p. 179). Similarly, Wacker (1998, p. 361) argues for extending the research methodology focus to qualitative studies in operations management because only 8% of articles applied empirical case methods over a five-year period and the “establishment of causal relationships are under-researched”. Furthermore, the author states that there is an imbalance of research methodologies in operations management due to a strong focus on quantitative studies (Wacker, 1998). Barratt *et al.* (2011, p. 329) identify a trend of using qualitative studies and state there “have been meaningful and significant contributions to the field of operations management, especially in the area of theory building”. Based on reviewing 204 articles published between 1992 and 2007, the authors note that strategic sourcing represents only 8% (17) of them, and are primarily inductive research contribu-

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tions regarding frameworks (7), descriptive insights (6) and propositions (2) (Barratt *et al.*, 2011). Furthermore, the field is dominated by within- and cross-case analysis (45% of inductive cases), case study designs (42%) and theoretical sampling strategy (71%) (Barratt *et al.*, 2011).

In summary, the qualitative method is appropriate to solve the research problem because (Miles and Huberman, 1994; Yin, 2009):

- The field is at an explorative research stage
- Deep understanding of the phenomena is required/targeted
- Direct feedback is obtainable, with the possibility of explaining actions and behavioural causes
- Observation of formal and informal processes is possible
- It allows for reflection of explicit knowledge

Hence, the research questions and objectives, the emphasis on data and theory contribution, the researcher's preference and beliefs and the existence of theory are determinants supporting qualitative case study research. This approach is suitable to develop an understanding of the topic, the relevancy of variables, pain areas and the applicability of existing research. Several advantages support the paradigm selection.

First, it provides the subjectivity and explorative process required to gain an understanding of unique company situations. This implies that a phenomenon can be observed or investigated, and only qualitative data can provide insights into human behaviour (Guba, 1990).

Second, qualitative studies provide a textual context through explanation and comments (Guba, 1990; Bryman, 2006).

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Third, the utilisation of case studies allows for the consideration of single cases and the specific context, whereas in quantitative studies the generalisation approach cannot be transferred to single cases (nomothetic/ideographic disjunction) (Guba, 1990). Eisenhardt (1989) highlights the relevancy of case study research in helping create creative and innovative theories, and “while there is no ideal number of cases, a number between four and ten cases usually works well” (Eisenhardt, 1989, p. 545). More than ten cases are difficult to manage due to the volume of data (Eisenhardt, 1989).

Practitioners are sometimes sceptical about academic research and its theoretical models; therefore, a qualitative investigation involving interviews and interaction can increase the understanding of the research project. The feedback from practitioners leads to explanations of the phenomena that occur in business life, and can help answer the ‘how’ and ‘why’ questions.

Critics, however, argue that the objective measurement achieved through quantitative studies in mathematics is the “true queen” in research, where other disciplines, such as biology and social sciences, are “soft” (Guba, 1990). Furthermore, the interaction of the researcher and the interpretation of findings is subjective, as the data sets and arguments cannot be interpreted by other researchers (Currall *et al.*, 1999). Conversely, quantitative research may be “too ritualised”, meaning the researcher loses the interconnection with the research “base” of, for example, companies or participants (Van Mannen 1979 cited by Currall *et al.*, 1999). Feilzer (2010, p.10) instead argues that “strict” questionnaires do not offer enough space for “unwanted noise”, and that during the survey process respondents cannot provide additional or explanative information (for instance with closed questions and a Likert-scale design). Therefore, in a sample case, Feilzer (2010) reported that additional information, such as “between the lines” comments, was considered as qualitative

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data. Furthermore, the findings were supported by participants, as “about a third of respondents felt the need to comment on some aspect of the survey” (Feilzer, 2010, p. 11). Although providing a subjective impression of the researcher, the findings of Feilzer (2010) can be confirmed in this research project. The research design includes open and closed questions and importance-weighted questions, leading to several question and answer sessions with the respondents who felt the need to add comments, explain the situation and validate their understanding. Although the questionnaire was pre-tested with the supervisor, a practitioner and a colleague, further questions were asked in the interview. It is necessary, therefore, to take these findings into consideration, especially as recent research supports the view that participants normally stick to the given questionnaires and frameworks (Feilzer, 2010).

Furthermore, to conduct solid quantitative research, a large sample size is required, and this is challenging due to the commonly low response rates. However, the quantitative method is seen more as an “academic discipline or recognition” than a qualitative investigation (Gummesson, 2006) because there is a kind of “distrust” of qualitative approaches such as interviews, observations or experiments (Currall *et al.*, 1999).

However, the quantitative survey approach is too generic to solve the research problem of this project, ignores individual situations and does not reflect the complexity of the problem (Gummesson, 2006). Voss *et al.* (2002) argue that qualitative research is the “strongest research” as “case research has consistently been one of the most powerful research methods in operations management [...] The results of case research can have a very high impact” (Voss *et al.*, 2002, p. 195)

However, despite offering several advantages, qualitative research has some disadvantages with regards rigour and the researcher’s interaction bias. Therefore, to convince

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critics to accept the applied research method, it should be based on a high degree of academic quality to minimise interviewer bias and the influence of interviewees (Hudson and Ozanne, 1988; Gummesson, 2006; Lee and Lings, 2008; Miyazaki and Taylor, 2008; Yin, 2009).

3.3 Research Design

The research framework as shown in Figure 3-2 demonstrates the sequential approach applied in this research project, and was developed based on the concepts of Edmondson and McManus (2007) and Yin (2009). The first project phase is planning, which includes the problem formulation, research aim and objectives. Following this is the design phase, which defines the methodology, conceptual framework development and questionnaire design. The preparation phase contains the pre-test of the questionnaire and the interview arrangements, and is followed by the data collection phase, which consists of the interview and transcription process. During the analysis phase, the notes and transcripts were coded, and each case study analysed, using the NVivo ® software. Based on this, the framework for strategic sourcing could be developed. Finally, the findings and concepts developed in this research project are shared with the academic community in this thesis. The participating companies will receive an executive summary report of the findings as compensation for their participation.



Figure 3-2: Case study research framework (adopted from: Edmondson and McManus, 2007; Yin, 2009)

The selected methodology for this research project is a qualitative approach, based on an empirical study conducted in the United Kingdom and Germany. A sample of twenty case studies was identified and face-to-face interviews conducted, mainly with chief procurement officers (CPOs). The interviewing period ran from September 2011 until November 2012, with the interviews based on a semi-structured questionnaire with open and closed questions. Furthermore, two handouts were provided, which the interviewees were asked to complete to rank success and supplier selection factors. Finally, one handout cov-

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ered the statistical data relating to the company and the interviewees. Figure 3-3 presents the interview structure with open and ended questions as well as its validation through handouts. The questionnaire and the handouts were pre-tested with the supervisor, one practitioner and one colleague, with no major changes subsequently required. All interviews were audio recorded with one exception, as the interviewee did not want to be recorded. In this case, this interview was manually transcribed and summarised based on the notes of the researcher.

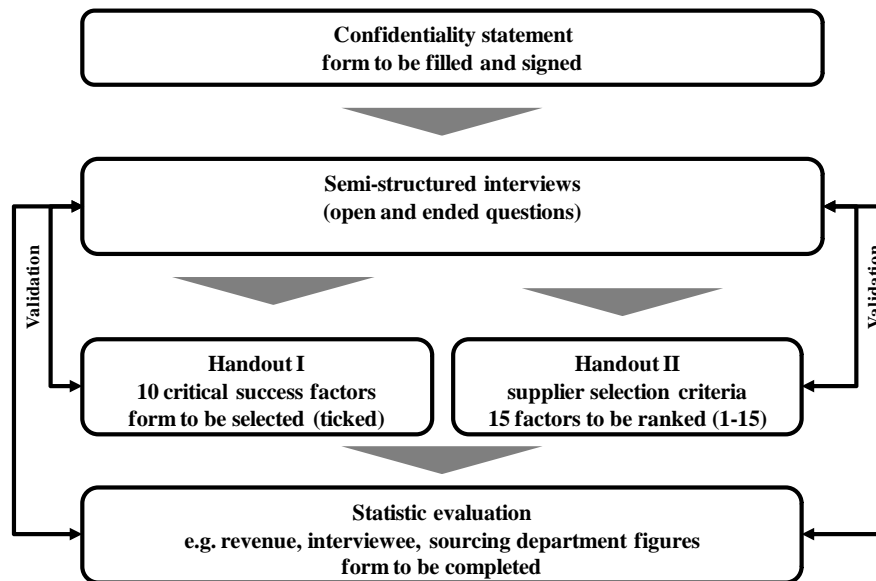


Figure 3-3: Interview design

The interview structure accorded with the questionnaire, and the interviewee had the right to reject specific questions if they were unsure of them or found them too sensitive. Based on the defined semi-structured interviews, the researcher asked additional questions to explore the field in more detail or if the answer required further explanation. Some interviewees took the option not to answer questions or to complete handouts.

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3.3.1 *Theory selection*

The literature review shows that 69% (91 of 131) of the articles do not relate or refer to a specific theory (see Table 3-5). One of the possible reasons is the high degree of qualitative investigation, case studies, literature reviews or conceptual or discussion papers, which do not relate directly to a theory (Kotabe and Murray, 2004; Gottfredson and Phillips, 2005; Chan and Chin, 2007; Freytag and Mikkelsen, 2007; Edgell *et al.*, 2008).

The most common theory, found in twelve (9%) of the reviewed papers, is the transaction cost economics theory (e.g.:Trent and Monczka, 2003; Hui and Tsang, 2004; Speklé *et al.*, 2007; Wang *et al.*, 2011), followed by eight (6%) articles with at least two theories, such as resource-based view vs. transactions cost economics theories (e.g.:Essig, 2000; Steinle and Schiele, 2008; Mols, 2010). The following Table 3-5 highlight the theories adopted in this thesis:

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Theory	No. of Articles	%
None	91	69%
Transaction cost economics	12	9%
Multiple (two and more)	8	6%
Information-processing theory	3	2%
Game theory	2	2%
Economic theory	1	1%
Electronic sourcing theory	1	1%
Resource dependence theory	1	1%
Contingency theory	1	1%
Systems theory	1	1%
Principal agent theory	1	1%
Comparative advantage	1	1%
Design theory	1	1%
Stakeholder theory	1	1%
Social capital theory	1	1%
Real options theory	1	1%
Network theory	1	1%
Social exchange theory	1	1%
Agency theory	1	1%
Sustainable competitive advantage	1	1%
Total	131	

Table 3-5: Applied theories in literature

Shook *et al.* (2009) highlight the ten most important theories in sourcing, and recommended the application of two or more to enhance or compare complementary theories in sourcing research (Shook *et al.*, 2009). However, only 6% of the reviewed articles refer to two or more theories. Although 69% of the publications do not refer to a theory, good research requires a well-grounded theory base, which is the central element in research design (Bartunek *et al.*, 2006; Tushman and O'Reilly III, 2007). Therefore, relevant theories were identified to support problem formulation and model building (Van Mannen 1979 cited by Currall *et al.*, 1999). Transaction cost economics focuses on economic behaviour

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and the evaluation of make-or-buy decisions, which seem to be central in strategic sourcing (Shook *et al.*, 2009). Therefore, the transaction cost economics theory was selected as the most appropriate fit for the research problem and is presented in Table 3-6 (Shook *et al.*, 2009).

Theory	Theory Summary	Impact for research
Transaction Cost Theory	<ul style="list-style-type: none"> • Focus on economic behaviour in make-or-buy decisions • Consideration of all costs being implied with every transaction • Intense focus on rationality 	<ul style="list-style-type: none"> • The rational and cost-driven focus on strategic sourcing • Classical focus on economic behaviour

Table 3-6: Relevant theory for research project

3.3.2 Country selection

Based on the reviewed literature it is clear there is a broad range of research covering one or more countries, with the majority focusing on the United States. Therefore, it was decided this research would provide in-depth analysis with a dual focus on cross-country findings. Determined by the research questions, the evaluation of sourcing practices and the coverage of risks, two European countries were to be the targets, and World Bank sources used to evaluate the significance of country selection.

The rationale for the selection was primarily determined by GDP contribution, geographic scope and location, exposure to different kinds of risks and culture. The research focus is limited to Central Europe, which is home to many similar cultures, as in qualita-

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tive research culture is essential to collecting appropriate data. Therefore, Germany and the United Kingdom were selected for this research project.

First, Germany, as the fourth largest world economy (World-Bank, 2009), is very much export oriented and the manufacturing industry is significant (GDP 3,653 Billion USD). Germany has excellent infrastructure and is at virtually no risk from natural disasters. In addition, the country is part of the European Monetary Union and can trade with many European countries using a single currency.

Second, the United Kingdom is the sixth largest economy worldwide (GDP 2,646 Billion USD) (World-Bank, 2009). Although the biggest sector is finance and services, potential supply chain disruption in other industries is high due to its geographic location. Furthermore, the country is not part of the European Monetary Union and therefore has to cope with exchange rate volatility, especially given that the strong British Pound has appreciated significantly against the Euro since 2009.

The selection of two European countries will lead to findings and best practices that allow a cross-country selection, specifically to answer the question of how risk management is applied and whether there are differences in the developmental stage of strategic sourcing practices.

Furthermore, cultural differences can have an impact on decision-making and the development of strategic sourcing practises. Research by Hofstede shows that leadership styles vary in the UK and Germany (Littrell and Valentin, 2005). Germany has a moderate individualism (IDV) score of 67 points, the power distance is low with 35 but it has a moderate intention on uncertainty avoidance with 65 points (Littrell and Valentin, 2005, p. 426). On the contrary, the United Kingdom has a strong focus on individualism (89 points), 35 on power distance and 35 on uncertainty avoidance (Littrell and Valentin,

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2005). In addition, Schneider and Littrell (2003) study the behaviour of leaders in the UK and Germany and their findings show differences in “superior orientation”, “production emphasis” and “initiation of structure”. These results indicate that tolerance of uncertainty is a highly undesirable trait (high uncertainty avoidance) in a leader and manager, opposite to Hofstede’s assessment in the United Kingdom (Littrell and Valentin, 2005, p. 432). Furthermore, German managers and leaders tend to have ‘Ordnung’ (order) as a major directive, meaning processes should follow a defined structure. Therefore, Littrell and Valentin (2005, p. 433) conclude that the German “leader should not tolerate uncertainty and postponement, but demonstrate concern in these situations and move the system towards certainty and schedule (to impose ordnung)”.

3.3.3 Industry selection

The selection of relevant industries for the research project was primarily determined by the literature review. The findings show that of the 131 reviewed articles, 37 (28%) do not relate to an industry (see Figure 3-4). Therefore, to assess and compare different sourcing strategies especially considering risk management, two specific industries were selected after the industry attractiveness had been analysed. It seems there is a huge demand for future research in some industries given that most articles had no direct link to an industry and were mainly based on theory development or conceptual or heuristic modelling papers. The second common focus is on cross-industrial research, primarily driven by research in cooperation with different national associations of purchasing managers (NAPM) (Bozarth *et al.*, 1998; Samli *et al.*, 1998; Hult, 2002). Multiple industries, which relate to more than two selected industries, represent 31 (24%) articles of the reviewed base.

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Furthermore, manufacturing, as a broad area covering several sub-clusters, such as electronics, OEMs, metals or plastics, was considered in 28 articles (21%). The remaining industries are divided across several sectors, such as retail, automotive, aviation, banking and consumer goods. Therefore, the main distinction in these analysed industries is the organisational importance of the sourcing function and its impact on business results. In manufacturing, strategic sourcing has the important role of ensuring material supply in production, and the focus in retail is more on supply availability, supply agility and costs. Conversely, the sourcing function in the insurance and banking industry is primarily focused on indirect materials and services (e.g., marketing, IT). These findings are supported by research by van Weele (2010) and Keough (1993), who highlight the developmental stage of purchasing departments across industries (see Figure 1-2).

The most important industries have an intense production automation (manufacturing, automotive, retail) and integrated supply chains. Furthermore, the attractiveness of industries to researchers may be influenced by the sourcing spend within companies or the GDP contribution. The banking industry spends little in relation to its revenue, contrary to a production or automotive company that spends significant amounts for indirect/direct goods and services.

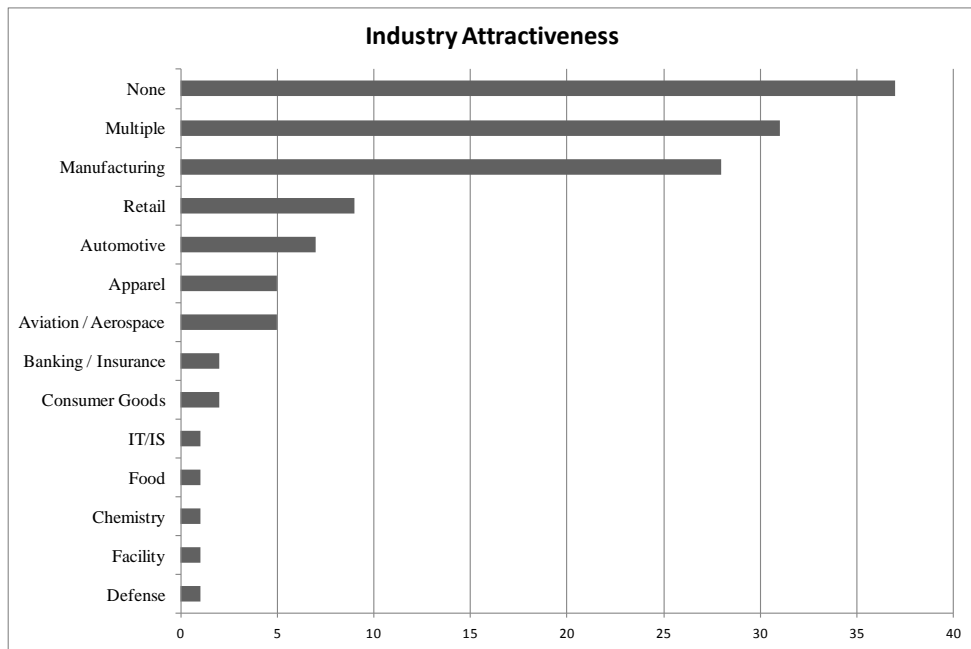


Figure 3-4: Industry attractiveness

Surprisingly, some industrial sectors are under-represented in this review. For instance, the construction sector and transportation/logistics industries have not yet formed part of any research. Perhaps these industries do not attract researchers' attention due to the relevancy of sourcing to business performance. Typically, the construction business is site-based and in many cases products are custom-made, while sourcing spending is low in logistics. However, in the construction sector, the monetary spending is relatively high compared with other industries, and the design and specification seems unique from project to project. Therefore, this industry and the research status attracted the author's attention for further evaluation and comparison with a more 'mature' industry like electronics manufacturing.

Two industries build a good research base and allow cross-industrial and cross-case analysis (Yin, 2009). The selection is based on the World Bank and Standard Industrial Classification (SIC) classification:

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- “Manufacturing and equipment” (World Bank, OECD terminology) or “Section D manufacturing” (Standard Industrial Classification)
- “Construction” (World Bank and SIC terminology is identical)

The rationale for the selection was the established sourcing practices in the areas of manufacturing and construction and their maturity, especially if considering the risk perspectives. Manufacturing was represented in 21% of the reviewed literature and has the advantage of manufacturing processes, just-in-time deliveries, raw materials and the need for agility. Furthermore, there is a high dependence on customers and potential demand volatility. The electronics manufacturing industry is highly exposed to Asian markets and necessarily has to cope with global sourcing, cultural changes and lean supply chains. The electronic component crisis led to significant risks for companies, where the lead times for certain parts increased from a few days to months. Companies had to manage their supplies and cash-flows as discussed in a case study by Kotula and Reiß (2011). In addition, the product life cycles become shorter and the electronic components change frequently, which leads to an additional risk exposure in single-sourcing strategies and products design. Finally, the bargain power from a sourcing point of view is typically smaller against the large OEMs producing chips or capacitors. The leading argument to select the electronics industry was to understand the phenomenon of occurred risks, which has affected the whole industry, and how companies managed it.

The construction sector was selected as a second sector and its nature is highly dependent on tight scheduling and project management. However, it utilises a network planning structure instead of an assembly line approach. It is under-represented in the sourcing research and warrants further exploration (see Figure 3-4). Furthermore, the scope, services and complexities differ from the manufacturing of products. Typically, the spend distribu-

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tion is high and often reach millions of Euros, which leads to a higher bargain power of buyers. In addition, standard approaches in sourcing such as part number analysis, service standardisation or repeated regular buying is seldom established. The site management or during the bidding process the specification and designs are set, which limits the bargain power with suppliers if the project starts. Hence, the general hypothesis is that construction sector is managing risks better, whereas the electronics manufacturing industries has a better established sourcing function and performs weak risk management.

3.3.4 Company selection

The company selection was based on a stratified purposive sampling derived from the chosen target industries and countries. Purposive sampling is a common and accepted procedure in qualitative research (Miles and Huberman, 1994), with the selection of cases or companies conducted with purpose and linkable to the research question. Miles and Huberman (1994) suggest defining a set of “boundaries” and a “frame” that have the potential to contradict each other. The definition of the frontiers in case selection is essential, and can also be linked to the research questions or objectives (Miles and Huberman, 1994; Lee and Lings, 2008). This research project is founded on 20 cases in total to achieve a relevant sample size in this qualitative research. Specifically, the focus is on ten cases per country and ten cases per sector. According to Eisenhardt (1989) a number of four to ten cases lead to a solid sample size. Furthermore, Yin (2009) argues to use six to ten cases to have sufficient findings for replication. Four to six cases can be used for to pursue pattern matching and theory replication (Yin, 2009). Therefore, a solid base of cases is mandatory to build a good theoretical model (Yin, 2009). Considering these arguments, the research project design objective was to select ten cases per country and ten cases for sector analysis to highlight phenomena (see Figure 1-3). Furthermore, it was intended to have a selec-

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tion of five cases per sector to identify within-country phenomena for replication and theory testing.

The author used purposive sampling and several defined criteria that are in line with the research objectives (see Table 3-7).

To ensure a high degree of rigour, a list including 73 UK companies and 59 in Germany from the construction and electronics manufacturing fields was compiled after online research. Social media/ business networking platforms including Xing (Germany) or LinkedIn (international) were used to identify appropriate companies and responsible contact persons. A selective and sequential approach was used to contact the companies, with the main objective to ensure a high degree of randomised selection. Contact was made with the target companies primarily by phoning the responsible person or via e-mail through LinkedIn or Xing. However, due to the high rejection rate a sequential approach was used; a strict random selection could not be ensured due to the large number of rejections. This is supported by Miles and Huberman (1994), who do not recommend randomisation in qualitative research. The target audience was CPOs or department managers responsible for buying, while the selection and filtering criteria were industry and country fit, revenue fit and product range. Several companies rejected the initial call to request an interview, with the most common reasons being time constraints, workload or general policies not to take part in a study. The interviews were conducted between September 2011 and November 2012, and the applied sampling criteria were:

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Criteria	Definition
Country:	The countries defined: UK and Germany
Industry/Product:	Construction according to the SIC code (construction of buildings, can be a master contractor). Manufacturing of electrical equipment for industrial customers (motors, generators, control apparatus, electricity distribution, batteries, lighting, etc.)
Company cluster: Medium and large enterprises	Based on the definition from the European Union, the targeted companies should be medium and large enterprises. The criteria are: Medium: 50–250 employees and a revenue of 10–50 million Euro; Large: above 250 employees and 50 million Euro
Revenue	> 10 million Euro
Employees	> 50
Production site	The company must have a production/construction site in Germany or the UK
Function	The target audience is the sourcing department. The interviewee should be the chief procurement officer or an employee in sourcing (e.g., commodity leader)

Table 3-7: Purposive sampling criteria

3.3.5 Nature of data and data analysis

The research project is of a qualitative nature and therefore the interview transcripts form the primary data. The transcripts are based on the direct documentation of the spoken words and were compiled from audio recordings. The findings were not summarised;

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rather the interviewees' entire answers were used for coding purposes, and the interviews were conducted in German and English and documented in these languages. A translation from German to English was rejected to avoid translation errors and minimise interpretation bias. In this context, the researcher used his language skills to code them. The coding structure and definition is in English. During data reduction, and to summarise central elements, the German cases were translated into English.

In addition, the handouts relating to supplier selection criteria and success factors provide another source of data, which can be viewed as 'quantitative' data. The results from the handouts form a separate database. Finally, the descriptive data from handout three (statistical data) were also treated as quantitative data (Appendix F: Questionnaire and handouts). Due to the large amount of data that required analysis, data reduction was a central process (Miles and Huberman, 1994).

Of the five basic data analysis strategies presented by Yin (2009), this research includes three: pattern matching, explanation building and cross-case synthesis: "A data display is another central pillar in qualitative analysis" (Lee and Lings, 2008, p. 247). The objective of data displays is the consolidated presentation of findings; where an interview transcript can consist of multiple pages of written text, the findings, for instance, across cases should be summarised in an appropriate manner. Therefore, data displays use different tools to present findings with reduced complexity (repertory grid, cause-effect diagrams and structural models). Lee and Lings (2008) discuss four classes: within-case, cross-case, describing and explaining displays:

- Cross-case displays: cross-country findings, cross-industry findings, cross-case findings
- Within-case displays: within-country findings, within-industry findings

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3.3.6 Research ethics: sensitivity and disclosure

Ethics and morality is essential for every researcher, but achieving an objective definition of moral or ethical behaviour is difficult. Scientific principles and theories are objective and morality is subjective and not testable (Werner, 1983). Therefore, it can be difficult to define moral and to distinguish between right and wrong. Werner (1983, p. 668) states, that “our background beliefs and social inheritance of knowledge influence what we see”, and this influences our moral behaviour. If knowledge influences our world views, then our experiences becomes a central aspect in the discussion. Ethical or moral standards are “general agreements shared by researchers about what is proper and improper in scientific inquiry” in research (Babbie, 2007, p. 62). Today, due to increased public attention, the issue of ethics in research is critical. The development of common research standards and practices, such as the AAPOR Code of Professional Ethics & Practice (2005) or the ESRC (2005), arguably represents one framework for academics and universities. These frameworks provide the primary regulations and guidelines for all researchers, while the researcher has to be aware that he/she has to maintain several stakeholders’ interests and ensure compliance with all of them (AAPOR, 2005, ch II; Babbie, 2007):

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- The public, such as private persons reading journals
- Clients and sponsors
- The profession of researchers
- The respondents and survey participants
- Ethics in research can be subdivided into three phases: before, during and after the research project (Wright, 1999)

The ESRC Ethics Framework defines six core principles to be considered in research (ESRC, 2005, pp. 23-26; also supported by Babbie, 2007):

- Integrity and quality
- Informed consent
- Confidentiality/Anonymity: anonym: researcher cannot identify person, no interviews, survey, no identification number; confidential: can identify person
- Voluntary participation/free from any coercion
- Harm must be avoided
- Independence and impartiality of researcher/free of interest conflicts

The compliance with research ethics and university regulation was always ensured. Before the interview, each interviewee was informed, using an executive summary paper, about the research topic, the ability to withdraw participation at any time and that data from the questionnaire would be kept confidential. Furthermore, each interviewee signed a confidentiality statement in which they could freely define their own degree of confidentiality/anonymity and whether the company or the interviewee's name could be included in this thesis or in research projects. Of the twenty case study interviews, the following confidentiality statements were agreed. Table 3-8 presents the responses:

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Full approval to use company and interviewee names	6 companies
Partial approval in thesis Company name Interviewee name	1 company 4 companies
No approval and full confidentiality	14 companies

Table 3-8: Overview of confidentiality statements

Therefore, company or interviewee names are mentioned only if the interviewee explicitly authorised their use. The researcher agreed to confidentiality and to store data safely and securely, with statements and interview transcripts remaining anonymous if not otherwise permitted. In general, all data was treated as anonymous until the interviewee explicitly agreed to disclosure. Details that would allow individuals to be identified will not be published or made available to anybody uninvolved in the research unless explicit consent is given by the individuals concerned, or such information is already in the public domain. The same will apply to the name of the company, which will be masked and remain anonymous if not otherwise permitted. Finally, the participants' consent and assent has been formalised, and every interviewee confirmed this process in writing.

3.4 Data Analysis

3.4.1 Software NVivo 9

The qualitative analysis interview was essential in this research project. In this context, a multiple cross-case analysis was performed, based on a various number of pages of interview transcripts (see Appendix E: Source Summary NVivo Project). Data management and analysis, together with coding and model building, was the key phase in this research project. For this purpose, the analysis was performed using the NVivo (Version 9 ®

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QSR International) software, which has the technological capabilities to support the research in managing extensive data/information and analysing several interviews, building models and performing cross-case analysis (Bazeley, 2007; Edhlund, 2011). Furthermore, the use of software “helps to ensure rigour in the analysis processes” (Bazeley, 2007, p. 3), and helps the researcher to work with more structure and methodology as queries and conceptual models increase the validity (Bazeley, 2007). According to Edhlund (2011, p. 11), the NVivo project consists of sources (i.e. interview transcripts), nodes (the code hierarchies and codes), queries and results (coded sections). The sample of codes is presented in the appendix. The structure is presented in Figure 3-5:



Figure 3-5: Simplified diagram of a NVivo project (Edhlund, 2011, p. 11)

The interview transcripts were digitalised and uploaded on to the NVivo Software. Interviews documented in German were transcribed into German, while the English interviews were stored in English. One focus of interview analysis is the application of semi-structured interviews with headings and sub-headings, as this leads to the application of ‘standardised’ structures for questions and answers from the interviews. This structuring allows for the creation of several reports and cross-case analysis of coded sentence sections. In addition, the conceptual model was built and integrated within the project. Based

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on the interview analysis within NVivo, the following features were used to analyse the relevant data for further discussion:

- Model building
- Word search
- Interdependencies analysis
- Coding/ Matrix-Coding
- Reports/ Queries

The project approach and steps were as follows:

- Interview transcript (original voice)
- Upload interviews on to NVivo 9
- Data and interview cleansing (structure - heading - formatting)
- Manual coding by applying hierarchical coding systems
- Used key words query
- Analysis/Queries
- Model building
- Findings/Summary

3.4.2 Interviews and coding

The interviews were audio taped and transcripts created; coding is the process for analysing interview transcripts and attaching a 'structured label' to the text section. The code structure was defined, stored in the NVivo Software and linked to the relevant text section. In the analysis phase, a query can be executed to analyse the case studies specifically to a semantic code. Miles and Huberman (1994) use three classes of codes: descriptive, interpretive and pattern, while Lee and Lings (2008) add organisational demographic

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codes to this cluster. In this research, the code structure was based on the research dimensions of the questionnaire. The majority is therefore descriptive. For organisational codes, attribute fields were used in NVivo. The applied structure and first level hierarchy is based on the conceptual framework of this research and should allow for a better understanding of the structure. Therefore, the following high-level cluster is shown as an extract in Figure 3-6, where Figure 3-7 provides further details and levels beneath the code level:

Nodes			
	Name	Sources	References
+	Cases	0	0
+	CSF	18	154
+	Other	0	0
+	PastDevelopment	0	0
+	Ris_Event_CompAdv	9	10
+	Ris_Event_Exmp	13	22
+	Ris_ProgN_Reas	10	17
+	Ris_ProgY_Descr	10	42
+	Ris_RiskFact	16	41
+	SRM_DemdChang	13	19
+	SRM_Example	4	4
+	SRM_ForecCustom	0	0
+	SRM_SupInteg	17	39
+	StS_CurrentRole	20	26
+	StS_Objectives	17	37
+	StS_RoleChange	18	39
+	StS_Tools	19	114
+	StS_ToolsEffective	12	24
+	SupSelCriteria	11	101
+	Trends	20	353

Figure 3-6: High-level code structure cluster

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Nodes		
Name	Sources	References
SRM_Example	4	4
SRM_ForecCustom	0	0
SRM_SupInteg	17	39
StS_CurrentRole	20	26
StS_Objectives	17	37
AddedValue	4	5
DeliveryPerf	4	4
LongTermStrategy	4	4
MoreVisibility	1	2
Price	10	10
Quality	3	3
SRM	5	6
Stock	1	1
SupplySec	2	2
StS_RoleChange	18	39
StS_Tools	19	114
StS_ToolsEffective	12	24
SupSelCriteria	11	101
Trends	20	353
SuccessFactors	18	90
TrendDep	19	120
TrD_BargainPowerSupplier	4	4
TrD_BestPeople	8	11
TrD_CompanyBrandValue	2	4
TrD_CompetitionSales	3	5
TrD_CustomerRequirement	4	5
TrD_Financials	9	9
TrD_ITSystems	2	2
TrD_noChange	2	2
TrD_OrganizationalChange	4	7
TrD_ProductCharacteristics	3	4
TrD_Regulation	5	7
TrD_SkillsTraining	5	11
TrD_SourcingStrategy	10	12
TrD_SRM	4	7
TrD_SupplyMarkets	6	7
TrD_SupplyRiskMgmt	3	4
TrD_SupplySecurity	3	5
TrD_Sustainability	9	14
TrendsCompany	20	143

Figure 3-7: Code structure and hierarchy

Generally, there are two methods in coding. The first approach is ‘inductive’, based on the iterative analysis and re-evaluation of the text (Miles and Huberman, 1994). The second is the ‘a priori’ method, where the researcher defines the codes and structure before analysing the text (Miles and Huberman, 1994). The ‘a priori’ method offers some advan-

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tages, as the predefined structure of codes increases the methodological rigor, specifically the replication (Miles and Huberman, 1994). The researcher may define the variables and subjects, for instance adapted from the conceptual framework, in advance, and use this structure to look for the phenomena in the transcript. However, based on experience it is difficult to anticipate any possible statement that might prove relevant for the research. The ‘a priori’ method is useful, and should cover the core elements in the project (e.g., conceptual framework variables and the research objectives); however, a situation can arise in the deep analysis where the inductive approach is necessary to extend the ‘a priori’ list of codes. This process was applied in this research project, with ‘a priori’ codes used and extended through iterative findings. The coding builds one central element in qualitative research (see Appendix C: Example of coding from interview transcript, Appendix D: Example of coding transcripts extracted, Appendix E: Source Summary NVivo Project).

3.4.3 Validity and reliability

Qualitative research is always conducted with rigour, and the validity of findings and data questioned. Due to the high subjectivity of the research, the research approach, the validity and especially the generalisation represent weaknesses in this research project. Research by Beverland and Lindgreen (2010) shows that over 75% of qualitative researchers do not explicitly address reliability and internal and external validity in case studies published in the *Industrial Marketing Management* journal.

Internal and external validity, and reliability, are therefore vital for respected qualitative case study research (Miles and Huberman, 1994; Beverland and Lindgreen, 2010). Yin (2009) developed criteria for judging and assessing the quality of a research design, which have been applied and considered in this research project as shown in Table 3-9 below:

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Test (Yin 2009, p. 41)	Case Study Tactic (Yin 2009, p. 41)	Consideration in Research Project
Construct Validity	<ul style="list-style-type: none"> • Use multiple sources of evidence • Establish a chain of evidence • Have key informants review draft case study report 	<ul style="list-style-type: none"> • Strength: Construct has open questions and closed question at the end to validate statements (chain of evidence); partially support with documents • Weakness: one interviewee per company
Internal Validity	<ul style="list-style-type: none"> • Do pattern matching • Do explanation building • Address rival explanations • Use logic models 	<ul style="list-style-type: none"> • Strength: Pattern matching, explanation building, rival explanation covered through analysis • Weakness: none
External Validity	<ul style="list-style-type: none"> • Use theory in single-case studies • Use replication logic in multiple case studies 	<ul style="list-style-type: none"> • Strength: multiple case studies with a sample of twenty companies in UK and Germany; replication logic applied • Weakness: none
Reliability	<ul style="list-style-type: none"> • Use case study protocol • Develop case study database 	<ul style="list-style-type: none"> • Strength: all interviews were audio taped and completely written up, NVivo Software and Database applied • Weakness: one company did not allow audio taping

Table 3-9: Design test for the quality of the research project (based on Yin 2009)

In this context, through construct validity the research project design will increase the objectivity of the construct to avoid subjective judgements, and allows for highlighting differences in cases transparently (Voss *et al.*, 2002; Yin, 2009). This research project has open and closed questions within the semi-structured questionnaire, which allows for tracing and validating the chain of evidence of the interviewee's statements. Although the interviews involved sourcing employees only, the researcher could validate the statements

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based on practical experience. However, it is a weakness that the stated arguments could not be validated, for instance, with other departments in the company.

Internal validity has gained importance based on past research and is focused on the research design and its interpretation of findings (Yin, 2009). Specifically, the biggest danger lies in the misinterpretation of causal relationships whereby the researcher is not aware of the inferences drawn from interviews (Yin, 2009). To minimise this risk, the author used the NVivo Software to manage the transcripts and statements from interviewees, which allowed for pattern matching, explanation building and model building. Furthermore, to reduce bias and potential misinterpretations, the central subjects were tested within the interview through the questionnaire design. This means that open questions such as “How do recent supply risks influence your corporate strategy in 2010/2011?” (Question 8 – see Questionnaire) were validated with a closed question—“Did you have some serious risk events with significant impact on your business in 2010/2011?” (Question 12 – see Questionnaire)—and supported by examples if the answer was yes (Question 13 – see Questionnaire). These answers can be checked against a handout (Handout II – see Questionnaire) where the interviewee had to manually select the rank and the supplier selection criteria (risk). Finally, the statements were validated against a handout relating to company statistics, and which asked for further information about the risks that had occurred. The findings from the transcript were validated through two additional statements from the interviewee.

External validity is the test for the generalisation of findings. Where quantitative research generalises from statistics, case study research generalises from analytics (Yin, 2009). However, case study research typically offers a small sample size with few cases, leaving it open to criticism (Yin, 2009). To solve this research problem and overcome the

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barrier to reliability, the author decided to use a multiple case study approach. To reduce selection bias, the author applied stratified purposeful sampling and preselected companies in one central list. The identified companies were listed, , a 'randomised' selection was made and the companies were personally contacted to evaluate their motivation to take part in this project . Based on the high rejection rate, the list was sequentially extended. Finally, twenty companies agreed to an interview, giving a sample size of five companies per industrial sector and country. This offers a profound basis to make analytical generalisations based on the results of this research project.

The reliability test should reduce bias, errors and ensure that independent research can follow this qualitative research and come to the same conclusion and replicate the findings (Yin, 2009). Therefore, the main objective is documentation in this research project. Nineteen of the participating companies agreed to an audio recording of the interview, the interviews were transcribed in full detail and validated with the notes of the researcher. In addition, handout questionnaires were collected and stored. All findings were imported into NVivo Software, which was used as the central database in the project. Furthermore, the handout findings were inputted into an Excel database to analyse, for example, critical success factors and supplier selection criteria. Finally, the coding structure and coding is highlighted in the appendices.

3.5 Overview of Case Studies

The cases represent, for each industrial segment, five companies per country. The companies vary across countries in revenues, number of employees, strategic and operational context and the sourcing organisation. Furthermore, the companies target different markets and structure their operations based on a domestic, regional (Europe) or global focus. The selected companies have average revenue of 1,594 Million Euro, where the small-

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est company has 37 Million Euro (electronics) and the largest 8,123 Million Euro (see Table 3-10).

The interviewees' experience in their current position is on average 8.5 years and in their entire sourcing career 17.7 years, meaning the participants are highly experienced in the field of sourcing practices and operations.

	n	Minimum	Maximum	Average
Revenue	19	37 Mil. €	8,123 Mil. €	1,594 Mil. €
Employees	16	265	58,312	6,595
Interviewees				
Experience in current position (years)	16	2 years	29 years	8.5 years
Experience in sourcing in sum (years)	13	3 years	36 years	17.7 years

Table 3-10: Company and interviewee characteristics

The interviewees have different hierarchical reporting lines, although the majority report directly to the executive board, which is split into chief financial officer (CFO), chief executive officer (CEO) and chief operations officer (COO) (see Figure 3-8). Some interviewees also report to different director functions, which could be the director of sourcing/purchasing or construction.

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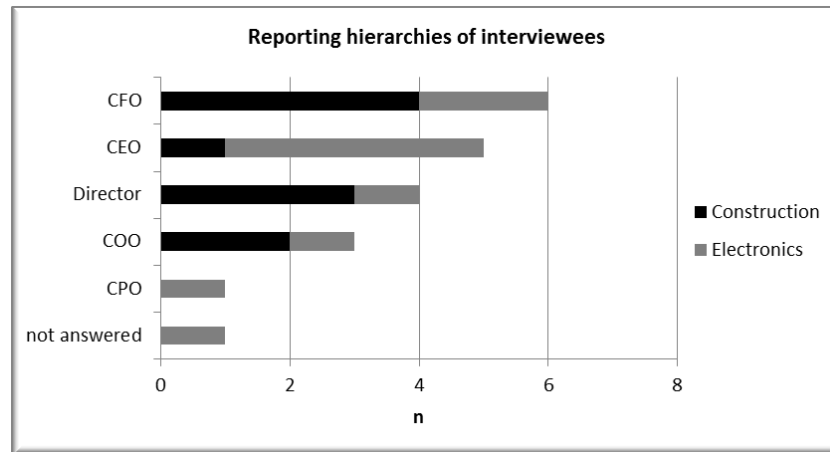


Figure 3-8: Reporting hierarchies of interviewees

The companies involved have different organisational structures, which are dominated either by decentralised sourcing with coordinated purchasing or by central sourcing (see Figure 3-9). However, it can be seen that the construction sector is still driven by project or decentralised purchasing, which is in line with the illustration shown in Figure 1-2 (Van Weele, 2010).

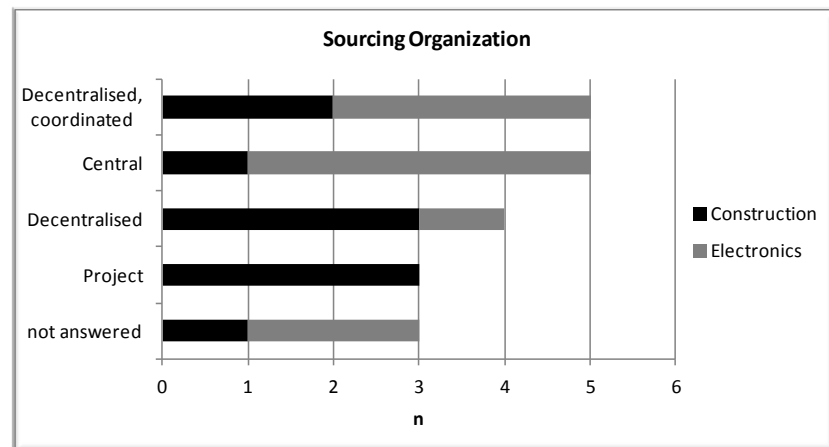


Figure 3-9: Sourcing organisation

Finally, the participants could refuse to answer specific questions in the questionnaire, which is in line with the required research ethics; therefore, the sample size (n) varies or those answers are presented as 'not answered'.

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Within the German construction sample, DECO1 embodies the large enterprise in a global context. This company represents the entire value chain in construction, from general contracting up to building and services. DECO2, on the other hand, represents the classic 'Mittelstand' company in the construction business. Meanwhile, DECO3 represents on one hand the construction business, with façade building as a specific business area, but it also provides project-specific solutions to general contracting companies. DECO4 also fits into the 'Mittelstand', but targets private customers, whereas all the previously mentioned companies mainly interact with business clients. The main business of DECO4 is prefabricated houses for private usage. Finally, DECO5 represents the general contractor from an investor point of view, deals with industrial clients and represents the entire value chain from financing to operation and asset management of large shopping centres.

The German electronics sector is represented by companies with their core business in the automation and processing industries. They may design and operate whole systems as an integrator and operator, or possibly produce electronic parts for the power and automation industry. DEEL1 supplies automation systems, electronic motors and drives, while DEEL2 offers a wide range of products and solutions for several industries. Similar to DEEL1 and DEEL2, DEEL5 provides a broad range of electronic products and services based around power and automation, and focuses on fieldbus techniques and positioning systems. DEEL3 supplies electronic, high-tech diagnosis and equipment to measure rotating components, and finally DEEL4 is a leading company and integrator in communication and radio control systems and supplies systems and products.

The UK construction sector is represented in this study by companies whose core business is focused on construction, large infrastructure projects, asset management and financing (UKCO2–5). UKCO2, UKCO3 and UKCO5 represent large enterprises with

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revenue of more than 1 Billion Euro, while UKCO4 is a smaller company with a greater local/regional focus. More specifically, UKCO1 offers construction and construction consulting with integrated services across the full property and infrastructure life cycle.

The companies selected in the electronics sector in the UK are primarily based in the area of measuring and test equipment. UKEL1 is a leading manufacturer in test equipment, and similarly, UKEL2 manufactures portable electric test and measuring equipment for high and low voltage. UKEL3 provides solutions and measuring systems for electricity, gas and water, while UKEL4 is an electronics manufacturer offering different kinds of services and solutions for cable looms or boxes, and provides clients with supply chain solutions for electronics components. Finally, UKEL5 is a leading company in high-quality technology tools and systems for industry and research. The company serves a specific niche in high-technology measurement and analysis equipment.

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3.6 Overview of Cases - Construction in Germany

Code	DECO1	DECO2	DECO3	DECO4	DECO5
Date of interview	October 2011	December 2011	October 2011	October 2011	September 2011
Length of interview	2 hours	2 hours	1.5 hours	1.5 hours	2 hours
Anonymity required/ Approval thesis	Yes/No	No/Yes	No/Yes	Yes/No	Yes/No
Interviewee		Mr. Peter Streit	Ms. Doris Labermeier		Mr. Volker Magga
Position	Director of Corporate Procurement	Head of Procurement	Head of Strategic Procurement	Head of Central Procurement	Head of Commercial Services
Years in current position	6	22	10.5	29	2.5
Experience in sourcing (years)	Not answered	22	Not answered	Not answered	22
Reports to	CFO	CFO	Director of Procurement	CFO	CFO
Member of the board	No	No	No	No	No
Member of mgmt. team	Yes	Yes	No	Yes	Yes
Company name		Heberger Hoch-, Tief- und Ingenieurbau GmbH	Lindner Group KG		
Business cluster	Large	Large	Large	Large	Large
Revenue in 2010 (Mil. €)	8,123	140*	769*	143	1,913
EBIT in Mil. €	343	0.96*	36.5	Not published	
Employees 2010	58,312	892*	5,500	850	~ 600
Organisation of sourcing department	Decentralised, coordinated	Decentralised	Central	Decentralised, coordinated	Decentralised
Sourcing Spend Mil. € (approx.)	5,400	120	430 (160 strategic sourcing)	74	95
Ratio Spend/Revenue	66.5%	85%	56% (21%)	52%	5%
Employees in sourcing department	400	6	29	12	6
Sales markets	Global	Europe	Global with more than 20 countries	Central Europe	Primarily Germany

*2009

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3.7 Overview of Cases - Electronics Manufacturing in Germany

Code	DEEL1	DEEL2	DEEL3	DEEL4	DEEL5
Date of interview	October 2011	September 2011	September 2011	September 2011	September 2011
Length of interview	2 hours	2.5 hours	2 hours	2 hours	1.5 hours
Anonymity required/ Approval thesis	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Interviewee	Mr. Herbert Reiss	2 Interviewees			
Position	Head of Strategic Sourcing	Director Supply Chain Mgmt./ Head of Purchasing	Head of Purchasing	Director Strategic Procurement	Head of Purchasing
Years in current position	2	4/6	8	3	
Experience in sourcing (years)	4	4/17	13	3	
Reports to	CEO	CEO/Director Supply Chain Mgmt.	CFO	CFO	COO
Member of the board	No	No/No	No	No	No
Member of mgmt. team	Yes	Yes/Yes	Yes	Yes	No
Company name					
Business cluster	Large	Large	Large	Large	Large
Revenue in 2010 (Mil. €)	96	84	140	211	370
EBIT in Mil. €	Not published	Not published	Not published	-12.8 (loss)	Not published
Employees 2010	480	1,262	1,000	1,372	4,300
Organisation of sourcing department	Central	Central	Central	Decentralised, coordinated	Not answered
Sourcing Spend Mil. € (approx.)	50	20	90	110	Not answered
Ratio Spend/Revenue	52%	24%	65%	52%	
Employees in sourcing department	19	9	28	26	Not answered
Sales markets	Global	Global	Global	Central Europe	Global

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3.8 Overview of Cases - Construction in United Kingdom

Code	UKCO1	UKCO2	UKCO3	UKCO4	UKCO5
Date of interview	September 2011	December 2011	October 2011	October 2011	November 2011
Length of interview	3 hours	1.5 hours	2 hours	1.5 hours	2.5 hours
Anonymity required/ Approval thesis	Yes/No	Yes/No	No/Yes	No/Yes	No/Yes
Interviewee			Mr. Graham Edgell	Mr. Jez Williams	Mr. Nigel McKay
Position	Operations Director	Lead Category Manager	Group Procurement Director	Senior Bid Manager	Head of Procurement EMEA
Years in current position	6		10		6.5
Experience in sourcing (years)	10		20		36
Reports to	COO	Director Purchasing	CEO	Construction Director	COO
Member of the board	No		No	No	No
Member of mgmt. team	Yes		Yes	Yes	Yes
Company name			Morgan Sindall Group plc.	GB Building Solutions Ltd	Lend Lease
Business cluster	Large	Large	Large	Large	Large
Revenue in 2010 (Mil. £)	851	5,400	2,101	125	5,769*
EBIT in Mil. £	21	182.2	46.5	1.46	455*
Employees 2010	2,902	45,000	7,662	265	17,181
Organisation of sourcing department	Project purchasing	Not answered	Decentralised	Project purchasing	Project purchasing
Sourcing Spend Mil. £ (approx.)	Not answered	3,500	1,800	Not answered	650 (EMEA)
Ratio Spend/Revenue		65%	86%		
Employees in sourcing department	Not answered	Not answered	80	65	24 (EMEA)
Sales markets	Global	UK, Middle East, Canada	Global	National	Global

* 7/10 - 6/11 - adjusted from Australian Dollar (Exchange Rate 0.64 11/2011)

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3.9 Overview of Cases - Electronics Manufacturing in United Kingdom

Code	UKEL1	UKEL2	UKEL3	UKEL4	UKEL5
Date of interview	October 2011	December 2011	November 2012	November 2011	February 2012
Length of interview	1.5 hours	2.5 hours	1.5 hours	1.5 hours	2 hours
Anonymity required/ Approval thesis	No/Yes	Yes/No	Yes/No	Yes/No	Yes/No
Interviewee	Mr. Martin Hardy	Mr. Stewart Martin			
Position	Purchasing Manager	Supply Chain Director	Sourcing Director	Director Purchasing	Group Commodity Manager
Years in current position		4	11	2	4
Experience in sourcing (years)		30	15	20	15
Reports to		CEO	CPO Global	CEO	Group Operations Director
Member of the board		Yes	No	No	No
Member of mgmt. team		No	No	Yes	Yes
Company name	Seaward Group				
Business cluster	Medium	Large	Large	Medium	Large
Revenue in 2010 (Mil. £)		115	1,125	32	262.2
EBIT in Mil. £	Not published	Not published	112	Not published	26.2
Employees 2010		300	5,959	300	1,566
Organisation form sourcing department	Not answered	Decentralised	Decentralised, coordinated	Central	Decentralised, coordinated
Sourcing Spend Mil. £ (approx.)		46	512	23	70
Ratio Spend/Revenue		40%	46%	72%	27%
Employees in sourcing department		Not answered	20 (1 Business Area)	18	40
Sales markets	Primarily UK	Primarily UK	Global	Global	Global

* 7/10 - 6/11

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3.10 Overview of Cases - Nature of Businesses and Companies

DECO1	DECO2	DECO3	DECO4	DECO5
The company is a large enterprise and serves public and industrial clients with project development, turnkey solutions, real estate management and facility management combined with services. The markets served vary from power, infrastructure or operations of infrastructure projects with financial management.	The company has broad offerings: building, turnkey solutions, civil engineering, underground construction, building renovation or pre-casting of elements. Furthermore, the company offers real estate services.	The primary business of the company is the services, product and turnkey solution provision with a focus on interior fit-out, facade construction and insulation engineering. The product range covers facade, steel, glass ceilings and industrial scaffolding.	The company serves private clients with prefabricated houses. The house can be selected from standards or references or can be custom-made. The company produces around 700 houses per year.	The company develops large projects for industrial clients. Primary activities are: project development, project management, general contracting and construction services. Furthermore, the company manages the properties, the facility, assets, centre and park houses. The company is general contractor for clients or develops and operates own properties
DEEL1	DEEL2	DEEL3	DEEL4	DEEL5
The company is a one of the competent solution providers for automation, installation, drive and control systems technology. The company produces electronic motors and drives, and automation systems based on its own engineering.	The company is a competent solution provider for automation, installation, drive and control systems technology. It serves all industries from automotive and aerospace to consumer goods.	The company is a global company with multiple sites and is one of the leaders in diagnosis and measuring systems for rotating components across industries.	The company is a solution provider in communication and radio control systems covering engineering, equipment and support across multiple industries.	The company provides the global automation markets and is a leading developer and manufacturer of electrical equipment such as sensor, barrier, fieldbus technique and positioning systems.
UKCO1	UKCO2	UKCO3	UKCO4	UKCO5
The company's core competency is in construction and construction consulting with integrated services across the full property and infrastructure life cycle. Despite the construction delivery, the company offers consulting services in project, facility and cost management.	The company has several offerings in the area of construction of buildings and infrastructure. The offering covers design, construction through project finance and lifetime asset management. Furthermore, it offers services in facility management, energy and infrastructure.	Morgan Sindall is the leading UK construction and regeneration group in the public and private sectors. The offerings range from construction and infrastructure projects, through investments, urban regeneration, fit-out restructuring projects and affordable housing.	The GB Group provides a broad range of services. They offer construction, development, energy, IT and management services across a variety of sectors. The company further specialises in care, student accommodation, residential, education, hotels and leisure.	Lend Lease is an international group, which operates as an integrated services provider around the globe. They offer the whole construction life cycle starting with development, investment management, project management & construction, and asset & property management for property and infrastructure.
UKEL1	UKEL2	UKEL3	UKEL4	UKEL5
The Seaward Group is the leading company in electrical test equipment. The company designs, manufactures and serves low and high-voltage markets, as well as the solar market.	The company designs and manufactures portable electric test and measuring equipment for high and low voltage. Although the company has a global footprint, the organisational structure is local to meet local customer requirements.	The company is a world leader in providing measurement and sophisticated communications and data solutions for gas, electricity and water customers.	The company is an integrated electronic manufacturing service provider of custom-made solutions for cable looms, cabinets and boxes. Furthermore, the company offers a range of services, from electronic component sourcing to supply chain management.	The company is a leading provider of high-technology tools and systems for research and industry. The company serves all industries, from agriculture to chemical and textiles.

3.11 Summary

This chapter presented the applied methodologies in this research project and their philosophical underpinnings. This research was undertaken from the realism and post-positivism perspective to explore the current state of strategic sourcing and risk management. For this purpose, a qualitative method was selected, with semi-structured interviews and structured handouts used to meet the research objectives. Twenty case studies - five per sector and country - create a solid foundation for the qualitative study. One of the biggest dangers in a qualitative research project is validity and reliability, a problem addressed in this section. To achieve high-quality research, several aspects must be considered. First, qualitative analysis software was used to compute models and findings and to document findings. Second, all interviews were fully and electronically documented. Third, multiple-case studies from a broad range were used to justify generalisation. Finally, the questionnaire design, with open questions in the first section and structured handouts with closed questions, should ensure a high degree of validity.

4 CHAPTER FOUR - FINDINGS OF INTERVIEWS

4.1 Introduction

Conducting 20 interviews with representatives from the construction sector and electronics manufacturing industry provided detailed information relating to how companies act in strategic sourcing. The interviews were designed around six dimensions, which covered 1) Trends, 2) Theoretical and Practical Sourcing Models, 3) Sourcing Risk Management, 4) Supply and Demand Chain Management, 5) Critical Success Factors and 6) Strategic Sourcing Criteria. The findings from the case studies are presented in the following chapters. This section covers the first, second and third research objectives, and discusses the developments and perceptions gained from the interviews, which are validated using secondary data.

Research Objective 1: To trace the trend of development in strategic sourcing. The goal is to verify the changes and trends in order to predict future business needs.

Research Objective 2: The research identifies the critical success factors in contemporary strategic sourcing, especially concerning holistic supply and demand management, combined with external factors emerging from markets and economies.

Research Objective 3: To evaluate the theoretical and practical sourcing models in terms of effectiveness and sustainability.

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4.2 Trends

The world economy is dealing with various difficulties, and different trends have led to the range of challenges facing sourcing departments and companies. The general market development being influenced by the financial crisis led to a downturn and several supplier bankruptcies. Furthermore, natural disasters caused a significant disturbance in supplies. The financial crisis has had a tremendous impact on economic development and the supply base, while the downturn in Europe and issues surrounding credibility and financial stability within the so-called PIGS states (Portugal, Ireland, Greece, and Spain) is a major challenge for the European Union. Given these economic developments, companies face a range of trends and challenges.

4.2.1 Trends to the company

The first task in case study research is to identify which and what kind of trends the interviewees view as relevant to the company. The analysis in Table 4-1 shows the following trends as relevant (sum represents the total number of coding; cross-country analysis represented in Germany (DE)/ United Kingdom (UK; cross-industry analysis represented in construction (CO)/ electronics (EL)):

Nodes	Sum	DE	UK	CO	EL	Companies
TrC_Economy	8	3	5	2	6	DECO4, DEEL1, DEEL4, UKCO3, UKEL2, UKEL3, UKEL4, UKEL5
TrC_SupplierPartnerships	8	4	4	5	3	DECO1, DECO2, DECO3, DECO4, UKCO4, UKEL1, UKEL3, UKEL5
TrC_Sustainability	6	3	3	3	3	DECO3, DECO5, DEEL2, UKCO3, UKEL3, UKEL5
TrC_AuditSupplier	6	3	3	1	5	DECO2, DEEL1, DEEL2, UKEL2, UKEL3, UKEL5
TrC_negGlobalSourcing	5	3	2	3	2	DECO1, DECO3, DEEL2, UKCO3, UKEL4
TrC_SupplyChainRisk	5	2	3	2	3	DECO2, DEEL2, UKCO5, UKEL4, UKEL5

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Nodes	Sum	DE	UK	CO	EL	Companies
TrC_SupplySecurity	5	3	2	2	3	DECO4, DEEL2, DEEL3, UKCO1, UKEL1
TrC_CultureOrgaChange	4	2	2	2	2	DECO1, DEEL1, UKCO5, UKEL2
TrC_Margin	4	1	3	3	1	DECO3, UKCO3, UKCO5, UKEL1
TrC_NewSourcingMarkets	4	1	3	1	3	DEEL2, UKCO3, UKEL2, UKEL4
TrC_posGlobalSourcing	4	2	2	2	2	DECO3, DEEL5, UKCO1, UKEL2
TrC_SalesMarkets	4	2	2	2	2	DECO3, DEEL3, UKCO5, UKEL5
TrC_WorkingCapital	4	4		1	3	DECO3, DEEL1, DEEL2, DEEL5
TrC_BargainPowerSupplier	3	1	2	2	1	DECO4, UKCO3, UKEL5
TrC_CustomerRequirement	3		3	2	1	UKCO1, UKCO2, UKEL3
TrC_incrSupplyPrices	3	1	2	2	1	DECO4, UKCO3, UKEL2
TrC_RawMaterials	3	3		1	2	DECO5, DEEL1, DEEL4
TrC_SalesPrice	3	2	1	3		DECO2, DECO3, UKCO5
TrC_SourcingStrategy	3	1	2	3		DECO3, UKCO2, UKCO5
TrC_VolatilitySupply	3	3		1	2	DECO5, DEEL1, DEEL2
TrC_Compliance	2	1	1		2	DEEL2, UKEL3
TrC_Fixed price projects	2	1	1	2		DECO4, UKCO1
TrC_PerfectDelivery	2	1	1	2		DECO4, UKCO3
TrC_Quality	2	1	1	2		DECO4, UKCO1
TrC_Standardisation	2	1	1	1	1	DEEL3, UKCO1
TrC_SupplierReduction	2		2	2		UKCO4, UKCO5
TrC_Talent	2	2			2	DEEL2, DEEL3
TrC_NoChange	1		1		1	UKEL3
TrC_Whole-life costing	1		1	1		UKCO3
n=20						

Table 4-1: Identified trends with an impact on the company

World economic development, especially in Europe, is vital to these companies. UKEL 3 highlights an *“increased awareness of socioeconomic factors within strategic sourcing”* (UKEL3). *“European economic challenge that’s currently going on and that has an impact on a number of strategies we have with the supply chain”* (UKEL5). Despite these developments in Europe, firms monitor developments in China and the currency development: *“I don’t think you have that big advantage anymore, because I think it is undervalued by 20% or over 25% something”* (UKEL4). More generally, the currency rates and volatility are the most important trends for DEEL4. Finally, there are several concerns

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regarding domestic economic development, and whether there will be a recession (DECO4).

Supplier partnerships gained increased importance based on past economic developments, and DECO1 focuses on the collaboration with clients, contractors and sub-contracts. The contractor has to provide appropriate creditworthiness, which is an important criterion. However, although some companies mention partnerships as relevant, some focus on price as the dominant driver. *“We look for the cheapest company, where we have the feeling that they can survive the construction site”* (DECO2). Where DECO3 aims for a healthy supplier portfolio, DECO4 sees problems with suppliers’ capacities and availability. It is therefore necessary to establish partnerships where the company guarantees a certain capacity utilisation. UKCO4 changed the supplier selection criteria and aims for longer partnerships, while UKEL1 strengthened their relationship with key distributors and UKEL3 brought in new key suppliers. UKEL5 changed to *“very much a partnering relationship instead of an arm’s length commercial relationship”*.

Sustainability is a discussion point for several companies. DECO3 sees green building as the dominant trend. This applies also to certifying all buildings—for example as is the case with fair trade coffee—and also affects the raw materials used in construction (DECO5). DEEL3 also focuses on ethical issues in sourcing. For UKCO3, sustainability has become a huge push, and UKEL3 even looks at the end customer and their perception, which in the end drives the *“socioethical responsibilities”*. UKEL5 looks at the wider picture: *“So whether you are looking at stationery, energy consumption, travel, we are starting to measure the carbon footprint, and then equally one of the key things is training where possible, maybe trying to bring in renewable energy”* (UKEL5).

Supply chain risk is seen by some companies as a relevant trend; this mainly relates to the financial health of suppliers given the need to avoid bankruptcies, disruptions and

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damages. UKCO5 clearly aims to *“improve the management of risk in the supply”*, and considers where other companies have to prevent and manage risks. UKEL5 considers and focuses on natural disasters: *“The Thai flooding was a big impact on us and also the Japanese tsunami was another large challenge for us”* (UKEL5). Finally, UKEL5 expects that the supply chain risk will increase and the systems to avoid and prevent risks will become more intelligent.

Arguably based on this risk, the companies start to increase their efforts in auditing suppliers and ensuring their financial health. Supply shortages and the economic crisis led to a critical situation where DEEL1 checked their suppliers and partially had to prepay orders to get the materials. DEEL2 sees the need for more requirements, and has started to work towards an ISO 14000 accreditation, while UKEL3 performs audits and visits suppliers to confirm compliance in some cases. UKEL5 is *“looking at mitigation, is looking at identifying these companies; we put tracking software that we use across a number of other areas of the business on looking at their financial stability”* (UKEL5).

Some companies believe the global sourcing trend has ended, and the “sourcing pendulum” swung back to Europe. DECO1 clearly targets European markets and moves spend back, and DECO3 does not see Asian markets as an option due to their long delivery times. DEEL2 notices an increasingly volatile and changing behaviour, where markets were targeted and companies simply *“move in and out”*. Similarly, UKCO3 highlights their experience: *“We ran to China, realised we have not got enough repeat construction design and therefore, we go in, we come out.”*

“Companies bringing goods back, probably to Eastern Europe” and this will exponentially increase in the coming years (UKEL4). In analysing the economic situation of China in particular, we find that labour rates increasing significantly, long delivery times,

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risks in the political system, counterfeit risks and the undervalued currency are drivers for new global sourcing evaluation.

Supply security is another relevant trend affecting five companies. DECO4 outlines a lack of sufficient supply capacities in the future and the need to “secure” them somehow. This is the main driver in delivery times and in the vicious cycle of budget and price. DEEL2 trades off between stock and supply security, as companies increase stock if delivery times are long: *“Finally, we have two dominating trends. It is the supply security and the increasing volatility.”* For DEEL3, the availability of parts is one of the biggest problems, while UKCO1 and UKEL1 simply state that securing the supply and ensuring continuity are the main trends.

Other identified trends with less than five entries are: cultural and organisational changes experienced by the company; an increased focus on margin improvement; an active focus on targeting new sourcing markets; further positive enforcement of global sourcing; and increased awareness of competitiveness in sales markets. Further trends included working capital optimisation initiatives, or a stronger focus on this topic, and the bargaining power of suppliers being seen to change and increase, with the need to meet customer requirements and further improve the offering with regards these requirements. Increasing supply prices and changes in raw materials, specifically regarding volatility, were mentioned. Furthermore, it is believed that recent developments will affect the sales price, and the adjustment of the sourcing strategy will become more relevant. Increased volatility is seen to affect the supply chains, while compliance management and its maintenance were mentioned by two companies. Furthermore, fixed-price projects seem to affect the company and the pressure on the organisation and references to perfect delivery of the company’s own services and solutions is in line with a focus on quality maintenance or improvement. Standardisation approaches will affect a few companies, together with pro-

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grammes to reduce the supplier base. Furthermore, two companies mentioned that the talent and human resource management is becoming more important. Finally, one company does not see any relevant changes and one considers whole-life costing as a new approach.

The identified trends to companies mainly reflect past developments and companies becoming more concerned about the future. The economic development in Europe and China can lead to a revenue downturn. Though, companies are more cautious about the economic environment. However, the findings indicate the relevancy to the electronics industry and it is a slightly relevant to the UK. Based on past experience, companies may face supplier bankruptcies and supply security issues (see Table 4-8). This is one reason for the greater focus on long-term supplier relationships or partnerships. Furthermore, this is in line with considering supplier audits, negative experiences of global sourcing, supply chain risks and supply security issues, which can be used to minimise risk exposure. In addition, Khan and Pillania (2008) provide evidence that strategic sourcing and supply chain agility impacts organisational performance. The companies tend to strengthen their relationships to avoid supply disruption and increase agility. One reason for the heightened volatility is the increased global sourcing, which increases risk exposure (Wagner and Bode, 2006). Specifically, Chan and Chin (2007) and Su *et al.* (2009) argue that supplier relationships are essential in strategic sourcing. However, supplier relation management is heavily dependent on the buyer's subjectivity (Wagner *et al.*, 2005). Furthermore, sustainability is externally motivated, and while many companies attract increased attention to sustainable and green sourcing, it did not attract researchers interest in a sourcing context, despite being discussed in public (Monczka *et al.*, 2011; Alderman, 2013). The findings show that sustainability becomes relevant in strategic sourcing. In summary, the highlighted trends facing the company can be seen as emerging risks that must be considered in strategic sourcing.

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4.2.2 Trends to the department

The trends affecting the sourcing department are mainly in the area of strategic questions to further establish and strengthen the department and its company value-adding activities. Table 4-2 shows the analysis results:

Nodes	Sum	DE	UK	CO	EL	Companies
TrD_SourcingStrategy	10	6	4	5	5	DECO1, DECO3, DECO5, DEEL2, DEEL3, DEEL5, UKCO1, UKCO5, UKEL4, UKEL5
TrD_Financials	9	6	3	3	6	DECO3, DECO5, DEEL1, DEEL2, DEEL4, DEEL5, UKCO3, UKEL4, UKEL5
TrD_Sustainability	9	2	7	6	3	DECO2, DECO4, UKCO1, UKCO3, UKCO4, UKCO5, UKEL2, UKEL3, UKEL5
TrD_BestPeople	8	5	3	5	3	DECO1, DECO3, DECO4, DEEL3, DEEL4, UKCO1, UKCO4, UKEL3
TrD_SupplyMarkets	6	4	2	2	4	DECO2, DEEL1, DEEL4, DEEL5, UKCO5, UKEL5
TrD_Regulation	5	1	4	1	4	DEEL2, UKCO4, UKEL2, UKEL3, UKEL4
TrD_SkillsTraining	5	3	2	3	2	DECO1, DEEL2, DEEL3, UKCO1, UKCO5
TrD_BargainPowerSupplier	4	2	2		4	DEEL1, DEEL2, UKEL1, UKEL4
TrD_CustomerRequirement	4	3	1	2	2	UKCO1, UKEL3, UKEL4, UKEL5
TrD_OrganisationalChange	4	3	1	2	2	DECO5, DEEL2, DEEL5, UKCO5
TrD_SRM	4	3	1	4		DECO1, DECO2, DECO5, UKCO1
TrD_CompetitionSales	3	2	1	3		DECO2, DECO3, UKCO1
TrD_ProductCharacteristics	3	1	2	1	2	DEEL3, UKCO1, UKEL1
TrD_SupplyRiskMgmt	3	2	1	2	1	DECO5, DEEL2, UKCO5
TrD_SupplySecurity	3	2	1		3	DEEL1, DEEL2, UKEL1
TrD_CompanyBrandValue	2	1	1	1	1	DEEL4, UKCO1
TrD_ITSystems	2	2			2	DEEL1, DEEL2
TrD_noChange	2		2	1	1	UKCO4, UKEL4
n=19						

Table 4-2: Identified trends with an impact on the sourcing function

Sourcing strategy is the most important trend facing the sourcing function. Ten companies mentioned the need to adapt and change strategies and to develop the sourcing

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function further. For DECO1, the primary target is the establishment of category management, which is part of the strategy to manage systematically. The objective is further to break the objective down into category strategies. DECO3 will adjust the sourcing strategy to reflect the recent focus on quality, DECO5 is moving in a visionary manner to develop and consider strategic partnerships or alliances while DEEL3 sees a strong focus on services outsourcing in the near future, and thought to ask the make-or-buy question. UKCO1 highlights its focus on organisation and structures: *“It actually adds value to your business, the way that you structure your business, organise yourselves”*, and points out that *“there is huge potential to be unlocked within the supply chain”*. For UKCO5, the trend is to obtain a full transparent spend overview across all sites and to establish commodity management (synonymous to category management). UKEL5 considers quality and service as a constant factor in the strategy.

Financial aspects are the second most important trend for sourcing departments, and imply costs, savings, sales prices or margins. One potential reason might be the general economic environment and downturn affecting the companies as a general trend (see Table 4-1). Such a downturn typically directs the focus to costs and cost reduction. In particular, four companies highlighted that the focus on margins will affect them (see Table 4-1). DECO3 considers overall profitability as critical, which is in line with DECO5 considering the impact of steel prices on profitability. DEEL1 simply looks at cost reductions overall, while for DEEL2 it becomes a trade-off between supply security and higher buying prices. Currency management, hedging and increased volatility leads to concerns at DEEL4, and there is a feeling that prices in general should be considered (DEEL5, UKCO3, UKEL4). DEEL5 states *“business as usual and pricing is still a normal topic”*. UKCO3 emphasises that *“price is the big one”*, while UKEL4 is also concerned about the

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increasing price of raw materials in the second tier, which leads to *“panic buys”*. UKEL5 will take a closer look at the cost base and the margin situation.

Sustainability and green sourcing developments are mentioned alongside financial considerations, and it is interesting that this area has become so important in the companies' considerations. The green sourcing approach and sustainable sourcing behaviour plays a big role in the sourcing trends and functions, which implies a new sourcing behaviour and an ensured supply chain. DECO4 argues that *“the big topic sustainability will constantly increase, which is based on my experience. Nowadays, this topic is sometimes on the agenda, but in the next five to ten years will become a very big one.”* UKCO1 even expects it to be *“an environmental sustainability, what I would call – the phrase that's been used – I don't know if it translates – a 'hygiene factor', it's a given”*. Governmental pressure and regulation is naturally one of the main drivers in this trend agenda. *“Government's demand for sustainability, we are having to change our supply chain”* (UKCO3). Similarly, green procurement, the carbon footprint and where to source from will be relevant topics in the next five to ten years (UKCO4; UKCO5; UKEL2; UKEL3; UKEL5). *“However, what we've done heavily, and I cover quite a lot of this, is the facility spend, the indirect spends. So whether you are looking at stationery, energy consumption, travel, we are starting to measure the carbon footprint, and then equally one of the key things is training where possible, maybe trying to bring in renewable energy. We've just recently, and we've been running a renewable electricity contract for the last two years, we are looking at another year extension, we've just recently signed that for renewable energy and we are looking at ways of cutting our energy usage”* (UKEL5).

The companies need the best people and highly skilled employees to manage the constantly increasing business complexities, and this is driven by demographic change. UKEL3 summarises the situation: *“Talent management, we see that there may be a poten-*

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tial gap over the next ten years to hire relevant highly skilled people.” DEEL3 highlights that having the best people is the most important topic, especially because hiring highly skilled employees is problematic. The focus on hiring the best people to strengthen the sourcing function is confirmed by many other firms (DECO1, DECO3, DECO4, DEEL3, DEEL4, UKCO1, UKCO5, UKEL3).

Supply markets are subject to continuous market monitoring, with companies following developments and trends and identifying new markets. DECO2 looks for new markets and suppliers primarily due to the capacity shortage with current suppliers, and DEEL1 generally states that global market monitoring will become more important in future. DEEL4 has already noticed market movements as companies move from Korea to China, Vietnam, the Philippines or elsewhere in the Far East. However, the movement back from China to Eastern Europe or the Baltic states has started already. The market behaviour is clearly dominated by cyclical trends and external influences such as the financial crisis (DEEL5). However, two companies also link the sourcing trend to customer demand and development. *“Externally, I would say that the areas are first of all, do you understand what markets you’re delivering in and how they would be receptive to this changing procurement practice,”* states UKCO5. The change to sourcing practices and strategic leadership has seen companies follow their customers. Therefore, UKEL5 sees a change affecting the corporate organisation and strategic locations: *“I mean we have developed further afield and we acquired businesses and we have got a place in China, but ultimately the market is skewing heavily towards Asia, our end customer.”*

Regulation is also important for some companies and covers new laws, guidelines, audits or the Basel regulations. DEEL2 mentions explicitly that bank requirements have changed and an increasing amount of documentation is required; even customers ask for audits and financial information. In general, governments and the EU drive certain regula-

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tions, but these are also partially down to customers (UKCO4, UKEL2, UKEL3, UKEL4). UKEL2 highlights current problems in regulation and conformity: *“We move lithium batteries around the world; because they are potentially dangerous you have to conform to a number of regulations. You have to get the batteries certified [...] they have to be specially packed you know, so all those kinds of legislation, we must be aware of those things. If we are not aware you know, a typical example recently, we issued some stuff to China, some fuses. A fuse, this [...] we sent a parcel out, because the person didn’t realise that fuse translated into Chinese is bomb [...]”* (UKEL2).

Skills and training is another main trend affecting the sourcing function, partly because companies face problems in recruiting the best people and therefore need to compensate to some degree for the experience gap. The sourcing function identified the need to consider skills and training programmes to solve the problem. UKCO1 for instance uses an internal business school approach to train employees and suppliers, while UKCO5 developed its own intranet page for career planning and training: *“So if you’ll see down here today, our personal development program is now open, so every person now has a ‘My Development’ site. So what happens is that we will start engaging with every person around their skills and career planning and we adhere to them filling in all of the necessary documentation around how we’re actually getting the personal development programs working for people as well. So it’s pretty well structured now and we’ve got the right things in place, what we’d have to do, of course, is match with the existing structure as we move towards the new structure, we will have to change it.”* The CPO of DEEL3 even states that the most important factor is having highly skilled employees that can meet the global market requirements. This trend is also supported by DECO1 and DEEL2.

The remaining trends (below five entries) are the changing and increasing bargaining power for suppliers through supply-side consolidation, changing customer require-

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ments, changes in the organisation, supplier-relationship management (SRM), changing competition in sales markets, changing product characteristics or complexity, supply risk management, supply security (ensuring supply to the company) and improvements to the company's brand value and IT systems. Two companies see no major changes upcoming.

The impact is supported in the adjustment of the sourcing strategies, which are seen in economic changes, supplier partnerships and supply chain risk, among others, being identified as trends for the company. Contrary to the findings, financial management is the second most important trend, and it can be argued that the supplier selection is still dominated by costs (Rossetti and Choi, 2005; Sandholm *et al.*, 2006). While the dominance of costs may lead suppliers into bankruptcy, the surprising finding here is that the sourcing function does not see this general trend to the company being relevant to the department. Therefore, the sourcing functions need to rethink and better align with the corporate environment.

The adjustment of the sourcing strategy is a relevant factor and must be aligned with the corporate strategy (Moses and Åhlström, 2008). In addition, the aforementioned trends to companies with regards risks are not directly reflected, and indeed respectively ranked lower, as trends to the department (supply chain risk, supply security). This bears a significant risk, especially if considering the weak implementation of risk management. Furthermore, the sourcing function needs to consider the external environment and the bargaining power of suppliers, together with supply or demand market developments (Porter, 1980; Kraljic, 1983). It can be concluded that the trends to the department mainly relate to financials and sourcing strategy adjustment; however, the findings show that the sourcing function does not focus on and consider all relevant trends the company is facing, specifically the risks.

4.2.3 *Country-specific differences in trends*

This section will present the analysis and discussion of major differences in trends between Germany and the UK, and will highlight the insights gleaned from the companies to identify country-specific trends. The major trends for companies (mentioned more than five times) are economic changes (8), supplier partnerships (8), sustainability (6) and supplier audits (6). The evaluation of these trends by country is presented in Table 4-1):

The recent economic changes caused by the financial crisis have led to major concerns within companies and in strategic sourcing. In this context, it is important to highlight that the interviewees did not focus specifically on the economic development in their country, instead considering the most important economies relevant to their sourcing strategies or decisions.

Surprisingly, British companies are more concerned about the economic situation than the Germans (3 DE, 5 UK). In particular, the British companies focus on the Euro zone and its current problems. UKCO3 highlights the concerns: *“Europe, the Euro zone agenda is one thing [...] with all the cutbacks due to the Euro zone, our pipeline twelve months ago was that big, so there was loads of stuff going to the pipe.”* All except two UK companies focus on developments in the Euro zone. The remaining companies focus on the economic situation in China, but this is largely explained by the industrial focus of electronics companies. The current market environment is relatively critical, especially when considering the European Union statistics. The presented annual gross domestic product (GDP) growth rates indicate that Germany has made a more successful recovery, and that the economic climate is tougher in UK (Eurostat, 2013) (see Figure 4-1):

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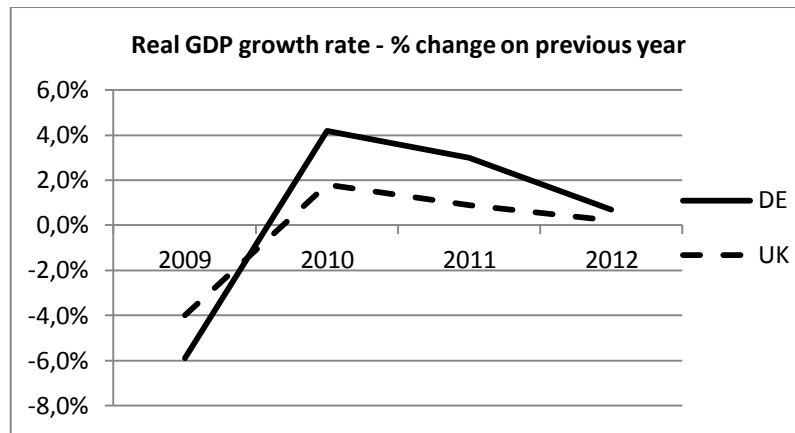


Figure 4-1: GDP growth rates DE and UK

The variances in recent economic development and recovery could be the cause of the different perceptions on trends. Furthermore, UK companies are more exposed than European countries when considering their supply side. This is also supported by interview findings, where UKCO3 highlights: *“Now we’ve got a problem here because manufacturing even, first, my preferred solar company is Antaris from Germany. Antaris wanted certain – 18 months ago, decided we can’t do it in Germany anymore so it goes to China so I’ve lost it. Again, it’s gone to China. And so we got to concentrate in the UK here, is having the right logistics people but just carrying enough influence for the manufacturer to ensure that we can meet the other drivers, which are sustainability, whole-life costing and longevity.”* Finally, this finding is also supported by the closed question and structured handout presented in Table 4-25. In this context, the UK companies ranked economy 3.8 mean points higher than their German counterparts.

The supplier partnership was the second most important trend, with companies in both countries ranking the topic equally (4 DE, 4 CO). UKCO4 is looking for suppliers with the potential for collaboration; UKEL1 highlights the importance of stable relationships with major distributors, UKEL3 talks about key suppliers and UKEL5 about “suppliers that are strategic to us in the long term”. On the contrary, German companies talk more about transactional partnerships, such as to increase communication in the value chain with

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suppliers (DECO1) and to focus on a “healthy” supplier portfolio to achieve savings with potential partners (DECO3). DECO4 clearly considers continuous, long-term partnerships to avoid new suppliers and the associated potential problems. This trend to manage relationships and to face supply-base dynamics is in line with the research of Freytag and Mikkelsen (2007). Similarly, Kocabasoglu and Suresh (2006) highlight the need for information sharing with key suppliers and supplier development as essential characteristics in strategic sourcing. The structured handout in this research also supports the importance of this trend, which is seen on one hand as a critical success factor (see Table 4-20). In this context, German companies view the supplier relationship as more important than UK companies do.

Six companies (3 DE, 3 UK) state that sustainability and green sourcing is an emerging trend (see Table 4-1) DECO3 points out that green building and Leadership in Energy and Environmental Design (LEED) certification is the clear trend in construction. In addition, DECO5 focuses on Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (DGNB) certifications (German Sustainable Building Council), where the focus is also affecting sustainable procurement, and DEEL2 relates to environmental norms and the pressure from OEM to comply with them. The situation is slightly different in the UK, where UKCO3 sees a general “push” throughout the country towards green issues and sustainability, and UKEL5 already implement programmes to measure their carbon footprint. UKEL3 relies on the end customer and their increased perception of sustainability through the “socioethical responsibilities”. Supplier audits are the fourth largest trend to companies, with the focus split equally between the UK and Germany (3 DE, 3 UK). The evaluation of the cases shows that the major target in supplier audits is to increase the financial checks and to focus more intensely on suppliers’ creditworthiness. Companies in both countries argue that the financial crisis led to a greater focus on the financial stability of

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suppliers, where companies even use external service providers to control the development. This section also covers the major trends facing sourcing departments (see Table 4-2). Based on the findings, the major trends are changes in sourcing strategy (10), management of financials and prices (9), sustainability focus (9), best people recruitment (8) and an increased focus on supply markets (6) (please refer also to Table 4-2).

Sourcing strategy is affected by economic changes, and ten companies see the upcoming and resulting trend in changing the sourcing strategies and objectives (6 DE, 4 UK). There is no obvious differentiation in the strategic approach between countries, therefore the sourcing strategy is dependent on the company, and the country attribute does not influence it.

Financials and prices are important to the companies (6 DE, 3 UK), and it is surprising that although the British face the more difficult economic climate, the objectives are not directly linked to price reductions or financials. One reason for this is that the majority of concern relates to the Euro zone, which does lead directly to cost reductions. The financial targets are viewed more as a general objective relevant in the company or resulting from recent market developments, such as supply security. DECO3 and DEEL5 highlight that price is always an issue, a view supported by UKCO3 and UKEL5.

Although only three UK companies mention sustainability as a trend to the company, seven see it as a trend to the department (2 DE, 7 UK). UKCO3 points out and summarises the situation in the UK, where because of “government’s demand for sustainability, we are having to change our supply chain”. In addition, some companies see the green trend as an industrial requirement and differentiation factor. Specifically, UKCO1 highlights the industrial change: *“The sort of environmental sustainability, what I would call – the phrase that’s been used – I don’t know if it translates – a ‘hygiene factor’, it’s a given. We must, as a leading company, be working with blue chip clients, be leading in all of*

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those factors. So constantly ensuring that not only we but our supply chain have all the latest accreditation, chain of custody of the supply materials, all of those issues are a given.”

Therefore, it is obvious that green and sustainable procurement is mainly an upshot of the environmental consideration, for instance to meet Kyoto figures, but it represents a significant factor within the industry.

The trend for best people (5 DE, 3 UK) covers the current and future gap in recruiting highly skilled staff, and is generally driven by the departments. Although the companies cite a general trend and the value of employees is considered important, it can be argued that based on European Union statistics the impact is more relevant to Germany than the UK. German firms are more exposed to demographic changes than the British companies (Eurostat, 2011)

The UK companies see the trend in the future to employ the best people (UKCO1), and UKCO5 points out organisational changes, the current need and the future trend: *“Now once we’ve got those people in place, because the next thing we’ve got to do is do a competency gap then against the job descriptions in there and they can’t position them, so that will then form part of my development plan for each of those people.”* In Germany, on one hand at least, companies are concerned about employees, such as DECO1 stating, *“we need to keep our employees”* or *“employees are the most important”*, where DEEL4 states *“talent and skills shortages are very important, but has different regional characteristics. If you look at Germany you will find differences with fewer relevancies such as in areas like Frankfurt, Berlin or Munich.”* Therefore, the demographic change and employee availability normally leads to problems in the labour market, but this research project did not support the conclusion within country-specific factors.

There are some minor differences in the evaluation of supply markets (4 DE, 2 UK), particularly in their importance to the company.

4.2.4 Industry-specific differences in trends

This section will present the analysis and discussion of differences in the major trends across the construction sector and electronics manufacturing industry, and will provide insights from the companies to identify specific trends. The major trends mentioned more than five times by companies are economic changes (8), supplier partnerships (8), sustainability (6) and supplier audits (6). The evaluation of these trends by industry is presented in (refer also to Table 4-1).

Companies in the electronics business are more concerned about the economic environment than construction companies are (6 EL, 2 CO). This development and these concerns are in line with market developments and the specific industrial downturn. Despite these general market trends, the companies are concerned about currency exchange volatility and the Chinese economy, whereas the construction companies tend to focus on the Euro zone.

UKEL4 states: *“China is still competitive, that is a trend that we are watching and we do sell our business on, you know, why you would want to make it in China.”* Similarly, UKEL2 explains: *“We are constantly monitoring what is going on in China because it’s a very strategic country for us.”* DEEL1 is more concerned about the Chinese economy, and specifically export hurdles and restrictions on rare earths, while the exchange rate volatility worries DEEL4.

Supplier partnerships are the second most important trend to companies (5 CO, 3 EL). It seems that the major trends affect the construction business specifically in Germany, as of these five construction companies, four are German. In particular, these companies focus and consider strategic questions that focus on the evaluation of future partners from the point of view of financial strength, changing markets and supply partner networks and consideration of available and changing capacities at the suppliers’ side. DECO4

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aligns the strategic collaboration, where “*we look on continuous, long-term collaborations, where we need to consider capacity utilisation to some degree and we commit to that*”. In addition, UKCO4 explains “*how we’ve gone to trade on selecting supplies and work with different suppliers and looked potentially to partner with*”. The electronics companies also focus on key suppliers (UKEL3) or have started to “*stabilise our relationships with the major broad line distributors*” (UKEL1). In this context, the importance of the supplier relationship also emerges in the area of sourcing objectives (see Table 4-4) and critical success factors (see Table 4-19).

Sustainable or green developments are emerging and affecting both industries (3 CO; 3 EL). There is no clear difference in this general trend, as both industries are driven by certifications and customer requirements, or by internal initiatives to reduce the carbon footprint.

The supplier audit behaviour is more relevant to electronics companies, as they are keen on executing supplier audits or monitoring the supplier in general (5 EL, 1 CO). This could be because of the past experiences of companies with supply security, where the majority of electronics companies were hit. It seems that companies will reduce their exposure to continuous monitoring and supplier audits. Furthermore, the financial crisis and supplier bankruptcies increased the need to audit. UKEL2 admits to performing “*more financial house checks on companies*”, and UKEL3 also feels the need to execute audits. DECO2 intends to increase supplier assessment to improve efforts in reference verification and creditworthiness assessments. Only DEEL2 performs formal audits with regards new certifications and customer requirements.

After understanding the trends to the company, the next section covers specific departments and presents the trend differences by industrial sector (see Table 4-2). The impact on sourcing strategy is split equally between the electronics industry and construction

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sector (5 EL, 5 CO). There is a slight difference in the maturity of industries, and where electronics manufacturing companies discuss more strategic approaches, such as outsourcing, portfolio management and supply chain transparency, the construction sector highlights fundamental topics, including establishment of category management, quality maintenance or developing strategic partnerships. DEEL2 highlights its reassessment of the current portfolio, while DEEL3 is looking for an outsourcing partner to gain capacity and flexibility. UKEL5 considers the changing sales markets, where the sourcing strategy needs to be adapted, DECO1 discusses the implementation of category management and DECO3 the maintenance of the quality specifications.

Sourcing functions has a bigger impact on electronics companies' financials than their counterparts in construction (6 EL, 3 CO). However, no significant deviation was identified and all companies point out that price remains the most important and constant factor, and the same applies for exchange rates. The impact in the electronics sector might be due to the economic trends, as the companies are concerned about Europe and China and therefore focus more on costs.

Six construction and three electronics companies see the sustainability trend emerging on a departmental level. In fact, the sourcing heads see the 'green' trend affecting their department more than the company in general (see also). This trend is clear in the UK (2 DE, 7 UK), where companies say the demand for sustainable and green sourcing is increasing. UKCO1 sees the development or requirement of green or sustainable sourcing as a given or a *"hygiene factor"*, and UKCO3 argues that the government's increased demands for sustainability have led to changes in their supply chain. UKCO4 notes *"change about sustainability especially that will change what's specified and how things are built"*. Equally, UKEL3 confirms that the trend in green procurement is emerging and specific in

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some industries, and UKEL5 states that the company strategy is clear towards green sourcing and the company “push” it heavily.

Best people or human resources management was identified as the sixth most important critical success factor (see Table 4-19). Five construction and three electronics companies see the availability of highly skilled people as critical and a trend to the sourcing department. This is most visible in German companies (5 DE, 3 UK). However, this trend is broad, and progresses from the first stage of ensuring current employees do not leave the company (DECO1, UKCO1) to focus on the problem of recruiting young highly skilled trainees or experts (DECO3), to investing in training (UKCO1) and predicting a shortage in the highly skilled labour market over the coming years due to demographic change (DEEL3, DEEL4). There is no significant deviation; all companies see the upcoming or even existing trend of being able to recruit the required number or standard of employees. However, a slight deviation can be seen because the construction sector is already facing this problem, and companies have started to focus on retaining employees and investing in training. The electronics industry is aware of the upcoming problem.

4.3 Theoretical and Practical Sourcing Models

This section evaluates the theoretical and practical sourcing models in terms of effectiveness and sustainability. For this purpose, the development and current role of strategic sourcing are analysed and identified, including an assessment of whether the discipline has increased in importance. Furthermore, the evaluation discusses the impact of the changing role on companies, and identifies topics relevant for strategic sourcing in practice. In particular, the strategic sourcing objectives are assessed together with the overall trends for companies and the department. Finally, the companies were asked which models and tools they apply in strategic sourcing. The appraisal of the most commonly applied methods and tools guides this research to an analysis of their effectiveness, which relies on

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the responses and the potential recommendation of tools to other industries. The findings of this section will allow for identification of the current state of strategic sourcing and the application of tools and methods required to meet strategic sourcing objectives. It will therefore prove interesting to identify the tools in practice, to learn how strategic sourcing has changed and how it is anchored within each company, especially in the construction sector.

4.3.1 *Current roles of strategic sourcing*

Strategic sourcing is an important and essential role within many of the companies. Table 4-3 presents the recent status: Nine companies (45%) see strategic sourcing as a significant function, but the remaining ten do not have an established strategic sourcing department. Four of these (20%) plan to establish it over the coming years. Three companies do not see the need for a strategic sourcing function. Two argue that sourcing is part of the process without a special role or importance, and at the other the engineering/project management department dominates the operations.

Nodes	Sum	DE	UK	CO	EL	Companies
StS_CurrentRole\ImportantRole	9	3	6	3	6	DECO1, DECO4, DEEL5, UKCO1, UKEL1, UKEL2, UKEL3, UKEL4, UKEL5
StS_CurrentRole\WillEmerge	4	3	1	2	2	DECO5, DEEL2, DEEL4, UKCO5
StS_CurrentRole\NoStrategic	3	2	1	2	1	DECO2, DEEL3, UKCO4
StS_CurrentRole\PartOfProcess	2		2	2		UKCO2, UKCO3
StS_CurrentRole\EngDominates	1	1		1		DECO3
n=20						

Table 4-3: Current role of strategic sourcing within companies

DECO1 highlights that the understanding of a strategic sourcing department is extremely important to the company, and reports directly to the board. *“I always say that the*

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strategic sourcing is the manufacturing of the future, it is the think tank for the transactional procurement.” The increasing attention paid to sustainable sourcing has increased the role of sourcing and its importance at DECO4, while the strategic sourcing department reports directly to the management board and plays an important role at DEEL1. *“It is very, very important that the strategic sourcing function has the relevant significance within a company, when discussing with the production or with the engineers,”* states DEEL1. The strategic sourcing department is essential, and leads the transactional procurement; it gives the respective directions and orientation (DEEL5). It is, of course, aligned with the corporate strategy and the major directions are aligned with the management board (DEEL5). At UKCO1, the importance is obvious *“[...] if I’m the CEO, if sourcing wouldn’t be that important to my company, I wouldn’t give you money to build a supply chain department”*. Sourcing in general has gained more management attention, but the strategic sourcing became particularly relevant as the board saw the impact sourcing could have on revenues (UKEL1). For UKEL2, strategic sourcing is just a “key role” within the company. However, *“I mean a fundamental role in our company, as we are primarily and increasingly a kind of an outsourced manufacturing model, i.e. that we’re pushing more and more of the assembly and testing of the products externally”* highlights UKEL3. At UKEL4, the business model considers the strategic role of the sourcing function to control and manage the supply chain, and UKEL5 has already undergone a change process and established the importance of strategic sourcing within the group. The understanding of the function is as a mentoring role: *“Well under strategic, our input in the group is to mentor and support the divisional teams. So we have a robust supply and audit process that covers a number of aspects, one of which is development and management. And that shows us, what is the current position the business is in, what they could do today*

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to fit our needs, however, what would they be able to offer in future demands and have they got any head room to expand and evolve.” (UKEL5).

Four companies state the intention to implement a strategic sourcing function in the following months. The management of DECO5 understands that the company has reached a significant size where the implementation of a sourcing function makes sense. The company size is the biggest challenge for DEEL2, and is the reason why strategic sourcing remains not established. Instead, the strategic sourcing approaches are managed as part of the daily business. *“We do not have a 100% strategic sourcing. It does not make sense, if we focus on our company size. There are three functions: project sourcing, series sourcing and strategic sourcing. But the role did change over the past three years and the strategic workload increased up to 50% [...]”*, states DEEL2. DEEL4 works on the implementation of a corporate strategic sourcing role within the holding organisation, although the decentralised structures will be more bundled. UKCO5 is going through a restructuring process; the corporate strategic sourcing function has been already designed and the strategy developed. Further structural changes, and the recruitment of highly skilled people, have started (UKCO5).

Three companies do not have a strategic sourcing department. DECO2 highlights that a strategic sourcing department is not planned: *“The work of strategic and transactional is really mixed together. It does not work if one employee only works strategically.”* Although the major workload is still transactional focused, the strategic direction is developed by the CPO and this guidance is relevant to the buyers (DEEL3): *“We do not differentiate between strategic and transactional. Though, the strategic guidance will be developed by myself, what we need to do, which suppliers we develop, etc.”* Finally, and surprisingly, UKCO4 use a different approach: *“The size of the organisation we are, we have ac-*

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tually probably gone the other way.” From centralised purchasing, the company has reverted back to project organisation and transferred the sourcing to the project level.

The interview findings highlight the importance of strategic sourcing. However, many companies are still planning to implement such a function, or simply have not established one. Given the significance of strategic sourcing to the company, its business performance or competitive advantage (Chan and Chin, 2007; Khan and Pillania, 2008; Su *et al.*, 2009), it is surprising that companies have not yet implemented it. Although some of the studies cover the US, Hong Kong or India, and different industries, the validity can be generalised through quantitative studies. Some companies did not recognise the importance or the added value of strategic sourcing (e.g., UKCO4, DEEL3, DECO2). In addition, the interviewed companies supported the relevance of strategic sourcing (e.g., UKCO1, UKEL2, UKEL3).

4.3.2 Trends of strategic sourcing importance

The interview findings show clearly that of the twenty companies, 18 (90%) confirm the role of strategic sourcing has changed over the past five years. In many cases, the department became more significant within the organisation. Possibly, the sourcing function still needs to renegotiate and save an additional 2–3% (DECO1), but in general *“we feel remarkably that the sourcing function reputation has increased in our company”*, highlights DECO2. The changing environment, and the financial and supply crises, led to this change in perception. *“The significance has positively changed, especially due to the crisis and the changed behaviour of our competitors, for example the cost pressure. Therefore, it is very substantial, became very substantial,”* summarises DEEL1. The same development is confirmed by DEEL2 and DEEL5. For DEEL4, the significance has changed and a central strategic sourcing function has developed with the goal to better collaborate across business units and utilise additional potential. UKCO3 argues that the gained impor-

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tance is a result of the cost pressures in the market. To UKEL4, the change also affected the customers and ran through the whole organisation, where the predetermined customer specification has been reviewed and jointly changed, allowing for a move from transactional to more strategic operations. UKEL1 describes the changes from transactional to strategic in detail:

Interviewer: Okay. And did it happen in your organisation probably that sourcing was a kind of, let's put it, clerical transaction work in the past and then the crisis came in and then the attention, also from board members, shifted to the sourcing and sourcing became more of an awareness in sales, in R&D and in manufacturing?

Interviewee: I think people's perception probably shifted that way. [...] But I think with what's happened over the last couple of years, definitely, sort of like from a director level, I think we've seen the impact that materials can have on revenue that if we can't get a hold of something like shipping product out the door and if we're paying a premium for something, shipping that out the door, what price of what material, so I would say definitely, people's perceptions of this thing, the impact that sourcing can have and how it needs to be solved.

UKEL5 describes the transition and migration process the company went through: *“So the role of strategic supply bases kind of migrated from what was originally more of a fire-fighting role, where you were brought in when there was a problem, can you fix it, and once you have fixed it, thank you very much, we don't want to see you again, to become more of a mentoring and providing the long-term direction of where we should be going, and to ensure that we bring everybody on the journey.”*

On the contrary, UKEL3 believes nothing has changed, despite the different focus areas and factors such as green sourcing. The strategic sourcing role has not significantly changed over the past five years, according to UKCO1, who points out that strategic sourc-

ing is the same, but the people might have changed in that period: “*The company strategy stayed the same. Individuals maybe got lost [laughs]. And those individuals aren’t here anymore so I guess it wasn’t quite right to do that.*”

The findings show a mixed structure to the responses, where on one hand the importance of the sourcing function increased and on the other everything remained equal. Actually, UKEL5 demonstrates a case of a transition process to further enable the sourcing function, which is in line with the findings of Axelsson *et al.* (2006). In addition, the crisis led to increased attention on costs and supply security. Specifically, if companies face problems in sales there are only a few possibilities to drive costs down, with sourcing being one (Kotula, 2010).

Gottfredson *et al.* (2005, p. 132) describe the changing trend in sourcing functions: “Sourcing is evolving into a strategic process for organising and fine-tuning the value chain. The question is no longer whether to outsource a capability or activity but rather how to source every single activity in the value chain.” Furthermore, the importance is supported by the added value to the company produced by the impact on competitive advantage, business performance and supply chain agility (Narasimhan and Das, 1999; Chiang *et al.*, 2012)

4.3.3 Strategic sourcing objectives in sourcing departments

The objectives set for each sourcing function are clearly dominated by the financial parameter and the aim to reduce costs and achieve savings, which is named by ten (50%) of the companies interviewed. The next criterion is discussed by five (25%) companies and relates to supplier relationship management, which implies managing suppliers and networks over a longer term. However, there is a wide range of objectives set by the companies (see Table 4-4):

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Nodes	Sum	DE	UK	CO	EL	Companies
StS_Objectives\Price	10	7	3	5	5	DECO1, DECO2, DECO3, DECO5, DEEL1, DEEL2, DEEL5, UKCO2, UKEL1, UKEL3
StS_Objectives\SRM	5	2	3	3	2	DECO1, DECO2, DEEL2, UKCO2, UKEL4
StS_Objectives\AddedValue	4	2	2	3	1	DECO1, DEEL4, UKCO1, UKCO5
StS_Objectives\DeliveryPerf	4	3	1	1	3	DECO4, DEEL1, DEEL2, UKEL3
StS_Objectives\LongTermStrategy	4	3	1	1	3	DECO3, DEEL1, DEEL4, UKEL5
StS_Objectives\Quality	3	2	1	2	1	DECO2, DECO3, UKEL3
StS_Objectives\SupplySec	2	2		1	1	DECO4, DEEL1
StS_Objectives\MoreVisibility	1		1		1	UKEL2
StS_Objectives\Stock	1	1			1	DEEL5
n=17						

Table 4-4: Strategic sourcing objectives

A financial gain is the main objective for many CPOs to reflect in their strategy and objectives, and this finding is consistent with the entire market environment. Companies face a difficult market downturn, specifically due to the financial crisis, which is reflected first as a general trend for the company (see Table 4-1; Chapter 4.2.1). This general trend will be relevant to the sourcing department, where the CPOs interpret market trends and break them down into departmental trends. Therefore, the majority have to adapt their sourcing strategies and consider the increased pressure on costs (see Table 4-2; Chapter 4.2.2). In particular, they formulate strategic sourcing objectives that are reflected in targeting financial and price aspects, as seen in Table 4-4.

DECO1 firmly focuses on the maximum utilisation of potential: *“It is clear to create competitive advantage and added value is to contribute a significant value to the busi-*

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ness success.” Similarly, DECO2 has a strong focus on costs and believes the implementation of a strategic sourcing function and the consolidation of speed to utilise economies of scale are important. *“Our aim is to increase the collaboration, to best utilise our potential, to identify and realise savings,”* states DECO3. The cost focus, especially on buying prices, is relevant to many companies (DECO5, DEEL1, DEEL2, DEEL5). UKCO2 has a stronger focus on margin improvements rather than prices alone, and UKEL1’s focus is on maintaining a beneficial price level. UKEL3 has the most ambitious objectives, as stated by the interviewee: *“Major one is cost; continues to be the top of the list in terms of cost reduction. You know, we continue to have a goal to reduce between five and ten per cent on a year-over-year basis.”*

Supplier relationship management is the second most common objective mentioned, and is also aligned with the trends affecting the company. The sourcing function obviously aligns and adapts the upcoming trends and transfers them to sourcing objectives (see Chapter 4.2.1, Table 4-1). DECO1 highlights the importance and management of supply networks, which should target one goal and add value to the *“buying community”*. Long-term partnerships are essential to companies, and DECO2 states the need to have a different culture in supplier relationship management and not to squeeze suppliers. *“We want to intensify the relationships and implement credit notes as well as KANBAN with certain suppliers,”* points out DEEL2. For UKCO2, the focus is on supplier rationalisation, compliance and health and safety, while UKEL4 wants to control the supplier base and add value to the business.

The remaining objectives focus on value-adding activities *“we push 20% for price, 80% for value”* (UKCO1), delivery performance of the supplier and the company, long-term sourcing strategy, maintaining the level of quality, ensuring supply security, more visibility in spend and stock key performance indicators (KPI).

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The clear objective in cost savings is interesting and possibly one to emerge from the economic downturn or changing market. Half of the interviewed companies see price as a dominant objective, followed by supplier relationship management. This finding is similar to those in studies by Li *et al.* (2000), Rossetti and Choi (2005) or Sandholm *et al.* (2006), who found price and costs to be the main drivers in sourcing decisions. Similarly, Axelsson *et al.* (2006) highlight that price and supplier performance are reasons for changing suppliers. However, the review by Ho *et al.* (2010) identified “quality” as the main criteria. Considering these mentioned objectives, the strategic supplier evaluation criteria in Table 4-25 are mainly consistent with the previous findings. However, the contrary and surprising finding is the misalignment with critical success factors, in which quality was ranked as the main criterion. In addition, risks are not targeted in the objectives; although several risks are identified in Table 4-1 as relevant trends to the company, the sourcing function neither consider these as a trend to the department nor as an objective within the sourcing strategy (Moses and Åhlström, 2008; Ho *et al.*, 2011; Kusaba *et al.*, 2011). This is despite the significant risks to the company, its competitive advantage and business performance.

4.3.4 Tools and methods applied for strategic sourcing

The strategic sourcing tools and methods are dominated by the classical ABC and Pareto analysis, with ten companies (50%) explicitly mentioning these as their main analysis methodology (see Table 4-5). Furthermore, portfolio techniques are applied where suppliers are clustered and grouped into strategic categories.

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Nodes	Sum	DE	UK	CO	EL	Companies
StS_Tools\ABC-Pareto	10	5	5	4	6	DECO2, DECO3, DECO5, DEEL2, DEEL5, UKCO2, UKEL1, UKEL2, UKEL3, UKEL5
StS_Tools\PortfolioYes	10	4	6	5	5	DECO1, DECO3, DEEL1, DEEL2, UKCO2, UKCO3, UKCO5, UKEL2, UKEL4, UKEL5
StS_Tools\Kraljic	7	3	4	4	3	DECO1, DECO3, DEEL2, UKCO2, UKCO5, UKEL3, UKEL5
StS_Tools\RiskMgmt	7	2	5	3	4	DECO1, DEEL1, UKCO1, UKCO5, UKEL3, UKEL4, UKEL5
StS_Tools\SpendMgmt	7	4	3	2	5	DECO1, DEEL1, DEEL2, DEEL5, UKCO5, UKEL1, UKEL3
StS_Tools\CategoryMgmt	6	3	3	3	3	DECO1, DEEL2, DEEL5, UKCO1, UKCO2, UKEL2
StS_Tools\PerformanceMgmt	6	2	4	5	1	DECO1, DECO2, UKCO3, UKCO4, UKCO5, UKEL1
StS_Tools\DemandPlanning	5	3	2	1	4	DEEL1, DEEL2, DEEL4, UKCO5, UKEL4
StS_Tools\KPI	4	2	2	3	1	DECO1, DEEL2, UKCO3, UKCO5
StS_Tools\ContractMgmt	3	2	1	2	1	DECO1, DEEL2, UKCO5
StS_Tools\eSourcing	3		3	2	1	UKCO3, UKCO5, UKEL3
StS_Tools\Porter	3	1	1	2	1	DECO3, UKCO2, UKEL5
StS_Tools\Benchmark	2	2			2	DEEL2, DEEL4
StS_Tools\PortfolioNo	2	1	1	2		DECO4, UKCO1
StS_Tools\QM	2	1	1	1	1	DEEL1, UKCO5
StS_Tools\Spreadsheets	2	1	1	1	1	DECO3, UKEL1
StS_Tools\CriticalParts	1		1		1	UKEL4
n=19						

Table 4-5: Tools and methods in strategic sourcing

Seven companies explicitly apply the Kraljic-Portfolio (Kraljic, 1983), while a form of risk management is established at seven companies, which mainly use risk matrix sheets to evaluate and assess supplier risk. Furthermore, seven companies use spend man-

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agement as a tool to visualise their spending and manage the supply base and their strategic sourcing approaches. Six companies apply category management practices, where spend is clustered into groups such as steel, ceiling, aluminium, castings, electronic components, etc. Performance management is clearly dominant in the construction sector, where sub-contractors and their performance is regularly assessed to provide a reliable track record and database. On the contrary, demand planning tools are mainly used in the electronics industry, where placed orders are modelled to forecast future demand.

The remaining tools are KPIs, contract management tools, electronic sourcing platforms or vendor portals, Porter's five forces as methodology to assess the markets and bargain power, benchmarking of prices with other companies, quality management checklists and guidelines, different kinds of spreadsheets and templates and finally a critical parts database. Only two companies do not apply any portfolio techniques. DECO4 states: *"We do not use any kind of formulas, charts, huddles and other things. But rather we ensure that through our employees being employed for a long time."* UKCO1 simply states: *"No, we don't."*

Considering this analysis, it is surprising that the application of tools is only established by half of the interviewed companies, albeit that these tools are more fundamental in sourcing. Trautmann *et al.* (2009a) for instance propose a purchasing portfolio approach to assess global synergies by adapting the Kraljic matrix (1983). The authors apply a two-by-two matrix and build three evaluation categories: economies of scale (degree of volume aggregation vs. supplier delivery scope), economies of information (purchase complexity vs. supply risk) and economies of process (transaction volume vs. process complexity). However, some companies see portfolios as difficult. Gelderman and Van Weele (2003) identify in case study research different applications and company-specific characteristics of the Kraljic matrix, particularly where the experienced user included additional informa-

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tion, such as the overall business strategy, specific situations of supply markets and individual suppliers (Gelderman and Van Weele, 2003). It is surprising that the application of eSourcing or reverse auction is not well established because it improves process efficiencies (Saeed *et al.*, 2005). Research by Spekman *et al.* (1999) identified that, in general, companies lag behind in the implementation of electronic data interchange or other electronic sourcing tools. Hence, companies may be sceptical about the added value of such tools and the real value (Emiliani, 2004; Arnold *et al.*, 2005). In addition, seven companies apply tools to manage risk appropriately. In summary, the sourcing maturity highlighted by Van Weele (2010) can provide one reason why the interviewed companies in the electronics industry and construction sector do not widely use tools.

4.3.5 Tools effectiveness

Based on the discussion of tools and methods the companies apply, the interviewees were asked which tool they feel is effective and which tool they would find relevant to other companies in their sector; see Table 4-6 below:

Nodes	Sum	DE	UK	CO	EL	Companies
StS_ToolsEffective\ABC-Pareto	3	2	1	1	2	DECO3, DEEL1, UKEL4
StS_ToolsEffective\PerformanceMgmt	3	2	1	1	2	DECO1, DEEL2, UKEL4
StS_ToolsEffective\Portfolio	3		3	1	2	UKCO2, UKEL4, UKEL5
StS_ToolsEffective\Forecasting	2	1	1		2	DEEL4, UKEL1
StS_ToolsEffective\NoAnswer	2		2		2	UKEL2, UKEL5
StS_ToolsEffective\ContractMgmt	1	1		1		DECO1
StS_ToolsEffective\eSourc	1		1		1	UKEL3
StS_ToolsEffective\SpendMgmt	1	1		1		DECO1
StS_ToolsEffective\SupplierInvolv	1	1		1		DECO3
n=12						

Table 4-6: Tools effectiveness

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Only a few companies answered the question, which limits the potential for generalisation from this section. However, the findings still allows us to interpret some tendencies. Only three companies see ABC and Pareto analysis as efficient and relevant to other companies, while three see performance management and portfolio techniques as relevant to the industry. Although not allowing for a generalisation, various reasons can explain the differences despite the changed sample size. First, the interviewee does not believe in the effectiveness and therefore does not recommend its application. Second, companies want to protect knowledge or their competitive positions and do not want to share information. Third, there can be a gap between interviewees' awareness and the lack of implementation (Christopher *et al.*, 2011). Finally, interviewer bias or a poor understanding of the question may lead to weak answers (Yin, 2009). However, despite the low response rate it is surprising that the efficiency of electronic tools is not seen to be recommended to the industry. Instead, it seems that the companies protect their knowledge. For instance, UKCO5 does apply an electronic sourcing tool and UKCO1 uses an online performance measurement for contracts, which they subjectively found helpful. But they do not see it as to be recommended. UKCO5 can support this argument: *"So the top two systems in place at the moment that are helping us are ... you just saw SES, that was a performance management tool, and we did that in-house, we used building confidence and SSIP around accreditation and pre-qualification for our supply chain, we got COINS or Oracle, we got both in place around our spending cost management."*

4.3.1 Country-specific differences in sourcing models

The major trends within the dimension of theoretical and practical sourcing are essentially split into the development of strategic sourcing, its objectives and the application of sourcing models. First, as is obviously the case, strategic sourcing plays an important role in 66% of UK companies and 34% of German companies (see Table 4-3). It is also

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obvious that strategic sourcing is increasing in prominence, and will emerge in three German companies and one in the UK, although strategic sourcing is more established in the UK than Germany. Companies such as DECO5 have a clear aim to establish a strategic sourcing function in the near future. At DEEL2, the leadership noticed the emerging importance of strategic sourcing but without concrete planning, while DEEL4 is already planning to establish a corporate strategic function and DECO5 is running through a holistic change programme.

However, no reason was identified as to why UK is leading in strategic sourcing. It can only be assumed that due to crises and recent developments, the UK companies have been exposed to a tougher market environment than their German counterparts. When considering the GDP development (see Figure 4-1), Germany was hit harder by the downturn but recovered much better than the UK and has enjoyed better GDP development recently. Therefore, from the interviews we propose the importance of strategic sourcing is dependent on the market environment. The financial and supply security crisis in Germany has led to an increased awareness of its importance, whereas some UK companies claim to have established strategies and strategic sourcing years ago. UKCO2 states: *“Yes, I guess, something that we introduced about ten years ago, I joined ten years ago, they started doing category management, it declined for a number of years, the business got more – the company got more focused in acquisition and integrating new companies. And so what happened then was once those companies have been integrated, we then found ourselves with a lot more suppliers than we had historically, because each of the companies brought their own supplier base with them, and that is part of the reason for a refocus on category management.”* Additionally, UKCO3 states: *“It gained importance because of the price pressures. This strategy is ten years old.”* UKEL2 confirms that cost pressures caused the increased perception and focus on strategic sourcing.

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This view is underlined by the cost and price-based objectives strategic sourcing is facing, particularly in Germany. Seven out of ten German companies state that price reduction, savings and cost management is an important objective, compared with three UK companies (see Table 4-4). Considering this, it is arguable that price objectives lead to the establishment of strategic sourcing. Out of four companies establishing strategic sourcing, DECO5 and DEEL2 see price and cost reduction as objectives, while DEEL4 and UKCO5 aim to add value to the value chain.

The supplier relationship management, the second most dominant objective, is discussed by three German and two UK companies. Although, supplier relationship was mentioned as a trend by eight companies (Chapter 4.2), only five companies defined an objective to adapt the trend. Although the companies' application of tools and methods is generally limited, and often reduced to using only the basic tools, there are significant cross-country differences (see Table 4-5).

Five UK companies use tools related to risk management, compared to two in Germany. These are mainly matrixes to record possible risks, and there is no real difference in their application or use across countries. The general procedure is in line with Desouza (2008), who recommends evaluating risks in contracts or monitoring outsourced risks, such as in the construction sector. Nevertheless, companies do not follow a structured process and are weak in mitigation planning. The surprising finding here is that some companies are not able to cover the emerging company risk. DECO2, DEEL2, UKCO5, UKEL4 and UKEL5 mentioned risk as a trend to the company (see Table 4-1), but DECO2 and DEEL2 lack the appropriate tools to deal with it. Furthermore, DECO4, DEEL2, DEEL3 and UKEL1 include supply security as a trend, but have not established appropriate risk management tools. Finally, this situation is reinforced by the structured questionnaire and the findings in, where we see UK companies rank risk 4.1 mean points higher

than German companies (see Table 4-25). This situation is also confirmed in the tool analysis.

4.3.2 Industry-specific differences in sourcing models

The major trends within the dimension of theoretical and practical sourcing largely encompass the development of strategic sourcing, its objectives and the application of sourcing models.

The first finding to highlight from the analysis is that the construction sector does not see strategic sourcing as significant. Only three (30%) companies, compared with seven (70%) electronics companies, rank it as important. If also considering companies in which strategic sourcing will emerge in the near future, then this would incorporate 90% of the electronics companies. This finding supports the supply development model of Van Weele (2010), in which construction is seen as laggard in terms of sourcing maturity (see Figure 1-2). The electronics companies report it to be well-established, with the findings mainly presented directly to the board. However, the function is only perceived as “value adding” in a few construction companies, or as DECO1 points out, as the “think thank” for transactional procurement. When the sourcing function is established, the perception of its importance increases. However, this research identified that strategic sourcing is still emerging within construction companies. It may be that the nature of the business is still dominated by engineers and architects, and the sourcing function is seen as part of the process or even as the role of the transactional office responsible for the contracts. This theory is supported by UKCO4, which has moved away from central or coordinated procurement to local, project-based sourcing.

In considering the strategic sourcing objectives, no significant deviation in major trends was identified across the industries.

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The tool usage in strategic sourcing is shown in Table 4-5 and is dominated by the ABC-Pareto analysis (6 EL, 4 CO), portfolio technique to cluster categories (5 EL, 5 CO), Kraljic portfolio (3 EL, 4 CO), risk management (4 EL, 3 CO) and spend management (5 EL, 2 CO).

The ABC-Pareto analysis is more established in the electronics industry than in construction, possibly due to the mature role of strategic sourcing within the electronics industry. One of the main targets and tools in strategic sourcing is to analyse spend and manage the portfolio appropriately to derive specific strategies, whatever the products, services or industry. The companies apply the ABC-Pareto tool to ensure transparency, identify the most important categories and prioritise actions. UKEL2 states: *“Our strategy is very much what we call material group based. As far as stocking we work on a, you know ABC type, certain components are weighted based on their importance to us and their usage so that [...]”*. The only difference is the fact that the construction sector tends to classify suppliers in accordance with ABC instead using the part numbers used by the electronics industry. UKCO2 highlights this: *“We tend to categorise our spend now by supplier, name, rather buy what we’re buying, because like I said, we cannot necessarily [...] it’s not easy; we’ve got all these different [...]”*.

The main deviations are in the areas of spend management and performance management. Where spend management is mainly dominated by the electronics industry (5 EL, 2 CO), five construction companies use performance management in dealing with suppliers, compared with one electronics company.

There is a higher application of spend management in the electronics industry as companies need to understand the spend by parts and products. UKEL3 highlights *“well, lots of different tools. Within sourcing we have a lot of tools regarding understanding of our spend and profile of spend”*. DEEL5 points out the need to analyse spend in accor-

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dance with the article numbers and parts. However, UKCO2 clearly highlights that spend management is not of such importance in construction: *“We actually have huge spend reports, accuracy of the information, again, which is why in construction it’s different, because it’s not like everything has got a part number, because everything hasn’t a part number, you cannot understand how much spending, who you are buying from and when you got a supply, you don’t necessarily know what you are buying from them, because they could supply a range of products. So it’s the kind of work that they did.”*

Therefore, performance management is more common in the construction sector, where the management of large scope and services on construction sites is more important. Several companies apply different tools to regularly manage and assess the performance of a supplier or contractor. DECO1 uses a supplier management system that supports the selection, assessment, development and disintegration. UKCO3 uses a similar system: *“We can manage on-going credit issues, accreditation, certification, and after that, performance management comes from our own jobs and it feeds into the portals so we’ve got the loop from our projects coming back in. In terms of sourcing, for instance, worldwide, because the UK – I took the decision ten years ago that we can’t do this.”* Similarly, UKCO5 uses a performance management system: *“We only do a system on performance management which I can show you – I’ll just show you an example. So in here we have a supplier performance database, so I’ll just put a tick in there. So this scoring is out of ten and it sounds pretty stale, seven out of ten and eight out of ten, but there is a management philosophy behind this.”* The remaining electronics company states: *“Yes. We do on-going appraisals of the suppliers as well, sort of from a performance point of view”* (UKEL1). Therefore, when reflecting on this analysis, it can be concluded that although both industrial sectors use basic tools in management, they deviate according to the industry-specific requirements and business nature. Hence, the construction sector necessarily focuses more

on performance management, because it is more important to see how suppliers perform and whether that supplier will be contracted again. However, it is interesting to see that spend management is largely not established in the construction sector, especially because it would be advantageous to establish the total spending on certain categories, such as steel, ceilings, lighting, etc. The challenge is, as UKCO2 pointed out, that it is difficult to achieve without part numbers.

4.4 Sourcing Risk Management

Several supply risks influenced the companies' corporate strategy in 2010/2011. Despite the financial crisis, the volcanic ash cloud in Iceland or the tsunami in Fukushima also led many companies to experience a volatile environment. This section evaluates how companies coped with the identified emerging risks, and how well their supply risk management practices operated. The findings of this section will allow us to identify and contribute to the risk parameter, which is necessary to develop a risk-based framework. For this purpose, it will be interesting to identify the gaps and requirements in business practice.

4.4.1 Influences of supply risks on corporate strategy

Recent supply risks influenced the daily operations of several of the companies, particularly the financial crisis and the Fukushima tsunami, which both led to delivery problems.

Nine (45%) companies experienced at least one serious risk event in 2010/2011 that influenced their business operations. The remaining eleven (55%) companies did not face such a risk event (see Table 4-7):

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Nodes	Sum	DE	UK	CO	EL	Companies
Ris_Event_Yes	9	4	5	4	5	DECO5, DEEL2, DEEL3, DEEL4, UKCO1, UKCO3, UKCO5, UKEL4, UKEL5
Ris_Event_No	11	6	5	6	5	DECO1, DECO2, DECO3, DECO4, DEEL1, DEEL5, UKCO2, UKCO4, UKEL1, UKEL2, UKEL3
n=20						

Table 4-7: Risk events in companies

The range of supply disturbances is wide; however, supply security and supplier insolvency were the major problems companies faced in 2010/2011; see Table 4-8:

Nodes	Sum	DE	UK	CO	EL	Companies
Ris_Event_Exmp\SupInsolv	8	1	7	5	3	DEEL4, UKCO1, UKCO2, UKCO3, UKCO4, UKCO5, UKEL2, UKEL4
Ris_Event_Exmp\SupplySec	8	3	5	1	7	DEEL2, DEEL4, DEEL5, UKCO3, UKEL2, UKEL3, UKEL4, UKEL5
Ris_Event_Exmp\Natural	2	1	1		2	DEEL3, UKEL5
Ris_Event_Exmp\Commodity	1		1		1	UKCO3
n=13						

Table 4-8: Examples of risk events

Eight companies faced the problem of supplier insolvencies. One supplier of DEEL4 faced significant financial problems, which led to risks regarding the supply of tools and deliveries. At this point there was an exclusive, single-sourcing strategy developed, which led to higher risk. The mitigation for this was that it ensured just-in-time deliveries. *“Administration, companies going to the board. We had one last year, just completely came out of the blue. None of our risk analysis picked it up. Significant supplier and*

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just went into administration,” says UKCO1. Equally, UKCO2 highlights the problems: *“We did in terms of supplier [...] a lot of suppliers who went into receivership, [...] because that is so difficult to predict, it has just been managed on sort of project by project, supplier by supplier.”* Credit-wise, UKCO3 manages the top 500 suppliers monthly. Although supplier insolvency influences the project significantly, UKCO4 could finish the project by partially funding some suppliers until completion. The financial crisis caused eight supplier bankruptcies at UKCO5’s and UKEL2 lost one key supplier. *“We have had suppliers in administration. And no more [...] and interestingly, not so many as in previous downturns in the economy and I wonder if suppliers in our industry are just a bit more able to flex,”* states UKEL4.

Furthermore, eight companies had significant problems with supply security and lead times from their suppliers. DEEL2 coped with much-increased lead times due to allocation problems: *“Allocation, long lead times, we had to exchange the information constantly. We had enormous problems, especially in the delivery times. We had one product where the lead time increased from normally six weeks up to forty weeks.”* DEEL4 faced similar problems, and DEEL5 had to manage challenges: *“It is a question of how prepared you are. [...] Of course, we had supply shortages, we had missing deliveries, but you will never have zero backlog of missing parts. Through disposal, deliveries, preparation, information gathering from suppliers, market information you get a feeling, which parts are available and which not.”* UKCO3 *“[...] have become more intense in monitoring basically market movements of any type in terms of lead-in times, manufacturing”*. The Japanese earthquake caused some problems, and UKEL3 started to identify alternative sources. However, the company faced delivery problems, mainly caused by their tier two suppliers:

“From the financial crisis, of course, there was risk from a supply chain level, but we didn’t have any major problems. Therefore, we didn’t have companies going out of

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business. I think, and hopefully this is testament to the risk processes that we have in place, but most of those suppliers were robust enough to weather the storm, so to speak. Okay, they needed some to refocus and cost-cut internally, there were suppliers who ran redundancy programmes and streamlining programmes, but, you know, we didn't lose any. And I think that, hopefully, says a lot for the work we're doing up-front to only work with suppliers who can weather these kinds of crisis on a financial level. The kind of nuclear and tsunami and things like that which you have, you know, accidents or extreme weather conditions like this, you know, we had impacts from both at tier-two supplier level and tier-three level only. You know, we didn't have any direct impact on our tier-one suppliers, but of course, when their supply chains tier two and three get impacted, then we have a knock-on. So we had some delivery-time issues, some delayed deliveries, most specifically around the nuclear accident, but also we had issues in, you know, regarding the tsunami as well, going back a little bit further. [...] So the areas where we got hit on that basis, it was simply waiting for the suppliers' business-continuity plans to kick in, and in most of our major tier-two, tier-three suppliers, and things like semiconductors, they've got dozens of factories around the world, so the trigger for them was to transfer in and kick in the other facilities and move production around. Our major focus was to ensure that, as a customer, we're on the top of their list for priority. Of course, they want to transfer all customers, but they have certain priority customers and certain low-priority customers that are either high or less so. That was a real supplier kind of management issue at that time, to make sure that effectively we were making sure with those suppliers that we were as high up the list as we could practically get ourselves in terms of priority for kicking in the business continuity. And we didn't have delays beyond two to four weeks. And we have buffer-stock agreements with some of the suppliers which sheltered us for paying beyond that.”

(UKEL3).

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UKEL3, UKEL4 and UKEL5 faced equally longer lead times and supply security issues, and UKEL5 simply thinks in terms of extending their storage capacities. The remaining problems involved natural disasters (flooding in Germany and Thailand) and the commodity price volatility of steel in the construction sector.

The findings show the significance of risk management in ensuring supply chain agility. Nine companies reported a significant risk impact caused by supply disruption in the form of supplier bankruptcy or delivery continuity. The findings show that the risk lead to revenue, cash-flow and delivery delays, which is also supported by Clarke and Varma (1999) and Chopra and Sodhi (2004). It can be further derived that single-sourcing strategies lead to lock-in situations, with a high risk to the company, if the supplier delivers high-value components and production is disturbed (Cousins *et al.*, 2004; Narasimhan *et al.*, 2009). In addition, supply security issues were mainly identified within the electronics industry, which can result from global sourcing, supply base reduction and complex, lean supply chains (Hallikas *et al.*, 2004; Blackhurst *et al.*, 2005; Jüttner, 2005). Although, supplier bankruptcies cannot be predicted, the central question is whether the sourcing function is indirectly responsible for a bankruptcy, especially while price and cost savings still dominate the sourcing objectives and the supplier gets squeezed without a long-term, strategic perspective (Rossetti and Choi, 2005; Manuj and Mentzer, 2008).

4.4.2 Impacts of risk management on competitive advantages

The execution of risk management should allow companies to improve their competitive advantage (see Table 4-9). However, the main problem arises when companies try to manage different kinds of risks and expend effort, which does not pay off if the risks never occur. In this research project, several companies highlighted that risks significantly influence the business strategy, and that, for instance, supply shortages caused longer lead

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times. Based on these findings, the companies were asked how a risk management plan could lead to a competitive advantage (if they had experienced a serious risk event).

Nodes	Sum	DE	UK	CO	EL	Companies
Ris_Event_CompAdv\ImpactNo	2	2		1	1	DECO5, DEEL4
Ris_Event_CompAdv\ImpactYes	7	2	5	3	4	DEEL2, DEEL3, UKCO1, UKCO3, UKCO5, UKEL4, UKEL5
Companies without a serious risk event	11	6	5	6	5	DECO1, DECO2, DECO3, DECO4, DEEL1, DEEL5, UKCO2, UKCO4, UKEL1, UKEL2, UKEL3
n=9						

Table 4-9: Risk management leads to competitive advantage

Seven companies highlighted that the awareness of risks had increased remarkably within the company and among board members. The fast economic recovery had led to supply shortages in the electronics sector, but given the management of the supply chain the risk became a competitive advantage for DEEL2: *“Well, we have now won new clients where we have not been price attractive in the past. Similarly, new competitors entered the market, which could not supply in the past.”* The delivery capability is therefore essential to win market share and gain competitive advantage. The company will definitely have a competitive advantage if they can serve a customer faster or are simply able to supply (DEEL3). UKCO1 summarises the need for, and impact of, risk management: *“I’ll go back to brand. The risk to our business of a failure of a contractor is not the cost of construction. Generally, so far, even the worst disasters in terms of risk, we’ve managed to manage out so we can recover from because, I suppose, we won off projects rather than volume. If you stop a production line, it costs you a lot of money. We have been able to manage the impact very, very well. So say your question again. In terms of, if we do have a company*

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go on us and it damages our reputation, excellence, quality, timely delivery and all of those things that is a risk that we are really managing ultimately. So everything focuses back at that point. Do we deliver the high standards that's expected of us by our clients?"

UKCO3 clearly supports the view that risk management leads to a competitive advantage: *"So yes, we do. It's a race but we usually risk register way in advance to obviously secure a competitive advantage."* UKCO4 even won a bid through having a profound understanding of risk management; the ability to assess the risks and actually take them: *"We tendered a job for a client who was not in a position to be able to take any risk and their whole ethos for designing that tender was whether you can manage with the risk or really take the risks. And that was a tender that we did a lot of work on to manage out the risks and their submission and by doing so we won that contract not from being the cheapest."* UKCO5 also refers to client expectations: *"Our clients nowadays are very clear as to what they expect from a main contractor and they expect leadership around how you select and manage your supply chain. And I think we're trying to demonstrate to the client that we've got as good tools as others but hopefully in the future, we will be able to move to a market leading position of which then the clients would feel more confident in our ability to procure and deliver against that of our peers."* UKEL4 states: *"Okay, the reason you implement any kind of risk management program in the supply chain is to ensure continuity of supply under your terms – so your cost, your lead time."*

Two companies state that risk management does not have an impact on competitive advantage. DECO5 in this context has two opinions and viewpoints, but the interviewee's previous experience was with a large construction company: *"We had a risk department and they assessed the projects. The only categories were good or bad and if we had a bad assessment, we tried to collect hundreds of arguments to make a good project of it."* Although the experience is influencing the judgment of his new company, it potentially re-

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quires a different corporate culture to accept neutral risk assessments. DEEL4 is critical: *“If no risks occur, risk management does not make sense and leads to higher costs. It may even lead to a competitive disadvantage if the costs are too high.”*

The finding from companies where a serious risk event occurred is that risk management leads to a competitive advantage. Although these findings have been taken as a statement without any quantification, risk management has been proven to lead to a competitive advantage and better business performance (Walker, 1988; Clarke and Varma, 1999; Hallikas *et al.*, 2004; Khan and Pillania, 2008) . These findings were disagreed with by the two companies that did not identify any competitive advantage. Monczka *et al.* (2011) argue that supply chain disruption is the single biggest threat to revenue streams. In addition, Walker (1988) points out the failure of a supplier of high value parts is a strategic risk that leads to a decline in the company’s performance. Chopra and Sodhi (2004) argue for balancing supply chain risks with rewards; however, a significant disruption can lead to cash-liquidity, lower sales and increased costs. If considering the previous cases, such as the fire at a Philips plant supplying Nokia and Ericsson, Nokia gained additional market share and a competitive advantage by managing the disaster better and using a different sourcing strategy (Chopra and Sodhi, 2004). Furthermore, Monczka *et al.* (2011) provides evidence that supply chain problems and disruption lead to a negative impact on shareholder value.

It is therefore essential to understand that long-term strategic decisions always imply risks (Baird and Thomas, 1985), as whenever a strategic supplier is selected the buyer must consider strategic and operational risks. In addition, the sourcing function must be aware of gaining a competitive advantage by applying appropriate sourcing strategies. Finally, the sourcing function needs to focus on the wider sourcing spend portfolio to identify the risk exposure.

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4.4.3 *Current state of risk management programmes*

A risk management programme is a structured approach to identify, assess, manage and mitigate risks. In an ideal world, this approach would be based on an IT system and established across different departments. The findings of the interviews uncover variations in how risk management programmes, or ‘light’ versions of these, are established. Ten companies (50%) have an established risk management programme or tools to manage risks, while ten do not. Table 4-10 presents the results:

Nodes	Sum	DE	UK	CO	EL	Companies
RiskMProg_Yes	10	4	6	4	6	DEEL2, DEEL3, DEEL4, DEEL5, UKCO1, UKCO3, UKCO4, UKCO5, UKEL2, UKEL3
RiskMProg_No	10	6	4	6	4	DECO1, DECO2, DECO3, DECO4, DECO5, DEEL1, UKCO2, UKEL1, UKEL4, UKEL5
n=20						

Table 4-10: Established risk management programme

The findings are surprising, in that where electronics manufacturing companies in Germany and construction companies in UK use such programmes, the opposite is the case when looking at companies without risk management programmes.

The ten companies with risk management systems apply different methods and processes, as presented in Table 4-11:

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Nodes	Sum	DE	UK	CO	EL	Companies
Ris_ProgY_Descr\RiskMatrix	7	1	6	4	3	DEEL3, UKCO1, UKCO3, UKCO4, UKCO5, UKEL2, UKEL3
Ris_ProgY_Descr\System	6	3	3	2	4	DEEL2, DEEL3, DEEL5, UKCO1, UKCO3, UKEL3
Ris_ProgY_Descr\CentrStrategy	5	3	2	2	3	DEEL2, DEEL3, DEEL4, UKCO1, UKCO5
Ris_ProgY_Descr\SupApprProcess	4	2	2	2	2	DEEL2, DEEL4, UKCO1, UKCO5
Ris_ProgY_Descr\Currency	2	2			2	DEEL4, DEEL5
Ris_ProgY_Descr\ExtSupAuditor	2		2	2		UKCO1, UKCO5
Ris_ProgY_Descr\PeerReview	1		1	1		UKCO1
n = 10						

Table 4-11: Risk management methods

Seven companies apply risk matrixes or templates to manage risks, most commonly in the construction sector. DEEL3 uses an Excel matrix as a template and integrates Dun & Bradstreet information into an electronic system to assess and monitor risks. UKCO1 highlights that risk management was even managed in duplicate—on a central and site level—a situation expanded on during the interview: *“Yes. They have a project checklist matrix that they complete and score to advice. I must admit I wasn’t fully aware of it until last week [laughs] but I’m glad you asked now, not last week, but yes, they do and they do score that. At a project, what was interesting for me was there is some duplication because of some of the risks I’ve already covered at central level and they are repeating it. So one of the reasons I’m looking at it is to see, remove the duplication.”* UKCO3 uses a risk register, which is also managed at site level but monitored at a central level: *“[...] there is a risk register for every job and there is a risk register for every business. That risk register is part of the monthly management process for each business and each project. As we go through the project, we need to mitigate the risk or eradicate the risk.”* Each construction

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project has its own risk characteristics, meaning UKCO4 tries to assess each package. Furthermore, the company tries to pass the risk through the supply base. *“It’s when we look to procure the package, there will be [...] when we tender a job there will be a risk analysis done, a risk register taken for that project which will transfer itself to a risk contingency within the contract. That is occasionally broken down onto a package-by-package basis but not always. But it would not be [...] so risk is – we try to identify the risk in relation to a certain package before placing that package and within the package it will either be placed on a lump-sum basis again to try and mitigate risk on that,”* states UKCO4. The same decentralised project site approach is applied by UKCO5:

“They tend to cover that in project level in commercial management. So we have a risk management process chart and risk management guidelines under that level and these are top level, these come straight under policy. So if we went to risk management clients actually, as you can see here each one of the links, risk management timetable, why do we use risk registers, how to complete risk and opportunity, where identify risk, evaluating, mitigating, etc. So there are a number of documents here from a project point of view on how the risk management process is given on the projects. And so yes, you say maybe one of those eventually and they might just identify in the project as a specific risk to the supply chain or something. I tend not to say that because that’s at project level because I’m a corporate level in procurement.”

Furthermore, UKEL2 uses Excel sheets and templates to look mainly at the supply continuity programme, and is therefore more focused on having a ‘Plan B’ if something happens: *“Sourcing side is, as I said here, is a fire in a vendor, vendor financial difficulty, how quick can we actually replace that vendor with the equipment products.”* UKEL3 also looks for continuity: *“We have a risk mapping which is done on a quarterly basis, which is part of the business continuity, if you like, where we’re always looking to risks and things*

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that can impact as part of our business continuity planning. It's always improving, it's always getting more details, and that will continue to be the case or the trend."

Furthermore, six companies use IT systems to better consolidate the risk findings. DEEL2 and DEEL3 use SAP as the central ERP system, but use additional templates and reporting (ClickView). DEEL3 uses the external system from Dun & Bradstreet, while DEEL5 established an Access database to identify the most critical elements and the impact they have on revenues and margins. UKCO1 now uses Experian, but previously used Dun & Bradstreet, and UKCO3 uses such systems at project level: *"We have programs for risk management, yes, so yes, we do. But we only use them project-specific. So if like at Crossrail, we've got a huge job down there at 300 million, there is the risk of the IT risk register."* UKEL3 is another that uses the Dun & Bradstreet tool: *"At a company high level here, we have, you know, a monthly supplier risk analysis, which is done in cooperation with a D&B tool, and this influences directly in that any supplier above a certain risk is immediately analysed in detail to see how critical that supply is to our business, and what contingencies that we can put in place to mitigate against the risk. So anyone of high risk and beyond has a full, detailed risk analysis done on the supplier and looks to put in place some mitigation."*

Five companies use central strategies to manage risks. DEEL2 has one central reporting system, headed by the CFO, and to which each department autonomously reports risks. Equally, DEEL3 uses a group-wide system that also covers sales topics such as increasing competition or market downturns. In this context, the sourcing function has a subsystem (DEEL3). DEEL5 refers to the automotive certification ISO TS 16949: *"It is a requirement by many OEM to comply with these standards and therefore, the whole company acts accordingly."*

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“Therefore, risk strategies are project-specific and so yes, we have a centralised strategy but they are project-specific,” points out UKCO1. UKCO5 has an entire department established for managing risks: *“There’s a whole risk department in the company, but what they’re doing is looking at project risk and financial risk from a company point of view.”*

The remaining approaches include a supplier approval process, where companies specifically use a standardised process to qualify and assess suppliers. Two companies use external auditing services for suppliers; the currency management is handled centrally by the treasury departments. Finally, one company has established a peer-review process within risk management from site to corporate level.

Of the ten companies that do not apply any kind of risk management, the reasons for this vary. Seven companies had not yet established a risk management programme, while the other three work informally on risk management. The results are presented in Table 4-12:

Nodes	Sum	DE	UK	CO	EL	Companies
Ris_ProgN_Reas\NotEstablished	7	4	3	4	3	DECO1, DECO2, DECO4, DECO5, UKEL1, UKEL4, UKEL5
Ris_ProgN_Reas\Informal	3	2	1	2	1	DECO3, DEEL1, UKCO2
n=10						

Table 4-12: Companies without a risk management programme

DECO1 does not use any kind of risk tools either in the group or sourcing, and DECO2 argues that the group heterogeneity does not allow for a standardised approach or tool. DECO5 is enjoying strong growth, and therefore the structures and capacity do not

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allow them to establish a structured approach. *“There is a very rough concept established, but not really a regular monitoring. It is a kind of business continuity, if we have a fire in the production,”* states DECO4. Similarly, UKEL1 states it has business continuity plans - especially in the IT and server landscape, but no such a plan in sourcing. UKEL2 believes that risk management does not add significant value and therefore it is not established, while UKEL4 has plans to implement a risk management programme next year, but this has not started yet and the capacity is still lacking. Finally, UKEL5 was working on a concept but had not implemented a programme: *“But from a risk management, myself and my colleagues we are working on this at the moment and we are crafting a check list for a framework where we are taking all the supply base, grading them on what is the likely failure points, whether it’s geographically, whether it’s the market, whether it’s down to technology.”*

DECO3 describes having an informal approach on a project level, and DEEL1 looks at risks informally and occasionally, but with no tool or approach systematised: *“We look on business continuity, have two independent production sites for instance. When it comes to sourcing, we focus on dual sourcing and went through a programme where we had to qualify new suppliers.”* When asked if they have a risk management programme, UKCO2 states: *“No, I guess we probably don’t. We do a lot of the risk analysis, it’s done at tender stage for individual projects.”*

Considering the research by Zsidisin *et al.* (2000), only three out of nine companies performed a risk management assessment, while Jüttner (2005) discovered that 40% of companies do not have risks plans for their supplier. The findings of this research project show a slight improvement to 50%, but this is still lagging behind what is expected, despite the possibility that companies are trading off between risks and benefit (Chopra and Sodhi, 2004). Although Khan and Burnes (2007) argue that the supply chain risk management is

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not well perceived, Rossetti and Choi (2005) remind us of the risks of close collaborations and dependencies. Considering that global sourcing continues to increase, and the companies' objective to reduce costs, the risk exposure increases (Wagner and Bode, 2006; Manuj and Mentzer, 2008). Research by Jüttner (2005) shows the importance of risk consideration in strategy formulation, where globalisation of the supply chain, focused factories, centralised warehousing or supply base reduction are drivers for risks and confirmed causes of disruptions. In addition, Desouza (2008) is critical that many companies are weak in the evaluation of strategic and operational risks.

Therefore, an established risk management and continuity programme is recommended and risks have to be considered in strategic sourcing. Considering the tools being applied in strategic sourcing, it is surprising that so few companies use strategic tools to manage risks. It seems that the companies apply the risk tools with a strong focus on financial metrics from Dun & Bradstreet or operational risks. For instance, if using the Kraljic matrix (1983), the link between supply security and profit impact will be visible and companies can though identify their critical parts. Walker (1988) suggests the classification of strategic risks according to appropriation, technology diffusion and degradation, while Clarke and Varma (1999) classify them into operational, counter party, market and event risks. Cousins *et al.* (2004) basically differentiate between technical and strategic risks, where strategic risks consider the bargaining power in the supplier-buyer relationships. A different risk approach is suggested by Sanders and Manfredo (2002), who apply the value-at-risk methodology to calculate the total sourcing portfolio risk profile, where a high portion of commodities are bought.

In summary, the introduced approaches are extremely operational and do not reflect the strategic risks from long-term supply decisions. There are risks from single sourcing and single specification, but also from complex supply chains and lean management.

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Therefore, when managing risks in strategic sourcing, companies need to take a long-term perspective, assess the sourcing spend portfolio and identify the risks to cash-flow and revenue streams. Hence, the need to develop a risk-oriented strategic sourcing framework is supported.

4.4.4 Critical risk factors

The implementation of a risk management programme is mainly driven by the content and its approach. Therefore, the selection of relevant criteria is mandatory and the evaluation models or suggested criteria can be broad. One goal of this research project is to develop an applicable risk management framework. For this purpose, the interviewees were asked for their views on the most important risks that should be considered in a new framework. Table 4-13 highlights the findings from the open-ended question:

Nodes	Sum	DE	UK	CO	EL	Companies
Ris_RiskFact\Creditw	11	6	5	5	6	DECO3, DECO4, DECO5, DEEL1, DEEL2, DEEL4, UKCO3, UKCO4, UKEL1, UKEL2, UKEL3
Ris_RiskFact\Quality	8	4	4	4	4	DECO4, DECO5, DEEL1, DEEL2, UKCO3, UKCO5, UKEL1, UKEL5
Ris_RiskFact\SupCapabilities	7	4	3	4	3	DECO3, DECO5, DEEL1, DEEL2, UKCO4, UKCO5, UKEL5
Ris_RiskFact\SupplContin	4	3	1	1	3	DECO4, DEEL1, DEEL4, UKEL5
Ris_RiskFact\Price	3	1	2	2	1	DECO3, UKCO3, UKEL5
Ris_RiskFact\Spec	2	1	1	2		DECO4, UKCO5
Ris_RiskFact\Compliance	1	1		1		DECO1
Ris_RiskFact\Country	1	1			1	DEEL3
Ris_RiskFact\EndLifeProduct	1		1		1	UKEL4
Ris_RiskFact\KnowHow	1	1			1	DEEL3
Ris_RiskFact\LeadTime	1	1		1		DECO5
n =16						

Table 4-13: Critical risk factors

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Eleven companies state that the suppliers' financial position and creditworthiness is most important. In this context, the companies must minimise the risks associated with supplier selection. The economic crisis led to several supplier bankruptcies, and therefore the companies are aware of and keen to handle this risk. Nevertheless, although some companies use credit rankings from Dun & Bradstreet for example, the credit worthiness and financial information are always ex-post and relate to figures taken from a certain point in time. If analysing an annual report from 2012 in mid-2013, the situation could have completely changed at the supplier's side and the report becomes unrepresentative. Few companies use the Dun & Bradstreet service to obtain regular and updated risk information at least on a monthly level.

Eight companies mention quality as a critical risk factor to be considered, aware that the sourcing companies must maintain the expected levels of quality. Seven interview partners point out that suppliers' capabilities ought to be considered a risk factor, as companies fear the supplier is unable to meet their requirements.

The remaining critical risk factors (below five references) are supply continuity, changing prices, suppliers' product or service specification, compliance, country risk, end-of-life risks for products with short life cycles, know-how and lead time risks.

The findings highlight the strong focus on operational risks, and suppliers' creditworthiness is an important factor in evaluating the risks. However, the disadvantage of using Dun & Bradstreet is the ex post evaluation of financial metrics. Furthermore, not every company is registered or provides accurate data; therefore, despite the on-going and quarterly monitoring companies can use such tools to evaluate the financial strength of suppliers. However, it is not an entirely relevant factor because, although companies managed such risks, bankruptcies still came as a surprise (see e.g., UKCO1, UKCO2). Therefore, to mitigate such a risk the sourcing function must be aware if the supplier is delivering high-

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value parts affecting the company. This can be done by applying the Kraljic matrix (1983) for instance. In addition, the sourcing strategy must consider the single sourcing risk and the tooling risk for custom-made products (e.g., DEEL4). Quality is seen as the second critical risk factor, which is in line with the critical success factors identified in this research project (see Chapter 4.6) and research by Manuj and Mentzer (2008) or Tummala and Schoenherr (2011). Supplier capabilities are also important (Chopra and Sodhi, 2004; Tang and Musa, 2011), but are mainly considered within the supplier selection process

Although the companies faced several supply security issues, this risk is under-represented within the wider consideration, and the interviewees mainly mentioned external risks. However, the sourcing function should consider strategic risks resulting from sourcing strategies such as single sourcing or outsourcing, lean supply chain, global sourcing and central warehousing (Jüttner, 2005). In particular, global sourcing and single sourcing were identified as major risks (Chopra and Sodhi, 2004; Sinha *et al.*, 2004; Blackhurst *et al.*, 2005; Wagner and Bode, 2006), while the focus on strategic risks, such as brand, shareholder value or sustainability, are relevant (Clarke and Varma, 1999; Monczka *et al.*, 2011). In addition, the high degree of specification or customisation of products bears a risk (Welch and Nayak, 1992; Cousins *et al.*, 2004). In summary, the consideration of risk factors is essential in sourcing, but the reported risk factors are too operational and the sourcing function must focus on strategic risks. Therefore, the supplier strategy (single, dual), the product lifecycle/technology, demand development and the revenue, profit or cash impact should be considered.

4.4.5 Country-specific differences in sourcing risk management

There is a similar situation in Germany and UK when it comes to risk events and their occurrence. Five British and four German companies reported that a risk event had significantly influenced the company in 2010/2011; see Table 4-7.

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These companies represent 45% of the interviewed companies, and the presented findings are significant and highlight companies' reactions. The increasing number of risks conforms with the research of Jüttner (2005), where 44% of the respondents expected a vulnerability increase. In general, five companies see emerging supply chain risks and five see supply security as trends over the coming years (refer also to Table 4-1).

Of the nine companies that reported significant risks, seven from the UK reported supplier bankruptcies as a risk, compared with only one German company (see Table 4-8). Companies reported that suppliers had entered administration or had significant problems in finishing the project (UKCO4). The finding was partially expected because a study by Creditreform (2012)—a German auditing firm—highlights that although supplier bankruptcies decreased by 11.1% from 2009 to 2010 in the UK, a year later the number increased by 6.3% and is now at one of the highest levels of the past ten years. The service and property sector was particularly hard-hit by the economic downturn (Creditreform, 2012). In the same period, Germany noted reductions in supplier bankruptcies of 5.8% in 2011 and 2.5% in 2010 (Creditreform, 2012), and the German construction business was able to benefit from the positive economic development (Creditreform, 2012). Therefore, the only company in Germany to report a bankruptcy problem was DEEL4. Supply security was mentioned by five UK companies and three in Germany, with no significance identified with regards country specifics. Both countries faced the same problems of allocation markets.

Companies face specific problems if they employ a lock-in, single-sourcing strategy and the supplier becomes bankrupt; this represents a high risk for the company. Although Meena *et al.* (2011) do not look specifically at bankruptcies, rather the possible failures of the supplier, the proposed model can help evaluate the potential risk. There is a

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risk exposure on supply security if single sourcing is applied (Quayle, 1998; Yu *et al.*, 2009)

Therefore, in established risk management it would be advantageous to follow a structured process, such as that proposed by the Association of Insurance and Risk Managers (AIRMIC). It starts with an assessment comprised of risk analysis (identification, description, estimation) and risk evaluation (AIRMIC, 2002). Furthermore, risk reporting, decisions, risk treatment, residual risk reporting and monitoring is recommended (AIRMIC, 2002). This research project assessed the situation, and concluded that of the twenty cases, ten companies (50%) apply a risk management programme (see Table 4-10).

Specifically, six UK companies and four German companies apply a risk management programme. Compared with the findings of Blackhurst *et al.* (2005), which showed only 5–25% of Fortune 500 companies were prepared to handle risks, this research shows that companies are improving at applying risk management practices. Six UK companies use risk matrixes to manage risk actively, where in Germany only one company uses a risk matrix (see Table 4-11). Despite this, there is a deviation in findings between companies using strategic sourcing tools and companies seeing a risk management programme as implemented. The deviation can be explained in that companies apply and manage risk on their own where a corporate programme is not established. Of the ten companies without a formal programme, four (DECO1, DEEL1, UKEL4 and UKEL5) use tools in strategic sourcing (see Table 4-5).

We can propose that the greater number of supplier insolvency events in the UK led to a higher perception or awareness of risks. Surprisingly, these findings do not support the general cultural attitude of Germans, who should display moderate to high uncertainty avoidance (Littrell and Valentin, 2005). Schneider and Littrell (2003, p. 135) state: “German management is often described as having a higher degree of risk aversion; the Ger-

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mans are rather unwilling to take a risk and go on an uncertain venture [...].” However, this view is not supported in this research. Although the study focuses on leadership and management styles, it could have expected to find German companies using risk management more often.

Of the nine companies that experienced significant risk events, seven (77.7%) believe that a risk management programme leads to a competitive advantage (see Table 4-9). In particular, this finding is supported by five (70%) British and two German companies. Given the results in strategic sourcing evaluation criteria, we see UK companies are more focused on risks and judge them higher (4.1 vs. 7.3 mean value, scale 1–15, 1 = most important).

Finally, the risk factors that should be included in a risk management framework were analysed. Table 4-13 presents the different risk factors, and a surprisingly high cohesion level between Germany and the UK was identified. Both countries see suppliers’ creditworthiness, quality and supplier capabilities as major risk factors for a future risk framework. This evaluation is supported by Meena *et al.* (2011), who specifically considered supplier failure probability, capacity and capacity-specific compensation in a risk model. Companies’ tendency to only focus on a few criteria in their evaluation is a new finding, and is contrary to several publications on risk management and the consideration of multiple factors such as economic development, global sourcing, single sourcing, natural disasters, fulfilment, transportation, etc. (Harland *et al.*, 2003; Hallikas *et al.*, 2004; Jüttner, 2005; Tang, 2006; Wagner and Bode, 2006; Khan and Burnes, 2007; Schoenherr *et al.*, 2008). Nevertheless, the focus on delivery and quality as the most important risks is in line with the research of Juha and Pentti (2008). In addition to this finding, the economic downturn and the financial crisis increased the risk of supplier bankruptcies. Therefore, it is obvious that such a risk is nowadays the most important factor in the framework.

4.4.6 Industry-specific differences in sourcing risk management

Although unexpected, the industries were generally equally affected by risks. The electronics industry is represented by five companies, compared with four from the construction sector. The remaining companies were not affected by a risk.

When analysing the kind of risks it becomes clear there is a significant difference between the industries. For example, in 2010/2011, the Japanese tsunami caused a crisis in the electronics industry.

This disturbance led to the situation where seven (70%) of the interviewed companies reported supply security issues. This finding is also in line with the situation of allocation management regarding the supply security of an electronics company, which was presented by Kotula (2010) and Kotula and Reiß (2011). In this research project, UKEL4 states that because of the just-in-time production system the company faced a tough allocation market environment, and was unable to supply a car manufacturer. This caused production shutdowns up to four times a day, which had a significant impact on the company. DEEL5 confirms that there were significant supply shortages in the market at that time. In addition, the economic crisis affected the supply chain as it led to several supplier insolvencies. *“Again, the balance of power was moving towards the buyer and then the tsunami affected everybody in electronics and it affected in a number of ways and the companies those lots of – there was a lot of companies bought up very early so created a false demand in the market [...] the knock-on effect those factors that were affected, often the companies had alternative factories but because people loaded the order book it filled up capacity very quickly, so prices went up, lead times extended.”*

Although the construction sector (5 CO, 3 EL) experienced slightly more events, the risk affected both industries in a similar way and supplier bankruptcies caused several problems. UKCO3 states: *“In fact, at a meeting, just as you arrived, I was in there talking*

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to somebody else. We have our top 500 managed monthly credit-wise that we are running credit in the background all the time because cash is now a real worry. Cash is drained out of smaller businesses. Commodity management in terms of each of the market sector specialists is managing this line here so that we can see as commodities move and shortages are X, Y and Z.” UKEL3 also had to deal with the financial crisis: *“From the financial crisis, of course, there was risk from a supply chain level, but we didn’t have any major problems. Therefore, we didn’t have companies going out of business. I think, and hopefully, this is testament to the risk processes that we have in place, but most of those suppliers were robust enough to weather the storm, so to speak.”* Hence, the mentioned risk events affected both industries, where supply security hit the electronics sector and supplier insolvencies hit both industries equally.

Risk management programmes are established within ten companies, six in electronics and four in construction (see Table 4-10). It can be concluded that 50% of the participating companies have an established company risk management system; however, the sourcing function does not apply risk management tools appropriately (see). Therefore, the findings generally indicate the tendency for companies to look for risks, but the dominant focus is business continuity or financial (e.g., currency exchange) risks. The next evaluation considers the applied subjects that form part of risk management.

The cross-industrial evaluation of the risk factors relevant for inclusion in a new risk management framework highlights no significant difference in perceptions. Six electronics and five construction companies state that the most important factor is creditworthiness or supplier bankruptcy risk, followed by quality (4 EL, 4 CO) and supplier capability, which is relevant to both industries (3 EL, 4 CO).

The creditworthiness of suppliers is split almost equally across industries, with no notable deviation identified. All companies in each sector citing critical risks factors con-

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sider the rating of the supplier as the most important criteria. The only difference is that usually the construction sector manages more suppliers, and therefore has a higher risk exposure. However, the consideration of risks within the strategic supplier evaluation is rated as the second most important selection factor in Table 4-24. This was possibly mentioned more often and ranked higher because several companies faced supplier bankruptcy risks and endured a negative experience. The second important risk factor considers quality (4 EL, 4 CO). This evaluation is, however, in line with the most important critical success factor (see Table 4-19) and the fourth most important supplier selection criteria (see Table 4-24). The companies are concerned with the quality level, but no deviation was identified with regards industry. UKEL1 describes the risk: *“I think one of the risks that we always have to be aware of when we’re dealing with a potential new source is the quality. Now, that’s something, so we don’t actually have the on-going business.”*

Supplier capabilities should be considered as the third critical risk factor (3 EL, 4 CO). Although no cross-industry variance was identified, the companies intend to protect against the risk of failure early in the process. DEEL2 looks at bargaining power and revenue figures and considers the potential attractiveness of a new customer. In addition, UKCO4 highlights the importance: *“There will be other things that we look at before we procure a package in terms of our need to provide ourselves certainty that that company has got the ability to deliver what we’re asking them to deliver, but it’s not on a strategic level.”* Although the companies highlighted the potential risk as significant, they do not consider this potential risk in the beginning. Indeed, the companies only consider supplier capabilities as the ninth supplier selection factor. However, they consider supplier performance as the second most important evaluation criteria. Therefore, the performance can only be assessed if there is an on-going business relationship, meaning engaging new suppliers is a challenge and potential failure risk.

4.5 Supply and Demand Management

Supply management is an obvious consideration for sourcing departments; however, it becomes important to look beyond the departmental borders and reflect market developments. If sales has acquired some large customers, this will have a major impact on the supply chain, not only from the economies of scale but from the supply security point of view, which was vital in the electronics crisis. This section, therefore, focuses on how the collaboration with sales or customers is established and how important the supplier integration is in that context.

4.5.1 Supplier and customer integration

The collaboration and integration of suppliers in the company is an essential approach, and 12 (60%) companies underline its importance, as shown in Table 4-14:

Nodes	Sum	DE	UK	CO	EL	Companies
SRM_SupInteg\Intg_Important	12	6	6	4	8	DECO2, DECO3, DEEL1, DEEL2, DEEL3, DEEL4, UKCO2, UKCO4, UKEL2, UKEL3, UKEL4, UKEL5
SRM_SupInteg\ITSystem	4	2	2		4	DEEL1, DEEL2, UKEL2, UKEL5
SRM_SupInteg\WeakCollab	4	1	3	2	2	DEEL5, UKCO4, UKCO5, UKEL1
SRM_SupInteg\Demd_SharePipeline	3		3	3	3	UKCO1, UKCO2, UKCO3
SRM_SupInteg\StartContractSign	2	1	1	2		DECO2, UKCO2
SRM_SupInteg\OpenBookCustomer	1		1		1	UKEL3
n=17						

Table 4-14: Factors in supplier and customer integration

DECO2 highlights the need for support from suppliers in calculations within the project acquisition phase, as it is the primary activity of the sourcing function to be the

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‘connector’ between the customer and the supplier. *“We had a high degree of specifications and custom-made products and are moving back to standards. The supplier integration is elementary”* (DEEL1). The integration with clients is for many electronics companies state-of-the-art, and the link established through an electronic data interchange (EDI) system. DEEL2 highlights the high degree of integration, and that customers can even ask for supplier audits. The dialogue between sales and the customer is essential (DEEL3), because in some cases the customer has narrow, even unique, specifications, for instance for a Siemens motor, but this may have the longest lead time (DEEL3). The integration is fundamental and information sharing and forecasting done via spreadsheets (DEEL4). UKCO2 comments: *“The more information that we can share with our supply chain the better, but again I think that is probably a bit further down the line for us, until we’re working with a rationalised supply base. We will share information with certain key suppliers, but it’s not necessarily part of a formal process, it’s more based around individual relationships, say a category manager and his preferred suppliers. Again, it’s a mixture, we do have some strategic supply chain partners who are integrated into the bid process, but we are probably not really that mature yet. So again, it’s—more often than not—it’s decided on a project-by-project basis, so we might [...] I don’t have a particular example.”* The collaboration is a strategic level for customers and suppliers (UKCO4). UKEL2 already integrates suppliers and customers within an enterprise resource planning system (ERP), and this integration could provide excellent alignment and increase expectations. *“I think when you look at supply chain historically, you would say that procurement was more dominant in a kind of adversarial kind of way, but within our organisation trying to build up the partnerships with the suppliers more, going forward has been a key one. Also customer side; I mean more and more of our customers are interested and involved, not in supply selection, but validation, let’s say”* (UKEL3). UKEL4 constantly increases collabo-

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ration with their strategic suppliers, but while UKEL5 agrees with the importance, they admit to a poor approach: *“I’d say it’s very important and we are very poor at it. We’ve identified that in looking at a more [...] a better ERP system and also better forecasting. But it is no way as good as it should be.”*

Electronics companies are more integrated when it comes to ERP and IT systems; it is an enforcement from clients with all the resulting problems (DEEL1). DEEL2 is currently finalising a forecasting tool, which is likened to the SAP ERP-system and allows users to see the demand, its volatility, the stock and the required supply, while UKEL2 has implemented SAP. *“We are currently looking at software that would become the new ERP system. We shall do a lot more integration of the whole operation and also measure how effective we are in doing these things”* (UKEL5).

Furthermore, three companies have a weak collaborative approach to information sharing. For instance, UKCO4 has a general problem with identifying demand because the core business is of a project nature and not comparable with a production company: *“We’re a lot more fluid in that. So we have got projected work that we need to achieve and we’ve got methods and business management out there, pulling in a lease that we then price forward trying to make sure we keep our workload to the target we need to achieve, but it’s certainly not as straightforward as I guess in a manufacturing business where you tend to get orders for certain products that you deliver.”* UKEL1 states: *“I mean at the moment, we have no sort of link between what our customers are doing and sort of what our suppliers are doing. I mean we do put things in place to sort of potentially sort of flatten spikes where we have with a number of our suppliers we have buffer-stock agreements, where they’ll look at an annual demand for something.”* Furthermore, DEEL5 has no link to suppliers but has planning cycles with customers.

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Surprisingly, three UK construction companies share their pipeline with their supply base, which seems to be relatively uncommon in the construction sector. The process is supported by the board at UKCO1: *“We share our pipeline. We only share our pipeline with the supply chain members¹ and we share that very openly. Our chief executive comes to the briefings and he sits down and not only talks about what we secured, he talks about what we’re bidding on.”* Furthermore, UKCO3 meet the strategic partner at least once a month to discuss the pipeline, and have adopted a more systematic approach: *“So my secretary sends out every month for every business to everybody. We don’t hide anything. There it is. So therefore, they come back to us and say, ‘Whoo, you won’t get that because it’s now on a 25-week lead-in, blah, blah, blah’.”* UKCO2 operates a more informal process in relation to supplier integration and pipeline sharing, with the demand and upcoming new projects essentially shared on a project-manager level. Although UKCO5 admits to not having established information and pipeline sharing, the company plans to improve significantly in the coming months, especially as, due to the obvious advantages, a planning horizon could offer and lead to savings:

“Well, at the moment it’s almost non-existent, so that can’t last. Demand management and the interrelation with the supplier is actually going to be very key for us because as we start specifying our products, aggregating the demand across the regions and the business unit we have to be working with our manufacturers to be able to demonstrate what added value they can bring. So if I could give you a good example; I’ve recently learned in Australia in our retirement apartments business that they’d got the manufacturer of their kitchens to work direct with the designer to come up with a standard kitchen design, so that when they procured kitchens from China, there’s no joinery or additional

¹ Due to confidentiality reasons, name changed from original transcript.

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carpentry to be done to install them and they saved 40% on the cost as a result of doing that.”

Two construction companies (DECO2 and UKCO2) start their collaboration with suppliers when the order has been received and the sub-contracting starts.

The findings show the relevancy of supplier relationships management within the companies. However, few companies really see an integration of suppliers as important, and the use of electronic data interchange is not well established. Saeed *et al.* (2005) generally argue to improve process efficiencies and different performance objectives by establishing and improving the electronic collaboration with suppliers. In this context, Leek *et al.* (2004) argue that manufacturing companies work mainly with personal judgments, where auto companies utilise a formal supplier relationship management system. The surprising finding is the demand sharing in the construction industry. Unexpectedly, the companies use their strategic suppliers to bid jointly for large projects and share their pipelines to reserve capacities with suppliers. Although, this specific approach is established a few constructions sector the companies can reduce the supplier capacity risk through previous announcement and exchange (Serel *et al.*, 2001; Tummala and Schoenherr, 2011). Furthermore, when it comes to supplier relationship management Spekman *et al.* (1999) highlight the integration/partnership, information sharing, trust and effective alignment as key, and supplier management is also essential with regards risk management (see Table 4-25) (Tang, 2006; Wagner and Bode, 2006). Finally, the supplier selection, management and integration can improve the competitive advantage or business performance of a company (Anderson and Katz, 1998; Chan and Chin, 2007; Su *et al.*, 2009). Therefore, it is essential to consider this supply and demand dimension in future strategic sourcing, and companies should start intensify their collaboration and data exchange with suppliers.

4.5.2 Forecasting and information from customers

The sourcing strategy and the approach to new markets are highly dependent on the demand development on a short- and long-term basis. The evaluation of how sourcing departments obtain information with regard to demand shows that the majority use a manual planning process, where three companies do not apply forecasting and another two companies use an integrated system, as seen in Table 4-15:

Nodes	Sum	DE	UK	CO	EL	Companies
SRM_ForecCustom\Manual	9	4	5	2	7	DECO4, DEEL2, DEEL3, DEEL5, UKCO5, UKEL2, UKEL3, UKEL4, UKEL5
SRM_ForecCustom\NoForecast	3	2	1	2	1	DECO2, DECO3, UKEL1
SRM_ForecCustom\OngoingEDI	2	2			2	DEEL1, DEEL4
n=14						

Table 4-15: Methods to evaluate forecasts from customers

In nine companies, the sourcing department has to collect planning and demand figures from the sales department manually, with the planning and demand forecasting largely done by applying a ‘rule of thumb’. DECO4 applies a yearly planning approach, which is based on sales, orders received and the company’s business plan. DEEL2 produces mainly in accordance to the order, which means that one production department simply knows on Thursday what it will produce the following week. The sales department leads the demand process at DEEL3, but there is close collaboration and in project phases the suppliers are informally updated. DEEL5 has many customers with a direct EDI link, but the majority of forecasting is done by the sales department, which also maintains the internal ERP figures. UKCO5 works manually to create and consolidate the different in-

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formation: *“Well, we don’t at the moment but we need to build a tool, so we’re actually looking at whether we build the tool from our planning tools, from our P6 planning tool that’s Primavera version 6. It’s got the ability to be able to understand what commodities we’re procuring over a period of time, plus also we’re moving to a beam technology and again the beam technology along with the new estimated tool will allow us also again to be able to aggregate demand over a large space over a large period.”* UKEL2 and UKEL3 obtain the information from the sales people as well, and although UKEL4 *“pushes very hard for forecasts”*, it is a difficult exercise. Clients can have a 12-month plan, but in the worst case they split their annual demand into 12 portions. *“You have a sales team that provides a view on their budgets of what they’re going to deliver, they also have a view of what they could also do potentially, and that then drives through into our forecasting and that allows us to place orders”* (UKEL5).

Three companies do not use and share information with clients. DECO2 does not have a pipeline with the customer, more an internally driven process for the kind of projects the company wants to execute. Although this is in line with the nature of the company’s business, the planning process for upcoming scope—whether internally or externally evaluated—may be helpful to drive a strategy. DECO3 will be informed if they have a project and signed a contract, while UKEL1 states: *“Yes, I mean I would say none of our customers actually supply forecasts.”*

Only two companies use a fully integrated system to utilise the information from clients in their own ERP system, which in the end leads to the supply chain. DEEL1 has established EDI links and executes a planning process with their clients, and DEEL4 points out that it is basically state-of-the-art in sharing information through EDI with large OEMs.

It is surprising that demand forecasting is nearly non-existent in the researched companies, and because the sourcing function does not have exact figures or rolling fore-

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casts, it becomes a challenge to ensure supply security. Therefore, the company still takes the risk of the bullwhip effect. However, it is essential to understand the dependencies to customers and not endanger or negatively affect cash cows or top customers. Specifically, Wagner and Bode (2006) point out the demand side risks caused by dominant customers and supplier dependence, where the company is actually stuck between the two. Furthermore, demand is generally seen as a significant risk factor in the supply chain (Hallikas *et al.*, 2004; Kleindorfer and Saad, 2005). Alternatively, the weak collaboration across functions and silo thinking can be a reason for the manual planning and exchange (Moses and Åhlström, 2008). In summary, sourcing functions should enforce the close collaboration and exchange on demand planning. The goal is not only to drive costs down through bundling, but the sourcing function can ensure supply security combined with appropriate flexibility, optimise working capital and adjust the sourcing strategy to hybrids of global and domestic sourcing.

4.5.3 Impact of changes from the demand chain

Changes or volatility from the demand side could lead to increased volatility within a company and its supplier, if following the bullwhip effect. This effect hits some electronics companies at a time of crisis, where the increased volatility influences the planning process. Therefore, the goal is to understand how companies are affected by demand changes, especially when considering the electronics industry and construction sector. The impact of demand changes is clustered into an increased volatility in the supply chain, with either no impact or a significant impact, as seen in Table 4-16:

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Nodes	Sum	DE	UK	CO	EL	Companies
SRM_DemdChang\IncrVolatility	7	3	4		7	DEEL3, DEEL4, DEEL5, UKEL1, UKEL3, UKEL4, UKEL5
SRM_DemdChang\NoImpact	5	4	1	4	1	DECO2, DECO3, DECO4, DECO5, UKEL2
SRM_DemdChang\SignImpact	3	3			3	DEEL1, DEEL3, DEEL4,
n=13						

Table 4-16: Impact of changes from the demand chain

Seven companies state that demand changes in sales will lead to increased volatility in the supply chain. Unsurprisingly, this only affects electronics companies. One option to deal with volatility is to increase the stock, which DEEL1 did. DEEL4 highlights that the major risk in supplying the automotive industry occurs when the OEM forecast is not binding and a risk has to be taken. In particular, supply shortages in the electronics sector with skyrocketing lead times provides a fundamental monetary risk to the company, and it faces having to pay penalties. Daily and on-going business is well-reflected in the ERP system, and figures are updated twice a year (DEEL5). However, large projects are planned separately, and the sourcing function is part of team (DEEL5). UKEL1 describes the situation and its volatility: *“Sometimes, you’ll get demand, high demand for a product that usually runs at a very low level, so sometimes, within one month, you could be presented with hundreds of new parts to buy that we’ve never really had to tackle with or we’ve never had to tackle at that higher level. So some suppliers that are used to building five or something a month can quite comfortably cope, but suddenly gets asked to do 100 or something and it tends to sort of – it shows up sort of the weaknesses within the supply chain.”* UKEL3 adopts the buffer-stock technique or applies a dual-sourcing strategy to flatten the volatility: *“I mean typically we are in a period in the last twelve months in going forward where*

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the demand is quite volatile. You know, therefore, buffer-stock agreements with our suppliers are something that we've been doing more actively." Furthermore, it is mandatory to understand the supply chain, especially if applying global sourcing with long transportation times (UKEL3). UKEL4 highlights a different problem, which originates from a restricted working capital policy: *"We are very careful. We only [...] we have a policy of we only buy what we need."* This restricts the flexibility to store parts, and is a kind of mitigation action, especially if the product life cycle of electronic components becomes shorter and shorter. *"It is a difficult one that, because we again one of our added value is to manage the supply chain, so we are constantly trying to find ways to drive down the lead times, and it is very difficult when in electronic components when lead time is 26 weeks. We will often feed [...] we will feed that back to the customer"* (UKEL4). UKEL5 has a similar problem, and claims: *"We end up slipping, cancelling, amending and reordering. So we have [...] the view from our supply chain is that they have to provide, they've got to be flexible."*

Five companies say that there is a minor impact, which can typically be resolved, or that there is simply no impact. The cases are quite common and, to some degree, a solution can be found (DECO1). DECO4 argues that demand changes over a short-term period simply do not exist; these are contracts and they will be executed. There may well be long-term changes because of economic development, but these can be covered through the supply chain change request procedure in what is a common process. *"If the client wants a change, we prepare a change request, assess the impact to cost and time and then they accept or not"* (DECO5). The same approach exists at DECO2, except the sourcing function is not involved in the change process. One electronics company, UKEL2, claims not to have any major volatility or demand changes.

Three companies argue that demand changes have a significant impact. DEEL1 produces and delivers custom-made products, and changes lead to high costs. Similarly,

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DEEL3 highlights that technical changes have a tremendous influence on lead times. Such changes will be passed to suppliers, meaning a good relationship is necessary (DEEL3). In addition, DEEL3 faces a problem with changes not only from the customer but from the supplying industry with their 'end-of-life' cycles, which has to be maintained as well. DEEL4 criticise the risk being passed from the large automotive OEMs to their company, as they have to bear the financial risk in both ways, over and under the budget.

The findings show that seven companies face serious problems and volatility increases, which supports the bullwhip effect. However, demand changes lead to increased volatility, mainly affecting the electronics industry, while the construction sector operates with fixed scopes and change requests. Specifically, companies should not be dependent on strong customers and a dominant supplier through single sourcing and single specification (Walker, 1988; Wagner and Bode, 2006). In addition, the electronics companies are mainly exposed to global sourcing and long lead times, while the large electronics production sites are in Asia. Although the risk exposure becomes leveraged through global sourcing (Blackhurst *et al.*, 2005), if a company decreases stocks to optimise working capital, out-sources production and applies just-in-time operation, the danger of disruption is extremely high (Jüttner, 2005). Therefore, the risk identification and awareness is critical. However, many companies and managers are aware of risks, but lack real implementation capabilities (Christopher *et al.*, 2011). The mitigation of volatility can be achieved through improved planning/forecasting, collaboration and information exchange (Hallikas *et al.*, 2004; Khan and Pillania, 2008), and the electronic exchange is recommended (Saeed *et al.*, 2005). Finally, the application of supplier relationship management is supported (Khan and Pillania, 2008; Chiang *et al.*, 2012), and the companies need to consider and identify their lock-in position and planning problems.

4.5.4 Country-specific differences in supply and demand management

Changes in demand increase the volatility in the supply chain, and the sourcing function has to manage it. There are also differences in the perception and evaluation of this factor, as only three German companies recognise a significant impact on the supply chain if the customer changes demand significantly or frequently (see Table 4-16).

Increased volatility is pointed out by four UK and three German companies. UKEL1 highlights the problems related to demand changes with views mirrored in companies across both countries: *“Sometimes, you’ll get demand, high demand for a product that usually runs at a very low level, so sometimes, within one month, you could be presented with hundreds of new parts to buy that we’ve never really had to tackle or we’ve never had to tackle at that higher level.”* Five companies see supply security as a trend, and two are additionally concerned about the volatility (see Table 4-1). Khan and Pillania (2008) investigate the impact of strategic sourcing, which has a significant effect on supply chain agility and the company’s performance. Similarly, Christopher *et al.* (2011, p.77) conduct a UK-based qualitative study and conclude that “global sourcing trends are making supply chains longer and more fragmented and this is exposing firms to greater costs and risks”.

Furthermore, four German companies and one UK company argue that demand changes have no significant impact on their operations. The difference in countries is not supported; instead, the majority of these companies are in the construction business, where changes are covered by the change request process.

When it comes to planning tools and methods, it is surprising that none of the participating UK companies has any kind of electronic data interchange (EDI) connection with their suppliers to share demand figures (see Table 4-15).

Only two German companies share demand via electronic data, while nine companies (5 UK, 4 DE) evaluate demand figures manually through the sales teams. The situa-

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tion is similar across countries, where the sales and marketing people conduct a kind of forecasting. DEEL5 confirms, similar to UKEL2 and UKEL5, that the forecasts are collected via marketing or sales staff. UKEL2 explains: *“We have a bit of that, not as much as we would like. Most of the forecasting is done via marketing people. There are only one or two larger customers that give us long-term schedules.”* When it comes to effective demand planning and distribution, strategic partnership is the most important factor according to Khan and Pillania (2008). Therefore, companies facing high levels of uncertainty in demand planning that are not well integrated and have weak planning and should strengthen their strategic supply base. Conversely, Murray *et al.* (2005) investigate strategic alliance-based sourcing and conclude that demand uncertainty is not a driver for the sourcing performance. In this context, Rossetti and Choi (2005) argue that the process is complex and buyers require the appropriate skills to manage complex sales and demand questions.

However, the majority of companies (6 UK, 6 DE) believe that supplier integration in an important aspect in supply and demand management (see Table 4-14). Nevertheless, many companies lack real implementation. Chan and Chin (2007) argue that the extent of implementation of critical success factors positively affects sourcing performance. Therefore, it is essential that companies do not simply state that supplier integration is important; they must also implement it to drive sourcing performance. If considering the high degree of manual forecasting, the importance of integration is still relevant, but it either has not been automated yet, or the companies lack the appropriate tools to do so.

4.5.5 Industry specific differences in supply and demand management

The topics related to the supply and demand management perspective are dominated by the electronics industry. Three companies state that customer-caused demand

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changes lead to significant changes to the supply chain, and a further seven companies (70%) explain that demand changes lead to an increased volatility in their supply chain.

Only one electronics company, but four construction companies, claimed demand changes were irrelevant. The respective business models clearly support this characteristic, because the construction sector generally deals with changes through a change request procedure that normally does not affect the project from a financial point of view, instead varying the time scale. However, this is also agreed in the change request procedure. On the other hand, the electronics industry is a more volatile environment, meaning the order book could sky rocket or drop if several clients change orders. Therefore, once a construction company wins a project, it is less exposed to demand changes than an electronics company. We can see then that the electronics industry is exposed on both the demand side and the supply side. Such a situation would normally lead to a reduction of the quantity spread to avoid such volatility. The companies provide sufficient evidence in addressing the volatility problem. UKEL1 mentioned problems with high volatility on a monthly level where the product range increased the problem. UKEL3 points out the problems and strategy changes: *“Changes in the demand chain, well, effectively, instability in the demand in changes, effectively leads us to review and then adapt our strategy. I mean typically we are in a period in the last twelve months in going forward of where the demand is quite volatile. You know, therefore, buffer-stock agreements with our suppliers are something that we’ve been doing more actively. Also, it’s influenced the way in which we choose suppliers. For example, you know, where we see a lot of volatility, sometimes we’ve gone for a dual-supply strategy with one supplier being more flexible with a shorter turn around, but being more expensive, running in parallel with a supplier who is lower cost but not very flexible.”* Meanwhile, UKEL4 summarises the operational impact: *“It is a difficult one that, because we again one of our added value is to manage the supply chain, so we are*

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constantly trying to find ways to drive down the lead times, and it is very difficult when in electronic components lead time is 26 weeks.” In addition, UKEL5 highlights: *“We end up slipping, cancelling, amending and reordering. So we have [...] the view from our supply chain is that they have to provide, they’ve got to be flexible. [...] Nothing is as fixed, because everybody wants a bespoke product. So they know there has to be a level of flexibility. But I would say the shock waves do go through the whole supply chain and they have to either stop, they have to remanufacture or hold a level of stock to allow us to be able to address the change.”* To improve the situation and reduce the volatility a company can integrate suppliers, share demand and forecasts and improve on the supplier relationship. While supply security is an important issue in the supply chain, the companies do not react appropriately. Only five companies apply a forecasting tool (see Table 4-5) in sourcing, and nine companies continue to collect forecasting data manually (see Table 4-15).

For this purpose, companies can integrate IT systems and have advanced planning or even share forecasting with the supplier. It is therefore a surprise to find that the application of such tools or methods is rare. Currently, 70% (7 EL) of electronics companies use manual forecasting approaches, and only two use an electronic data interchange (EDI) connection with suppliers.

Although eight electronics companies and four construction companies support the importance of supplier integration, the real integration from an IT perspective is weak. Companies arguably state and agree to the importance of the integration, but finally lack implementation, a finding supported by Chan *et al.* (2007). Only three electronics companies use systems for integration without on-going forecasting, while three construction companies share their project pipeline, which is carried out manually.

In summary, it can be concluded that electronics companies lack focus on appropriate planning systems and supplier integration. Although eight electronics (80%) companies

argue for the importance of suppliers, only two effectively integrate them. It is therefore no surprise that this industry faces volatility and supply security issues, because it experiences fluctuation in the market environment and finds itself sandwiched between demand and supply volatility. Furthermore, the bullwhip effect is one the major risks or weaknesses in the industry.

4.6 Critical Success Factors

Critical success factors are always important for a company in identifying what is important in gaining a competitive advantage. This research is interested in the perception of interviewees relating to what might be relevant to their company. For this purpose, the researcher asked an open-ended question (Q3) at the beginning of the interview: “Which success factors will determine competitive advantage for your company?” In addition, to validate the findings and increase construct validity, a structured handout was presented that allowed the interviewee to select ten critical success factors out of a list of twenty-nine (Q18): “If you look at this handout, which ten of the following critical success factors will be more important in your value chain over the next ten years?” (see Appendix F: Questionnaire and handouts).

4.6.1 Identification of critical success factors by open-ended questions

The critical success factors presented through the open question primarily relate to the margin and cost situation, which was mentioned by 11 companies. The analysis is presented in Table 4-17:

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Nodes	Sum	DE	UK	CO	EL	Companies
CSF_MarginCost	11	5	6	6	5	DECO1, DECO3, DECO5, DEEL1, DEEL3, UKCO1, UKCO4, UKCO5, UKEL1, UKEL3, UKEL5
CSF_MarketApproach	8	4	4	3	5	DECO1, DECO3, DEEL1, DEEL4, UKCO4, UKEL1, UKEL4, UKEL5
CSF_ProductsProjects	8	3	5	4	4	DECO4, DECO5, DEEL1, UKCO1, UKCO3, UKEL2, UKEL4, UKEL5
CSF_Performance	7	4	3	5	2	DECO3, DECO4, DEEL2, DEEL3, UKCO3, UKCO4, UKCO5
CSF_AddCustomerValue	6	1	5	2	5	DEEL1, UKCO4, UKCO5, UKEL1, UKEL4, UKEL5
CSF_SourcingStrategy	5	3	2	3	2	DECO3, DEEL2, DEEL3, UKCO3, UKCO5
CSF_Risk	4	2	2	3	1	DECO1, DECO5, DEEL5, UKCO5
CSF_SupplySecurity	4	4			4	DEEL2, DEEL3, DEEL4, DEEL5
CSF_Quality	3	2	1	2	1	DECO3, DECO4, UKEL3
CSF_Sustainability	3	2	1	2	1	DECO3, DECO4, UKEL3
n= 18						

Table 4-17: Identified success factors that determine competitive advantage

DECO1 highlights that the construction sector typically have the highest risks across all industries business by operating at the lowest profit margin, while DECO3 points out that price still dominates the business and too many fixed-price projects are offered. The general contracting approach has changed, and DECO5 has started to do this independently, with the aim of achieving higher margins, and has hired new employees with the relevant skills. DEEL1 points out that sourcing prices and total cost remain very important, and the sourcing function has to ensure competitive market prices. The financial crisis led to a significant market downturn and DEEL3 has changed strategy to dual suppliers, leading to significant savings, although the cost and margin base could be improved. UKCO1 is concerned about fixed-price projects, while UKCO4 states: *“I think the vast majority of work is price-driven and it’s the end figure that a lot of clients are now looking*

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at.” The right cost base for the supply base is essential to UKCO5, where UKEL1 sees the objective to improve product margins. UKEL3 points out:

“I think success factors for our company is to keep in focus the core objectives, you know, which are the direct costs, the quality aspects, to keep all of those in track, but also ensure that we roll in these new emerging, let’s say, elements, such as the green procurement and, okay, the socioethical or the responsible procurement aspects, to roll these in but still keep a costs control over the core direct costs on the product.” In addition, the UKEL5 target is to achieve an appropriate level of profitability.

Market approach is seen as significant factor. Where DECO1 sees an appropriate market offering with increased internationalisation, DECO3 and DEEL1 identify competitiveness in general as relevant. In addition, DEEL4 considers technological leadership, innovation and sustainability as key. UKCO4 believes differentiation is important to *“distinguish yourself from that if you want to create a margin”*, and UKEL1 sees a danger in new market entrants competing in their sector, and the importance in developing a new strategy to cope with the competition. UKEL4 is confident it has a strong position and the ability to improve it: *“We think we have developed a few skills and capabilities that are rare. [...] So how we stay competitive is offering something that the market isn’t offering. We have to stay ahead.”* UKEL5 believes it will be important to follow the market place, which has moved mainly to Asia.

New products and projects are essential in the future, making it necessary to think about product development and offering new project models to customers. For instance, DECO4 is closely associated with engineering and is involved in new solutions and offerings. The operating model was changed at DECO5 from all-in lump-sum price contracts to modules, and the company is more integrated in project management, coordination and steering. This will be important in meeting future market requirements and reducing risk.

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DEEL1 criticises the broad development of the product range and the increased parts complexity required by customised products. It is therefore essential that the sourcing function is involved in the product road map and the qualification of new parts. UKCO1 and UKCO3 see the differentiation in new solutions and offerings to the client as key. UKEL2, UKEL4 and UKEL5 see new product introduction as essential in the future, and UKEL2 is concerned about the increased complexities and product varieties: *“Harmonisation there is not. You know, as a company we have to make a French version, a German version [...] etc.”*

Operational performance was brought up by several companies and highlights the need for quality, reliability, on-time deliveries and a fast response (DECO3, DECO4, DEEL2, DEEL3, UKCO3, UKCO4, UKCO5). *“We can win work through performance and client relationships, that’s key”* (UKCO4).

The value added to customers is also seen as a critical success factor. DEEL1 highlights the need for employees’ technical competency to sell the product and consult the customer, while UKCO4 and UKCO5 aim for solution and sourcing strategies offering added value to customers. *“It’s basically sort of like just keeping one step ahead and sort of like people almost trying to mimic our product and steal the share of our market. It’s them basically saying, well, that was yesterday’s product,”* highlights UKEL1 in relation to technological and innovative improvements. UKEL4 describes added value by providing an example of how flexible and remarkable the solution was in changing supplier parts and the whole PCB design, which impressed their client. The entire business should work on what is value added and what is not (UKEL5).

Sourcing strategy covers the appropriate supplier base and approaching new markets. DECO3 tries to involve suppliers at certain points and work jointly on solutions and price, and the supplier management and selection will be more important due to require-

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ments to use KANBAN or lean processes (DEEL2). DEEL3 simply sums-up the situation with “*you need suppliers who can deliver*”. The company used to implement a dual-supplier strategy and ran through a change process in qualifying and testing new suppliers. UKCO3 sees its current sourcing strategy as a good foundation, with a partnership programmed called ‘The UKCO3 family’: “*We guarantee these people minimum competition. They never trade. They’re only ever in bunches of four. We don’t send to ten sources. We don’t send to 15. We only got four and we make them a promise, ‘If we pick you, one of the four will get the job’.*”

The remaining trends (below five entries) are supply security, which should ensure the continuous supply of materials and services; risk management, to ensure supply and how to solve risks that might occur; sustainability, especially as the area of responsible and green procurement is seen as a differentiator and a critical success factor; and quality, which was mentioned by a few companies in highlighting that quality should become the dominant factor instead of price.

In summary, the findings of the open-ended questions highlight the critical success factors of margins and costs, followed by the market approach, an upcoming development that the companies see as critical. In addition, the products and services offered, combined with the added value to the customer, plays a relevant role. Considering the main factors in margin and costs, Narasimhan and Das (1999) underline the possibility of reducing costs and increasing flexibility in manufacturing through strategic sourcing. Furthermore, strategic sourcing and supplier selection has an influence on competitive advantage—in this case market approach and products/service offered—and business performance (Su *et al.*, 2009). In addition, the involvement of suppliers in the product development adds further value to the product/services (Zhao *et al.*, 2005; Moses and Åhlström, 2008).

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Finally, the strong focus on margins and costs is reflected in the strategic supplier evaluation criteria, contrary to the structured questionnaire on critical success factors. The interesting finding is the consistency in answers when the interviewee has the opportunity to talk freely, explain the critical success factors (see Table 4-17) and openly select the relative importance of the supplier evaluation criteria (see Table 4-24).

4.6.2 Identification of critical success factors by structured questions

In the structured handouts, the interviewees could select ten factors from a list of twenty-nine. These factors were mainly identified from the literature review and extended by a random selection of criteria the researcher viewed as relevant for inclusion in the questionnaire. The randomised and alphabetically sorted questionnaire provided a solid base from which the interviewee could select. Therefore, the questionnaire consisted of empirically and quantitatively validated critical success factors. The sum of the selected success factors is intentionally uneven to avoid the identification of any logic by the interviewee. This approach should specifically increase construct validity, as the open-ended question is compared with that in the questionnaire. Furthermore, the order and structure of the questionnaire was designed to avoid acquiescence bias (the tendency to choose an answer without considering the content (Iarossi, 2006)). If the interviewee is selecting from a list then the order in which the criteria are presented is important. The interviewee may choose the first factors from a long list and ignore the real importance (Iarossi, 2006). Therefore, alphabetical sorting was chosen and the interviewee explicitly asked to explain their choice with one short sentence after completing the questionnaire.

The selected criteria were largely found in publications, with an extract presented in Table 4-18:

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Identified criteria	Method	Authors
<p>Total cost of ownership, sourcing process excellence, annual plan, develop requirements, devise sourcing strategies, procurement materials and services, evaluate suppliers, and manage supplier relationships.</p>	<p>Discussion paper (consulting experience, studies)</p>	<p>Anderson and Katz (1998)</p>
<p>Buyers can increase through strategic sourcing, the manufacturing performance and reduced costs. Suppliers should have strong delivery, consider volume-change-response capabilities and focus on modification response. Furthermore, supplier involvement is a key element.</p>	<p>Quantitative, sample size 68 responses</p>	<p>Narasimhan and Das (1999)</p>
<p>Status of purchasing, internal coordination, information sharing with key suppliers and key supplier development. The authors argue to empower the sourcing function with relevant tools to make strategic decisions and to manage the supplier relationships. Furthermore, the cross-functional team collaboration should be improved with sales or R&D departments.</p>	<p>Quantitative, sample size 140 manufacturing firms</p>	<p>Kocabasoglu and Suresh (2006)</p>
<p>The 14 success factors have been grouped to a) visionary leadership in strategic sourcing, b) supplier management system and c) continuous improvement.</p> <p>Most important to least important factors: people management, linking sourcing strategy to corporate strategy, supplier evaluation and selection, system improvement, supplier collaboration, supplier development, supplier monitoring, sourcing strategy, learning organisation, process improvement, leadership in strategic sourcing planning, competitive analysis, proficiency focus, life cycle costs.</p>	<p>Quantitative, 205 companies in the Hong Kong toy industry</p>	<p>Chan and Chin (2007)</p>

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Identified criteria	Method	Authors
<p>Strategic supplier partnership, sourcing flexibility, supplier evaluation and trust. Empirical justification of the importance of strategic sourcing and supply chain agility and the impact on organisational performance. Strategic partnerships are the most important factor when it comes to stability and effective demand and distribution.</p>	<p>Quantitative, 128 Indian firms from manufacturing, multiple industries</p>	<p>Khan and Pillania (2008)</p>
<p>Test whether strategic sourcing and supplier selection has an influence on competitive advantage and corporations' performance. Strategic sourcing: long-range plan reviewed and adjusted to strategic plans, relationship to suppliers covered in long-range plans, sourcing strategies developed and considered corporate goals.</p> <p>Supplier selection: product cost, product quality, delivery dependability, delivery speed</p> <p>Competitive advantage: cost, quality, delivery dependability, flexibility, response time</p> <p>Business performance: return on assets, profit margin, market share</p> <p>Outcome: 1) strategic sourcing vs. competitive advantage not supported 2) supplier selection vs. competitive advantage supported 3) competitive advantage vs. business performance not supported 4) strategic sourcing vs. business performance supported</p>	<p>Mixed, pre-tested and mail survey, sample size 181 US apparel companies</p>	<p>Su <i>et al.</i> (2009)</p>
<p>The researchers conclude that strategic sourcing and strategic flexibility are significant influencing factors for the agility of supply chains. Specifically, strategic sourcing being determined by strategic purchasing, supplier development, internal integration and information sharing has a greater influence on a firm's supply chain agility than flexibility.</p>	<p>Mixed, 140 US firms</p>	<p>Chiang <i>et al.</i> (2012)</p>

Table 4-18: Literature on critical success factors

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The analysis of the questionnaires is presented in Table 4-19 and Table 4-20:

Rank	Critical success factor	Responses	%
1	Quality	15	75%
2	Sourcing strategies are aligned with corporate goals	13	65%
3	Supplier management/ partnership	13	65%
4	Continuous improvement	11	55%
5	Profit margin	11	55%
6	Employees/ human resources	10	50%
7	Supply flexibility	10	50%
8	Total cost of ownership	10	50%
9	Delivery dependability	9	45%
10	Internal customer buy-in	9	45%
11	Technology	9	45%
12	Information exchange	8	40%
13	Product cost	8	40%
14	Availability of sourcing information	7	35%
15	Company's strategic plans	6	30%
16	Delivery speed	6	30%
17	Operations/manuf. support of global sourcing process	6	30%
18	Response time	6	30%
19	Trust	6	30%
20	Visionary leadership	6	30%
21	Organising effectively	5	25%
22	Market share	4	20%
23	Knowledge about global supplier	3	15%
24	Supplier integration	3	15%
25	Development of key suppliers	2	10%
26	Identify common requirements across business units	2	10%
27	Return on assets	1	5%
28	Supplier who are interested in global contracts	1	5%
29	Supplier evaluation	0	0%
	n=20		

Table 4-19: Critical success factors in strategic sourcing

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Code	Country	Industry	Company	AvaiSourInfo	CompStratPlan	ConImpr	DeIDepend	DeISpeed	DevKeySup	ReqAcrcBU	InfoX	IntCusBuyIn	KnowGlobSup	MarkShare	GlobSourProcess	OrgEffectiv	HR	ProductCost	Profit	Quality	ResponTime	RoA	SourStratCorpGoals	SupEval	SupInng	SRM	SupGlobalContr	SupplyFlex	Techno	TCO	Trust	VisLeaders
DECO1	DE	CO	1	1							1	1					1		1	1			1		1		1	1	1	1		
DECO2	DE	CO	2	1			1					1	1						1	1	1			1		1		1	1	1		
DECO3	DE	CO	3					1					1					1		1	1			1		1		1	1	1		
DECO4	DE	CO	4	1	1	1						1			1			1		1	1			1		1		1	1	1		
DECO5	DE	CO	5	1			1					1				1	1			1	1		1		1		1	1	1	1		
DEEL1	DE	EL	1		1			1						1			1	1			1						1	1	1	1		
DEEL2	DE	EL	2					1				1			1			1	1		1			1		1		1	1	1		
DEEL3	DE	EL	3			1						1				1	1			1	1			1		1		1	1	1		
DEEL4	DE	EL	4				1	1		1		1				1	1			1	1			1		1		1	1	1		
DEEL5	DE	EL	5	1		1		1					1						1	1	1			1		1		1	1	1		
UKCO1	UK	CO	1	1	1	1	1		1							1	1			1	1			1		1		1	1	1		
UKCO2	UK	CO	2	1	1	1						1		1				1	1	1	1				1		1	1	1	1		
UKCO3	UK	CO	3		1	1	1		1			1				1		1	1	1	1			1		1		1	1	1		
UKCO4	UK	CO	4			1						1				1	1			1	1		1		1		1	1	1	1		
UKCO5	UK	CO	5				1					1			1		1	1	1	1	1		1		1		1	1	1	1		
UKEL1	UK	EL	1			1		1			1	1			1			1	1	1	1						1	1	1	1		
UKEL2	UK	EL	2		1	1	1			1					1	1			1	1	1			1			1	1	1	1		
UKEL3	UK	EL	3			1	1					1	1					1	1	1	1			1		1		1	1	1		
UKEL4	UK	EL	4	1			1					1		1					1	1	1					1	1	1	1	1		
UKEL5	UK	EL	5			1									1					1	1				1	1	1	1	1	1		
Total				7	6	11	9	6	2	2	8	9	3	4	6	5	10	8	11	15	30	5	65	0	3	13	1	10	9	10	6	6
				35%	30%	55%	45%	30%	10%	10%	40%	45%	15%	20%	30%	25%	50%	40%	55%	75%	30%	5%	65%	0%	15%	65%	5%	50%	45%	50%	30%	30%
				14	15	4	9	15	25	25	12	9	23	22	15	21	6	12	4	1	15	27	2	29	23	2	27	6	9	6	15	15

Cross-country analysis

Sum of DE	5	2	3	3	5	0	1	4	6	2	1	2	3	7	2	5	9	2	1	7	0	2	7	0	5	5	7	3	1	
Sum of UK	2	4	8	6	1	2	1	4	3	1	3	4	2	3	6	6	6	6	4	0	6	0	1	6	1	5	4	3	3	5
Delta/ Deviation	3	-2	-5	-3	4	-2	0	0	3	1	-2	-2	1	4	-4	-1	3	-2	1	1	0	1	1	-1	0	1	4	0	-4	

Cross-industry analysis

Sum of CO	5	4	5	5	1	2	0	6	5	1	1	2	2	6	4	7	8	1	1	6	0	2	8	0	3	3	5	3	4
Sum of EL	2	2	6	4	5	0	2	2	4	2	3	4	3	4	4	4	7	5	0	7	0	1	5	1	7	6	5	3	2
Delta/ Deviation	3	2	-1	1	-4	2	-2	4	1	-1	-2	-2	-1	2	0	3	1	-4	1	-1	0	1	3	-1	-4	-3	0	0	2

Coding

AvaiSourInfo	Availability of sourcing information
CompStratPlan	Company's strategic plans
ConImpr	Continuous improvement
DeIDepend	Delivery dependability
DeISpeed	Delivery speed
DevKeySup	Development of key suppliers
ReqAcrcBU	Identify common requirements across business units
InfoX	Information exchange
IntCusBuyIn	Internal customer buy-in
KnowGlobSup	Knowledge about global supplier
MarkShare	Market share
GlobSourProcess	Operations/ manuf. support of global sourcing process
OrgEffectiv	Organizing effectively
HR	Personal/ HR, own staff
ProductCost	Product cost
Profit	Profit margin
Quality	Quality
ResponTime	Response time
RoA	Return on assets
SourStratCorpGoals	Sourcing strategies are aligned with corporate goals

Table 4-20: Analysis of critical success factors

In the following, the top ten critical success factors are presented with selective citations and arguments from interviewees. The research (n=20) shows that quality was mentioned fifteen times (75%) as the most critical success factor in the next ten years. This represents the dominant factor across both industries in two countries. The quality re-

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quirement is one of the most important in meeting customers' expectations and positioning the company appropriately against competitors.

For some companies, quality is a given factor, ranks high and is a pre-condition (DECO1, DECO2, DEEL3, DEEL4, UKEL1, UKEL3). For DECO3, the quality requirements and expectations have increased constantly in recent years, while for DECO4 and DECO5, quality is one vital factor that directly relates to the company brand and reputation. DEEL1 highlights the recent changes: *“Quality is very important to us, because the requirements to quality as well as technical availability of machines of the end customer is worldwide constantly increasing. [...] We are more and more involved to meet the quality requirements of our customers with a zero-defects rate.”*

“Quality is a given, but the key topic. If you buy cheap, but you do not have quality, you will destroy your brand,” states DEEL5. Similarly, it is essential to UKCO2: *“Quality, we need it right first time. That just goes and that has always been the main driver. Quality.”* UKCO3 states: *“Quality is paramount because that's what our customer wants. Customers are always right. Customer service is key.”*

The second success factor (13 mentions) is the alignment of sourcing strategies with corporate goals. The need to achieve this particular alignment seems to have established an appropriate awareness within sourcing departments. Several companies already practice the alignment, and many think that due to changing markets the on-going adjustment of sourcing strategies will be an important factor. DECO1 practices specific strategy workshops to align the strategy, and DECO4, DEEL1 and DEEL2 highlight the importance of the sourcing strategy in meeting the market requirements and maintaining competitiveness. *“Sourcing strategy and the alignment with the corporate goals is extremely important. Specifically, how the sales market change, the demand changes, where the sales markets move, to follow them and to build a supply base there,”* states DEEL4. For DEEL5,

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UKCO3, and UKEL5 the sourcing strategy must be aligned with the corporate strategy, as UKEL5 states: *"Sourcing strategies are aligned with corporate goals. If there is a misalignment that will have a long-term impact to their business whether it's through their inability to achieve targets or the shareholders will not be happy, so we need to keep that aligned. "So the sourcing strategies must be aligned when meeting those corporate goals and so that means that the reduction in product cost and increase in profit margin go hand in hand with that,"* according to UKCO5. Equally, UKEL3 highlights the impact and importance: *"Sourcing strategies are aligned with the corporate goals. I think that sourcing and supply chains have got to be very connected to the overall corporate goals, you know, where we want to focus, where we want to grow regionally. So I think this, you know, it's important that we're in tune with that. If we're going to have expansion goals, especially focused within Europe, then we need to tailor our goals accordingly on the supply side."*

Third, the supplier management and partnership (13) will become increasingly important according to respondents, especially in the construction sector where long-term partnerships are established. Surprisingly, the interviewees think that the networks and partnerships will determine the competitive advantage of a company. DECO1 offers a general and holistic definition of supplier management: *"The selection is important, but first of all, we need to identify and find appropriate suppliers."*

"Supplier relationship management and partnerships, if you have a healthy mix of collaboration and flexibility and trust, can from my perspective be successful on a long-term base," highlights DECO3 with regards the importance of relationship management. To DECO5, DEEL2 and DEEL3 it is a given factor, but DEEL4 aims for a different approach: *"The supplier management, partnerships is a high dependency, but very important. We even can think of alliances or to collaborate similarly with important partners, such as the large OEMs do it today."* UKCO2 will increase strategic partnerships: *"Supplier man-*

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agement and partnership, so as I mentioned, we still got far too many suppliers, so we need to reduce that number, manage them and work closer with the ones who can really add value to our business.” UKCO5 states: *“The next part is supply management and the supplier because obviously they’re the providers of the equipment and materials so delivery dependability and the supply management partnership is key in that area. If we start looking at companies that don’t support us then we don’t get the right partnership behaviour with those organisations, so that their delivery dependability fails then a large part of what we’re going to do is going to fail because we lose personal buying from the business, and of course it will increase our cost and reduce our profit.”* Suppliers are hugely important to the business operations of UKEL3 because there is a high degree of outsourcing, and therefore the suppliers’ performance is vital. This is also a key driver for UKEL5.

Fourth, eleven companies mentioned continuous improvement as an important factor in the future. It is quite unusual, but DECO4 has a different, automotive-inspired, approach in their assembly line for prefabricated houses: *“We work in accordance with the Porsche system, and this will be more and more important. We are on the way to meet the, let’s say, zero failures.”* DEEL3 and DEEL5 identify areas for progression constantly, and optimise processes, tools or approaches for further improvement. UKCO2 points out: *“Continuous improvement, I think that goes through everything we do, we just need to keep getting better at it, if you got a period of ten years, then if we could do that then we will be doing okay.”*

“It is important to do and improve the things over and over, and the company will be able to improve margins and quality” (UKCO3). It is also a constant approach for UKEL1: *“Continuous improvement also in that we are constantly working on as well so I use suppliers who do the same sort of thing.”* UKEL3 highlights the need for constant improvement: *“If we stand still, we’re going to fall further behind. So, you know, that’s, I*

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would say, mandatory on each business.” Finally, it is also relevant to UKEL5, as continuous improvement helps “*retain and enhance competitiveness*”.

Fifth, eleven companies see the profit margin as relevant for the future success. This is in line with the previous findings, where costs and margins played an important role for several companies. However, for many companies the profit margin is a standard and given critical success factor. “*We talk about a profit margin, which is a low single-digit figure and therefore important,*” highlights DECO1 with regards the profitability problem. For DECO3, the profit margin is “crystal clear”.

“*If you look on recent earnings, it is quite clear, the profit margin is important*”, states DEEL4. The profit margin is important for a company of course, but it is not only a result of sourcing. Instead, the company must consider the sales people, who possible give too much profit “away” (DEEL5). UKCO2 operates on a slim margin, meaning profit is an important factor, while UKCO3 focuses on earnings and profit: “*And I think that if you do it that way, you’ve then got yourself a depth to your trade profit margin because I got to tell you, UKCO3 is run for profit. Profit is not a dirty word. Profit is a good word. It’s acceptable. It enables us to develop our own staff and give our own staff some feeling of safety that they are in a same place and they do a better job.*” UKCO5 has already started a project to increase margins, “*whereby we want to have actually achieved a three-fold increase in our profit margin by 2016.*” Finally, UKEL3 points out that a profit margin is relevant for the business operations: “*Profit margin as well, you know, we’re in it to make money. We’re not going to be successful if we have a profit margin, you know, kind of below European bank base rate or something like that. We are going to have to question why we were in business in that case. So I think that’s key.*”

Sixth, employees and human resources were mentioned by the half of the companies. Many firms see a lack of qualified employees in the next ten years, and to some ex-

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tent today. It is essential to hire the best people and ‘enter the war for talent’, but the demographic situation already forecasts a decrease in the number of qualified engineers available to companies. DECO1 highlights the importance of *“how to get new employees in sourcing functions? – a big topic”*. The investment in employees, to give support and to stipulate, is essential, and employees can be seen as the most important capital of a company (DECO3). DECO5 already sees a demand for talented employees in the area of business administration and back office, especially to manage complex contracts and commercials. DEEL1 and DEEL2 see an emerging demand for highly skilled employees. *“Employees are my number one priority. Good employees, employee development, employee training, absolutely. But also to hire and win new trainees,”* states DEEL3. Human resources are important to a company, and this is the most important topic for DEEL4 and UKCO1. UKCO3 explains: *“We need to develop our own. It’s a bartering process. Bartering process is always going to be done by people. People who treat people properly and behave properly I think is key. We need to develop people’s technical capability. Too many people still trade in this industry particularly with bluff and bluster rather than business ethic. That is key.”* Similarly, UKCO5 argues that *“only people that do the work are the people, our people, so therefore there has to be a large emphasis on personal development of our own staff to be able to deliver those aspirations.”*

Seventh, supply flexibility is becoming increasingly important, and companies and customers require a high degree of it. DEEL1 describes how the market and expectations change: *“Well, I ticked supply flexibility because our customers have constantly reduced their production cycles, going into pre-assembly modules, etc. It becomes shorter and shorter, well we have to cope with customer specific and unique products, where the flexibility is very high. We partially have the situation where the electronic equipment is decided in the assembling process.”* DEEL3 equally has to maintain a high degree of flexibil-

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ity and to react in a shorter time. For UKEL1, it is more a focus on storage and order books to be able to meet the flexibility, where UKEL4 talks about supply chain agility: *“There is still [...] there is the market impact, so there is having [...] being in the market and making money. It is about the supply base that I can trust and can be agile or flexible, you put flexible, but it’s the same thing, agile. And I think it is how we move the business forward. How we drive the business and that is where we go and we have to be adaptable. We can’t, you know what we are doing now can’t possibly be the same in three years’ time.”* The market environment is also the driver for UKEL5, who points out: *“Supplier flexibility. The market place is volatile. We work in high technology. We both got to enter into the view that we are flexible. Let’s not be inflexible, because that means we won’t enjoy some opportunities. Technology, high technology company – I have said earlier we want suppliers who can flex their technical excellence. We can’t think of everything for them, we want to tell suppliers, this is the output, you provide the product and the performance.”*

Eighth, the total cost of ownership (TCO) consideration is viewed alongside profit, and for the majority of companies it is natural to consider their costs. DECO4 and DECO5 see the TCO approach as similar to profit and margins, while DECO1 highlights the fact that, especially in the construction sector, the final balance is calculated after the project has been finished. Furthermore, the market trend is focused on the lowest price. DEEL1 sees the pressure and increased competition from global markets to be more competitive at the TCO level. The complexity of the supply chain is the driver of the total costs, considering taxes, insurance, customs, etc. (DEEL3). *“[...] the total cost of ownership, we will eventually move away from a price-based approach where cheapest is best to understand the total cost of ownership. A large part of the assets we build we actually manage for up to 35 years, so the learning’s coming from the facilities management part of our business, but to make sure we make the right design decisions end from end around product is going*

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to be very important in here,” highlights UKCO5. The development around global sourcing and its cost impact is seen as more critical by UKEL1: “Total costs of customer ownership, that’s something that one of the drivers, well, especially down from my managing director, he is wanting to move more and more to direct Far East purchasing. And I think one of the things that we tend to lose out on is how much it does actually cost with additional stock holding, the rise in transportation costs, and things like that”

Ninth, delivery dependability has become more important to many companies during recent supply shortages, and this also affects construction sites, where the order of a crane on a short-term basis is impossible (DECO2). For DEEL4, this seems to be a question of whether production sites in Europe will remain competitive: *“We get faster and faster and one reason is that we have to accept dependability.”* It is mainly a question of partnership, as UKCO5 points out: *“If we start looking at companies that don’t support us and then we don’t get the right partnership behaviour with those organisations, so that their delivery dependability fails, then a large part of what we’re going to do is going to fail because we lose personal buying from the business, and of course it will increase our cost and reduce our profit.”* The same applies for UKEL3: *“[...] delivery dependability, I mean this is a fundamental for customers, you know, as I mentioned, quite a flexible demand profile, and therefore, when our customers are looking for us to hit the deliveries and the milestones that we have, if we’re going to win follow-on business. It’s a fundamental one.”*

Tenth, internal customer buy-in targets collaboration across departments, and should cover the alignment of departmental strategies and joint working with engineering, production and sourcing. *“We are technology driven, and therefore the involvement of other functions is essential. Or we need to collaborate with new functions such as treasury within the sourcing process to cover emerging risks,”* states DECO1. The information ex-

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change with other functions is essential (DECO5, DEEL2, DEEL3). *“The involvement of the sourcing function must be earlier; for complex products, too,”* highlights DEEL4, while being critical that in many cases the researcher designs and creates specifications without consideration of already bought or approved parts. UKCO2 sees the involvement of other functions during category strategy development as particularly important, *“so they need to buy in to strategies that are developed, and also to contribute towards it as well.”* Similarly, this is one of the key points of UKCO5: *“Internally the business must support the global sourcing process and the internal customer has a bind as to this new model and that’s very key for us, because that’s all around the fact that as we put these people to work, they have to know that the business is actually fully supportive of their requirements.”*

In summary, the findings show a good base from the structured handouts, whereby quality is the predominant critical success factor mentioned by 75% of the interviewed companies. Quality is also seen as a significant factor to gain a competitive advantage in line with costs, response time and flexibility (Su *et al.*, 2009). The companies mentioned the strategic alignment to corporate strategy as a significant success factor, which is also supported by Moses and Åhlström (2008) and Chan and Chin (2007). However, the interview findings show the contrary. The interviewees discuss, in an open-ended question, profit and costs as primary factors (see Table 4-17), but in completing a structured handout (see Table 4-19) they obviously select those factors they believe are right. This phenomenon is supported by the supplier evaluation criteria, where price and costs are still dominant (see Table 4-24). Therefore, although the interviewees believe the alignment is vital, they do not align across functions. Instead, the findings provide further evidence of the silo thinking surrounding demand forecasting. Therefore, the alignment with corporate goals and cross-functioning is still an important factor that the sourcing function needs to adapt

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to (Moses and Åhlström, 2008). Furthermore, the supplier management and partnerships, continuous improvement, employees, supply flexibility and total cost of ownership (Narasimhan and Das, 1999; Kocabasoglu and Suresh, 2006; Chan and Chin, 2007; Su *et al.*, 2009; Chiang *et al.*, 2012) were identified as significant factors and are mainly in line with previous research, although these were only mentioned by around half of the companies.

4.6.3 Country-specific differences in critical success factors

The evaluation of the critical success factors in shows that some such factors are perceived differently across countries. The analysis shows the sums of the factors mentioned and identifies the largest variance. The most frequently mentioned critical success factors vary across country and are presented in Table 4-21:

UK	DE
<ol style="list-style-type: none"> 1. Continuous improvement (8) 2. Delivery dependency (6) 3. Product cost (6) 4. Profit (6) 5. Quality (6) 6. Sourcing strategy aligned with corporate goals (6) 7. Supplier relationship management (6) 	<ol style="list-style-type: none"> 1. Quality (9) 2. HR (7) 3. Sourcing strategy aligned with corporate goals (7) 4. Supplier relationship management (7) 5. TCO (7)

Table 4-21: Top critical success factors by country

We see Germany focuses more on quality where the UK concentrates on continuous improvement. Although this research project is of a qualitative nature, the study shows that 90% of German companies see quality as the dominant critical success factor, ahead of four other factors, as 70% of German companies view human resources, alignment of

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sourcing strategy with corporate goals, supplier relationship management and total cost of ownership as the next most crucial considerations.

Meanwhile, 80% of UK companies believe in continuous improvement as the critical success factor. UKCO1 states: *“A lot of collaboration happens at project level and then the knowledge gets lost. This is ‘continuous improvement’. And what I want to try and create is a supply chain that can better articulate the commercial advantage of working, bringing in their knowledge.”* Similarly, according to UKCO2: *“Continuous improvement, I think that goes through everything we do, we just need to keep getting better at it, if you got a period of ten years, then if we could do that then we will be doing okay. Internal customer buy-in, for the reasons I mentioned to you for it needs to be something that all departments in UKCO2 are involved in the supply chain process, and so they need to buy-in to strategies that are developed, and also to contribute towards it as well.”* The same rationale is presented by UKCO3: *“Continuous improvement is important to us because by doing things over and over again you are able to improve, and that is improved profit margin, improved quality.”*

The second most important factor is difficult to identify, as only 60% consider the importance of the following critical success factors: delivery dependency, product cost, profit, quality, sourcing strategy aligned with corporate goals and supplier relationship management.

This evaluation uncovers some shared views on success factors across countries. However, the UK companies focus more on operational factors to realise profit, consider costs and deliver based on an appropriate quality. This could be because of the economic market situation and competition, where the consumer/customer is not willing to pay a premium for quality. Human resources management and the future challenges brought about by demographic changes will, as already pointed out, affect Germany more than the

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UK. The evaluation of the differences in the top five factors is presented below and referenced in Table 4-19.

Quality is most important critical success factor, and mentioned by 75% (9 DE, 6 UK) of the research project participants. Several researchers discuss its influence in driving and impacting on business performance or competitive advantage (Su *et al.*, 2009). In this context, there is no significant country-specific difference in responses. Instead, companies mention quality in direct relation to the customer and brand. DEEL4 highlights that *“the topic quality is essential and ensures the survival of the company”*, where DEEL5 sees quality as the key element: *“Quality for sure, because you have without quality no chance. If you buy cheaper and cheaper, and you cannot maintain the quality level, you will destroy your brand.”* Similarly, *“quality is paramount because that’s what our customer wants. Customers are always right”*, states UKCO3. In addition, UKEL3 argues that *“you know, quality is an assumed for all the major customers. It’s got to be there to be successful. You know, you can easily get a bad reputation very quickly for poor quality, and no matter how good your cost is, and your feature strategies, if you’ve lost the trust for your poor quality, it’s very hard to rebuild that. So that has to be there.”*

The alignment of sourcing strategies with corporate goals was mentioned by 13 companies (65%, 7 DE, 6 UK). The relevance of such an alignment is supported by Anderson and Katz (1998), Chan and Chin (2007) and Su *et al.* (2009), and is also well-represented in this research project. The companies face several challenges and trends in the market (see Table 4-1), adapt their sourcing strategies and objectives (see Table 4-4), cope with increasing risks and supply volatility (see Table 4-7) and finally require a sales forecast (see Table 4-15). UKEL5 summarises the impact: *“Sourcing strategies are aligned with corporate goals. If there is a misalignment that will have a long-term impact to their business whether it’s through their inability to achieve targets or the shareholders*

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will not be happy, so we need to keep that aligned.” There was no country-specific deviation in the interviews; instead, all companies pointed out the importance of that alignment, mainly driven by sales market changes.

Supplier relationship management was the third factor, with 13 (65%) companies identifying its relevance. This was also supported by previous claims that it leads to a competitive advantage (Anderson and Katz, 1998; Kocabasoglu and Suresh, 2006; Chan and Chin, 2007; Khan and Pillania, 2008). In analysing the findings we discover no significant variances in the arguments. Although supplier relationship management is seen as an important area, German companies tend to focus on, or argue from, a transactional perspective. DEEL3 highlights and refers to the reliability and trust in a supplier, where DECO3 deals with collaboration and flexibility. On the contrary, UKEL3 states: *“Supply management and partnership, I think working in partnership and managing the supplies more closely is critical to really extract the best performance and to aid the continuous improvement goal.”*

This continuous improvement was mentioned by 11 (55%) companies, three German and eight British. The factor is supported by Chan and Chin (2007), but based on their findings the authors demonstrate a variance between the importance perception and degree of implementation. The findings in this research show no significant deviation in arguments between the UK and Germany. *“Continuous improvement is important to us because by doing things over and over again, you are able to improve, and that is improved profit margin, improved quality. Familiarity, for us in our industry, is we need to know the end date,”* states UKCO3. Similarly, *“continuous improvement would be to retain and enhance competitiveness.”* (UKEL5). It is possible that due to the operational orientation of the British companies, continuous improvement has gained in relevance.

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The fifth critical success factor is profit margin, which was brought up by 11 companies (5 DE, 6 UK). The profit margin itself is seen as driver to business performance and considered in the research by Su *et al.* (2009). There are no country-specific dissimilarities in profit margin, and the companies argue that it is an objective because of the need to make money. UKCO3 summarises the situation: *“And I think that if you do it that way, you’ve then got yourself a depth to your trade profit margin because I got to tell you, UKCO3 is run for profit. Profit is not a dirty word. Profit is a good word. It’s acceptable. It enables us to develop our own staff and give our own staff some feeling of safety that they are in a same place and they do a better job.”*

4.6.4 Industry-specific differences in critical success factors

The evaluation of the critical success factors shows that some of these are perceived differently across industries. The analysis shows the sums per industry of the mentioned factors and identifies the largest variance. Furthermore, Table 4-22 presents the top three critical success factors, which vary across industries.

The evaluation and assessment of the industry-specific critical success factors shows that the construction and electronics companies view these differently. The construction sector ranks quality equally with supplier relationship management, followed by profit. However, the electronics industry ranks quality, sourcing strategy aligned with corporate goals and supply flexibility as the most important critical success factors.

Construction	Electronics
1. Quality (8)	1. Quality (7)
2. Supplier relationship management (8)	2. Sourcing strategy aligned with corporate goals (7)
3. Profit (7)	3. Supply flexibility (7)

Table 4-22: Top critical success factors by industry

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Quality is most important critical success factor, and mentioned by 75% (8 CO, 7 EL) of the research project participants. Its essentiality in driving business performance or a competitive advantage is supported by several researchers (Su *et al.*, 2009). There is no significant deviation in statements across industries, the only difference is in the service performance, where the construction companies need to get it right first time (UKCO2), and the electronics companies can deliver a new product in the worst case. Although quality is ranked extremely high as a critical success factor, the companies do not systematically see it as being relevant in strategic supplier selection.

The alignment of sourcing strategies with corporate goals was mentioned by 13 companies (65%, 6 CO, 7 EL), and appears slightly more important to German companies. However, all companies state the importance of the alignment, especially if considering the sales markets, with the electronics market more volatile than that of construction. It is interesting to learn how companies cope with new and emerging trends such as green sourcing or economic changes (Table 4-1). Furthermore, the alignment of the strategy is vital to drive the competitive advantage and increase business performance (Anderson and Katz, 1998; Chan and Chin, 2007; Su *et al.*, 2009).

Supplier relationship management was mentioned as the third factor, with 13 companies (65%, 8 CO, 5 EL) identifying the relevance. This factor was also supported by previous research and seen to lead to a competitive advantage (Anderson and Katz, 1998; Kocabasoglu and Suresh, 2006; Chan and Chin, 2007; Khan and Pillania, 2008). By analysing the findings, a variance between industries is identifiable, and we see supplier relationship management is more important for construction companies. The findings show that due to the nature of the business, companies in the construction sector rely more on credible suppliers or contractors to deliver a good performance. DECO1 defines supplier

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relationship management as a holistic process, which considers supplier identification, evaluation, integration, etc. DECO3 and DECO5 rely more on partnerships and trust with a degree of “healthy” collaboration and flexibility. UKCO2 states that even *with “supplier management and partnership, so as I mentioned, we still got far too many suppliers, so we need to reduce that number, manage them and work closer with the ones who can really add value to our business”*. However, when it comes to supplier selection this factor drops to seventh in the evaluation criteria, and is even lower in the construction sector. This implies that companies believe relationships are important, but do not apply this factor in supplier selection.

Continuous improvement was mentioned by eleven (55%) participants; five construction and six electronics companies. The findings in this research show no significant deviation in arguments across the industries.

The fifth critical success factor is profit margin, which was also mentioned by 11 companies (7 CO, 4 EL). There are differences in the perception of profit margin, and although companies argue that profit is a given and constant objective, the majority of these are construction business. The reason is arguably the tough environment and the generally low margins in the sector. DECO1 states: *“Of course, these are the topics; profit margin, quality. We operate in a low-margin business and this will be more critical. We do not have margins of twenty-five per cent plus like SAP.”* Similarly, UKCO2 argues: *“Profit margin, again I guess same sort of reason as cost, we operate with a very slim profit margin, so we need to improve that and reducing some cost is obviously the main way of increasing the margin, we’re not going to have the opportunity to increase our prices really.”* This critical success factor is in line with the economic development, the strategic-sourcing objectives of the functions and the strategic supplier selection criteria.

4.7 Strategic Supplier Evaluation Criteria

Supplier selection and evaluation is a common practice, and researchers have already studied these dimensions (Ho *et al.* 2010). Because of the supplier selection impact on competitive advantage and business performance, these criteria are identified from a long-term strategic perspective. This research is interested in the perception of interviewees towards which criteria they might apply and if those are aligned with corporate strategy and critical success factors. For this purpose, the researcher provided a structured handout that allowed the interviewee to select and rank the most relevant factors. (Q19): “What are the primary factors in your strategic supplier selection?” (see Appendix F: Questionnaire and handouts).

4.7.1 Identification of strategic supplier evaluation criteria

Companies apply different criteria when selecting a strategic supplier. The goal of this research is to identify how and why companies select certain criteria. For this purpose, a handout was prepared, and interviewees had to bring 15 given criteria into an order from 1 (most important) to 15 (least important).

These factors were mainly identified from the literature review and extended by a random selection of criteria the researcher viewed as relevant for inclusion in the questionnaire. The randomised sorted questionnaire allowed the respondent to consider all the factors before ranking them. This approach should specifically increase construct validity, with the interviewee using a scale (1–15) to rank the most important and least important selection criteria. Furthermore, the position bias relating to the position of each factor in the list could not be excluded (Iarossi, 2006). The disadvantage of this is the complexity, as the interviewee has to bring these different factors into an order and has to rethink, evaluate and reassess the selection (Iarossi, 2006). Therefore, some companies only partially ful-

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filled the requirements, only selected some of the criteria or did not participate. In addition, the interviewee was explicitly asked to explain their choice using one short sentence after completing the questionnaire. The selected criteria are mainly founded on the publications presented in Table 4-23:

Identified criteria	Method	Authors
<p>Buyers can increase through strategic sourcing, the manufacturing performance and reduced costs. Suppliers should have strong delivery, consider volume-change-response capabilities and focus on modification response. Furthermore, supplier involvement is a key element.</p>	<p>Quantitative, sample size 68 responses</p>	<p>Narasimhan and Das (1999)</p>
<p>Development of 10 sourcing principles leading to effective supplier management.</p> <p>1) integration/partnership, 2) information sharing, 3) develop trust, 4) organisational effective alignment, 5) commodity teams, 6) global sourcing, 7) total cost, 8) rationalise supply base, 9) let suppliers manage it, i.e. VMI, 10) leverage technology</p>	<p>Quantitative, 160 companies from Europe, America, and Latin America, across five industries</p>	<p>Spekman <i>et al.</i> (1999)</p>
<p>State of market, organisational policy to single source, buyer's view of the importance of policy to single source, poor delivery from suppliers, buyer's view of the importance of reducing purchasing costs, buyer's view of the importance of price reductions, buyer's view of the importance of continuity and security of supply, increased price demand</p>	<p>Quantitative, 160 companies in the UK and 75 companies in Switzerland</p>	<p>Quayle (2001)</p>
<p>The 14 success factors have been grouped to a) visionary leadership in strategic sourcing, b) supplier management system and c) continuous improvement.</p> <p>Most important to least important factors: people management, linking sourcing strategy to corporate strategy, supplier evaluation and selection, system improvement, supplier collaboration, supplier development, supplier monitoring, sourcing strategy, learning or-</p>	<p>Quantitative, 205 companies in the Hong Kong toy industry</p>	<p>Chan and Chin (2007)</p>

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Identified criteria	Method	Authors
ganisation, process improvement, leadership in strategic sourcing planning, competitive analysis, proficiency focus, life cycle costs.		
Strategic supplier partnership, sourcing flexibility, supplier evaluation and trust. Empirical justification of the importance of strategic sourcing and supply chain agility and the impact on organisational performance. Strategic partnerships are the most important factor when it comes to stability and effective demand and distribution.	Quantitative, 128 Indian firms from manufacturing and multiple industries	Khan and Pillania (2008)
Strategic sourcing: long-range plan reviewed and adjusted to strategic plans, relationship to suppliers covered in long-range plans, sourcing strategies developed and considered corporate goals Supplier selection: product cost, product quality, delivery dependability, delivery speed	Mixed, pre-tested and mail survey, sample size 181 US apparel companies	Su <i>et al.</i> (2009)
Quality, delivery, price/cost, manufacturing capabilities, service, management, technology, research & development, finance, flexibility, reputation, risk, relationship, safety	Review paper	Ho <i>et al.</i> (2010)

Table 4-23: Literature on supplier selection criteria

Eleven companies completed this exercise using the appropriate scale; other answers have been excluded due to being incomplete or applying a different scale. The results are presented in Table 4-24 and Table 4-25, which show the sum of all applied and ranked criteria. Therefore, the lowest sum is the most important factor; for example, if all eleven companies had ranked price as number 1, the sum would be 11.

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Rank	Strategic supplier selection criteria	Sum of ranks
1	Price, costs, finance	27
2	Performance of the supplier	47
3	Risk	51
4	Specification, product complexity, quality	52
5	Delivery process with lead-times and supply continuity	65
6	Strategic sourcing fit with internal strategy	75
7	Supplier relation and integration	92
8	Competitive advantage over competitors	95
9	Supplier production capability	96
10	Own capabilities and resources (make vs. buy)	104
11	Customer / demand of own company	108
12	Supply market characteristics (bargaining power)	112
13	Processes and automation, transaction costs	120
14	Economic environment	136
15	Geography of the supplier	140
	n=11; DECO2, DECO3, DEEL1, DEEL2, UKCO2, UKCO3, UKCO4, UKCO5, UKEL2, UKEL4, UKEL5 Scale 1–15 (1=most important)	

Table 4-24: Strategic sourcing supplier selection criteria

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First, the most important selection criterion is financial information regarding the suppliers' product price, costs and payment terms. For many firms this is a key premise and a given factor. DECO3 says *"this speaks for itself"*, while DEEL1 points out that *"it is a key premise to be competitive"*. It is an extremely important factor for DEEL2 and UKCO2, and the *"right price, I guess for us, if the price isn't right, the rest starts to tail away"*, states UKCO3. Additionally, UKEL5 simply reduces it to a contract requirement: *"Price, cost, finance. Why that has to be part of a contract. We need to have it."*

Second is the performance of the supplier in the overall delivery process. Some companies, especially in the construction sector, heavily rely on the suppliers' performance. In the electronics sector, where companies have outsourced some essential components, the performance has a direct impact on the company and its brand. *"Performance of the supplier is key to us because we can't deliver perfectly if our team doesn't deliver perfectly. It's a team exercise. And we are actually sub-letting risk to him by doing it so he's got to be performing,"* highlights UKCO3. Equally, *"performance is number five [in the list], because if they fail, then you're in for a credibility issue"* (UKCO5). It is of similar importance to DECO2, DECO3 and UKCO2, and UKCO4 *"would assess, and that's tied pretty well to risk, if I'm placing an order with someone, is really [...] at the end of the day, can I deliver and do it, just to deliver it, and if we've got past performances to prove they could deliver it."*

The potential risk to the supply chain is ranked third. This implies that the companies consider risks more actively in their supplier selection criteria within strategic sourcing. However, the risk consideration is mainly restricted to the creditworthiness and quality check. DECO3 argues that if the decision is taken, the company assesses the risks and the creditworthiness of the supplier, and DEEL1 considers primarily the financial health of the supplier, but also looks at capabilities and the geography. In addition, DEEL2 would also

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consider business continuity and how the suppliers operate with the company's competitors. UKCO2 states: "*[Number] Four, risk, again this it's a similar sort of thing. What other risks are around.*" For UKCO3, it is a question of a trade-off between risk and reward, while UKCO5 focuses on the overall picture of strategic sourcing with a clear focus on risks that could affect the business plan. UKEL5 is more interested in the methods the supplier applies: "*Yes, that would be important in measuring what that is and understanding if they have any ways of managing it.*"

The participants next listed specification and quality, which with 52 scale points was only one point below risk. DECO2 requires the highest quality to meet customer requirements, and DECO3 mentions quality, complexity and specification as a second important point, and explains that suppliers are only selected if they can produce or deliver the requested specification. Similarly, it is one of the top criteria for DEEL1 and the most important factor for DEEL2. "*The top is specification, product complexity and quality, and I guess, quality has got to come first,*" highlights UKCO2. UKCO5 and UKEL2 rank quality relatively highly as a key requirement, and UKEL2 states: "*Around eight was specification, product complexity, quality. It's a key requirement, although it's midpoint.*"

Fifth, the delivery process and the operational performance with on-time deliveries and supply continuity are relevant in the evaluation. Supply continuity plays an especially important role for the companies, and appears to be the main driver of this factor. However, different ranks are given. For UKEL5 it is a factor in the bottom third: "*Ten was delivery process, we need times and supply continuity, yes, that's important. We need clarity of what they can achieve, and if they can't, what would be the contingency in the event of not.*" However, it is the second most important factor for UKCO2: "*Two, delivery process, lead times and supply continuity, in terms of the work we do, the program is always vital*", while for DEEL2 it is the third most important factor.

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Sixth, the supplier has to meet and fit with the internal strategy. This factor has a broad range and some companies rank it in the upper third, where other companies rank it relatively low; it largely depends on the strategic importance to a company. *“I’ll just go through number two, strategic sourcing must fit with the internal structures, kind of like the previous conversation around business planning. There has to be an alignment with the business, is this the right thing to do.”* (UKCO5) On the contrary, UKEL5 states: *“Twelve was strategic sourcing fit with internal strategy. You’ve got to understand what their medium to long-term plan is and if it’s aligned, is it converging or diverging to what we want. Because ultimately, what fits now, if it’s not [...] if it’s diverging ultimately they are not going to be correct for us or we correct for them. So there is not a long-term vision to be in it.”*

“Strategic sourcing fits with internal strategies, I think. Like we said on the previous question, I think, that we’ve got to develop the sourcing strategy to fit with the internal goals and strategy of the company, so that we’re focussing the efforts in the right places,” states UKEL3.

Seventh, companies named the supplier relationship management and the integration capabilities. For many companies this is a minor consideration, and only DEEL1 and UKEL5 ranked it at third and fourth place. DEEL1 explains the background and its importance: *“Supplier relationship management and integration is the next. It is flexibility, which expect and get only if you have the respective relationship. Especially, if you integrate the supplier can technically ‘fertilise’ our developments.”* On the contrary, the supplier relation management and integration is not important in the selection phase, rather in the continuity phase, as UKCO2 highlights: *“Thirteen, relation and integration, as we move forward that will move up the list, thinking years to come. At the moment, it’s not so needed.”*

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Eighth, the supplier should have a certain competitive advantage over competitors to meet the strategic perspective of the buying firm. This criterion provided the widest range, as it was ranked both in first place (e.g., UKCO5) and fifteenth (UKEL2). In this context, UKCO5 elucidates the rationale: *“So I won’t go through each one but number one, without a doubt, competitive advantage over competitors. We’ve got to be in a position to win more work, because that’s where we make our profit – from winning more work. I’ve gone straight to number fifteen first, geography and supply. I don’t really care where it comes from. If we can buy it cheaper and better anywhere in the world, then I think that’s exactly what we should be doing. Where it comes from doesn’t matter.”* Similarly, UKEL5 states what is needed from suppliers: *“Number two, competitive advantage over competitors. If you’re not competitive or have a desire to be competitive you are going to become lazy and also slow and that in the long-term is detrimental, because that could cause your business to fail very quickly. It is part of being [...] able to sustain [...] sustainability, really. So the competitive advantage over competitors, if you haven’t got it I would say very quickly you would not be a key company to us to invest time and effort in and build your product into our technology. Why should we take our margins and erode them because you are not competitive. Why should we prop up your business? Sorry.”*

Ninth, suppliers’ production capabilities are taken into consideration by some companies, although others do not place much emphasis on it. However, it is the most important factor to UKEL5: *“Number one was supplier production capability. Really that is the reason I’m there. If they can’t produce what I want or have an ability to produce what I want, it’s going to be difficult for me to understand where we would initially engage them. They’ve got to have something there worthy for me to do work with them.”* The supplier should have the capabilities and capacities to meet the requirements and deal with higher volumes (DECO3). UKCO2 points out: *“Supplier production capability. I guess you could*

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probably argue that that was a bit higher on the list but I put it lower down, we already talked about supply continuity at number two. Because we perhaps [...] a lot of our work that we buy in is sub-contract, so it's lot of labour."

Tenth, companies consider their own capacities and capabilities to evaluate make-or-buy decisions, with a few companies ranking this criterion fifth (DECO2, DECO3) or sixth (UKCO2, UKEL2) on the scale. *"Own capabilities and resources is important to us, it is obvious, we only go externally if we really cannot make it internally,"* explains DECO3. In addition, UKCO2 highlights: *"Own capabilities and resources, make versus buy – again, well, that depends on the particular category, there might be certain categories that we could do, so we would then compare our cost against a sub-contractor, but others we definitely could not do, so it wouldn't be an issue."* On the contrary, DEEL2 states: *"I see own capabilities as relatively low"*, and UKCO4 replies: *"Some of them didn't seem relevant, for example about our own capabilities."*

The final five factors have rank points between 108 and 140. Based on the findings and the summary of scales, it can be concluded that these are the least important criteria in the evaluation process.

Eleventh is the demand forecast, and this low rank is surprising because many firms stated they had problems in the demand chain in securing supply. However, the criterion is less important to the buying firms, possibly because they do not have the appropriate figures or are not involved with the sales department.

Twelfth, the consideration of the supply markets and the potential bargaining power of suppliers are not seen as important. This is also surprising, because companies described the changing markets and the dominant position of suppliers as crucial. Furthermore, the supplier dominance and bargaining power could be considered strategic decisions.

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Thirteenth, process and automation capabilities to reduce transaction costs are less important for strategic suppliers. The use of electronic sourcing and ERP integration reduces the importance, and represents a differentiator with other industries.

Fourteenth, the economic environment is more or less irrelevant and is seen as a given. This leads to the situation where companies do not actively seek out the economic situations of suppliers or economies.

The final and least important factor in selecting a strategic supplier is its geographic location. This finding is also surprising, because the companies rank supply continuity quite high, but the location of the supplier seems irrelevant; apparently, companies still follow the cheapest markets and opportunities.

In summary, the surprising and deviating finding is the dominance of price and financials in the strategic supplier evaluation, although quality was ranked the most important critical success factor. This finding therefore supports the misalignment with corporate objectives and strategy (Moses and Åhlström, 2008). The literature review by Ho *et al.* (2010) identifies the most common supplier selection factors, where quality was ranked first, delivery second and price/cost third. Monczka *et al.* (2011) point out cost or price, quality and delivery, and present a study where the misaligned strategic fit is supported in performance measurement; however, the chief executive officer ranked quality first and the chief procurement officer ranked price as most important. The companies largely ranked price or cost as the main selection criterion, followed by a group of criteria mentioned by several respondents (see Table 4-24, factors 2–6).

One may argue that the reduced sample size causes a misinterpretation; however, due to the use of the structured handout, companies could have a stronger focus on costs because of the changing environment. Nevertheless, it seems to be a vicious cycle for many companies. The tough economic environment leads to revenue decline and the cost

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pressure increases, although the sourcing function starts cost-saving initiatives and squeezing suppliers. The bargaining power of the buyer leads to short-term cost pressures on the supplier (Rossetti and Choi, 2005), and the increased pressure leads to higher risk exposure and supplier failure risks (Manuj and Mentzer, 2008), which finally ends in a bankruptcy. On the contrary, the buyer may be in a lock-in position if they have chosen a single-sourcing strategy, allowing the supplier to become dominant (Cousins *et al.*, 2004; Wagner and Bode, 2006). This situation can lead to supply security issues or price increases while the buyer cannot change the supplier in the short-term. Surprisingly, the consideration of risks was mentioned as the third most important factor, and can support the general development in increasing risk environments. To the author's best knowledge, this is the first study where risks have been mentioned as a significant factor in strategic supplier evaluation. Nevertheless, the consideration of risks was already suggested in the 1980s by Kraljic (1983) and Walker (1988). The increasing trend for global sourcing, the complex supply chain or the increasing external risks (Jüttner, 2005; Khan and Burnes, 2007) have caused increased attention to, and consideration of, risks. Given the risks associated with supplier bankruptcies and supply disturbances, companies have started to rethink. This possibly happened through negative experiences, as several interviewees pointed out the change in practices. However, only 45% of the analysed companies have a risk management programme (see Table 4-10). Furthermore, companies see the competitive advantage by applying and considering risks (Clarke and Varma, 1999). Therefore, consideration of risks, specifically strategic risks, is mandatory in strategic sourcing.

The remaining mentioned factors are in line with previous research, although ranked differently (Su *et al.*, 2009; Ho *et al.*, 2010). Consequently, sourcing functions must generally align their objectives and supplier evaluation criteria. If not, they miss their stra-

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tegic fit, act contrary to corporate objectives and increase the strategic and operational risks faced by the company.

4.7.2 Country-specific differences in strategic supplier evaluation criteria

The evaluation of the strategic supplier selection criteria is founded on the analysis presented in Table 4-24.. The top three strategic supplier selection criteria by industry are presented in Table 4-26, and show variances across countries; both consider financials as the most important factor, however, on the 1–15 scale Germany ranks it as most important with 1.5 points, compared with the UK rating of 3.0. It is surprising that the second factor is risk in the UK and specification in Germany, followed by supplier performance. Research by Quayle (2001), Su *et al.* (2009) and Ho *et al.* (2010) presents the importance of different supplier selection criteria. However, the current research found that risk should be considered in the strategic supplier evaluation, which is—to best of the researcher’s knowledge—the first study in which risk has such a dominant role. Chan and Chin (2007) identify the supplier management system as essential and supplier evaluation as an important factor to gain an competitive advantage, while Khan and Pillania (2008) argue that supplier selection and trust is important in ensuring supply chain agility.

UK	DE
1. Financials (3.0)	1. Financials (1.5)
2. Risk (3.1)	2. Specification (1.5)
3. Supplier performance (3.9)	3. Supplier performance (5.0)

Table 4-26: Top three strategic supplier selection criteria by country

Financials, including price (1.5 DE, 3.0 UK), costs, payment terms and pre-payments, is the most important factor in strategic supplier selection. German companies consider it more important than the UK companies, but within the deep analysis no signifi-

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cant deviation could be identified, as companies see price and cost as important factors in their evaluation of whether they are using the best source. The second factor is the suppliers' performance (5.0 DE, 3.9. UK), which is ranked as more important in the UK than Germany because some companies view a good performance as mitigation against risks. UKEL5 provides the thought process behind this: *"So [...] number three was performance of the supplier. If a supplier hasn't got a natural ability to perform at the high end of their markets it would indicate a high level of risk and the ability to be a difficult relationship."* Due to the UK being more concerned about risks, the companies rank supplier performance as more important. The surprising finding in this research is that British companies focus more on risks and rank it higher in the supplier evaluation process. The criterion of risk reaches a scale level of 3.1 on average in British companies, compared with 7.3 in German companies. Considering the findings presented above in relation to risk management, which confirm that British companies face more risks, it is obvious that they would consider risk at an early stage of the strategic supplier evaluation process. This finding is in line with the previous criteria on suppliers' performance, and the results are coherent with the statement that risk management leads to a competitive advantage (see Table 4-9). However, it is surprising given the research into leadership styles by Schneider and Littrell (2003), as following this we would have expected German companies to perform better in the management of risks.

We can see that perception varies most between the two countries on the issue of specification (Spec: specification, product complexity, quality). On average, Germans rank this criterion quite highly with 1.5 points, where UK companies assign it 6.6. It seems that German companies rely more on specification than British companies, hence this finding is in line with the critical success factors, where Germany ranked quality as the most impor-

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tant factor. This finding is also supported by Ho *et al.* (2010), who present a literature review of the most important factors in which quality was ranked first.

The delivery process with lead-times and supply continuity is the fifth most important factor (5.5 DE, 6.1 UK), and provides similar cross-country results. There is no significant deviation in delivery processes between the countries. UKCO2 highlights: “*Two, delivery process, lead times and supply continuity, in terms of the work we do, the program is always vital.*” The companies argue, from their operational point of view, that the delivery process should be aligned with the business needs. This finding also relates to the strategic sourcing objectives, where delivery performance was mentioned by four companies due to the increased volatility in supply security.

4.7.3 Industry-specific differences in strategic supplier evaluation

The evaluation of the strategic supplier selection criteria is founded on the analysis presented in Table 4-27. The challenge in the analysis is the number of companies providing responses, and therefore the scale was adjusted to mean values to better compare the findings by industry. The applied scale for the answers is 1 as the most important factor and 15 for the least important. Furthermore, presents the top three critical success factors, which vary across industries.

Construction	Electronics
1. Financials (2.8)	1. Financials (2.0)
2. Supplier performance (3.0)	2. Specification (4.4)
3. Risk (3.8)	3. Delivery process (4.8)

Table 4-27: Top critical success factors by industry

There are variances across industries in the second and third most important criteria, but both industries consider financials as the most important factor, despite that on the

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scale of 1–15 electronics ranked it with 2.0 points compared with construction's 2.8. The importance of financials is more relevant to electronics, which is surprising considering the above stated ratings. Furthermore, where electronics' second focus is on specification, with a rank of 4.4, the construction sector chooses supplier performance, with a rank of 3.0. Finally, the third factor also differs between industries, with risk (3.8) for construction and delivery process (4.8) for electronics. Considering these results and mean values, the evaluation of the construction criteria provides more rigour with a value of 2.8 to electronics' 3.8.

The major differences in the most important criteria are presented below. Financials (2.8 CO, 2.0 EL), including price, costs, payment terms and pre-payments, is the most important factor in strategic supplier selection. It is ranked more highly by electronics companies than construction companies, which is surprising because construction firms claim to be in a "low margin" business in terms of critical success factors, but ultimately do not rank price highest. Therefore, although the margins are low, the sector focuses on other relevant criteria such as performance or risks. However, the financials are the most relevant strategic sourcing objective, which is also reflected in this selection (see Table 4-4).

The second factor is suppliers' performance (3.0 CO, 5.8 EL), which was ranked higher in construction than in electronics. The construction companies rely more on the suppliers' performance in complex construction work than the electronics companies in their line of work. UKCO3 highlights the situation: *"Performance of the supplier is key to us because we can't deliver perfectly if our team doesn't deliver perfectly. It's a team exercise. And we are actually subletting risk to him by doing it so he's got to be performing."* The electronics sector judges the performance in relation to the operational performance.

The surprising finding in this research is that construction companies rank risk as the third most important factor (3.8 CO, 5.6 EL), which could be related to the high num-

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ber of risks and supplier bankruptcies the sector has faced recently (see Table 4-8). Therefore, companies have become more risk aware and rank the suppliers' creditworthiness as the most important risk factor, followed by quality (see Table 4-13). UKCO3 provides support for ranking risk so highly: *"Risk is the next one. We need to be really balancing risk against reward, and so it's high on our criteria."* Furthermore, UKCO5 states: *"And then number three, of course, is risk. What are the risks in doing strategic sourcing and how are you going to manage those risks to make sure you deliver your business plan."*

The specification, product complexity and quality are ranked as the fourth selection criteria (5.0 CO, 4.4 EL), and there is no significant deviation across industries. Companies rank the specification and quality relatively low when considering that quality is the most important critical success factor (see Table 4-19) and the second ranked critical risk factor (see Table 4-13). This finding is also contrary to Ho *et al.* (2010), who presented a literature review of the most important factors where quality was ranked first.

The delivery process, with lead times and supply continuity, is the fifth most important factor (6.8 CO, 4.8 EL). There is a variance across the two scales, potentially explained by the nature of business and the importance of just-in-time deliveries for a production company. In particular, the supply security issues the electronics industry faced possibly led to the higher rank. While eight companies faced supply security issues (see Table 4-8), supply security was also mentioned as a concern within trends (see Table 4-1) and the increased volatility through customer changes (see Table 4-16) heightened the exposure. Therefore, it is reasonable that the electronics industry rank the factor higher, although the situation could be improved through better supplier integration. DEEL1 focused on the delivery process, which is a vital factor for the business: *"Delivery times, because our market requires short delivery times and we expect these from our suppliers. Supply continuity is obvious, however, the delivery time is important due our reduced stock. This*

reduced stock is combined with the target to avoid an increase in working capital". DEEL2 refers to the delivery process and continuity and ranks it third.

4.8 Future Needs

The interviews and company insights provide a wide range of findings and an answer to the first research objective to trace the trends and identify future needs. Therefore, in this section the major trends are summarised and reflected on in terms of future needs.

First, the identification of major trends and future needs must incorporate the first dimension of trends, specifically that recent developments within companies are dominated by economics and the recession caused by the financial crisis. Supplier partnerships are seen as the second trend affecting companies, while the third trends involves sustainability and green sourcing, which is an emerging trend that will remain relevant in the coming years. Despite these trends, the sourcing function has seen the adjustment of sourcing strategies, financial management and an increasing focus on cost and the upcoming green sourcing emphasis. Companies across industries have increased attention on sustainable sourcing and measuring their carbon footprint. It will continue to be one of the most important areas in strategic sourcing, therefore the future needs can be summarised in the adjustment of sourcing strategies to react to economic developments, intensify supplier partnerships to avoid supply security issues and bankruptcies. Furthermore, the market development and customer perception of sustainability and green sourcing will lead to changes in sourcing practices; new initiatives may be introduced and new suppliers are likely to enter the market. Hence, green sourcing becomes a significant value.

Second, the importance of sourcing functions has increased remarkably, and 90% of companies confirm this increase. The Japanese crisis caused supply shortages and the financial crisis led to supplier bankruptcies, and these situations possibly increased the importance of sourcing functions within companies. Despite this positive trend, it is surpris-

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ing that some companies have still to establish strategic sourcing functions. In this context, the strategic sourcing approach within the construction sector was identified. Two companies used external, remarkable and large consulting firms to drive change and establish strategic sourcing functions. However, these companies are ahead of the industry in general, and the introduction of strategic sourcing departments, especially within the construction sector and smaller electronic companies, is a future need. The application of tools and methods is weak when compared with the range available from academia or consultants. In the end, the companies apply the ABC and Pareto analysis, but there remains a significant need to close the gap between academia and practice. Companies applying strategic sourcing should be able to apply different portfolios, models or tools to manage the supply base. This will continue to increase in importance because the demand to manage suppliers and establish supplier relationship management is increasing.

Third, risk management becomes more relevant as it is driven by overall trends and markets. Currently, every second company applies a risk management programme, and companies that have experienced a risk event believe in gaining a competitive advantage through risk management. The major risks the companies experienced were supply security and supplier bankruptcies. To mitigate such risks the companies named several factors that should be considered in a risk model, the most common being the creditworthiness of the supplier, the quality level and suppliers' capabilities. Risk management tools or the application of a risk-oriented strategic sourcing frame is neither established nor used. Due to increased volatility and changing market environments, the need for a risk-oriented tool is supported.

Fourth, sales and demand planning is gaining importance and companies lack information systems support and sufficient collaboration with sales. Many companies still gather data and forecast manually or through rule of thumb. Demand planning is one es-

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essential element for securing supply and ‘reserving’ capacity in the supplier’s production. In addition, if sufficient planning is established, economies of scale through bundling can be realised. Therefore, there is a need to improve collaboration and planning, and strategic sourcing departments should be able to negotiate on an ex-ante basis instead on purely on past figures. The biggest risk here is being locked in the ‘bullwhip’ effect and supply becoming insecure. Although nobody has a crystal ball to forecast demand exactly, several companies could improve with better demand planning and forecasting with suppliers.

Fifth, the most important critical success factors were determined through interviews and handouts, and identified as required and specified quality, aligning the sourcing strategy with the corporate goals and the supplier management partnerships. Quality is seen as the most important critical success factor in the value chain, which was mentioned by several companies in the open-ended interview section. The alignment of sourcing strategy and corporate goals, and the supplier management criteria, are generally in line with the identified trends and practices.

Sixth, fifteen strategic evaluation criteria were presented for the interviewee to rank the most important. An examination of the responses identified financials/price, supplier performance and potential risks as the most important factors in strategic sourcing. Surprisingly, risk was ranked relatively highly, differing from the existing literature where it viewed as less important. Therefore, this research project will contribute a risk-oriented sourcing framework to cover this future need, particularly if the risk management is assessed using the already-established practices in risk management and the available tools.

4.9 Summary of Findings

This chapter focused on the findings from semi-structured interviews and presented insights into how companies apply strategic sourcing. The methodology considered open

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questions and structured questionnaires (handouts) to increase and ensure construct validity. This chapter met the first three research objectives.

It demonstrates the trends of development in strategic sourcing and predicts future needs (research objective one). It can be concluded that the economic environment has a significant impact on companies' strategies, which are transferred into functional objectives of the sourcing function and changing sourcing strategies. The strategic sourcing role has gained importance, but half of companies continue to disregard it. The practices around risk management are increasing and every second company applies a risk management programme to cope with emerging problems relating to supplier bankruptcies and supply security issues.

Furthermore, this chapter identifies the critical success factors in contemporary strategic sourcing by applying an open question and a structured handout to answer research objective two. The findings show that the dominant factors are quality, alignment of sourcing strategies with corporate goals and supplier management/partnerships. It further identified strategic sourcing evaluation criteria, which are led by price, performance and risk.

Finally, the research evaluated theoretical and practical sourcing models in terms of effectiveness and sustainability to fulfil research objective three. The responses show a weakness in the tool establishment, its proliferation and effectiveness.

5 CHAPTER FIVE - FRAMEWORK DEVELOPMENT

5.1 Introduction

This chapter presents the development of a risk-oriented strategic sourcing framework based on the findings presented in Chapter 4. The main goal is to fulfil the fourth research objective:

Research Objective 4: To develop a strategic sourcing framework or model while considering risk factors. This is based on the validation of contemporary requirements and critical evaluation of the existing state to propose a more effective and sustainable framework with the most relevant determinants.

The interview analysis from Chapter 4 has led to the framework development. Based on the major findings in strategic sourcing across industries and countries, the framework will be simulated with case study findings from this research.

5.2 Strategic Sourcing Across Industries and Countries

The situation across countries and industries in this research project highlighted already significant findings. It seems that although the importance of strategic sourcing was sufficiently supported by the case studies, the maturity level remains nascent. The investigation into six core dimensions of strategic sourcing did not uncover sufficient evidence of strategic sourcing excellence, and there is a gap between what the companies believe is important and the degree of implementation (Chan *et al.*, 2007).

However, this study provides deep insights about companies and their approach to, and set-up of, strategic sourcing. In this context, the research findings identify several weaknesses and misalignments, and a model can be developed to explain the phenomenon.

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First, the interviewees highlighted the emerging trends to the company, which were mainly economic, environmental, a stronger focus on supplier relationship management, increased collaboration and sustainability. These factors were evaluated on a sourcing function level, where sourcing strategy, financials and sustainability were identified as sub-trends to the department. It is arguable that the current economic environment (downturn) has increased the attention paid to costs and financials. Therefore, the sourcing function has to adapt its strategy according to the environment, which is in line with Porter's five forces (Porter, 1980). Furthermore, the sourcing function has to consider the financials, which may increase or require reductions, and adapt the general trends with regards sustainability.

Second, having identified the trends the sourcing function defines objectives that are in line with the sourcing strategy. This research project identified that strategic sourcing objectives cover the issues of price reduction or financials, which are followed by supplier relationship management and adding value to the customer. In this context, a slight misalignment is apparent because sustainability does not form part of the objectives. Although it can be argued that a trend is not necessarily an objective, it is surprising that none of the companies formulated a sustainability objective. One can also argue that the initiatives required to manage sustainability have been already implemented.

Third, the sourcing behaviour in this context, with a tough environment and strong focus on prices, potentially leads to sourcing from alternative, cheap(er) suppliers. One can argue that there is no evidence for such behaviour in sourcing, but it can be assumed that the supplier bankruptcies described in this research are an argument for such evidence. This is also supported by the fact that the companies want to consider suppliers' creditworthiness and quality as critical risk factors.

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Fourth, a further major problem is the supply security issue, which results from reduced industrial capacities (e.g., a disturbance caused by a tsunami), the weak integration and forecasting system and adopting a single-sourcing strategy for uniquely specified components. Therefore, the sourcing departments did not sufficiently collaborate with sales to align or even prevent such problems. This is supported by the fact that the level of integration and collaboration with suppliers is nascent, but the companies did not manage these in the context of supplier relationship management and integration.

Fifth, the structured questionnaire led to data collection of critical success factors and strategic supplier selection criteria. In this context, the majority ranked quality, sourcing strategies aligned with corporate goals and supplier management as the most important critical success factors for the next ten years. However, the findings from the open questions led to margins/costs being the most important factor. This anomaly may be attributable to interviewer bias, however, and the responses to the open questions reflect how the companies currently act.

Sixth, the structured questionnaire regarding strategic supplier selection criteria concluded that companies rank price/financials, performance of the supplier and risk as the most important criteria. Therefore, it can be concluded that the strategic orientation is not aligned and lacks rigour. Companies arguing for quality, yet selecting strategic suppliers according to price/financials, are not aligned. In particular, the profit margin was the fifth most important factor, whereas price was the most important criterion. Furthermore, supplier relationship management and partnership, which was the third most important critical success factor, is matched against the seventh, strategic evaluation criteria.

Therefore, the conclusion of this analysis is the misalignment of objectives and findings within the sourcing dimension. The sourcing function aims for cheap prices to operate in accordance with the objectives, but to find the cheapest supplier the company takes

more risks and possibly trades off the supplier bankruptcy risks vs. the cheap price. The main intention is therefore to manage risks appropriately and according to coherent and aligned objectives in a new framework.

5.3 Risk-oriented Strategic Sourcing Framework (ROSS)

The development of a risk-oriented strategic sourcing (ROSS) framework is essential to this research project and contributes to Research Objective 4. The development is based on the conceptual model being the core element in this research project, and on the findings presented in Chapter 4. The main aim of this model is to allow a practical implementation and support companies in finding the strategic balance and alignment required in risk-oriented strategic sourcing. As the literature review highlights the gap in considering risk management in strategic sourcing (see Chapter 2.3), the risk component must be considered.

The ROSS framework requires several process steps, as presented in Figure 5-1:

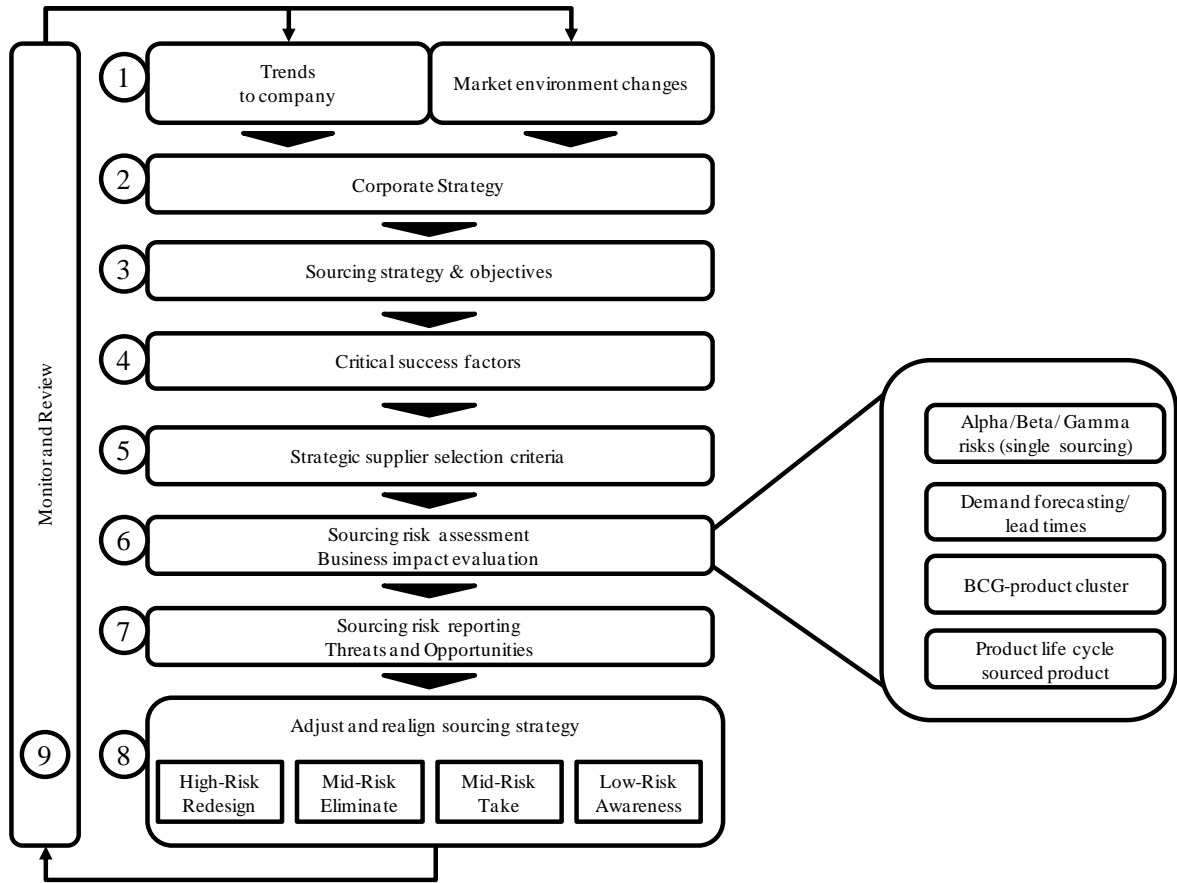


Figure 5-1: Risk-oriented strategic sourcing framework (ROSS)

The starting point in the ROSS framework is the identification and evaluation of certain trends faced by the company on one hand, and economic changes and considerations on the other hand. The specific trends the company could face, and as we have established, include sustainability, supplier partnerships and best people recruitment. Furthermore, the economic situation must be considered. For instance, GDP growth indicates the degree of growth in an economy, which affects employment rates and capacities, and interest rates indicate the level of investment potential specific to capital investments and construction projects. Similarly, commodity prices, for instance for oil or metals, provide a reliable indicator of the current economic situation. Although extremely useful, these indicators should be limited in number.

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The identification of trends, especially the market environments of suppliers, competitors, customer or substitutes, is the starting point of strategy (Porter, 1980). Trends determine sourcing decisions and the adjustment of the sourcing strategy. For instance, Porter (1980) highlights the need to monitor markets and competitors (future goals, current strategy, assumptions, capabilities = competitor's response profile), and several authors identify supplier selection as a future challenge (Chan and Chin, 2007; Freytag and Mikkelsen, 2007; Khan and Pillania, 2008; Su *et al.*, 2009).

In this research project, the dominant trends to companies are economic changes, a stronger focus on supplier partnerships and sustainability aspects, where companies need to adjust the sourcing portfolio (see Chapter 4.2). Based on the general trends to companies, the sourcing function must develop and adjust their sourcing strategies. Consequently, the findings of this thesis present the reaction of sourcing departments, which see the dominant trends in adjusting sourcing strategy, financial management and sustainability. The strong focus on cost management was already identified and supported by Von Corswant and Fredriksson (2002). In addition, companies address this trend of economic downturn with tighter cost management, which is also represented within the supplier evaluation criteria (see Chapter 4.7).

Second, the identified trends are assessed and compared with the corporate strategy to evaluate how intensively they affect the business operation. Furthermore, the company strategy on business operations (stock, working capital) and the production characteristics indicate the strategic approach to suppliers (lean, just-in-time, agile, hybrid). If, for instance, a market downturn is expected, the company will adjust the sales targets or cut budgets. Chan and Chin (2007) highlighted the necessity for visionary leadership and governance, and the alignment of the sourcing practices with the corporate strategy is mandatory (Spekman *et al.*, 1999; Chan *et al.*, 2007; Hartmann *et al.*, 2008), particularly while

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many sourcing functions still work independently from other functions (Moses and Åhlström, 2008). This weakness is a significant risk to the company, as strategy and operations across departments are misaligned and a strategic gap exists. In addition, this research highlights through interview findings and handouts that the alignment of the sourcing strategy with corporate goals is seen as the second most important critical success factor (13 out of 20 companies or 65%; see Table 4-19). Therefore, the process step covering the strategic alignment of corporate and sourcing strategy within the ROSS framework is essential.

Third, based on the corporate strategy, the functional strategy is adjusted and adopted and objectives aligned to the corporate strategy. This research project also indicates the misalignment in strategies, especially when it comes to critical success factors that are not fully in line with the strategic supplier evaluation criteria. The following Table 5-1 presents the misaligned critical success factors of the company with the supplier evaluation criteria (selection of the top five factors):

Rank	Critical Success Factor (see Table 4-19)	Supplier Evaluation Criteria (see Table 4-24)
1	Quality	Price, costs, finance
2	Sourcing strategies are aligned with corporate goals	Performance of the supplier
3	Supplier management/partnerships	Risk
4	Continuous improvement	Specification, product complexity, quality
5	Profit margin	Delivery process with lead-times and supply continuity

Table 5-1: Misalignment in critical success factors and supplier evaluation

Fourth, the critical success factors that drive and support the corporate and sourcing strategy are considered. For instance, if the corporate strategy requires an increase in supplier relationship management to avoid bankruptcies, this will be the relevant critical success factor. Research by Chan and Chin (2007), Chan *et al.* (2007) and Su *et al.* (2009) highlights the importance of strategic sourcing to influence competitive advantage or drive business performance. Specifically, the supplier selection and partnerships are important (Narasimhan and Das, 1999; Kocabasoglu and Suresh, 2006; Khan and Pillania, 2008). In addition, Khan and Pillania (2008) justify the importance of strategic sourcing and supply chain agility to organisational performance. This research project shows partially contrary findings between the strategic fit in critical success factors and the supplier evaluation criteria presented in Table 5-1. However, one can criticise that the interviewee audience is limited to a sourcing view only, and additional research across other functions is necessary.

Fifth, based on the previous adjustments and new strategic set-up, the strategic supplier selection criteria must be aligned. This step is central in strategic sourcing and can lead to several conflicts. This research project has identified the five most common factors in strategic supplier evaluation:

1. Price, costs, finance
2. Performance of the supplier
3. Risk
4. Specification, product complexity, quality
5. Delivery process with lead-times and supply continuity

The review by Ho *et al.* (2010) presents the most important supplier selection criteria, where the top five are: quality, delivery, price/costs, manufacturing capabilities and service. In addition, Su *et al.* (2009) highlights product cost, product quality, delivery de-

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pendability and delivery speed as important criteria in supplier selection. Considering the research findings from this project, there is a high degree of consistency with the literature, although the prioritisation differs. The most interesting finding is the relatively high consideration of risks in strategic sourcing, which possibly results from the changed and highly risk-conscious environment. Next, and most important, is the identified gap with regards the strategic alignment with critical success factors. For example, profit and total of cost of ownership were mentioned as the fifth and eight critical success factors respectively. Therefore, this gap bears significant risks to the interviewed companies. If the critical success factor relies on quality, the most important supplier evaluation criteria ought to have mentioned “quality” as the first criterion. Instead, product specification and quality were given as the fourth criterion (see Table 5-1). Although this comparison is obvious, for some companies it is a given factor: *"Quality is a given, but the key topic. If you buy cheap, but you do not have quality, you will destroy your brand"* (DEEL5).

The problem results from a misalignment in the factors; that if a company wants to position itself as a quality leader and applies a differentiation strategy (Porter, 1980), the supplier selected based on a cheapest price can apply a cost leadership strategy (Porter, 1980), which can be contrary to the corporate strategy of the buyer. In addition, the findings from this research project further underline the importance of considering risks in strategic sourcing. In analysing previous studies, it is clear several companies do not consider risks or lack an implemented risk management (Zsidisin *et al.*, 2000; Blackhurst *et al.*, 2005; Jüttner, 2005). This research has identified the following most important critical risk factors (see Table 4-13): supplier creditworthiness, quality, supplier capabilities, supply continuity and price. Consequently, long-range decisions should imply risks (Baird and Thomas, 1985).

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Sixth, after defining the supply selection criteria, a risk assessment of the sourcing spend is necessary, with the business impact evaluation key to this. Many companies lack the appropriate transparency at this step, meaning it is necessary to consider the following dimension, which can lead to a high- or low-risk profile. Nine companies faced serious risk events in 2010/2011, having had problems with supplier bankruptcies and supply security issues. Of the nine, seven argue that a risk management plan has an impact on competitive advantage. The main question is therefore, how can risk be considered in a long-term strategic supplier evaluation? While the interviewees' responses focused very much on operational and tactical risks, the question in this project is how to address and consider them from a strategic perspective. In this context, the sourcing function must know and understand the implied strategic risk exposure with certain suppliers if they were to go bankrupt or a supply disruption occurs. While bankruptcy is unpredictable, it is important to have knowledge of the impact and possible mitigation actions. Two companies highlight the situation:

“Administration, companies going to the board. We had one last year, just completely came out of the blue. None of our risk analysis picked it up. Significant supplier and just went into administration” (UKCO1).

“We did in terms of supplier [...] a lot of suppliers who went into receivership, [...] because that is so difficult to predict, it has just been managed on sort of project by project, supplier by supplier” (UKCO2).

Specifically, to address the problems resulting from supplier bankruptcies this project considered the analytical approach to understand the risk exposure by classifying the total sourcing spend into alpha, beta and gamma risks. In addition, this helped identify the cash-flow impact to the organisation and understand the product life cycle in the supply market.

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The execution of a risk assessment is in line with the AIRMIC standards (AIRMIC, 2002), where in a first stage the risks need to be assessed. While the sourcing spend is typically covering certain areas and multiple parts or a service cluster, a prioritisation is necessary. For this purpose, the ABC analysis or even the Pareto rule (80:20) can be applied to identify the most important areas.

Risk identification is an essential process because companies must understand their exposure (AIRMIC, 2002). For this purpose, the following method, consisting of a portfolio and a monetary approach, is proposed. The base for this approach is a quantitative risk process (Khan and Burnes, 2007), and the monetary approach focuses on the spending of a company in a year and evaluates that spending according to the following cluster:

Alpha-Risk	Sum of total spending on part level with single sourcing/single specification x revenue growth or decline factor p.a.
Beta-Risk	Sum of total spending on part level with dual sourcing/single specification x revenue growth or decline factor p.a.
Gamma-Risk	Sum of total spending on part level for the remaining spend

If taking the example of an unexpected supplier bankruptcy, the likelihood is difficult to measure. Therefore, to avoid bias, such as the positive judgement of the sourcing responsible, the herein defined cluster will highlight the transparency in risk exposure. The focus on, and consideration of, single sourcing is claimed by several authors to be a significant risk (Chopra and Sodhi, 2004; Sinha *et al.*, 2004; Schoenherr *et al.*, 2008; Tang and Musa, 2011)

The interview findings highlighted the need for, and weakness in, the collaboration of planning and information exchange with suppliers, and the possibility of the bullwhip

effect is relatively high. The demand risks within the supply chain is a critical dimension that the sourcing function must manage (Chopra and Sodhi, 2004; Hallikas *et al.*, 2004; Tang, 2006; Wagner and Bode, 2006). If the sourcing function does not have the relevant data due to weak internal collaboration or systems, it can simply mitigate this problem through better collaboration and information exchange. Within the supplier relationship management the information sharing and exchange with suppliers is essential (Spekman *et al.*, 1999; Wagner *et al.*, 2005). Therefore, in line with the findings from Driedonks *et al.* (2010) or Oke and Kach (2012), this research underlines the necessity for cross-functional collaboration, and the supplier integration and exchange was identified as a critical success factor (Spekman *et al.*, 1999; Chan and Chin, 2007).

Furthermore, to evaluate the risks in accordance with the strategic impact of the products, and strategic market positioning contributing a significant margin, a new portfolio approach is suggested to manage strategic sourcing and consider risks appropriately, which is aligned to Kraljic (1983). Figure 5-2 depicts two dimensions, with one representing the Boston Consulting Group (BCG) growth-share matrix (Grant, 2005) and the other representing the degree of sourcing strategies. The market positioning and market share of the product is essential in the supply considerations. Many firms lack internal collaboration with the sales functions, and therefore lack knowledge of the most important products sold or those that contribute the best margins. This is especially relevant if a key supplier fails or delivers insufficient quality, directly affecting a cash-cow product. This is not only the case for brand reputation but also a high liquidity risk to the company. Many companies establish a single-sourcing strategy with a unique and exclusive specification, which are used for example as a design type for many applications. When that supplier has a major delivery problem, the cash-flow products are influenced, goods are not produced, revenues

cannot be generated and the liquidity will drop. Therefore, it is essential to know and map the single-sourcing product in accordance with the BCG matrix products.

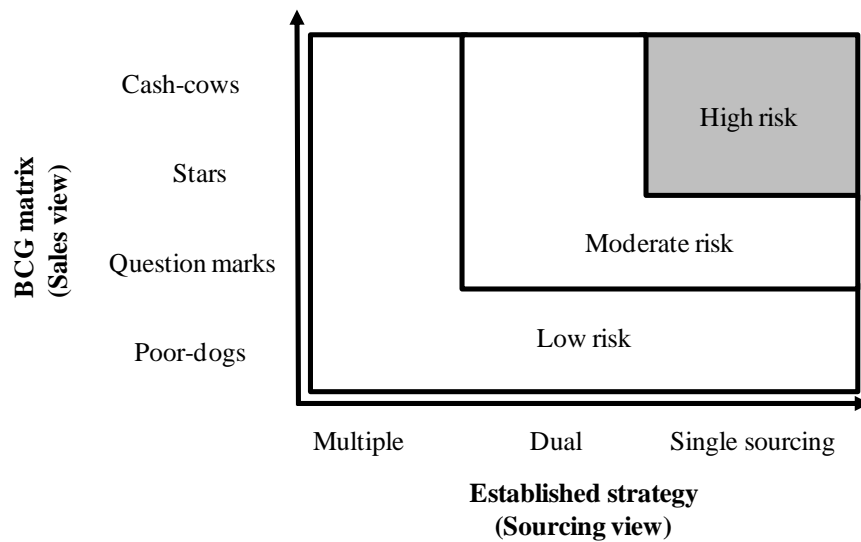


Figure 5-2: Risk portfolio based on sourcing strategy

This research has identified supplier bankruptcy, product quality and supplier capabilities as the critical risks factors. If the supplier goes bankrupt, or has supply security issues, the company can no longer produce the cash-cow products. This will affect the cash-flow because the company faces problems in gaining a contribution margin. Despite these potential problems, the product brand and delivery times are crucial. Therefore, this portfolio suggests identifying the risk potential and establishing at least dual-sourcing strategies for cash-cow and star products. Supply chain risks can damage sales, increase costs or have a significant impact on cash-flows (Chopra and Sodhi, 2004; Monczka *et al.*, 2011). The failure of a supplier not only causes operational problems, but also risks brand reputation (Clarke and Varma, 1999) or even a company's survival (Baird and Thomas, 1985). Furthermore, it can damage shareholder value (Monczka *et al.*, 2011). The empowerment of

the sourcing function through this portfolio means monetary risk exposure will be clearly visible.

Another emerging problem is the short life cycles of sourced products, especially if focusing on electronics parts or equipment. A die cast product can have a lifetime of 20 years or more, and spare parts produced without a problem. However, if we consider electronic components, a mobile phone has an expected lifetime of two years or less, and this is especially relevant when considering spare parts. Therefore, the companies need to consider the risk of product life cycle and end-of-life products. In particular, the company must have substitutes or alternative designs prepared for when a product reaches the end of life.

The model development for product life cycle based sourcing risk management is presented in Figure 5-3. It is partially based on the idea from Welch and Nayak (1992), together with the product life cycle (Grant, 2005), and encourages companies to focus on the replenishment of such electronic products. If, for example, a company is producing specific electronic parts and using specific capacitors, they must ensure during the production time and the life cycle that the related specification is not dependent on a single supplier or technical specification. The example can be related to a capacitor that has been on the market for a year and is now moving into the decline phase. When a single-sourcing strategy is established, and no substitute or alternative products approved, the company is running into high risk (Chopra and Sodhi, 2004; Blackhurst *et al.*, 2005; Tummala and Schoenherr, 2011). This risk is even higher if the situation involves custom-made products.

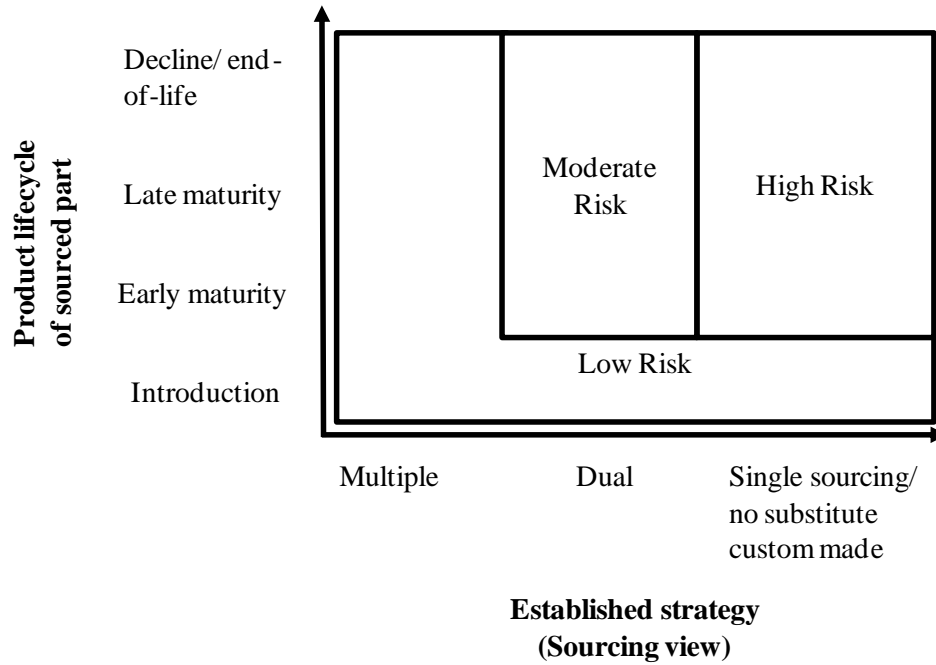


Figure 5-3: Product life cycle based on sourcing risk management

Seventh, the risk evaluation and assessments will be consolidated in a sourcing risk report, including the highest risks, opportunities and threats (AIRMIC, 2002; Harland *et al.*, 2003). Tummala and Schoenherr (2011) suggest classifying the outcome into acceptable, unacceptable and tolerable risks, while the involvement of relevant stakeholders is important, in addition to cross-functions (AIRMIC, 2002).

Eighth, the sourcing strategy adjustment and realignment is necessary and covers some strategic options. If the risks are identified and assessed, the ‘high-risk redesign’ category could focus on the most important products with the highest risks (Harland *et al.*, 2003; Blackhurst *et al.*, 2005; Tummala and Schoenherr, 2011). If, for instance, one design type has been approved so far, a new approval and qualification process should begin to allow for a second source. The next category, ‘mid-risk eliminate’, reflects medium-priority risks that, although can be mitigated, in the mid-term should be eliminated. This can mean, for example, that a new tool and a second supplier must be evaluated and se-

lected. In addition, the next group, 'mid-risk take' covers those parts and services where the company is aware of the risks and their impact but does not initiate action to mitigate them. Such a strategy can be implemented for own products that are going to be out of life or in the decline phase. The final category covers 'low-risk awareness', where for instance dual-supply strategies are established or substitute products approved, with the main objective of managing awareness.

Ninth, the final step in this framework considers constant monitoring and reviews, especially because the parameters and trends change along with the risks (AIRMIC, 2002; Harland *et al.*, 2003; Tummala and Schoenherr, 2011). In this research project, companies already monitor suppliers on a monthly basis through financial reports from Dun & Bradstreet. The monitoring also considers dedicated key performance indicators.

5.4 Application of the Risk-oriented Strategic Sourcing Framework

The application of the ROSS at DEEL2 will highlight how the model operates and whether it adds further value to the practice. Although it was not tested in practice, the interview findings and discussion allow for the computation of key findings and coherence. The majority of the findings presented in the model relate to the stated arguments and especially the herein coded variables, Figure 5-4 and Figure 5-5 summarise the findings. It is important to highlight that, although the corporate strategy and sourcing strategy were not the subject of this study, the information was gathered from publically available company information. Therefore, the analysis is based on that information and statements. This can cause bias, because the company might be operating internally to different objectives. However, this information can be used and presented in the risk-oriented framework.

First, the trends to the company and to the department were highlighted. The economic trends were briefly presented, but can be extended through further analysis such as considering which other industry's or company's development can be linked to identify

future trends. This model also shows that the mentioned trends are not directly aligned. One can argue that although during an interview not all statements are logically coherent, the major developments and values should be reflected over the course of the entire interview. For instance, if the company aims to be a quality leader, the values should be in line with that goal.

Second, the strategic element was gathered from public information. The surprising finding here is the misalignment of trends, where innovation, technology or supplier integration in development processes is not covered. Furthermore, the strategy already indicates a wide product range with potentially low quantities, high tooling costs and increased product model complexity.

Third, the sourcing strategy defined transactional and basic objectives that are significantly affected by the external environment and identified trends. However, the sourcing strategy seems to be well aligned with the corporate strategy.

Fourth, the critical success factors were established at the beginning of the interview through an open question and by using a structured handout at the end. In general, it can be concluded that the basic values and objectives regarding critical success factors are consistent. However, innovation is not considered appropriately, the global sourcing process is mentioned (although the company sees negative experiences as a trend) and finally the cost efficiency is reflected by TCO and profit not considered.

Fifth, the most interesting finding reveals the deviation between the beliefs and the actual implementation. Therefore, the interviewee behaves differently when it comes to the strategic supplier selection and the importance of rankings. Although some of the selection criteria are coherent, some offer room for improvement. For instance, specification/quality ranked relatively highly and in line with the corporate and sourcing strategy. However, the interviewee did not select quality as a critical success factor, which indicates a misalign-

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ment. The opposite is the case for supplier relationship management, which is part of the strategy and trends and a critical success factor but has low importance in the selection criteria. Furthermore, financials/price is the second important factor, despite the company's strategy of technological leadership, where price plays a minor role. The innovation and bargaining power of suppliers is also not considered appropriately.

Sixth, the risk assessment and business impact step can only be founded on the little information gleaned during the interview. The company had a serious risk event in 2010/2011 that influenced their business operations (see Table 4-7), meaning DEEL2 coped with much-increased lead times due to allocation problems. Furthermore, the risk factors of supplier creditworthiness, quality and supply capabilities were identified (see Table 4-13). There is some information lacking for the presentation of a holistic risk evaluation, but two examples illustrate the impact. The company has several products reliant on a single-sourcing strategy where it faced supply shortages and significant disturbances. *"Due to high approval and testing costs we had only one resin supplier"* (DEEL2). Furthermore, the company had only one exclusive specification for electronic components and worked exclusively with one design specification, which led to a single-sourcing situation where the bargaining power of the supplier increased significantly. These designs were used for multiple products, and it is assumed by the researcher that several products were affected (cash-cows, question marks, stars, etc.). Through a *force majeure* a production site was affected, delivery times increased and the company faced significant supply shortages. Therefore, when reflecting on this, the company is able to identify the risk exposure based on the annual spend on sourced categories and its strategic position within the company. However, there is a misalignment in critical risk factors and occurred risks. In this context, the company did not have a bankruptcy problem or a quality issue; instead, it had internally caused problems in single-supplier strategies, single specifications and weak

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demand planning systems. Although the company has a central strategy reporting to the CFO, use their ERP to create reports and have dedicated supplier approval processes, certain risks were undiscovered. One reason is the weak collaboration across functions and the highly volatile production environment with manual forecasting (see Table 4-15). The company is still working on the automatic ERP-based forecasting tool, which increases the collaboration or at least collects data from sales.

Seventh, based on the previous evaluation of the risks, the CPO would be able to create a report with the risk exposure, the occurring threats and opportunities linked to the trends and economic developments. The company already applies a risk management programme, but no details were given about its content. In addition, the company already applies the Kraljic (1983) matrix and has identified critical parts. However, the sourcing function does not collaborate with sales and does not know what cash-flow or monetary contribution effects the risks may cause. In this context, the problem can be put down to the availability of resources, because a strategic sourcing function is not yet established and it is carried out partially by the buyers.

Eighth, the adjustment and realignment of the sourcing is a necessary step to determine the strategies in accordance to the risk. High-risk profiles, such as the case with the designs, immediately require a redesign of the current strategy and specification. To avoid the failure of cash-cows and stars, a dual-sourcing strategy would be beneficial. This risk category considers the highest risk exposure in monetary terms, which is linked to single sourcing, single specification, supply shortages/volatility or other criteria that mean the company cannot escape from a lock-in situation on a short-term basis. DEEL2 already claim to have applied the “high-risk redesign” strategy by initiating another dual source and dual specification. In addition, the company underlines gaining a competitive advantage through risk management: *"Well, we have now won new clients where we have not*

been price attractive in the past. Similarly, new competitors entered the market, which could not supply in the past."

Ninth, although the company has an established risk management programme (see Table 4-10), it is surprising that these sourcing risks are not monitored regularly. The IT system for risk management predominately covers financial risks, for which the finance department is responsible. It is therefore necessary for the total risk exposure to be identified and quantified.

In summary, the risk-oriented strategic sourcing framework is a new model to support companies in aligning their strategies with trends, corporate and sourcing strategies and critical success factors. It offers a new methodology with which to evaluate the risk exposure relating to lock-in situations, and the simulated implementation supports the model.

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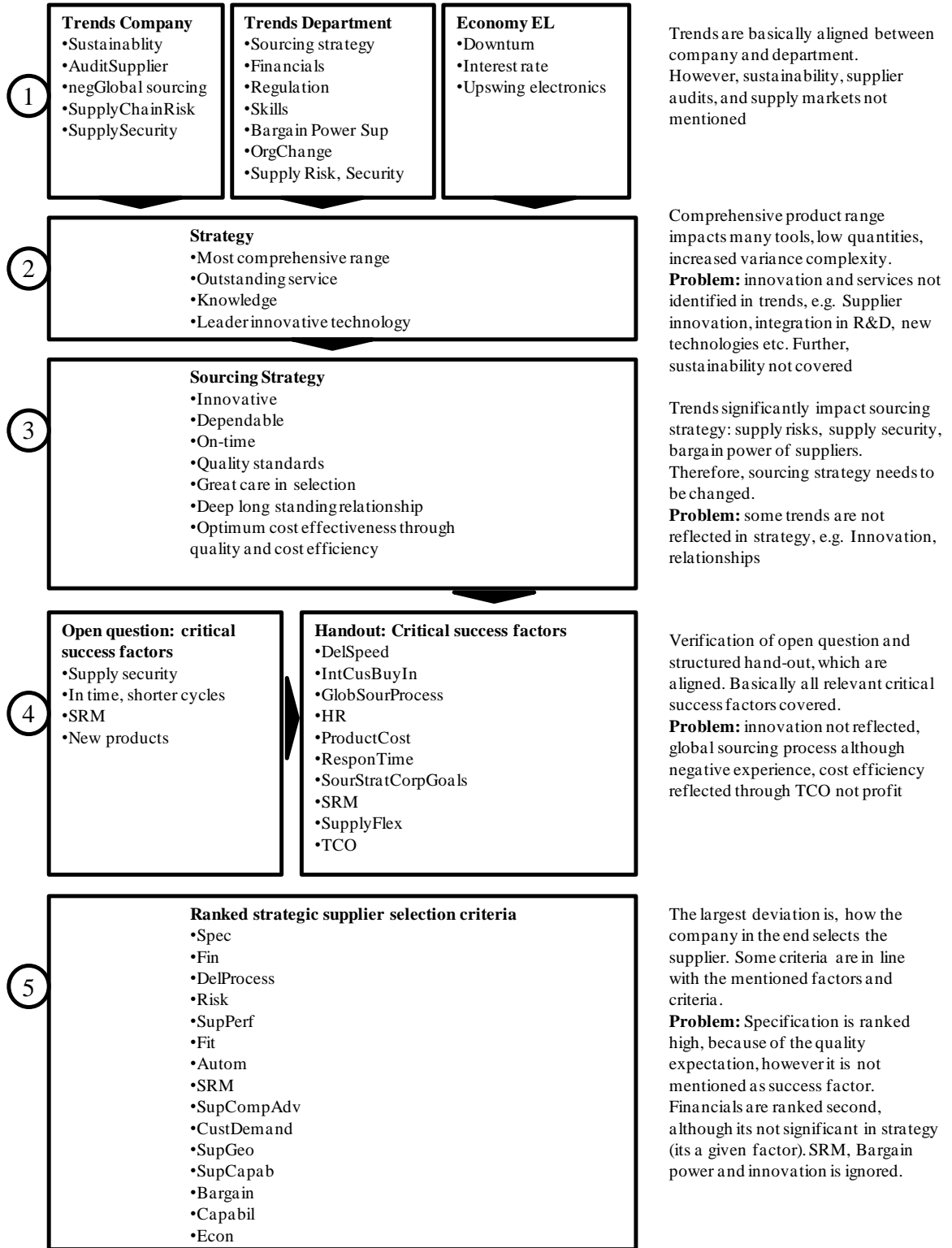


Figure 5-4: Implementation of ROSS - I

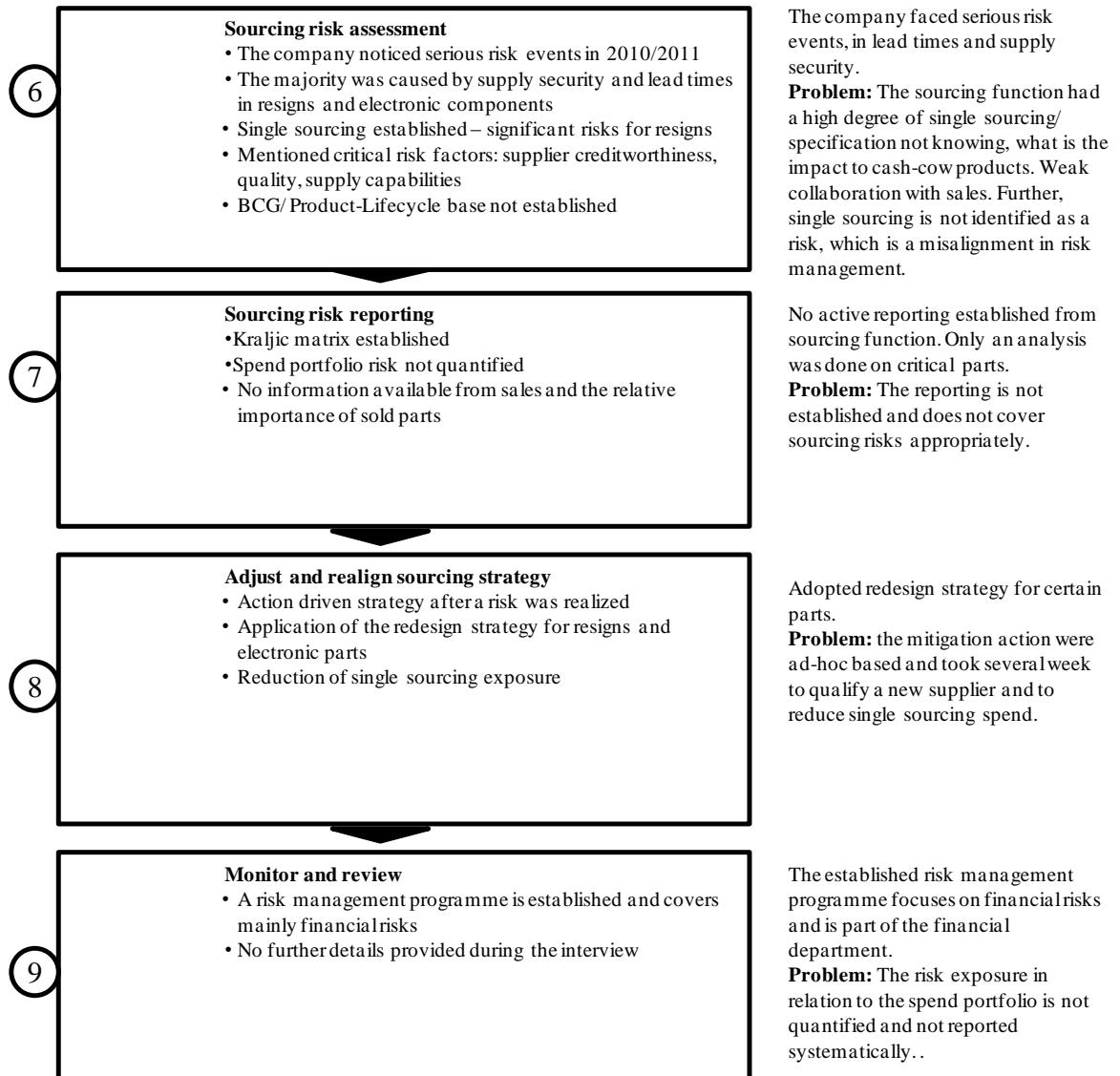


Figure 5-5: Implementation of ROSS - II

5.5 Summary

This chapter focused on the development and application of the ROSS framework, thus fulfilling the fourth research objective to develop a strategic sourcing framework or model while considering risk factors. The ROSS framework was introduced and presented, and although it could not be tested in practice, the application with one company offers additional understanding and further strengthens its validity. Furthermore, two risk-oriented

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portfolios covering the product life cycle and the BCG matrix were developed and presented. The application of the framework with DEEL2 presents the advantages in identifying alignment problems and considers risks in strategic sourcing.

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6.1 Distinctive Achievements

This qualitative research project studied twenty companies in two industries and two countries to provide detailed analysis of the strategic sourcing discipline. In particular, it fills a significant knowledge gap in understanding strategic sourcing practices in the construction sector, a gap identified after a literature review of articles from 1998-2012 (see Chapter 2.4 and 2.5). Furthermore, it evaluates and explores a recent development within the electronics industry, where supply shortages caused by a bullwhip effect and the Japanese tsunami led to significant disturbances in the supply chain. The financial crisis further fuelled problems within the supply chain and the European recession led to several supplier bankruptcies, which represents the other major influence on the companies' behaviour. Although companies became more risk aware, they are still lacking integration in supply and demand management in coping with risks and volatility caused by the market environment. In addition, the findings show that companies have weaknesses in adopting strategic sourcing methods and tools, which is another indicator of the gap between academia and practice.

In general, this research projects builds the findings, analysis and conclusion on:

- Cross-case displays: cross-country findings, cross-industry findings, cross-case findings
- Within-case displays: within-country findings, within-industry findings

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Finally, this research project has fulfilled four research objectives and contributed to the body of knowledge and to practice. The central research question of “**How do companies apply risk management in strategic sourcing?**” has been answered by analysing six research dimensions in accordance with the conceptual framework and by fulfilling the four research objectives.

6.1.1 Objective one: trace the trend in strategic sourcing

The first objective is to trace the trend of development in strategic sourcing, with the goal to verify the changes and trends to predict future business needs.

The analysis and findings show the different perspectives of the companies and where the recent trends are relevant to the company focus on economic development, the supplier relationship management, sustainable development, supplier audits and the negative impact of global sourcing or risks. These trends affect the sourcing department, where the interviewees see different trends as relevant to their department. In this context, the major trends drive the change and adoption of sourcing strategies, the realisation of savings and cost management, sustainable sourcing, the increasing difficulty of recruiting the best people and changing the supply markets. In addition, the analysis shows that the sourcing department is aware of the market environment and economic changes and reacts appropriately by identifying the trends relevant to the sourcing function and transferring them into sourcing objectives. The dominant trends in the UK relate to sustainability, a stronger focus on customer requirements and increased regulation. German companies focus on sourcing strategies, financials and recruiting the best people. The sourcing departments in the construction sector concentrate more on sustainable developments than the electronics sector, where the financial perspective dominates. Furthermore, construction companies focus more on the best people and recruiting talent than their counterparts in the electronics

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industry, which is more concerned about supply security and the increasing bargaining power of suppliers.

Theoretical and practical sourcing models were analysed together with the current state of strategic sourcing. Although strategic sourcing has gained in importance within companies, further development is required and the sourcing function needs to develop strategic capabilities. The development of the strategic sourcing approach is particularly weak in the construction sector. The cost and savings perspective is still dominant, and it remains a future trend to manage costs and remain competitive, especially if countries such as the UK and Germany are to compete with 'low-cost' countries. The application of tools and methods is clearly below best practice when compared with the range of tools and methods available from academia or consulting firms. In the end, the companies apply the ABC and Pareto analysis, but there is a significant need to close the gap between academia and practice; companies applying strategic sourcing should be able to utilise different portfolios, models or tools to manage the supply base. This will take on greater importance because the demand to manage suppliers and establish a supplier relationship management is increasing. Companies in both countries use ABC and Pareto analysis and portfolio techniques. However, the significant difference relates to risk management and performance management, which is dominated by UK companies, while German companies focus additionally on spend management. The deviation on an industry level is dominated by demand planning and spend management, which is mainly applied by the electronics industry. Both industries apply ABC, Pareto and portfolio techniques.

Risk management will form part of the strategic sourcing practice, and every second company has an example of a risk management programme. Nine companies experienced a serious risk event during 2010/2011 that had an impact on business. When companies were affected by a risk, they believe they earned a competitive advantage by being

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adequately prepared, and UK companies apply risk management practices more frequently. Where German companies faced problems in supply security - a clear phenomenon in the electronics industry - UK companies had problems with supplier bankruptcies. Furthermore, respondents identified a range of risk factors, which should be considered within a suitable framework. Risk management is seen as a future need in strategic sourcing; however, as opposed to what we see in the literature, the applied factors in practice are reduced down to the most essential.

The collaboration in supply and demand management is insufficient and mainly carried out manually, and thus requires improvement in the future. Companies face several problems in forecasting and detailed demand planning, which leads to risk exposure and volatility. In a worst case scenario, this causes a bullwhip effect and supply security issues. Market environments are volatile and it is expected that this volatility will increase over the coming years. Companies have reduced working capital, have limited stock and operate on a just-in-time model, and this situation leads to several issues and potential risks if the supply chain faces significant disturbances. Companies need to be aware of such problems as they directly lead to cost and delivery issues, which are critical success factors for many companies. On a country level, no significant changes were noted despite the significant impact of demand changes on German companies. Specifically, electronic companies see demand changes as significant problems leading to higher volatility; however, the forecasting is not well-established and the process still relies on manual work. Although this phenomenon is primarily relevant to the electronics industry, this research shows that the construction sector shares the project pipeline but lacks standardisation and bundling potential.

The evaluation of the most critical success factors across industries and countries highlights the importance of quality, the alignment of sourcing strategy and corporate goals and supplier management. For many companies, quality is seen as a prerequisite, and many

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believe that it will remain a critical factor in the future, especially given recent product recalls. Furthermore, maintaining quality is particularly essential for European ‘high-cost’ countries. These research findings also reflect the trend that supports the alignment of sourcing strategies with corporate goals. Through the increase in importance of the sourcing function, strategic alignment with the corporate goals for quality has become vital.

The identification of the most important strategic sourcing evaluation criteria leads to new findings, with the most important criteria noted as financials/price, supplier performance and potential risks. Surprisingly, risk was determined to be of relatively high importance, and this differs from the literature where it was ranked lower. Reflecting the country perspective highlights a difference in these selection criteria. Both German and UK companies rank financials/price criteria as the most important driving factor. However, German companies focus more on specification where UK companies tend to focus on potential risks as the second most important factor. The third factor is supplier performance, which is relevant to both countries. Construction companies focus on financials, supplier performance and potential risks, while electronics companies also view financials as the dominant factor, but then focus on specification and delivery performance.

6.1.2 Objective two: identify critical success factors

The second research objective identifies the critical success factors in contemporary strategic sourcing, especially in holistic supply and demand management, combined with external factors related to markets and economies.

The evaluation of the critical success factors was performed using open and structured handout questions. In the open questions, the interviewees highlighted profit margin/costs, the competitive market approach of the company, the differentiation in products and construction projects, company performance and added customer value as the most important factors. In comparison, the findings from the structured handout highlight qual-

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ity, the alignment of sourcing strategies with corporate goals, supplier management/partnerships, continuous improvement and profit margin/costs as the most important factors. It can be concluded that main objectives of strategic sourcing are the alignment with corporate goals and the establishment and management of the supplier relationships or partnerships. Furthermore, the target is a continuous improvement within the relationship and the management of the financial situation through considering price or margin.

The evaluation of the factors by country shows the UK companies' focus on continuous improvement, delivery dependency, product cost, profit and quality (listing highest to lowest). Meanwhile, German companies consider quality, human resources, aligning sourcing strategy and corporate goals, supplier relationship management and total cost of ownership as important factors (listing highest to lowest).

The industrial perspective also highlights differences, but quality is identified as the most important factor in both industries. Construction companies see supplier relationship management and profit as relevant factors, where electronics companies consider sourcing strategy alignment with corporate goals and supply flexibility.

In summary, it can be concluded that there are differences between the countries that directly influence the strategic sourcing methodologies and the different justifications for the business approach. In addition, companies' perceptions of critical success factors vary by industry. Therefore, based on this qualitative research project, it can be concluded that the participants believe in a range of critical success factors, depending on their industry.

6.1.3 Objective three: evaluate theoretical and practical sourcing models

The third objective is to evaluate theoretical and practical sourcing models in terms of effectiveness and sustainability.

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The importance of the strategic sourcing function has increased in recent years, but it is not established in every company. The application of theoretical and practical sourcing models was provided on one hand by the literature review and on the other by the interviewees and case studies offering insights into real practice. The application of tools and methods is weak, as the companies simply apply fundamental ABC and Pareto analysis and portfolio techniques. Some companies use risk management tools to better manage their risks, but this process varies across industries and we find different proficiency levels. In general, the interviews showed that the importance of risk management will increase and that risks represent an important criterion in strategic supplier evaluation. Furthermore, the management of supplier relationships emerged as a trend and critical success factor, but companies lack the relevant tools to manage appropriately, partially because few companies consider performance management as a tool to manage the relationship.

Finally, although the companies apply the tools in practice, only a small number of them find this relevant to their industrial sector.

6.1.4 Objective four: develop strategic sourcing framework

The fourth and final objective is to develop a strategic sourcing framework or model while considering risk factors. This is based on the validation of contemporary requirements and critical evaluation of the existing state to propose a more effective and sustainable framework including the most relevant determinants.

The risk-oriented strategic sourcing framework is a new model to support companies in aligning their strategies with regards trends, corporate and sourcing strategies and critical success factors, and it offers a new methodology to evaluate the risk exposure focusing on lock-in situations in sourcing. The model begins with an evaluation of trends and market environments, and leads to the corporate and sourcing strategy objectives. In the next step, the critical success factors are determined and based on the predefined strategies

the strategic supplier selection criteria are defined. The risk assessment should allow for evaluation of the risk exposure, which is based on the annual spending of single parts. The risk reporting leads to the adjustment and realignment of the strategy, finally followed by the monitoring and review.

Although the framework could not be tested in practice, the application with one company offers additional understanding and further strengthens its validity.

6.2 Academic Contributions

There are several facets to the contribution of this research project. One is to trace and present trends in strategic sourcing over the past decade. Second, this research evaluated the application of theoretical and practical sourcing models in practice, and identified the continuing gap between academia and practice when it comes to models and portfolios. The companies do not fully utilise the academic knowledge, possibly because of its complexity; where for instance one academic paper covers over fifteen risk factors in a framework (Sinha *et al.*, 2004; Schoenherr *et al.*, 2008), the practitioners would limit the critical risk factors to three (creditworthiness, quality, supplier capabilities).

Third, the risk management practices in strategic sourcing were identified, and these present the importance and relevancy of risk management in contemporary strategic sourcing.

Fourth, the collaboration involving planning and forecasting with the sales department is a weakness and poorly established, and this research project contributes new findings relating to collaboration and planning practices. Supply and demand management is mainly relevant to the electronics industry, but the construction sector takes only limited advantage of supply consolidation or standardisation.

Fifth, critical success factors in contemporary strategic sourcing were identified through the subjective lenses of the interviewees. Although these findings are too limited

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to be generalised, and lack further implementation proof, it can be stated that they support an industry-specific critical success factor view.

Sixth, this research project is the first (to the knowledge of the researcher) to specifically evaluate strategic supplier selection criteria. The findings show that despite the strategic corporate goals, the dominant factor is price, followed by the performance of the supplier and risks, which represented a new and surprising finding.

In accordance with the knowledge gaps identified in Chapter 2.5, this research project's primary contributions are:

- The consideration of two countries highlights differences in the adoption of, and behaviour in, strategic sourcing, and the risk perception. The consideration and focus on Germany and United Kingdom extends knowledge.
- New research targeting the construction sector and the electronics sector. Specifically, the new findings from construction sector.
- Assessment of the impact of risk management and its current state in strategic sourcing, especially in highly volatile environments. Contribution of the risk-oriented strategic sourcing framework.
- Identification of strategic sourcing supplier evaluation criteria.

6.3 Contributions to Industries

In addition to the academic contribution, practitioners and industries will obtain new insights into strategic sourcing practices, critical success factors and strategic supplier selection criteria in contemporary strategic sourcing. The assessment of two countries highlights differences in the adoption of sourcing methods and identifies cultural differences between two leading world economies. The research findings show how companies

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in these countries act and apply strategic sourcing, and whether critical success factors are implemented consistently or variably across countries.

The main contribution to the companies is the presentation of strategic sourcing supplier selection evaluation criteria and the critical success factors relevant to the industry and country. Furthermore, it is possible to identify how companies act in strategic sourcing, and specifically which methods and practices are relevant within the analysed dimensions of trends, strategic sourcing methods, risk management and supply and demand management. Companies currently have significant weaknesses in the areas of risk management, strategic sourcing methods and supply and demand management.

In addition, the comparison of the electronic manufacturing and construction sector identifies differences in the sourcing behaviour and risk perception due to the different business natures. Research in the construction area is limited, and this research provides required evidence of how companies behave in strategic sourcing. Recent risk events allow for the discussion of real experience and a deep exploration of the impact on the companies.

Finally, a risk-oriented strategic sourcing framework, based on the interview findings, has been developed for adoption in practice. The findings allow companies to assess their methods and realign their processes based on the project's findings to add further value or increase their competitive advantage.

6.4 Limitations of Research

6.4.1 Limitations of the research methodology

A qualitative research project has its critics and raises doubts that need to be highlighted. It can be claimed—as always in qualitative design—that findings cannot be generalised and the method is anecdotal, lacks rigour and biased. It starts with the simple coding of interviews by the researcher, the interpretation and then the analysis of the findings. It can be claimed that the interpretation of findings, coding and the development of frameworks are also dependent on the researcher's experiences and individual skills. The major claim against the findings is typically based on personal biases and peculiarity, which is particularly the case if the project and interviews are analysed by one researcher only.

The researcher tried to highlight and present sufficient evidence of the validity in this research by providing citations and an appropriate research design. However, there is always a risk of interviewee/interviewer bias, which cannot be excluded. The researcher has to believe in the interviewees' responses and the design of the project that the findings are validated with different questions in the research and through examining the overall situation. This has been achieved by using open, closed and structured questions.

The researcher's experience in qualitative research also limits the findings, because this was the first such project they have carried out. Although the researcher conducted multiple interviews during his consulting work, the analysis of findings and interpretation through the academic lens provides a different challenge. In this context, it must be pointed out that the strength of qualitative research is to 'hear the voice' of the interviewee. One advantage of the researcher is his background in strategic sourcing and consulting and the ability to speak the same language as the interviewees.

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Anonymity, confidentiality and the presence of the researcher is normally one further limitation in qualitative research. However, the researcher offered confidentiality and anonymity statements before the start of each interview.

One further claim is that a short interview of between one and three hours with a sourcing department representative is not sufficient to understand the company's behaviour and situation fully. A study and interviews involving multiple departments would add further understanding of different perspectives within a company.

Furthermore, critics can argue that the findings from the electronics manufacturing and construction sector are not representative, cannot be compared and therefore could be misleading.

6.4.2 *Limitation of findings*

The construct validity is a weakness because only one interviewee within one company was subject to the study. However, the replication of findings and explanation of phenomena are based on twenty cases that offer a broad exploration of the research field. In particular, the research design was based on questions with a high degree of subjectivity, which supports the qualitative study and the research objective of deep understanding; however, the answers only reflect the interviewee's point of view and experience.

Furthermore, it can be claimed that the selected cases are not representative of the industry and do not allow a direct comparison of the companies, their business nature, revenues and sizes.

The reliability of data and its replication can be criticised, although the researcher attempted to increase the reliability and validity by providing sufficient evidence through direct, unedited citations. In this context, it is a limitation to the construct validity that the interviewee did not receive a transcript for further validation and approval.

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The analysis of the six dimensions provides deep insight into the company's situation and strategic sourcing. However, the findings are limited and cannot be generalised to specific industrial or country characteristics. Nevertheless, this study of the strategic sourcing discipline, a discipline still at an explorative stage, provides previously uncovered information and contributes to the body of knowledge and practice.

6.5 Future Directions

This research project investigates the explorative stage of strategic sourcing, and the selected case study research method increases understanding of how companies apply strategic sourcing and presents the current situation. There are several possibilities for extending knowledge in the area of strategic sourcing.

First, this qualitative research provides insights into strategic sourcing while considering risk elements. The limitation of qualitative research is its lack of generalisation, therefore additional research including strong quantitative studies with a large population, or based on longitudinal research and observation, would be beneficial.

Second, this research highlights differences between the industries and shows that sourcing practices in the construction sector are underdeveloped and seldom researched. Therefore, further research into strategic sourcing in the construction sector is required.

Third, this research can be replicated in other countries, and the developed strategic sourcing framework should be tested in depth with practitioners. It can be tested or generalised in other industries using qualitative or quantitative research methods.

Fourth, detailed or longitudinal strategic sourcing research is necessary to identify whether the sourcing function adds value to a company and influences the competitive advantage or business performance. This research should be based on a quantitative, or even longitudinal, survey design and supported by financial metrics or performance measures.

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Finally, the research shows that companies in different countries behave differently, and cultural differences between the UK and Germany were noted. Therefore, it would be interesting to understand how the cultural backgrounds of managers or CPOs influence strategic sourcing and its direction.

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- UKCO4 Dissertation, Case Study Interview-Transcript.
- UKCO5 Dissertation, Case Study Interview-Transcript.
- UKEL1 Dissertation, Case Study Interview-Transcript.
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Appendix A: List of publications submitted during research programme

Practitioners journals

- Kotula and Petrak (2012), "Komplexes beherrschen - Durchdachtes Variantenmanagement senkt die Kosten im Maschinenbau", Kotula/Petrak, ZulieferMarkt 02/2012
- Kotula and Reiß (2011), "Das Ende des Engpasses." Beschaffung Aktuell. Leinfelden-Echterdingen: Konradin Verlag GmbH.
- Kotula (2011), "Fehlendes Risikomanagement – Unternehmenserfolg benötigt Multi-Sourcing-Strategie." All about Sourcing, 3.6.2011.
- Kotula (2010) "Innovationen produzieren lassen - Über den Einkauf von Forschungs- und Entwicklungsleistungen (FuE)", Beschaffung Aktuell, Leinfelden-Echterdingen: Konradin Verlag 7/2010
- Kotula (2010) "Trend zum Outsourcing von F-&-E-Leistungen verändert den Beschaffungsprozess - Die Ideen der anderen", ZulieferMarkt 03/2010

Economic newspapers

- Kotula (2010) "Telekommunikationsleistungen: in vielen Unternehmen Kostentreiber", Handelsblatt News am Abend, 15.4.2010
- Kotula (2010) "Lieferengpässe durch gezieltes Risikomanagement vermeiden." Handelsblatt News am Abend, 30.11.2010.

Books

- Kotula, M. and Michalak, C. (2012), "Der Einkauf im Dilemma zwischen messbaren Wertbeitrag und "Papiereinsparungen" in Eppinger and Zeyer (eds) (2012), "Erfolgsfaktor Rechnungswesen", Springer Gabler Wiesbaden
- Hofmann, E., Maucher, D., Kotula, M., Kreienbrink, O., (2012), "Erfolgsmessung und Anreizsysteme im Einkauf", Springer Berlin

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Appendix B: Scopus Search Query for literature review

The research selection on social sciences based on "sourcing", articles and review paper and the time horizon 1998-2012.

TITLE(sourcing) AND DOCTYPE(ar OR re) AND SUBJAREA(mult OR arts OR busi OR deci OR econ OR psyc OR soci) AND PUBYEAR > 1997 AND PUBYEAR < 2013 AND (LIMIT-TO(LANGUAGE, "English")) AND (LIMIT-TO(SRCTYPE, "j"))

Appendix C: Example of coding from interview transcript

The screenshot displays a software interface for coding interview transcripts. The main window shows a transcript with the following content:

1 Where do you see the major trends in strategic sourcing being relevant to your company?

Interviewee: At what sort of level? I mean one of the things that we are seeing at the moment is **global sourcing is helping** us on certainly our fixed price element. What I described earlier is the majority of our business but we are **moving into more fixed price**. So certainly, global sourcing of certain elements, obviously utilizing labor rights and international labor rights and things like that. Most of our focus tends to be on quality as opposed to price because **we work in the high end markets** and therefore **quality and certainty** are very significant to us. So whilst we have looked at various supplies internationally, **one of the things that often preclude it is whether they can achieve quality and delivery**. We do study some of the sort of price markets but in a very narrow field, for the reasons I described earlier. So for example, we did do a study on steel for the Shard because of the high content of steel in that one project and understanding the national demand. And in the early days, because the project started in the peak, we were looking to advise the client on single sourcing for steel because of just to secure -

Interviewer: The supply.

Interviewee: To **secure the supply**. Interestingly, because of delays in the project and by the time it went live, those studies were not required because there was no shortage anymore. The Shard was the only major project going on. We could get any steel. I mean that's obviously the price has dropped dramatically. So I think you said earlier and I

The right-hand sidebar shows a list of coding categories with corresponding colored bars indicating their density in the text:

- Sup. Inesky
- TrendDep
- Ris. ImpCS
- SupApptProcess System
- Ris. ProgY. Descr
- Coding Density
- Trends

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The screenshot shows a web-based coding interface. At the top left, there is a browser tab labeled 'UKCO1'. A 'Click to edit' link is visible at the top right. The main content area displays a transcript under the heading '10.1 How do you identify potential risks?'. The transcript consists of several paragraphs, each starting with 'Interviewer:' or 'Interviewee:'. Several segments of the transcript are highlighted in yellow, indicating they have been coded. On the right side, there is a vertical sidebar with a list of coding categories: 'Sup_Instrk', 'TrendDep', 'Ris_ImprCS', 'SupAppProcess', 'Trends', 'Ris_Proj_Descr', and 'Coding Density'. Below these categories are two vertical bars: a purple one and an orange one labeled 'System'.

Appendix D: Example of coding transcripts extracted

Name: Trends\TrendsCompany

<Internals\DECO1> - § 3 references coded [0,69% Coverage]

References 1-3 - 0,69% Coverage

Global Sourcing Ansatz. Es geht wieder zurück, ein Stück weit, also auf den europäischen Ansatz, je nachdem, wo der Kernmarkt ist, also auf den Kernmarkt-Ansatz. Wo drauf es hingeht, das ist auf jeden Fall das Thema Netzwerke bei uns. Also ein Thema, was auch die Kommunikation mit Kunden, mit Lieferanten, Nachunternehmern und Dienstleistern angeht. Und wo der Trend absolut hingeht, ist zur Aufwertung des Einkaufs.

<Internals\DECO2> - § 4 references coded [0,60% Coverage]

Reference 1 - 0,13% Coverage

im Prinzip ist Punkt eins: preisliches Thema. Ganz klar.

References 2-4 - 0,48% Coverage

dass wir die Nachunternehmer durchleuchten, das heißt Bonitätsabfrage, Referenzen, und versuchen dann eben einfach, eine günstige Firma zu bekommen, wo wir aber das Gefühl haben, er könnte die Baustelle überleben.

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<Internals\\DECO3> - § 9 references coded [2,23% Coverage]

Reference 1 - 0,17% Coverage

Der erste Trend ist, ganz klar, das Green Building, die LEED Zertifikationen.

Reference 2 - 0,33% Coverage

Ja, zu der anderen Seite hin, also Lager so gering wie möglich zu halten, also wirklich dass die Umschlagshäufigkeiten so oft wie möglich gegeben sind

Reference 3 - 0,38% Coverage

Erschwert den strategischen Einkauf auch einfach, wenn man jetzt sich im fernöstlichen Bereich bewegt, mittlerer Osten, wenn man einfach die Lieferzeiten rechnen muss, ja.

Reference 4 - 0,38% Coverage

der Haupttrend darauf liegt, einfach Einsparungen zu finden über die Produkte, die wirklich die größte Kaufkraft haben, wo einfach wirklich eine Kaufkraft dahintersteht.

References 5-8 - 0,80% Coverage

Jetzt konzernübergreifend auch für die ganzen Töchter, wir haben ja auch in China einen Produktionsstandort, dass man da einfach sagt, o.k. wir legen unsere Produkte zusammen und sourcen die einfach gemeinsam out. Also nach wie vor, das Einsparpotenzial ist immer noch gegeben, weil der Kunde trotz alledem einfach wettbewerbsfähige Preise haben will und

Reference 9 - 0,17% Coverage

da muss man einfach wirklich einen guten gesunden Lieferantenmix sich suchen

.....
<Internals\\UKCO1> - § 6 references coded [0,31% Coverage]

Reference 1 - 0,03% Coverage

global sourcing is helping

Reference 2 - 0,03% Coverage

moving into more fixed price

Reference 3 - 0,03% Coverage

we work in the high end markets

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Reference 4 - 0,04% Coverage

quality and certainty are very significant

Reference 5 - 0,02% Coverage

secure the supply

Reference 6 - 0,15% Coverage

we are getting a lot more into standardization and prefabrication, off-site assembly, again, to drive the quality issue, congested sites, safety.

<Internals\\UKCO2> - § 2 references coded [0,36% Coverage]

Reference 1 - 0,12% Coverage

challenge for us is to have much like central strategies

Reference 2 - 0,24% Coverage

So we have to make sure that our supply chain is matched with appropriate sectors in which we are operating in.

<Internals\\UKCO3> - § 15 references coded [3,16% Coverage]

Reference 1 - 0,07% Coverage

Europe, the eurozone agenda is one thing

Reference 2 - 0,09% Coverage

huge push sustainable-wise. Sustainability in the UK

Reference 3 - 0,05% Coverage

carbon reduction commitments

Reference 4 - 0,18% Coverage

ran to China realized we have not got enough repeat construction design and therefore, we go in, we come out

Reference 5 - 0,11% Coverage

So India becomes another issue, which we are starting to look at.

Reference 6 - 0,02% Coverage

sustainability

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Reference 7 - 0,05% Coverage

whole-life costing, longevity

Reference 8 - 0,10% Coverage

mantra in this business is something called “perfect delivery.”

Reference 9 - 0,54% Coverage

This business here finishes 84% of its jobs on time, on budget, defect-free, delighted client because in the UK, with a congested market, we ... the only differentiator is you're either quicker, cheaper, or you are a niche market, but we're none of those so the only thing that we've got is perfect delivery, which is a culture.

Reference 10 - 0,51% Coverage

We just wouldn't be able to keep the demand going and then we don't stock anything anymore so it's all done on demand just in time. So we have to engage with this logistics company who then would say, “Well, if you want to do that, we'll stock it for you and manage it but you're going to have to commit to X.”

Reference 11 - 0,17% Coverage

UK market is doubled in price, Martin, so for us, the basic commodities - steel is huge, as is concrete.

Reference 12 - 0,83% Coverage

Europe, with the consolidation in Europe with the steel mills, I think there are still only 11 steel mills in Europe, nine of them which are owned by one company. So Celsa owned nine of the mills. And so procurement people or sourcing people around in Europe who think that they are affecting the marketplace need to look in a different way. I can't influence Celsa. All I can do is position myself in their business to be someone that they would prefer to do business with. I need to use different tactics.

Reference 13 - 0,13% Coverage

price trend is very worrying for us because as supply and demand affects the UK

Reference 14 - 0,22% Coverage

with all the cutbacks due to the eurozone, our pipeline twelve months ago was that big, so there were loads of stuff going to the pipe

Reference 15 - 0,09% Coverage

the margin dropped this year to almost to a last position

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<Internals\\UKCO4> - § 3 references coded [0,58% Coverage]

Reference 1 - 0,29% Coverage

how we've gone to trade on selecting supplies and work with different suppliers and looked potentially partner with

Reference 2 - 0,14% Coverage

certainly has been a radicalization of our supply chain

Reference 3 - 0,14% Coverage

We try really to keep generally to the people we've got.

<Internals\\UKCO5> - § 12 references coded [3,01% Coverage]

Reference 1 - 0,21% Coverage

first trend that we have in our organization is to do with losing all of the company identities for all of the four or five upraising divisions

References 2-3 - 0,29% Coverage

So what we were asked to do was to try and leverage in this region as much as possible our procurement offering and move away from a traditional base where each project was procuring project by project.

Reference 4 - 0,47% Coverage

we started a conversation with the global management team, senior management team, in Australia, which is where our headquarters are, around how we could leverage the brand across the globe and start working in a collaborative way with other parts of the business units which were outside this traditional region as well.

References 5-8 - 0,62% Coverage

goals now for each of the regions around maximizing leverage and the reduction of suppliers around the globe to produce better margins on the return on the procurement of the materials and services that we buy, improve the management of risk in the supply chain, and demonstrate industry leadership to be a scene setter or a goal setter with regards to the way we want to procure what would hopefully be seen as best in class.

Reference 9 - 0,41% Coverage

Yes, definitely, and it's a big fundamental change as to the way we would actually deliver our business in this region and across the globe as well. So we're going away from a very traditional construction management model towards a more focused approach around construction delivery.

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References 10-11 - 0,33% Coverage

The biggest trend is around understanding your cost base in construction. A large number of contractors in the last two to three years have really been breaking down the cost base and what we call the net trade value of a package.

Reference 12 - 0,67% Coverage

That thing isn't a make or buy, it's whether we procure it ourselves and self-deliver or whether we just procure to a trade. So it's about understanding from the labour part. If you're going to procure the materials, you're direct, and the only part left is labour, the idea then is, how would we actually fulfil the labour requirement? Would we self-deliver it of our own people or would we just go out there and buy a service from the industry around that part?

<Internals\\UKEL1> - § 3 references coded [0,21% Coverage]

Reference 1 - 0,04% Coverage

continuity of supply

Reference 2 - 0,03% Coverage

improve margins

Reference 3 - 0,14% Coverage

source and stabilized our relationships with the major broad line distributors,

<Internals\\UKEL2> - § 10 references coded [1,53% Coverage]

References 1-2 - 0,36% Coverage

China comes into that. You know probably our expenditure with China has increased dramatically over the last 7 ... 5 years. China is becoming more expensive because of the social side in there is you know.

Reference 3 - 0,08% Coverage

It's all about continually monitoring really.

Reference 4 - 0,21% Coverage

Unfortunately, where do we go next, India, we doubled a bit with India but they haven't got the infrastructure there yet.

Reference 5 - 0,27% Coverage

We looked to Eastern Europe but we haven't had this ... one thing we would say about - I will say about the Chinese, they are very keen to do business with you.

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Reference 6 - 0,17% Coverage

we are constantly monitoring what is going on in China because it's a very strategic country for us

Reference 7 - 0,25% Coverage

monitoring freight cost, because that's, you know, it's a big chunk of expenditure which isn't - you know it's not a prime cost as such, freight.

Reference 8 - 0,09% Coverage

so we are worried about certain European countries

Reference 9 - 0,07% Coverage

more financial house checks on companies.

Reference 10 - 0,03% Coverage

changing culture

Appendix E: Source Summary NVivo Project

Internals		
Name	Nodes	References
DECO1	55	105
DECO2	43	76
DECO3	82	172
DECO4	53	111
DECO5	53	105
DEEL1	78	173
DEEL2	87	212
DEEL3	46	101
DEEL4	65	103
DEEL5	44	73
UKCO1	60	154
UKCO2	74	126
UKCO3	78	178
UKCO4	45	94
UKCO5	92	233
UKEL1	52	98
UKEL2	49	93
UKEL3	67	145
UKEL4	56	129
UKEL5	87	184

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Source Summary

DBA Thesis final - Martin Kotula

Total Words in Source	Total Paragraphs in Source	Number of Nodes Coding Source	Coded Percentage of Source	Number of Text References	Number of Audio	Number of Im-
Document						
Internals\\DECO1						
9402	199	54	0,1800	104	0	0
Internals\\DECO2						
6979	291	43	0,2163	76	0	0
Internals\\DECO3						
6852	335	82	0,3278	172	0	0
Internals\\DECO4						
7160	174	53	0,3210	111	0	0
Internals\\DECO5						
9694	471	53	0,2320	105	0	0
Internals\\DEEL1						
6510	448	78	0,3346	173	0	0
Internals\\DEEL2						
16803	657	87	0,2273	212	0	0
Internals\\DEEL3						
8707	308	46	0,2497	101	0	0
Internals\\DEEL4						
3816	190	65	0,4819	103	0	0

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Total Words in Source	Total Paragraphs in Source	Number of Nodes Coding Source	Coded Percentage of Source	Number of Text References	Number of Audio	Number of Images
Internals\\DEEL5						
5516	375	44	0,3217	73	0	0
Internals\\UKCO1						
16187	473	59	0,1865	153	0	0
Internals\\UKCO2						
7877	257	73	0,3653	125	0	0
Internals\\UKCO3						
11038	240	77	0,3064	177	0	0
Internals\\UKCO4						
7018	172	44	0,2475	91	0	0
Internals\\UKCO5						
12159	279	92	0,5265	236	0	0
Internals\\UKEL1						
9936	246	52	0,2910	98	0	0
Internals\\UKEL2						
9637	595	49	0,0855	93	0	0
Internals\\UKEL3						
8233	216	67	0,3763	145	0	0
Internals\\UKEL4						
9476	405	56	0,2556	129	0	0
Internals\\UKEL5						
11244	225	87	0,4629	184	0	0

Appendix F: Questionnaire and handouts

Opening

Dear Mr/Ms.....,

First of all I would like to thank you for your time to participate in this interview. This interview is scheduled for 90 – 120 minutes and will be audio taped, if you agree.

As you know, my research is focused on strategic sourcing with the central question “How companies apply strategic sourcing and consider risks?” Therefore, I would like to know and understand how your company behaves and acts in certain sourcing areas. The areas we are covering in this interview today are: trends, sourcing models, supply risk management, supply and demand chain management and finally success factors.

We will start with the first section, where I would like to get a better understanding of trends.

Trends

Currently, there are several changes and emerging trends in economies and societies, which has an impact on strategic sourcing. Specifically, those changes may affect your value chain with customers, distribution partners or suppliers.

1. Where do you see the **major trends in strategic sourcing being relevant to your company?**
[3-5 examples - for instance: cost reduction, risk management, supplier relationship mgmt, low cost country sourcing]
2. Considering the stated: **What are the 3 - 5 most important trends** for your sourcing department **in the next 10 years?**
[focus on **WHY** and examples; could be: global sourcing, green, talent, supply security, quality, IT]
3. In this context... Which **success factors will determine competitive advantage** of your company? [e.g.: skills + capabilities, systems, right suppliers, raw materials, supply, IT, mgmt buy in]
- 4.

Theoretical and practical sourcing models

Reflecting the recent developments in markets, economies and societies the role of sourcing has changed and becomes more attention now.

5. Could you please explain **which role “strategic sourcing” is playing** in your company?
 - 5.1. What are the **main objectives**
[e.g. sourcing strategy, cost vs. supply, IT, SRM, Quality]?

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6. Did the **role change** over the last five years?
[for instance: market/ economy changed the importance/ perception of sourcing]
Yes 1 (move to 5.1) No 2 (move to 6)

6.1. How did it change?

7. There are several tools and methods in strategic sourcing. What **kind of tools and methods do you predominantly use** in strategic sourcing?
[If guidance needed: models, Kraljic, Pareto, ABC/XYZ, Risk map]:
8. Considering your applied tools: What are the **three most effective tools** you find relevant to other companies in your sector?
- 9.

Supply Risk Management

10. How do recent supply risks **influence your corporate strategy in 2010/2011?**
11. Do you have an implemented a risk management programme in your company?
Yes 1 (move to 10) No 2 (move to 11)

12. If YES:

- 12.1. How do you **identify potential risks**?
[Could you please make an example, how you normally execute that process?]
- 12.2. When it comes to the assessment of risks: What are the applied **criteria**?
- 12.3. What kind of risks do you manage **actively and preventive**?
[internal, external, economical, quality, supplier]
- 12.4. How **do you monitor** the identified and assessed risks?
- 12.5. What kind of **tools** do you use?
- 12.5.1. Do you have a special IT system for risk management?
Yes 1(move to 12) No 2(move to 12)

13. If NO:

"What **are the reasons for not implementing** a risk management programme?"

Over the last months some serious events happened such as financial crisis, volcano ash, or the nuclear accident, which lead to disruptions in the supply chain.

14. Did you have **some serious risk events** with significant impact to your business in 2010/2011?
Yes 1 (move to 13) No 2 (move to 14)

15. If YES:

- 15.1. Could you please give **two examples, how those events affected your company**?
- 15.2. How can the risk management lead to a **competitive advantage**?
[Did the company perform better having a risk management than competitors?]

16. If we focus purely on strategic sourcing: What are the **dominating "must-have" risk factors to be used in a preventive risk management portfolio**?
[Risk factors such as: supply, quality, compliance or dimension like internal, external]

Supply and Demand Management

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When we consider the stated and focus on the collaboration across the value chain.

17. How relevant is **the integration with suppliers and customers in strategic** sourcing in your company?
[Construction: Dependency on consortium partner, Scope changes, Requirements mgmt, Quality // Manufacturing: IT exchange with enterprise-resource-planning, forecast, demand mgmt. etc.]?
18. When it comes to the **demand chain management**, **how** do you get information and forecasts from the customer side?
[Construction: project pipeline to bundle demand; // Manuf: demand for production and supply planning in JIT]
19. In this context changes in the demand chain influence the supply chain. **How do changes in your demand chain influence your sourcing activities?**
[Construction: Project delay, acceptance test, Project stop // Demand reduction; Product life cycle]
 - 19.1. How do you cope with **such changes**?

Critical success factors

Finally, we are moving to the last section of this interview, where I am interested in success factors in strategic sourcing.

20. If you look at this handout, which **10** of the following **critical success factors will be more important in your value chain over the next ten years?**
[Handout I and show examples in list]
 - 20.1. Could you please give a brief description, **how those factors (will) affect your company?**
 - 20.2. **Why these** and not others?
21. Your supplier base builds a very important party where your company is depended on. When it comes to a strategic sourcing decision, **what are the primary factors in your strategic supplier selection?**
[Handout II and show examples in list: Could you please rank according to your priority?]

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Closing Remarks

Finally, I **thank you very much** for your time and these very interesting insights.

I would be very happy, if you can fill in the statics form and return it back to me.

Furthermore I will very much appreciate to come back to you, if I have additional questions for verification.

Do you probably know any other company, which would like to take part in this study?

If you have any additional questions, please do not hesitate to contact me.

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Q18) - Handout I –Success Factors

If you look at this handout, which **10** of the following **critical success factors will be more important in your value chain over the next ten years?**

Please select the 10 most important factors.

- Availability of sourcing information
- Company's strategic plans
- Continuous improvement
- Delivery dependability
- Delivery speed
- Development of Key Suppliers
- Identify common requirements across BU's
- Information exchange
- Internal customer buy-in
- Knowledge about global supplier
- Market share
- Support of global sourcing process
- Organizing effectively
- Personal/ HR, own staff
- Product cost
- Profit margin
- Quality
- Response time to external events
- Return on assets
- Sourcing strategies are aligned with corporate goals
- Supplier evaluation
- Supplier integration
- Supplier Management/ Partnership
- Supplier who are interested in global contracts
- Supply flexibility
- Technology
- Total Cost of Ownership
- Trust
- Visionary leadership

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Q19) - Handout II – Strategic Sourcing Criteria

Your supplier base builds a very important party where your company is depended on. When it comes to a strategic sourcing decision, **what are the primary factors in your strategic supplier selection?**

Please rank the below stated criteria from 1 to 15 and state briefly why.

1 = Most Important to 15 = Not Important

Rank	Criteria	Why
_____	Price, Costs, Finance	_____
_____	Specification, product complexity, quality	_____
_____	Own capabilities and resources (make-vs-buy)	_____
_____	Supply market characteristics (Bargaining Power)	_____
_____	Supplier Relation and Integration	_____
_____	Delivery Process with lead-times and supply continuity	_____
_____	Supplier production capability	_____
_____	Risk	_____
_____	Strategic sourcing fit with internal strategy	_____
_____	Customer / Demand of own company	_____
_____	Economic environment	_____
_____	Processes and automation, transaction costs	_____
_____	Geography of the supplier	_____
_____	Performance of the supplier	_____
_____	Competitive Advantage over competitors	_____

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The statistics will be handed over and filled in separately.

Statistics: "Finally, I would like to ask you for some statics"

Company Information

1. What are the total revenues of your company including consolidated revenues of subsidiaries?

1-12/ 2010 _____(Million) GBP

1-12/ 2009 _____(Million) GBP

1-12/ 2008 _____(Million) GBP

2. What are the company earnings before interest and taxes (EBIT) including consolidated earnings of subsidiaries? (please enter losses as negative figure)

1-12/ 2010 _____(Million)GBP

1-12/ 2009 _____(Million)GBP

1-12/ 2008 _____(Million) GBP

3. How many full-time employees does your company employ including consolidated subsidiaries?

1-12/ 2010 ca. _____ Employees

1-12/ 2009 ca. _____ Employees

1-12/ 2008 ca. _____ Employees

4. How many production/ project sites does your company have globally?

_____ (Number) in 2010

_____ (Number) in 2009

_____ (Number) in 2008

5. How many risks did you identify during a year?

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1-12/ 2010 _____(Number)

1-12/ 2009 _____(Number)

1-12/ 2008 _____(Number)

- a. How many risk events happened and influenced your supply and demand chain?
(For example: caused significant costs, customer claims, shut known production, stopped construction)

1-12/ 2010 _____(Number)

1-12/ 2009 _____(Number)

1-12/ 2008 _____(Number)

6. How is the sourcing function organized:

- Central
- De-central
- Coordinated
- Project purchasing
- unkonwn
-

.....

.....

7. How many full-time employees are working in the sourcing area including consolidated subsidiaries (please indicate part-time employees in digits)?

- Transactional: buyers are mainly processing purchase orders
- Strategic: buyers are working on strategic level creating master contracts, measuring, and processes
- Hybrid: buyers are working strategically (more than 40% of the time) and transactional (more than 40% of the time)

Year	Number of full-time employees			
	Transactional	Strategic	Hybrid	Total
As of Dec. 31 st				
2010				=
2009				=
2008				=

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8. How much time of all employees is allocated to the following activities? (Please enter estimated percentages)

a. Strategic sourcing (for instance: develop strategies, market research, supplier audits)

_____ (%)

b. Transactional sourcing (for instance: manage requests for quotation, assess, negotiate, manage on-time deliveries, claims)

_____ (%)

c. Risk Management (establish strategies, manage simulation, develop substitutes, identify risk, mitigation actions)

_____ (%)

99 Unknown

9. What is the total external spending of the company?

1-12/ 2010 _____ (Million) GBP

1-12/ 2009 _____ (Million) GBP

1-12/ 2008 _____ (Million) GBP

99 Unknown

10. Please indicate **your 2010 spend** distribution according to the global markets, where you regularly source during a year?

North America _____ %

South America _____ %

Western Europe _____ %

Eastern Europe _____ %

Russia _____ %

Africa _____ %

Asia _____ %

Australia/ New Zealand _____ %

Unknown _____ %

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Interviewee

11. How many years are you working in sourcing/ purchasing function?

_____ Years in general in sourcing/ procurement (incl. previous companies)

_____ Years in your current job

I do not like to answer

12. What is your current reporting line?

Chief Executive Officer

Chief Financial Officer

Chief Operations Officer

Other: Please specify: _____

I do not like to answer

13. Are you part of the Board or Management Team?

Member of the Board

Yes 1 No 2

Member of the Management Team

Yes 1 No 2

I do not like to answer