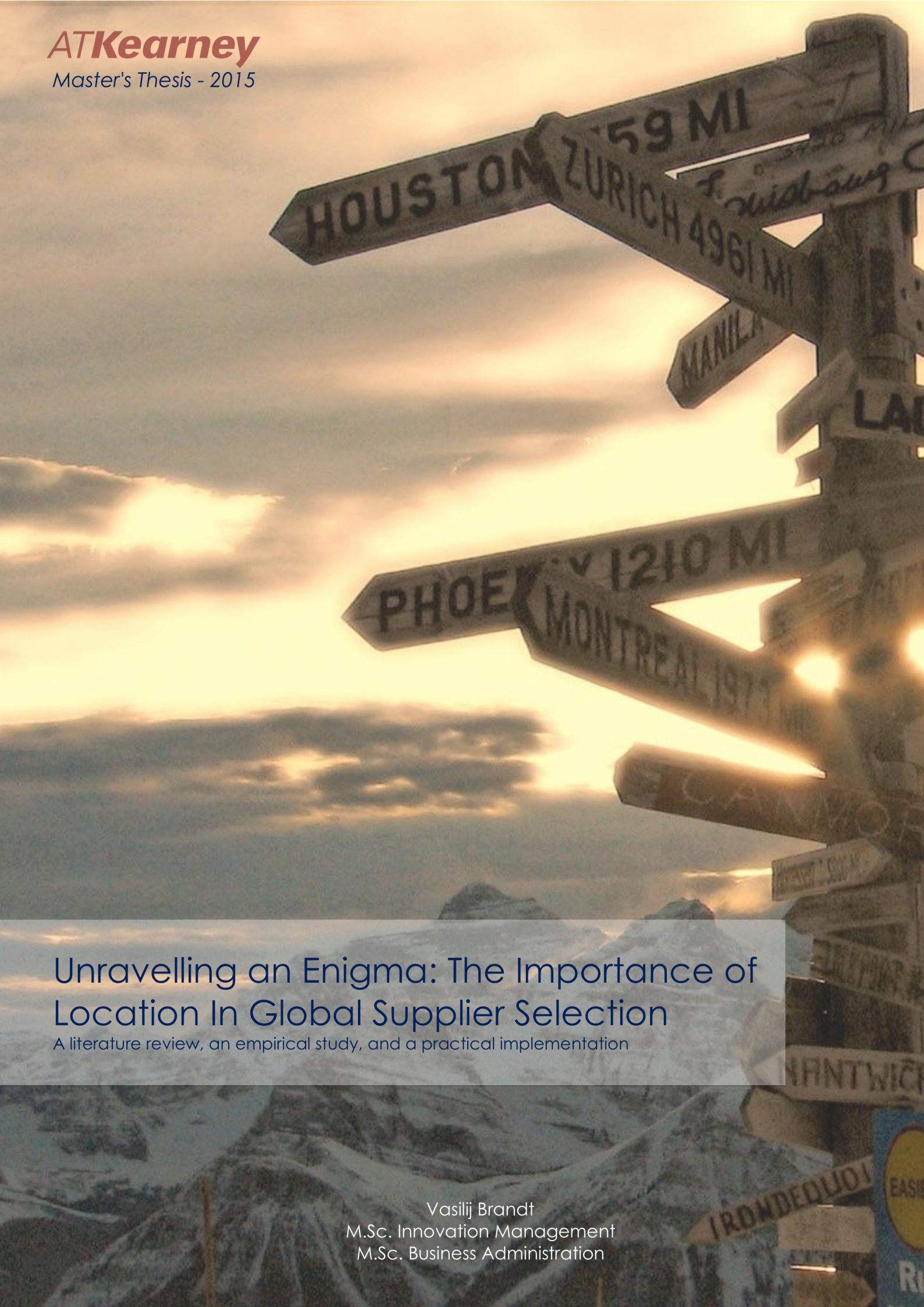


Unravelling an Enigma: The Importance of Location In Global Supplier Selection

A literature review, an empirical study, and a practical implementation

Vasilij Brandt
M.Sc. Innovation Management
M.Sc. Business Administration

Management Summary

In the last decades, the concept of outsourcing has become more proliferated. Companies are exploiting the opportunities in the global marketplace in order to maintain or enhance their competitive position on a continuous basis. However, the process of supplier selection, which is one of the initial and most important steps of the overall outsourcing process, is still conducted ineffectively by many firms in various industries. A low array of decision variables are considered in the decision processes, and the methods used to execute the final decision(s) often lack sophistication. However, one of the major issues in modern supplier selection processes is that buying firms do not consider location-specific factors (macro-level factors); firms do instead evaluate suppliers based on their internal characteristics and capabilities (micro-level factors). The underlying reasons for why macro-level factors are not considered extensively by companies in the modern economy is not justified by any academicians, but the lack of research on this specific issue could be one of the reasons. Only a few studies have in fact examined macro-level factors together with traditional micro-level factors for supplier selection purposes; however, the breadth and depth of factors in those studies is not considered extensive. Macro-level factors have neither been ranked together with traditional micro-level factors, which means that an overview of which macro-level factors are of greatest importance for supplier selection engagements neither exist. Further research which captures those issues has been suggested by recent scholars, but an in-depth study which fill the gaps is yet to be composed, which is why this thesis serves to do so.

In this thesis, the issues in the current academic landscape of supplier selection research have been combated based on one central research question (also referred to as a problem formulation), which subsequently was dissected into three research questions. The question was formulated as following: *"Which micro-level and macro-level decision factors should be considered in major supplier selection engagements, and how can the factors be integrated into decision-making software which is based on a collaborative optimisation approach?"*. In order to identify *which* factors to consider in major supplier selection engagement, the factors first had to be identified and subsequently ranked. In order to identify macro-level factors, which as mentioned before have not been presented extensively in supplier selection research, another research stream had to be taken into consideration. It was here decided to include studies from Foreign Direct Investment literature, as this research stream exhaustively present macro-level factors due to the fact that such variables are used by firms to identify the comparative advantages of different locations when establishing internal facilities abroad. Both supplier selection research and Foreign Direct Investment research was thereby scrutinised based on a systematic literature review. It was overall identified that several hundred micro-level and macro-level factors exist in academia, and

further factors were also identified based on qualitative interviews conducted with two outsourcing experts. Due to the profound amount of factors identified in academia and practice, a clustering process took place, thereby clustering all the factors within different constructs. This was done based on an empirical validation approach, where the same outsourcing experts which were used to identify further factors from practice were included as external sources. The clusters were orchestrated in order to make the total list of factors more operational for practical purposes, but also to enable the development of a new ranking based on a quantitative empirical study. A final list of 25 constructs should then be ranked by practitioners (i.e., outsourcing or purchasing managers who have more than five years of experience, and who work in either an SME or MNE). The respondents were asked to rank the factors based on a recent major outsourcing engagement, while the performance of that respective engagement likewise should be specified so that a correlation and a multiple linear regression analysis could be conducted. The survey instrument was distributed to 217 managers. 42 useful responses were obtained, meaning that the final response rate of the research was equal to 19,4%.

The results of the empirical study showed that macro-level factors are indeed important for major supplier selection engagements. Although traditional factors within constructs such as 'cost', 'quality', and 'time and delivery' were considered most important by practitioners, macro-level constructs such as 'accessibility', 'labour', and 'business climate' were in fact assessed to be more important than, for instance, micro-level constructs such as 'CSR', 'service', 'finance', 'innovativeness', and 'technology'. Also, it was identified that macro-level factors have a stronger relationship with performance compared to micro-level constructs, and some macro-level constructs (i.e., 'governmental regulations') do in fact also have a significant positive impact on performance. The results suggest that although macro-level constructs are considered important by practitioners, the macro-level constructs should in fact gain even more attention, as they are more strongly related to performance compared to many of the supplier-specific constructs. Of course, traditional constructs such as 'cost', 'quality', and 'time and delivery' should still be evaluated extensively due to their significant impact on performance as well, but relative to the other micro-level constructs, macro-level constructs do indeed have stronger positive relationships with the performance of outsourcing engagements. Hence, the macro-level attributes in terms of the location in which the evaluated suppliers are embedded should thereby be considered more extensively by practitioners in the future, thereby looking beyond the boundaries of the suppliers in the overall selection process. In order to facilitate this process, awareness have to be created, which is why further research within this respective academic avenue is strongly encouraged.

How the macro-level factors should be used in major supplier selection engagements is also an issue that has to be investigated. In the case of this research, factors from the most important constructs (i.e., based on the empirical ranking) were integrated into optimisation software which is based on a collaborative optimisation approach. This was the practical part of the thesis, and served to answer the second part of the problem formulation. Integrating data for the macro-level factors (e.g., political instability data was retrieved from an index from the World Bank) into an optimisation platform enables the buyer to run scenarios where the location-specific attributes can be used as constraints. In

this research, all macro-level data which was retrieved from indexes was normalised based on the feature scaling technique, and subsequently categorised into "low", "medium", and "high". Hence, if a buyer uses the created software configuration to run a scenario where constraints, for instance, are that the political instability, the level of corruption, and the trade restriction in a foreign location all should be "low", then suppliers which fulfil those criteria in this scenario will be considered for business allocations. Collaborative optimisation is according to the collaborative company partner of this thesis one of the current best practice approaches for major supplier selection engagements, which is why this approach has been used in this thesis. Of course, other more generic optimisation approaches - or non-optimisation approaches - which do not encompass the value of "collaboration" could also be used as alternatives.

Overall, this thesis suggest that macro-level factors should be considered in much greater extent in major global supplier selection engagements. Not only do practitioners believe that the factors are important relative to some traditional micro-level factors, but the performance analyses also show that the macro-level factors correlates more significantly with performance, and that some of them have a significant positive impact on performance. The attention on these factors should therefore increase in future major outsourcing engagements, and future research within this domain is therefore highly encourages. How decision-making which includes macro-level factors is executed in practice still have to be investigated, but in this thesis it has been exemplified how the factors could be integrated into an optimisation platform which is based on the idea of collaborative optimisation. It is strongly recommended that the awareness of *why* macro-level factors should be included in major outsourcing engagements is spread in the corporate community, while the *how* question then can be emphasised subsequently. This thesis provides insights regarding why location factors should be included in major supplier selection, and how they can be used in optimisation software; however, further steps need to be taken in order to ensure that the findings are valid, and perhaps to present other approaches for how the macro-level factors can be used in practice.

Supervisors

Dr. Niels Pulles, University of Twente

Dr.ir. Petra Hoffmann, University of Twente

Dr. Matthias Mrozewski, Technical University of Berlin

Vice President of Europe, Middle East and Africa, A. T. Kearney

Preface

This report has been composed by Vasilij Brandt as part of the Dual Master of Science degree programme in Innovation Management & Entrepreneurship and Business Administration conducted at the Technical University of Berlin and the University of Twente. The report, which is the master's thesis of the educational programme, is based on the requirements presented in the syllabus. However, further requirements from the academic supervisors as well as A. T Kearney, which is the the company partner of the project, have been taken into consideration in the development of the report. The report does overall serve to examine the current academic landscape of supplier selection and foreign direct investment research, in order to accumulate numerous of micro-level supplier-specific and macro-level location-specific factors which can be used in outsourcing engagements. The factors will be ranked based on empirical research in order to identify how important macro-level location-specific factors are compared to micro-level supplier-specific factors in outsourcing engagements. The comprehensive list of factors, and the ranking of those, will contribute to fill two identified academic gaps which are currently present in supplier selection research. Lastly, the most important factors will be integrated into supplier selection decision-making software, thereby fulfilling the practical part of the thesis.

Acknowledgements

Throughout this report a large amount of assistance and constructive critique have been obtained from fellow students, connections, employees at A. T. Kearney, and employees from the two involved universities. I am grateful to everyone who have been involved in the project. However, I wish to dedicate a special thank you to the practical supervisor from A. T. Kearney whose inputs, help, and feedback to this report have been valuable. Furthermore, a special thank you is dedicated to my supervisors from the University of Twente, Dr. Niels Pulles and Dr.ir. Petra Hoffmann, for their support and guidance throughout the complete project period. Dr. Matthias Mrozewski, who was the supervisor from the Technical Univeristy of Berlin, is also thanked for his guidance in the initial part of the project. Lastly, a Supply Chain Planner from a major Danish pharmaceutical company, is also thanked for his participation in the factor clustering and filtering process conducted in this report.

Thank you!

Vasilij Brandt

Abbreviations

In this report the following abbreviations will be used:

AHP	Analytical Hierarchy Process
ANP	Analytical Network Process
CO	Collaborative Optimisation
CSR	Corporate Social Responsibility
CSS	Comprehensive Supplier Selection
F2F	Face-2-Face
FDIs	Foreign Direct Investments
ISM	Institute of Supply Management
JIT	Just-In-Time
M&A	Merges & Acquisitions
MNEs	Multinational Enterprises
On-Spec	On-Specification
OTD	On-Time-Delivery
PAS	Procurement and Analytical Solutions
RFI	Request For Information
RFQ	Request For Quotation
SCP	Supply Chain Planner
SMEs	Small and Medium-Sized Enterprises
VIF	Variance Inflation Factor
VP EMEA	Vice President of Europe, Middle East and Africa

Index

"*Nothing is more difficult, and therefore more precious, than to be able to decide.*"

- Napoléon Bonaparte

1 Introduction

Engaging in outsourcing activities have become of great importance for various firms to stay competitive within the industries in which they operate. The removal of trade barriers, the ease of travel, and not to mention the enhanced means of communication as well as the internet, have all facilitated the proliferation of sourcing out activities (Jonsson et al., 2011). However, despite the exponential trend of outsourcing, several hurdles still exist which firms have to overcome in order to effectively exploit the opportunities associated with outsourcing. One of the main problems in modern outsourcing is the process of supplier selection, which have generally become more complex due to its increasing multi-criteria nature (Ho et al., 2010; Deng et al., 2014). The importance of effective supplier selection and its associated complexity is also accentuated by several scholars, including Cheraghi et al. who state that *"Any mistake in this decision can easily render the approach ineffective and could even adversely affect the stability of the organization in today's turbulent competitive environment with little or no tolerance for errors"* (Cheraghi et al., 2011, p. 92).

Despite the increasing importance of effective supplier selection procedures, a large proportion of firms across industries in the current economy rely on simple sourcing approaches, where a couple of suppliers are evaluated based on a low array of factors (McIvor, 2000; Dou and Sarkis, 2010). The factors which firms consider in the supplier selection processes are moreover primarily retrieved from the micro-level domain, meaning that buying firms are evaluating potential suppliers based on micro-level factors such as the suppliers individual capabilities and characteristics (Dou and Sarkis, 2010; Hätönen and Eriksson, 2009). In this report, micro-level factors are defined as factors which reflect the internal capabilities and characteristics of the individual supplier which is being examined in the supplier selection process. When it comes to the usage of micro-level factors in supplier selection, buying firms most often consider *hard factors* such as cost, capacity, on-time-delivery (OTD), and quality (Ellram, 1990; Kannan and Tan, 2002). However, micro-level *soft factors*, which are more strategic in their nature, are often neglected despite the fact that such factors have become of increasing importance (Kannan and Tan, 2002). To clarify the difference between hard and soft factors, it can be argued that hard factors are those factors that can easily be quantifiable (e.g., delivery, quality and price), while soft factors are more hard-to-quantify types of factors (e.g., supplier's attitude, partnership potential, innovativeness, and strategic fit) (Kannan and Tan, 2002).

Besides using micro-level factors for selecting suppliers, macro-level location-specific

factors have also become of greater importance in recent years (Dou and Sarkis, 2010). In this report, macro-level factors are defined as factors which reflect the location-specific characteristics of the environment in which the examined supplier is located and operates in. Despite the increasing importance of such factors, they are very often being neglected in supplier selection decisions (Graf and Mudambi, 2005; Boardman Liu et al., 2008; Hätönen and Eriksson, 2009; Dou and Sarkis, 2010). The omission of macro-level factors can be assumed to be problematic, as firms which engage in major outsourcing projects cannot just rapidly switch supplier in case macro-level forces suddenly have a negative influence on the supplier. Major outsourcing engagements can, for instance, be when a firm outsources goods or services which are highly complex and/or where, for instance, knowledge has to be transferred from the buying firm to the supplier. The macro-level forces which can then have an influence on such engagements are, for instance, political changes, natural disasters, decreasing levels of desired labour skills, corruption, etcetera. Also, buying firms might have long-term objectives regarding entering new countries or new markets, which is why using suppliers from those particular locations could be more value-adding than solely selecting suppliers based on micro-level characteristics and not reflecting on the location-specific advantages (Bozarth et al., 1998). It can thereby be argued that including macro-level factors in the supplier selection process add a more long-term dimension to the overall outsourcing engagement, which can ultimately have a positive effect on the prospective competitiveness of a buying firm.

A. T. Kearney - specifically their *Procurement and Analytic Solutions (PAS)* practice - does, among other things, advise clients on how to engage in complex major sourcing decisions based on analytical approaches containing a large amount of different factors. The firm, which is the company partner of this thesis, acknowledges the increasing complexity of conducting supplier selection decisions effectively, and they do especially emphasise the need of taking macro-level factors into consideration when selecting suppliers on a global scale - especially in the upcoming years. As a result of this recognition, A. T. Kearney did initially request the author to develop a report that presents a comprehensive list of important academic decision-factors for outsourcing which both takes micro-level factors as well as macro-level factors into consideration. At the same time, the most important factors should be integrated into supplier selection decision-making software which is organised around Collaborative Optimisation (CO).
Supplier selection factors have generally been presented in numerous of existing academic studies. In fact, several studies have been developed throughout the last century to date regarding what kind of factors decision-makers can consider in supplier selection activities, and various studies have since the middle of the last century also had the objective to rank the factors in order to identify which of them are of highest importance. However, equally for the vast majority of those studies, macro-level factors have not comprehensively been considered in the list of factors, and the macro-level factors have neither been ranked within the context of supplier selection. These two academic gaps have also been emphasised in two recent studies conducted by Jussi Hätönen who, for instance, state that *"The location decision has been discussed, thus far, mainly in relation to foreign direct investment (Dunning's OLI paradigm), and the locational questions with regard to outsourcing have been somewhat neglected."* (Hätönen and Eriksson, 2009, p. 151), and *"[...] with regard to the location decision it still remains largely unclear whether*

the same factors that promote ownership-based offshoring encourage the firm to make an outsourcing investment in which ownership and thereby hierarchical control is passed to the foreign vendor/partner" (Hätönen, 2009, p. 62). The importance of filling those gaps are also emphasises by other scholars, including Dou and Sarkis, who state that the *"[...] outsourcing decision needs to take into account other metrics such as facility location factors, rather than a sole consideration of supplier or subcontractor selection factors"* (Dou and Sarkis, 2010, p. 568).

Hence, since current supplier selection research do not provide much information about various macro-level factors, it can be argued that the problem in this report is two-fold. This is due to the fact that micro-level and macro-level factors have to be accumulated and ranked based on the needs and wants of A. T. Kearney, but by doing so, academic gaps which is currently present in supplier selection research (i.e., the lack of macro-level factors and an importance-assessment of those) will be filled. Filling the academic gaps will therefore be a facilitating process to enable the conduct of the practical part of this report, which is to integrate the factors into the decision-making software. Due to the profound gap which is present in the academic literature, and the need which A. T. Kearney has provided for this respective thesis, the subsequent section will serve to present the problem statement and the research questions of this report, thereby providing a clear path for how the thesis is going to be conducted. It has to be noted that the identified academic gap has not been justified in any previous studies, which is why the underlying reason for why macro-level factors have not already been included in supplier selection studies in great extent is unknown. Nevertheless, A. T. Kearney's strong emphasis of the importance of using such factors in major outsourcing engagements based on previous experiences, as well as the fact that some scholars have already commenced to address this gap, can be argued to be a justification for the further research which will be conducted in this report. If further information about A. T. Kearney should be of interest, then please refer to Appendix A where a company description is enclosed.

1.1 Problem Statement

Based on what has been presented in the introduction, it can be argued that being more fact-based and analytical in supplier selection procedures, thereby considering various hard factors and soft factors from both the micro-level and the macro-level domain, can be considered of value for firms in the modern economy. The problem, however, is that not many firms in the current economy do this, and the scientific literature which combine both micro-level and macro-level factors is still scarce. No comprehensive list of both types of factors have been developed to date, and macro-level factors have neither been ranked for supplier selection purposes. Both issues can be considered gaps in the current academic landscape of supplier selection research.

Hence, based on the identified problem, the purpose of this report is to gather a large amount of factors from both the micro-level and macro-level domain that can be used for supplier selection and convey them into a comprehensive list. Also, empirical research will be conducted in order to identify which of the large amount of factors are of greatest importance, thereby proposing a new factor-ranking with the inclusion of macro-level factors. The objective of the accumulation of factors, as well as the ranking of those,

is to contribute to filling the identified academic gaps, while at the same time fulfil the needs of the collaborative partner of this thesis. The factor accumulation and the ranking is therefore also pursued to determine which of the factors should be included in the supplier selection software for A. T. Kearney, thereby allowing comprehensive combinatory decision-making as well as risk adjustments to be made based on different important macro-level factors. The latter task is a part of the practical element of this report, where a tangible output in terms of a decision-model based on CO has to be developed by using practical decision-making software. In order to fulfil the purpose and objectives of this thesis an overall problem formulating question, also referred to as the central research question, has been developed:

Problem Formulation: *"Which micro-level and macro-level decision factors should be considered in major supplier selection engagements, and how can the factors be integrated into decision-making software which is based on a collaborative optimisation approach?"*

In order to answer this question extensively, it has been dissected into three research questions, which are presented in the following subsection.

1.1.1 Research Questions

In order to identify a large amount micro-level and macro-level factors, a systematic literature review will be conducted. To be able to capture all micro-level and macro-level factors, literature from both supplier selection research and FDI research will be taken into consideration, thereby providing in-depth insights to both research streams. The underlying reasons for why FDI research has been used is explained in the respective section later in the report (See Section 4.3). Hence, the first research question:

RQ 1: *"Which decision factors have currently been proposed within the field of supplier selection and FDI literature?"*

Subsequently to the systematic literature review, empirical research will be conducted in order to assess if further factors besides the ones identified in scientific studies should be included, while the importance of all the various micro-level and macro-level factors will be determined by the development of a novel factor-ranking. Outsourcing experts will therefore first be asked to participate in qualitative interviews in order to assess if further factors should be added to the total list of academic factors. Managers within the field of outsourcing and/or purchasing will subsequently be asked to participate in a quantitative study, by providing their opinion on the importance of different micro-level and macro-level factors for supplier selection. The latter part serves to synthesise the main factors that the participating companies see as being important when selecting suppliers. Hence, the second research question:

RQ 2: *"Which decision factors are further suggested by practitioners, and which of all the identified micro-level and macro-level factors (i.e., from academia and practice) are of highest importance when firms today engage in major supplier selection activities?"*

When an analysis and a ranking of the various factors have been conducted based on the empirical research, the next and last step of the report will be to include the various factors into the CO supplier selection software, which will be developed for A. T. Kearney in order

to manage the complexity associated with conducting multi-criteria decisions. This part will therefore be the practical part of the thesis, where the former generated content is used as input for a practical problem. Qualitative research will also be conducted here in order to obtain knowledge regarding the software in which the factors have to be integrated. The third research question is formulated as following:

RQ 3: *"How can the most important micro-level and macro-level factors from the empirical research be integrated in the collaborative optimisation software?"*

Now that the problem formulation and the research questions of this thesis have been presented, the next step is to present the methodology which will be used in this report. It has to be noticed that the report is divided into three parts in order to make the storyline clear. Each part is responsible to answer one research question. This also means that the first part is strictly theoretical, that the second part is empirical, and that the third part is practical. The first part will be commenced after the methodology chapter.

Methodology 2

This chapter will present the different methodologies used throughout this report. The chapter will be structured into three main sections; 1) *Type of Research Project*, 2) *Qualitative Research*, and 3) *Quantitative Research*. The first section will examine the nature and the requirements set up for the research as well as the research type. The second section will present how the systematic literature review of the report has been conducted as well as how qualitative interviews have been completed in order to derive desired information. The third and last section will present how the data selection and data retrieval for the quantitative part of the report have been pursued.

2.1 Type of Research Project

The scope of this project is based on the requirements provided by A. T. Kearney when the topic was defined before the actual commencement of the thesis. Also, the project is based on the requirements presented in the syllabus of the University of Twente as well as the Technical University of Berlin, while further requirements have been provided by the academic supervisors from both universities.

As presented in Chapter 1, the purpose of the report is to investigate which factors are currently proposed for supplier selection and FDI decisions, which factors are of highest importance, and how can the factors be managed by integrating the most important ones into a software tool based on CO. As a result of the extensive need for literature and conduct of interviews in order identify the currently proposed factors for supplier selection, and due to the data needed to identify which ones are of greatest importance, the type of project can be classified as a combined qualitative and quantitative research - a mixed-method approach. The objective of the qualitative part is to identify which factors are currently proposed in academia and in practice for supplier selection activities, and subsequently compile this into a large list of factors which can be used for supplier selection engagements. The objective of the quantitative part will on the other hand be to conduct an empirical study based on surveys which will enable practitioners specialised in outsourcing to rank the compiled list of factors based on their perceived importance. A further elaboration of the research type and the way it will be conducted is included in the subsequent section where the research design of the report is visually presented. A more thorough description of the qualitative research is presented in Section 2.2, while a more thorough description of the quantitative research is delineated in Section 2.3.

2.1.1 Research Design

In order to have a clear plan for how the research questions will be answered, a good research design has to be formulated. As it is argued in Saunders et al. (2011), a research design serves to translate the research questions and main objectives into a research project, which considers certain research strategies and choices. As mentioned before, this report is a combination of qualitative and quantitative research, which is why the following two section will serve to elaborate how each type of research was conducted. However, a visualisation of the overall research design has been developed in order to provide a clear overview of what the methods presented in the subsequent sections covers within the overall report. The visualisation of the research design is portrayed in Figure 2.1.

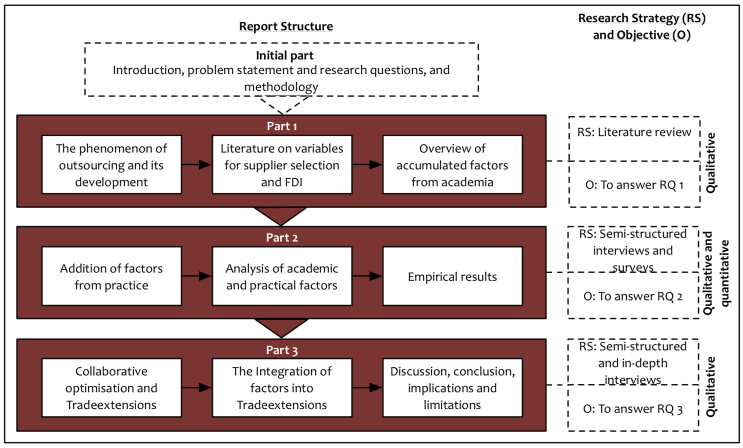


Figure 2.1. Visualisation of the research design used in this report

2.2 Qualitative Research

The qualitative part is based on a systematic literature review as well as qualitative semi-structured interviews and in-depth interviews, which is why those two approaches will be presented in the following subsections.

2.2.1 Qualitative Data Selection and Retrieval

Throughout the development of this report, various sources have been used to gather qualitative data. The selection of sources for qualitative data has been based on what can be assessed to be the most trustworthy; that is, the most credible scientific journal articles, online sources, as well as knowledgeable people in the field of outsourcing. Part I of the report served to determine which decision factors have currently been proposed within the field of supplier selection and FDI literature. In order to determine this, a systematic literature review has been conducted. Qualitative interviews were used for the first time in Part II, where interviews were conducted with different practitioners in order to identify if further factors, which have not been proposed in academia, likewise should be taken into consideration. Also, as the amount of factors retrieved from academia and practice can be considered substantial, external sources were moreover needed in the

clustering and filtering process of those factors, which is why qualitative interviews also were conducted for this purpose. Qualitative interviews were also conducted for Part III in order to obtain knowledge about the decision-making software in which the factors have to be implemented for A. T. Kearney. Based on what has been mentioned above, two subsections have been developed. The first subsection will present how the systematic literature review was conducted for Part I, while the second subsection presents how the qualitative interviews were conducted for Part II and Part III.

Systematic Literature Review

As mentioned previously, the systematic literature review was conducted in order to answer the first research question by identifying, selecting and synthesising the large amount of studies. The underlying reason for why a systematic literature review was conducted was due to the broadness of the research question (i.e., *"Which decision factors have currently been proposed within the field of supplier selection and FDI literature?"*) which generally asks for an identification of all the factors which have been presented in supplier selection and FDI literature. Also, as presented in Chapter 3, an introduction to the general outsourcing phenomenon was conducted in order to provide an understanding of the groundwork in which supplier selection research is rooted. This also required a review of this existing academic literature; however, since the review of supplier selection and FDI studies was more extensive in this report, and since the review of those streams was used to answer the first research question, the underlying approach for how this systematic review was conducted will be emphasises in the following paragraphs.
In order to conduct the systematic literature review effectively and thoroughly, the approach presented in Saunders et al. (2011) was used as inspiration. Here, it is articulated that a certain subject area (or subject areas) should be pursued, that the publication period should be specified, that the literature type should be emphasises (e.g., type of publications), that the geographical search is determined, and that the publication language is specified (Saunders et al., 2011). For this reason, the following paragraphs serves to encapsulate those requirements.

Databases and Keywords for Subject Areas: The studies were retrieved from various academic databases and scholarly publishers such as Emerald Insight, Wiley Online Library, Springer, ScienceDirect (Elsevier), and others. However, Google Scholar was used as the main aggregation platforms to identify articles which were retrievable from the various publishing websites. The choice of using Google Scholar as the main database is due to the fact that its coverage is larger than other databases (Falagas et al., 2008), and due to its intuitive nature. Gehanno et al. (2013) also argue that the database is good to use alone for systematic literature reviews. However, Scopus was also used as a secondary database to capture further potential useful studies. Hence, those were the platforms which were used to enter the various keywords to identify and retrieve the studies which have been used throughout the literature review.

The keywords which have been used to identify the prevalent studies within the field of supplier selection can be considered many, and they were all listed in an initial brain storming session. Different keywords were here listed, and synonyms were identified for the most important ones. For instance, when searching for *supplier* selection, other synonyms such

as *vendor* and *contractor* were also used. The primary keywords used were the following: *Supplier/vendor/contractor selection factors/criteria*, *supplier/vendor/contractor selection location factors/criteria*, *supplier/vendor/contractor selection micro factors/criteria*, *supplier/vendor/contractor selection macro factors/criteria*, *supplier/vendor/contractor selection risk factors/criteria*, *supplier/vendor/contractor selection risk management*, *supplier/vendor/contractor risk assessment*, *supplier/vendor/contractor location selection risk*, *supplier/vendor/contractor parameters*, *supplier/vendor/contractor factor/criteria ranking*, *risk management supplier/vendor/contractor selection*. Also, numerous re-configurations and combinations of those keywords were made, while operators and boolean logic likewise were used. It is therefore believed that all the most prominent studies within the field of supplier selection based on the keyword configurations have been retrieved. Of course, it has to be notified that the literature which have been reviewed only include studies that have been published in journals written in English. Hence, Doctoral dissertations and non-English studies have not been reviewed. Despite this, every effort has been made in order to be exhaustive, and any oversight studies of importance are regretted and unintentional.

The approach was the exact similar when literature from the FDI domain was retrieved. The same search engines were used, and the keywords were similar; however, keywords such as *supplier/vendor/contractor selection* was substituted with *facility/location/facility location/FDI*, and that the keyword *determinants* was added to *factors/criteria* as this is used often in FDI research. Similarly to the search for supplier selection literature, only studies which have been published in English journals have been used, and dissertations have not been considered in the report.

The keywords used to find studies that combine micro-level factors and macro-level factors factors for outsourcing engagements were only different when it comes to the configurations of concepts. The keywords used to retrieve adequate studies within the field of suppler selection and FDI literature were here combined in various ways. Similarly to when searching for supplier selection and FDI studies, operators and boolean logic were used in order to specify the searches further.

Of course, similar for all three domains in which searches were made, studies were also identified within the studies, that where retrieved based on the keyword combinations presented above. In order for those papers to be accepted in this report, all the requirements presented in this section had to be fulfilled as well.

Publication Period of Used Literature: As a result of supplier selection literature being a research stream that dates back to the middle of the 20th century, numerous studies have been identified and investigated. However, since several studies have already accumulated and listed several factors based on old studies which, for instance, only presented a couple of factors, such studies were prioritised in this report. In fact, an exclusion criteria was thereby established in order to not include any supplier selection studies that present less than 10 factors. Hence, all the used studies - except for the initial work conducted by Dickson (1966) - presented factors based on various previous studies which is why the total amount of retrieved factors can be considered high relative to the amount of reviewed studies. Since Dempsey (1978) and Weber et al. (1991) gathered most of the literature since the early work of Dickson (1966) and until the early 1990s, all the

studies used in this report, besides the earlier studies just mentioned, are from the 1990s to date. Literature with a maximum age of 25 years was therefore being searched for, as supplier specific factors from earlier years were already captured in the two studies mentioned above. In terms of literature on FDIs, it became clear during the literature search that less articles have accumulated and listed various factors which should be taken into consideration in FDI engagement. For this reason, articles which only presented a couple of factors (i.e., from five and beyond) were also considered, and since only a few studies which comprehensively summaries earlier studies on FDI factors were identified (e.g., similarly to Cheraghi et al. (2011) for studies on supplier selection factors), no constraints were set up for the publication years of the retrieved FDI studies.

When searching for studies that have combined both micro-level and macro-level factors for outsourcing purposes, it was evident from the beginning that the scarcity of such studies can be considered high. For this reason, no exclusion criteria were established regarding from which point in time the studies should have been published. All the studies identified within this field are moreover from the 21st century, which mirrors the novelty of this research.

Usage of Scientific Journals and Their Geography: In the initial part of this report, it was decided that only journals with a top impact factor from the supply chain management and business administration field would be considered for the supplier selection and FDI literature review (e.g., Journal of Supply Chain Management, Journal of Operations Management, Journal of Purchasing and Supply Chain Management, Journal of International Management, Journal of International Business Studies, Journal of Management, etcetera). However, after the initial search on especially supplier selection factor studies, it became evident that the spread of journals for this research stream can be considered large. That is, various journals from different academic avenues have been used throughout the years, which is why limiting the report to certain types of journals was assessed to be unreasonable as various good studies would be neglected. For instance, the study of Cheraghi et al. (2011), which served to update the initial work of Dickson (1966), and which can be considered a good paper due to its comprehensive examination of supplier specific factors and its number of citations, was published in the Journal of Applied Business Research, which is not directly related to supply chain management and business administration journals. Dou and Sarkis (2010), which is considered a key study in this thesis due to the fact that it combines micro-level and macro-level factors was also published in the International Journal of Production Research, which is not directly related to supply chain management and business administration journals. Having neglected this study due to its production focus - when assessing it based on the journal - would have been a strong omission in this thesis. Nevertheless, although some of the studies which have been assessed to be useful for this report are from journals which were not desired in the first place, the vast majority of the used studies are still from journals which primarily publishes studies within the field of supply chain management and business administration domain. It is, however, important to notice that regardless of which domain the journal is from, only top tier journals with a high impact factor have been considered in the systematic literature review. Also, journals from all over the world were considered, and were not limited by their geographical origin, as long as the written language of the

journal articles was in English. Conference papers and other non-published studies were excluded. For instance, although numerous of factors were presented, Calvi et al. (2010) was excluded from the useful list of supplier selection studies due to the fact that it was an unpublished paper. Premus (1982) was, for instance, neither used for the list of FDI factors since it was a study developed for the Joint Economic Committee Congress of the US, thereby not being published in a scientific journal. Lastly, Lin et al. (2007), which actually presented macro-level factors for supplier selection purposes, was eliminated as it was a conference paper.

Now that the structured approach for the literature review has been presented, the next step is to illuminate how qualitative information has been gathered based on different interview approaches.

Semi-structured and In-Depth Interviews

In Part II and Part III, where the last two research questions will be answered, qualitative interviews were necessary to conduct. As mentioned earlier, the first part of the second research question does specifically ask for which factors are proposed in practice beside the ones identified in earlier scientific studies. For this reason, qualitative research in terms of *semi-structured interviews* have been conducted as a part of the empirical research related to this report. A semi-structured interview is here defined as *"[...] a verbal interchange where one person, the interviewer, attempts to elicit information from another person by asking questions. Although the interviewer prepares a list of predetermined questions, semi-structured interviews unfold in a conversational manner offering the participants the chance to explore issues they feel are important"* (Longhurst, 2003, p. 117). With more than 20 years of outsourcing experience, it was assessed that the practical supervisor for this thesis - a Vice President for Europe, Middle East, and Africa (VP EMEA) - would be a value-adding and credible source for discussions about decision factors. Also, a further external practitioner was used: A Supply Chain Planner (SCP) from a world renowned healthcare company with its headquarters located in Copenhagen, Denmark. The sample used in this respective case can be considered quite convenient as they are both directly connected to the author. However, since the VP EMEA is one of the global thought leaders within the field of outsourcing, and since the SCP likewise has good experience with outsourcing, it can be argued that the sample is adequate for the purposes of this report. The fact that the SCP works in one industry can of course have some drawbacks compared to the VP EMEA who can provide perspectives from various industries; however, with a master's degree in Supply Chain Management, and with outsourcing experience from other companies as well, it has been assessed that the SCP would be value-adding to include for semi-structured interviews.

Besides using semi-structured interviews to identify which further factors can be added to the total list of academic factors in Part II, further interviews with the same sample of experts were conducted in order to validate the clusters which were made by the author, thereby reducing subjectivity. Clusters were developed in order to structure the large amount of factors which have been identified in the literature review of the report and in the qualitative interviews just mentioned. The structured list with clusters was developed in order to make it more tangible and operational for usage by practitioners, but also to

enable the conduct of quantitative empirical research (See Section 2.3). Lastly, qualitative interviews in Part II were conducted to validate the filtering of the identified factors, as some of the macro-level factors were assessed not to be of value for supplier selection engagements, since they have been derived from FDI literature. Hence, in a nutshell, the interviews for the last two purposes were used to validate the clusters and filtered list of factors which the author had already conducted prior to the meetings in order to reduce subjectivity, and in order to make the work more thorough and complete. A further elaboration of the underlying reasons for why the clusters were developed and why a filtering process took place is included in Chapter 7. The semi-structured interviews for Part II were hence conducted in multiple rounds, over a time period of two months. Table 2.1 illustrates the list of interviews which were used for Part II of the report.

Meeting No.	Date	Interviewee and Channel	Type of interview	Purpose
1	02.03.15	Supply Chain Planner - F2F at the headquarters in Copenhagen	Semi-structured	To go through all identified supplier selection and FDI factors from academia, in order to assess if further factors should be added.
2	06.03.15	Vice President EMEA - Via Skype	Semi-structured	To go through all identified supplier selection and FDI factors from academia, in order to assess if further factors should be added. Also, the clusters which the focal author of the report had developed were discussed.
3	13.03.15	Supply Chain Planner - Via Skype	Semi-structured	To go through the clusters which the author of the report have developed, and to ask questions regarding whether further clusters should be added.
4	20.03.15	Supply Chain Planner - Via Skype	Semi-structured	To ask questions regarding whether the interviewee interpret some factors as being similar, thereby validating the amalgamation process of factors conducted by the author.
5	27.03.15	Vice President EMEA - F2F in Berlin	Semi-structured	The main purpose of this meeting was to discuss the model (See Table 2.2); however, the filtering of factors were also discussed briefly.

Table 2.1. Overview of interviews conducted for Part II

Besides conducting qualitative interviews for the purpose of adding further factors, cluster the accumulated factors, and filter those factors, in Part II, qualitative interviews were likewise conducted for Part III in order to obtain the necessary information to be able to integrate important supplier selection factors into the optimisation decision-making software, which A. T. Kearney required for the project. Semi-structured interviews were also conducted for this purpose; however, for the initial four meetings, unstructured interviews - also referred to as *in-depth interviews* - were conducted. An in-depth interview is a method where *"The interviewee is given the opportunity to talk freely about events, behaviour and beliefs in relation to the topic area, so that this type of interaction is sometimes called 'non-directive'. It has been labelled as an informant interview since it is the interviewee's perceptions that guide the conduct of the interview."* (Saunders et al., 2011, p. 321). The reason why such an interview method was pursued was due to the fact that the author was unsure about how the important factors from Part II should be integrated into the software solution which A. T. Kearney required for Part III. Also, since the concept of CO neither was clear to the author due to the fact that little research has been conducted on the topic, further information was desired through in-depth interviews,

which are more explorative in their nature. The first interviews were therefore guided by some questions developed by the author, but the discussions were primarily lead by the VP EMEA in order for him to provide all necessary information to the author to be able to initiate the practical work of the thesis. Table 2.2 depicts all the interviews which have been conducted in order to obtain knowledge about how the supplier selection software and how the complexity of the micro-level and macro-level factors can be managed. As it can be seen in the *Date* column, the interviews for Part III date back to October 2014, as the decision-model development was what the author started with in the project (i.e., due to the fact that technical knowledge should be gained). Hence, to make sure that the process of qualitative interviews is clear, it should be noted that the interviews for Part II were conducted after the ones for Part III were commenced.

Meeting No.	Date	Interviewee and Channel	Interview Type	Purpose
1	20.10.14	VP EMEA - A. T. Kearney - Via Skype	In-depth	To discuss the underlying reasons and exact objectives of the model which is to be developed, the scope of factors which have to be included, and how the model can be used to manage the complexity of the large amount of included factors. Also, it was discussed why optimisation is better than generic scorecard approaches such as AHP.
2	12.11.14	VP EMEA - A. T. Kearney - Via Skype	In-depth	To discuss how macro-level location-specific factors, which can be considered "soft", can be included in the model. The possibility of including projected future values was also discussed, while the basics of the optimisation software was being run through.
3	18.11.14	VP EMEA - A. T. Kearney - F2F in Utrecht	In-depth	To have a more detailed discussion about the software which is going to be used. The main components of the software (Trade Extensions) were discussed, and an overview of how it is structured was obtained (i.e., bids, lots, bid fields, lot fields, constraints, supplements, etc.). Possible involved stakeholders were also discussed.
4	16.02.15	VP EMEA - A. T. Kearney - F2F in Berlin	In-depth	To discuss how the model will have to be developed in practice. Templates are normally used by A. T. Kearney, which subsequently are imported into Trade Extension. A template from a previous engagement was provided, while access to the software as well as certified academy courses was granted. Also, it was discussed how certain factors should be included in the cost function. Sources of data for the model were also discussed.
5	18.03.15	VP EMEA - A. T. Kearney - Skype	Semi-structured	To conduct a detailed discussion about the functions of Trade Extensions. The author has obtained the software certificates prior to the meeting, which is why parts of this course were discussed. Also, it was discussed how the mock-up template should be developed (i.e., content of sheets, and the visibility of these sheets to the involved stakeholders).
6	27.03.15	VP EMEA - A. T. Kearney - F2F in Berlin	Semi-structured	To conduct a discussion about the draft mock-up as well as to ask questions about which factors to include in the cost function of the model, and which factors to include as constraints. Also, potential data sources for macro-level factors were presented, and questions about this were prepared.
7	15.04.15	VP EMEA - A. T. Kearney - Skype	Semi-structured	To assess how the macro-level factors should be added in the software. Using bid fields or bid supplements are both viable options, but due to the higher level of details by using bid fields, it was decided that such fields should be used. It was assessed that all location-data should be populated automatically depending on the locations which suppliers enter. Also, it was agreed that supplier-specific soft factors should be added as bid supplements.
8	22.04.15	Analysts - A. T. Kearney - F2F in Berlin	Semi-structured	To discuss technical issues regarding the usage of the Trade Extensions software. It was necessary to understand how the micro-level and macro-level factors could be divided into separate bid tables, but still be provided for the same components that are being outsourced by the buyer. The outcome should be presented for the VP EMEA in a subsequent meeting (Skype call on the 06th of May 2015).

Table 2.2. Overview of interviews conducted for Part III

Meeting No.	Date	Interviewee and Channel	Interview Type	Purpose
9	06.05.15	VP EMEA - A. T. Kearney - Skype	Semi-structured	To discuss the current set-up in the software. The pipe commands used to separate the micro-level factors from the macro-level were presented. How to develop a multi-period approach in the Trade Extensions software was also discusses, while the usage of constrains also was discussed. Here, the different between normal constraints/rules on a scenario-basis was compared to constraints developed in the assert statement.
10	18.05.15	VP EMEA - A. T. Kearney - Skype	Semi-structured	To discuss all the lot fields and bid fields which have been included in the model. Several lot fields were added, including 'delivery destination' and 'quantity needed', while additional bid fields including the 'ex-works price' and 'delivery duty paid' also were added. It was also discussed what kind of alternative bids a supplier should be able to include in the model, thereby fulfilling the requirements for a true CO approach.
11	22.05.15	Analysts - A. T. Kearney - F2F in Berlin	Semi-structured	To get input regarding how the multi-period approach can technically be developed in the model. Different methodologies were discussed, but it was assessed that the simplest way would be to enable the suppliers to add offers for different periods (e.g., years), whereafter the decision maker can run scenario's for the individual years by the usage of constraints.
12	04.06.15	Analysts - A. T. Kearney - F2F in Berlin	Semi-structured	To discuss how bid analysis fields can be defined in the software in order to enable the participating suppliers to review their position in regards to the other suppliers who likewise are providing offers. As it will be mentioned in Part III, the fact that suppliers can see their position is one of the key components of CO.
13	11.06.15	VP EMEA - A. T. Kearney - Skype	Semi-structured	To discuss the current multi-period approach used in the model, and how it can be modified in order to be more useful for practical purposes. Furthermore, it was discussed whether it would be adequate to add further cost factors which are included in the 'cost' cluster', in order to dissect the costs further based on a total cost of ownership approach.
14	24.06.15	VP EMEA - A. T. Kearney - Skype	Semi-structured	To discuss issues regarding some tags in the Excel sheet, which has to be uploadable to the Trade Extensions platform. 'readOnly' pipe commands and validation cells were here discussed, and questions regarding what further features the Excel sheet should encompass were asked.

Table 2.3. Overview of interviews conducted for Part III - (Cont'd)

2.3 Quantitative Research

The quantitative part of this research is a results of the usage of surveys, which have been developed in order to obtain sufficient data to answer the second research question. As it has briefly been mentioned in Chapter 1, the current research on supplier selection has only developed rankings including micro-level factors (a further description of this is added in the literature review in Chapter 4). In order to update the rankings with macro-level factors based on new empirical research, surveys were sent out to a population equivalent to the ones used in previous studies. This will be further elaborated in the following subsection, where the sources from where the data has been obtained likewise are presented. However, before this elaboration will take place, the survey instrument will be presented.

2.3.1 Survey Instrument Design

The survey instrument which was designed to collect data was inspired by previous studies. Similar to Kannan and Tan (2002), the factors which had to be ranked were retrieved from previous studies, as well as what is further proposed by practitioners (See Chapter 4 and

Chapter 6). However, as mentioned in Section 2.2 in this chapter, since the total list of factors in the report is much larger than the list of factors which have been ranked in earlier studies, a clustering and filtering process took place in Chapter 7. The respondents in the survey did thereby only have to rank broad variables (also referred to as constructs) which the clusters were organised around. The construct used in this report are very similar to the broad variables which were ranked in earlier supplier selection studies (e.g., quality, cost, delivery, etcetera); however, in order to ensure the comprehensiveness of the research, all factors which have been clustered under each construct were still presented in the survey, so that the respondent could obtain a better idea of what the constructs exactly encompassed. A further description of the benefits of this approach is presented in Section 7.1.

A total list of 25 constructs, with a total amount of 285 factors within them, were included in the survey. For each construct, the respondents were asked to assess the importance based on a five-point likert scale (5 = very important, 4 = important, 3 = undecided, 2 = unimportant, and 1 = very unimportant). Similarly to the research by Choi and Hartley (1996), the respondents were asked to score the factors based on a recent major outsourcing engagement which they were a part of. By reflecting on a specific recent case, it is assumed that the respondents are more likely to score the constructs based on actual practices rather than what can be considered socially desirable. When the constructs were scored, the next step for the respondents was to answer five further questions about the specific outsourcing engagement. Firstly, the motivation for the outsourcing event should be specified. Here, the three most common reasons for outsourcing, according to Schiele et al. (2011), were selectable; those were 1) to achieve cost saving, 2) to access innovative products which would otherwise be unavailable, or 3) to exploit sales opportunities in the outsourcing region. Next, the location of the supplier should be specified. The amount of turnover which was assigned to the supplier was subsequently asked for, while the performance of the outsourcing engagement should be specified at the end. The performance question asked the respondent to rate the overall performance of the selected supplier on a five-point likert scale. Only a few studies have previously examined whether a certain utilisation of factors for outsourcing engagements yields a higher performance. In fact, in this report, only one study which has done this was identified, namely the study of Kannan and Tan (2002). The problem here was, however, that they looked on the performance of the overall company, and not the individual outsourcing engagements. Since it can be argued that the overall performance of a firm (e.g., a firms market share, its return on assets, its overall product quality, etcetera) is influenced by much more than just the outsourcing engagements and the supplier selection factors which a firm pursue, these broad measurements were not used in the survey of this research. Neither were individual KPIs used, as this would simply derive too many technical questions for the respondent. For this reason, an overall score in regards to the latest outsourcing engagement was asked for, thereby providing a more useful result than if the overall company performance was used, and with a lower complexity than if individual KPIs were used. A visualisation of the complete survey instrument can be found in Appendix E.

In order to ensure the comprehensiveness of the survey before it was distributed to the selected sample, it was revised throughout three rounds with the academic supervisors of the thesis. After the last round, when all the comments and feedback were implemented

in the survey, it was distributed to five fellow students, as well as the SCP, in order to pretest it for content validity. The questions and the structure were then reworded where it was necessary, in order to enhance the clarity and the validity. Subsequently to this, the survey was distributed to the a certain type of people - this is further presented in the following section.

2.3.2 Quantitative Data Selection and Retrieval

In previous empirical studies which served to develop a ranking of supplier selection factors, managers within the field of outsourcing and purchasing were used as samples to obtain the needed information. For instance, Dickson (1966), Choi and Hartley (1996), and Kannan and Tan (2002) used the member-base of the Institute of Supply Management (ISM) to get access to purchasing managers. Dickson (1966) distributed his survey to 273 purchasing managers, while Choi and Hartley (1996) and Kannan and Tan (2002) reached out to 733 and 4,500 purchasing managers, respectively. Kar and Pani (2014) distributed their survey to 512 purchasing managers through a channel which was not declared in their research.

In this report, a purposive sampling technique was pursued in order to ensure high quality responses from experts within the field of outsourcing. Similar to Kar and Pani (2014), it was assessed that only people with more than five years of experience in purchasing and outsourcing should be approaches. Both small and medium-sized enterprises (SMEs) and multinational enterprises (MNEs) were considered in this report. This means that any company which had an annual turnover of €10M or more was considered eligible to participate, based on the definition of SMEs and MNEs from the European Commission. Startups and Micro-companies where not considered, as it is assumed that they do not engage in major outsourcing engagements in the same extent as SMEs and MNEs, and as it is assumed that the outsourcing/purchasing division of such firms is less mature.

In contradiction to, for instance, the research of Dickson (1966), Choi and Hartley (1996), and Kannan and Tan (2002), it has not been possible to gain access to the member-base of major institutions like ISM, although various attempts were made. As an alternative, two other sources were used to approach purchasing managers: The first source was the network of the author (i.e., connections of connections), and the second source was LinkedIn, the business oriented social network service. Based on the network of the author, a list of 21 people who possess a manager position or higher within the field of outsourcing, and with more than five years of experience, were created. All those managers were from Denmark, Germany, and the Netherlands, respectively. Through LinkedIn, 196 managers within the field of outsourcing and with more than five years of experience were approached, meaning that a total amount of 217 managers were contacted. The geography where here similar to the people who have been approach through the authors network. An original message as well as one reminder was submitted to each person with a two week interval. A total amount of 43 responses across 41 firms were obtained; however, one response was ineligible due to the company not fulfilling the criteria (revenue $<$ €10 million). Hence the response rate was equal to 19,4%. Further details about the sample and the outcome of the survey are presented in the empirical results in Chapter 8.

Part I

Outsourcing and Supplier Selection Research - A Review

Approach

The first part of the report serves to present the current literature on outsourcing and supplier selection. The overall phenomenon of outsourcing will initially be illuminated in order to provide a good overview of the groundwork which supplier selection research is based on. The concept of outsourcing will here be defined, whereafter its proliferation and development in academia and practice is presented. Subsequently to the general introduction to outsourcing, the current literature on supplier selection and the development of this literature will be presented. A systematic literature review has here been conducted with the objective of gathering all the supplier selection studies which serve to present various factors - in terms of decision variables - useful for supplier selection. However, since studies within supplier selection primarily consider micro-level supplier-specific factors, literature from the FDI research stream will also be reviewed in order to be able to obtain a good overview of which macro-level factors could be of value for supplier selection purposes. Studies which have already combined the two types of factors will also be examined; however, since the scarcity of such studies can be considered high, it has been assessed that reviewing studies within the field of supplier selection and FDI research likewise is of necessity. It has to be mentioned that not all the identified factors will be presented in the literature review. This is done in the last chapter, which is dedicated to provide a comprehensive tabular overview of all the factors identified in the supplier selection and FDI research streams. The comprehensive list of factors will thereby serve to contribute to fill the first academic gap as well as answer the first research question. The structure of Part I is portrayed in Figure 2.2.

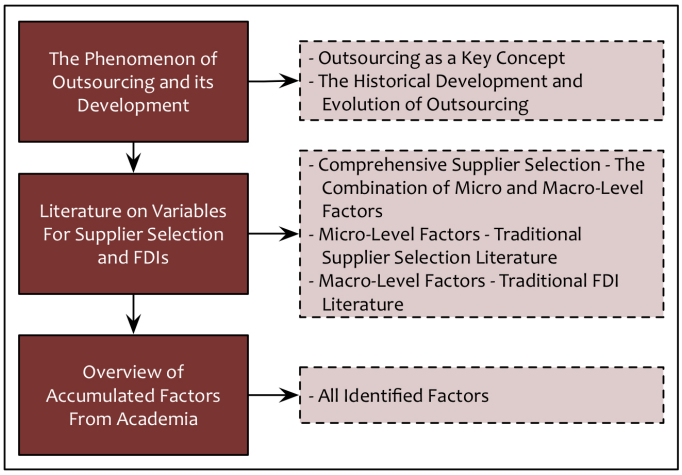


Figure 2.2. Structure of Part I

The Phenomenon of Outsourcing and its Development 3

The first chapter of Part I serves to present the general concept of outsourcing, what it entails, and how it has diffused and developed in practice and within academia. The chapter is composed of two sections, where the first section will present the basic elements of outsourcing, while the second section will provide a historical overview of outsourcing and its continuous development. The overall chapter serves to create a thorough understanding of outsourcing, thereby creating a foundation for Chapter 4, which will introduce one of the sub-streams related to outsourcing, namely supplier selection literature.

3.1 Outsourcing as a Key Concept

Outsourcing is a concept which has become of great importance for firms in the last decades in order for them to maintain or increase their competitiveness. This is primarily due to the increased globalisation, as well as the elevated level of competition and dynamics in most external business environments (Cavusgil et al., 1993; Gilley and Rasheed, 2000; Gottfredson et al., 2005; Maskell et al., 2007; Boardman Liu et al., 2008; Chen, 2011).
In a nutshell, outsourcing can be defined as *"[...] the transfer of the production of goods or services that had been performed internally to an external party"* (Ellram and Billington, 2001, p. 16), and is traditionally an abbreviation for "outside resource using" (Arnold, 2000). Hence, outsourcing is an approach which is used to transfer the ownership of one or more activities from one actor to another (Zhu et al., 2001). The approach can both be pursued domestically - that is, within the national borders of a firm - and/or internationally (Kotabe and Murray, 2004). The domestic approach is often referred to as *'domestic outsourcing'*, while international sourcing is referred to as *'offshore outsourcing'* (Kotabe and Murray, 2004; Hätönen and Eriksson, 2009). *'Offshoring'* is, however, also a term which is used as a synonym to FDIs and facility location, which is why this construct should not be confused with *'offshore outsourcing'*. FDIs can be argued to be an opposite approach to outsourcing, as operations are transferred to a foreign location but conducted in internal facilities instead of external. Hence, in this thesis, offshore

outsourcing is exclusively used when referring to outsourcing which takes place outside the national borders of a firm, while the term 'outsourcing' is used as a broad concept to cover both domestic outsourcing and offshore outsourcing. A simple clarification of the different sourcing types is portrayed in Figure 3.1.

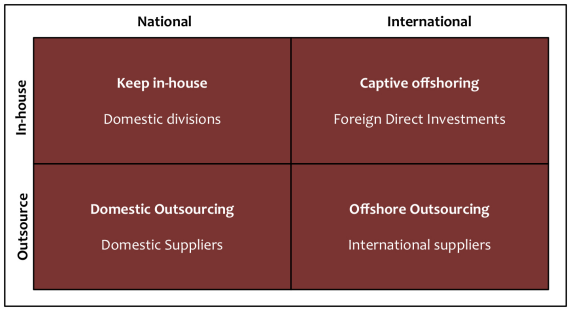


Figure 3.1. Clarification of sourcing types - inspired by Sako (2006), Kinkel and Maloca (2009) and Peng (2013)

Outsourcing can take place on many levels of aggregation, and the functions which firms outsource do likewise vary in great extent. According to McGovern and Quelch (2005) firms often outsource activities such as call center operations, direct mail and e-mail program management, website management, and database management, while other scholars refer to more traditional outsourcing engagements such as outsourcing of manufacturing (Momme, 2002), logistics (Abdur Razzaque and Chen Sheng, 1998), auditing (Rittenberg and Covaleski, 2001), accounting (Everaert et al., 2006), information systems (Lacity and Hirschheim, 2012), legal services (Woffinden, 2007), and even research and development (R&D) (Ulset, 1996). Also, Kakabadse and Kakabadse (2005) has identified that the most commonly outsourced activities are related to basic services, human resources, IT services, and telecommunications. Of course, the extent to which a firm engages in outsourcing activities, and the types of functions which a firm selects to outsources, depend entirely on the specific circumstances of the individual firm, meaning its external environment, its internal resources, its corporate and competitive strategy, etcetera (Kahraman et al., 2003; Gottfredson et al., 2005). Ensuring that there is a congruence between a firms purchasing/outsourcing activities and its overall strategy, etcetera, is also referred to as an outsourcing strategy (Monczka et al., 2008).

Pursuing outsourcing as a corporate practice has numerous of benefits, and the underlying rationales for engaging in outsourcing can therefore be considered to be many. Quinn (1999) and Gilley and Rasheed (2000) do, for instance, accentuate that cost reductions can be achieved, that a firms flexibility can be enhanced, that the focus in greater extent can be placed on a firms core competences, and that a firm can obtain higher quality components or services as well as gaining more innovative knowledge compared to if the same operations were conducted in-house. However, the benefits and value perception of outsourcing have gradually changed through time. In fact, ever since the concept first became widespread in the 1970s, the research has identified various areas in which outsourcing can create value, which is why the subsequent section of this chapter will serve to present the development and proliferation of the outsourcing phenomenon.

3.2 The Historical Development and Evolution of Outsourcing

The idea of outsourcing certain products/components/materials or services became very widespread in the early 1960s, when firms started to realise the large potential of exploiting the competences and resources of external actors, thereby increasing their own effectiveness and efficiency (Dibbern et al., 2004). However, it was not before the 1970s, after the development of Williamson (1975)'s theory on transaction cost economics, that the phenomenon of outsourcing became highly proliferated in practice and within academia (Cox, 1996; McIvor, 2000; Hätönen and Eriksson, 2009). The work of Williamson (1975) was in a great extent based on the Nobel price awarded article - 'The Nature of the Firm' - by Coase (1937), which is why his groundwork can be argued to have been the first conceptual basis for outsourcing (Arnold, 2000). The idea of transaction cost economics within the field of outsourcing is - in simple terms - that firms make their outsourcing decisions with the objective of reducing transaction and production costs (McIvor, 2008). That is, if exploiting the market in terms of capitalising external sources would result in lower transaction costs compared to when a firm performs the same activity in-house, then that respective activity should be outsourced to a sub-contractor (Jarillo, 1988). Hence, the objective of outsourcing in the initial stage of its proliferation was primarily to increase the effectiveness and efficiency of firms by reducing the costs that previously were present as a result of certain in-house operations (Kotabe and Murray, 2004). Outsourcing was all about profit maximisation, where companies engaged in arm's length relationships by relying on contractual agreements (Hätönen and Eriksson, 2009).

Subsequently to the transaction cost era within the field of outsourcing, the idea of core competences started to play an important role. In their research, Prahalad and Hamel articulate that *"focusing on core competencies creates unique, integrated systems that reinforce fit among your firm's diverse production and technology skills - a systemic advantage your competitors can't copy"* (Prahalad and Hamel, 1990, p. 75). Pursuing the core competence approach requires that the core competences first are identified based on the evaluation of every activity within a firm, and that the practices and procedures which are not a part of the firms core competences are outsourced to an external supplier (Kakabadse and Kakabadse, 2005; Hätönen and Eriksson, 2009). Basically, Prahalad and Hamel (1990) increased the awareness regarding *what* to outsource which was not always completely clear in the generic transaction cost perspective (Hätönen and Eriksson, 2009). The competence perspective in outsourcing entailed that firms now went beyond the single measure of cost efficiency by also looking for external knowledge and competences which are sufficient to provide value for more complex and strategically important activities which was, however, not directly related to the core competences of firms. Strategic outsourcing did now become a new trending concept, and implied a more long term orientation to outsourcing by looking beyond single cost factors. More sophisticated practices and procedures started to be outsourced, and was generally facilitated by the larger pool of competent vendors (Quinn, 1999; Gottfredson et al., 2005). This is also emphasised by Quinn, who articulate that *"Executives increasingly understand that outsourcing for short-term cost-cutting does not yield nearly as much as outsourcing for longer-term knowledge-based system or strategic benefits - like greater intellectual depth*

and access, opportunity scanning, innovation, reliability, quality, value-added solutions, or worldwide outreach." (Quinn, 1999, p. 10).

Today, in the 21st century, the research on outsourcing does in great extent emphasise the importance of co-creation and collaboration between companies and their suppliers. The focus is now no longer just on reducing cost, enhance quality, emphasise core competences, etcetera, but also on creating networks which are agile and sustainable on the long-term (Hätönen and Eriksson, 2009). It can be argued that the changing nature of outsourcing has been greatly facilitated by the increased volatility and declining product life cycles that are present in many industries, which in turn is pushing firms to continuously develop themselves by engaging in innovative activities, and to be agile enough to adapt to changes which are occurring in the external environment - changes which likewise require the suppliers to adapt in order for a focal firm to stay competitive (Watts et al., 1995). The increasing focus of having a robust and sustainable supply chain is also accentuated by Lambert et al. (1998), who argue that competition in industries is no longer based on organisations versus organisations, but rather on supply chains versus supply chains, which is why cost and other hard measures are not the single most important parameters for outsourcing in the modern economy. Of course, despite the academic and practical trend of moving away from mere cost reduction towards more strategic and long-term rationales for outsourcing, some engagements in outsourcing and procurement still only focus on cost as the single most important factor. The focus point regarding what a firm wants to achieve is contingent to the individual outsourcing engagement. The generic procurement matrix of Kraljic (1983) can be argued to be a good example of an approach that considers different sourcing strategies depending on each individual sourcing activity; that is, for commodity components, a pure cost focus is, for instance, more appropriate than when a firm needs to outsource something which is of greater strategic importance. The overall paradigm shift, where the trend is to move from competitive/product based sourcing to cooperative/capability based sourcing is illustrated in Figure 3.2. As it can be seen in the figure, firms are moving from arm's length adverserial relationship (upper left corner) to a more capability-based partnership-like relationship (lower right corner). The two other corners are intermediate stages, which firms often go through before reaching an effective partnership-like relationship which is more long-term focused.

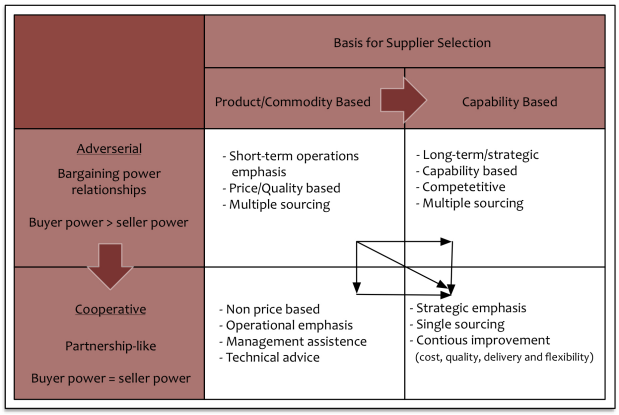


Figure 3.2. Shifting paradigm of the buyer-seller relationship (Watts et al., 1995)

As mentioned in Chapter 1, the topic and the scope of this thesis was provided in advance by A. T. Kearney; that is, which micro-level and macro-level factors are important to take into consideration when engaging in large-scale outsourcing decisions and how can those factors be integrated into a CO software. The overall topic is therefore specifically within the field of supplier selection, which can be considered one of the first steps in the overall supplier selection process - or outsourcing process - after the underlying reasons and objectives for the outsourcing engagement has been defined, and after suppliers have been identified for further evaluation (Motwani et al., 1999; Zhu et al., 2001; Momme, 2002; Mahnke et al., 2003). The research stream on supplier selection literature is according to Chen and Paulraj (2004) just one research stream under the overall supply chain management and outsourcing umbrella. Due to the scope of this research, the subsequent chapter is dedicated to present the literature on supplier selection, thereby introducing how this phenomenon has been investigated in the context of academia.

4 Literature on Variables For Supplier Selection and FDIs

Now that the concept of outsourcing and its development has been presented, this chapter seeks to go one step further by presenting the current literature on supplier selection and FDIs. As mentioned earlier, one the purposes of this report is to identify various micro-level and macro-level factors for supplier selection. After having investigated the literature on supplier selection, it was evident that very few studies consider macro-level factors for supplier selection procedures. The macro-level factors are, however, used in great extent within the field of FDIs, which is why a large amount of literature from this academic avenue also have been investigated. As a result of this fragmentation in the academic literature when it comes to factors that can be considered in comprehensive supplier selection activities, this chapter is divided into three sections. First, Section 4.1 will present the recent but yet scarce literature that combine both academic avenues (i.e., supplier selection research and FDI research). Section 4.2 and Section 4.3 will subsequently present each of the two research streams in more detail. A section is dedicated to each research stream in order to illuminate the groundwork which the recent studies that combine both research streams are build upon and to enable the development of a comprehensive list of factors. It has to be noticed that only an extract of the supplier selection and FDI factors will be presented and described in this chapter; a full list of all identified factors will be presented in a tabular form in Chapter 5.

4.1 Comprehensive Supplier Selection - The Combination of Micro and Macro-Level Factors

The selection of external suppliers is one of the initial steps in the overall outsourcing process, but can yet be considered one of the most important ones (Chan et al., 2008; Wadhwa and Ravindran, 2007; Deshmukh and Chaudhari, 2011). This is also pointed out by Weber et al., who in their research articulate that *"The selection of competent suppliers has long been regarded as one of the most important functions to be performed by a purchasing department"* (Weber et al., 1991, p. 2). Nonetheless, despite the fact that supplier selection has long been considered an important function within a firms purchasing

or supply chain department, only very few studies have attempted to combine micro-level and macro-level factors for supplier selection procedures, thereby making the supplier selection process more comprehensive and analytical. Supplier selection approaches which both combine micro-level and macro-level factors will in this report be referred to as *comprehensive supplier selection* (CSS) decisions.
The scarcity of research that combines both types of factors is also accentuated by Hätönen and Eriksson, who articulate that *"The location decision has been discussed, thus far, mainly in relation to foreign direct investment (Dunning's OLI paradigm), and the locational questions with regard to outsourcing have been somewhat neglected. Therefore this also seems to continue to be an important avenue for further research."* (Hätönen and Eriksson, 2009, p. 151). Kotabe and Murray also state that *"The ultimate objective of global sourcing strategy is for the company to exploit both its own and its suppliers' competitive advantages and the comparative locational advantages of various countries in global competition"* (Kotabe and Murray, 2004, p. 8), which also emphasises the need for further research that combines both micro-level and macro-level factors in the supplier selection process. It can be argued that the studies that have combined the two types of factors thus far have not done it exhaustively; that is, the number of factors included in those studies are significantly lower compared to the number of factors which studies within supplier selection research or FDI research have presented (See Section 4.2 and Section 4.3).

In their research, Kotabe and Murray (2004), for instance, only present a small handful of macro-level factors despite acknowledging that such factors are of importance in supplier selection processes. Graf and Mudambi (2005) also acknowledge the need to consider macro-level factors, and they do also develop a model that portrays how macro-level factors have an influence on the attractiveness on a suppliers location, and how this attractiveness is moderated by micro-level factors. However, besides this model (which was not tested empirically) and a couple of factors, not much could be derived from the study. Chan and Kumar (2007) and Chan et al. (2008) do also emphasise the importance of macro-level factors, as *"[...] global supplier selection is much riskier than its domestic counterpart"* (Chan et al., 2008, p. 3837). However, similarly to the other studies, despite the fact that both Chan and Kumar (2007) and Chan et al. (2008) acknowledge the importance of combining both micro-level and macro-level factors for supplier selection decisions, only four critical macro-level factors are suggested in both papers. Those factors are the overall *'geographical location'* of the evaluated suppliers, the *'political stability and foreign policies'* in that particular location, the *'exchange rates'*, and the level of *'terrorism and crime'* rates. In contrary to the former studies, Boardman Liu et al. (2008) provides a more comprehensive list of factors, all of which are categorised under five main constructs, those being 'costs', 'culture/language', 'economic/political', 'infrastructure', and 'expertise/viability'. However, their proposition of factors is still only based on a couple of previous scientific studies from the supplier selection and FDI literature, and they do in fact neglect various common supplier selection factors, thereby making their study resemble generic FDI studies. In the study of Hätönen and Eriksson (2009), the need for considering macro-level factors for outsourcing engagements is emphasised, but instead of presenting any factors, they emphasise the need for further research, and that FDI literature should be used to identify the macro-level factors. In another study from

the same year by Jussi Hätönen, a couple of macro-level factors are presented, but the objective of his study is not to present various micro-level and macro-level factors for supplier selection, but rather to identify whether micro-level factors are more dominant than macro-level factors on a relative level. Hence, Hätönen (2009) does not rank any of the presented factors, but rather investigates how location-factors are used for sourcing engagements based on two case studies involving SMEs.

After having screened a large amount of studies within those two academic avenues (See Section 4.2 and Section 4.3), it can be argued that the amount of studies, and factors included in the studies above, are very limited. Nevertheless, Dou and Sarkis have moved in the right direction in regards to developing an extensive comprehensive supplier selection approach, by developing a *"[...] model for evaluation and selection of various offshoring alternatives by simultaneously considering facility location factors, supplier selection metrics, and sustainability factors"* (Dou and Sarkis, 2010, p. 567). Similarly to what this thesis seeks to do, Dou and Sarkis (2010) accumulated various factors from both the supplier selection literature (See Section 4.2) as well as the facility location literature (See Section 4.3) in order to construct their respective decision model. They did, however, also add various sustainability factors separately from the supplier selection factors and the facility location factors in order to make their list even more comprehensive. Dou and Sarkis (2010) did also include all the identified factors into an analytical network process (ANP) model in order to manage the complexity related to the multi-criteria nature of such supplier selection decision. The ANP model, which is a generalised form of the analytical hierarchy process (AHP) model, is further elaborated in Appendix G, where traditional supplier selection approaches are presented. A further referral to this appendix is included in Chapter 9, where the CO approach is presented as one of the more novel types of decision approaches for supplier selection.
The work of Dou and Sarkis (2010) seems to be a inspired by earlier work conducted by Professor Joseph Sarkins, who both examined factors which should be considered for FDI engagements (i.e., Sarkis and Sundarraj (2002)) and factors for supplier selection (i.e., Sarkis and Talluri (2002)). Overall, despite the fact that Dou and Sarkis (2010) have moved in the right direction when it comes to proposing a comprehensive list of factors for supplier selection activities, the total amount of factors here can still be considered low compared to the total list of factors which will be presented in Chapter 5 in this report, meaning that a more comprehensive list should still be constructed.

Equally for all the studies presented in the previous paragraphs, none of them served to assess the importance of the different macro-level factors for outsourcing engagements - neither theoretical, nor empirical. As it will be presented in the subsequent section (See Section 4.2), there have been conducted some studies which objective was to rank the different supplier selection factors proposed in academia. Dickson (1966), who was one of the first scholars to conduct research within the field of supplier selection did, for instance, rank various factors based on each factors perceived importance. Kannan and Tan (2002) did later update Dickson (1966)'s ranking by including further soft measures as it was assumed that such factors were becoming more important by the beginning of the 21st century, while Cheraghi et al. (2011) later updated the ranking even further by including contemporary factors which have become more profound after the first decade of the 21st century. No scholars have, however, updated those lists by adding macro-level factors,

which is a gap that this thesis will serve to resolve. Hence, the main two academic gaps which will be narrowed in this report are the lack of research that combines both type of factors (as presented throughout this section) as well as the lack of an importance-assessment in terms of an updated ranking that considers both types of factors. An overview of the research streams and the identified gaps are portrayed in Figure 4.1. The areas marked in grey are the gaps which this report will contribute to fill.

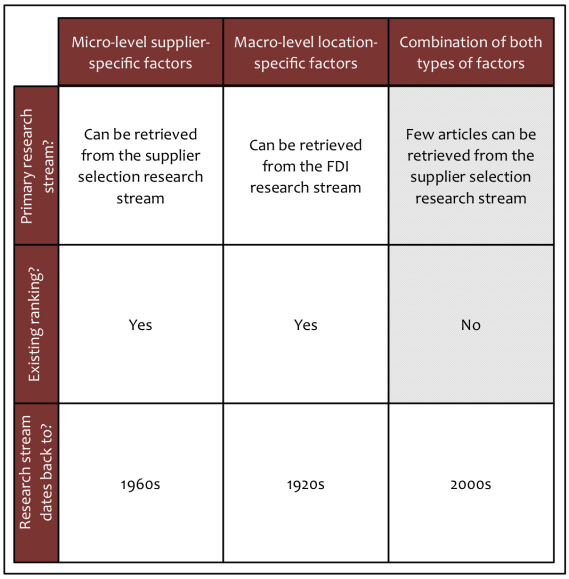


Figure 4.1. Overview of research streams and identified gap

The literature that combines both micro-level and macro-level factors for supplier selection decision does not cover more than what has been presented above. Despite having conducted a systematic literature research with the usage of various keywords and multiple keyword combinations (See Chapter 2 for further information regarding the keywords), the literature presented above can be argued to be the most prominent literature on CSS. An overview of the identified literature is portrayed in Table 4.1.

Overall, in the more generic supplier selection research (i.e., supplier selection research that only presents micro-level factors), a significantly larger amount of factors are considered. The same is the case for macro-level factors within the research stream of FDIs. For this reason, the subsequent sections will serve to present the current literature on supplier selection and FDIs, thereby both presenting the background for the research presented in this section, but also deriving a large amount of factors which can be used for supplier selection engagements. As mentioned in the introduction to this chapter, only an extract of all identified factors will be presented in the following sections - a full list of all identified factors will be presented in Chapter 5. Since generic supplier selection research can be considered a rather old research field, a historical chronological introduction is composed in the subsequent section.

Author(s) and Titles	Year	Title of The Journal	Comments and critique
Kotabe and Murray - Global Sourcing Strategy and Sustainable Competitive Advantage	2004	Industrial Marketing Management	The study acknowledges the importance of considering macro-level factors for outsourcing engagements, and it does also present ten macro-level factors that can be considered good for outsourcing.
Graf and Mudambi - The outsourcing of IT-enabled business processes: A conceptual model of the location decision	2005	Journal of International Management	A model that portrays how macro-level factors have an influence on the attractiveness on a suppliers location, and how this attractiveness is moderated by micro-level factors is developed in the study. The model is not tested empirically, but emphasises the need for joint consideration of micro- and macro-level factors in outsourcing.
Chan and Kumar - Global supplier development considering risk factors using fuzzy extended AHP-based approach.	2007	Omega - The International Journal of Management Science	The main focus of the study is on how the supplier selection problem can be conducted effectively. The study acknowledges location factors, and includes a few of those in order to reflect risk. However, only four factors are included, an no ranking is made.
Chan et al. - Global supplier selection - a fuzzy-AHP approach	2008	International Journal of Production Research	This study is very similar to the previous one (same main author), but the focus on macro-level factors is more profound. Similar factors as previously are presented, but have been dissected further. No ranking has been made.
Boardman Liu et al. - Applying the analytic hierarchy process to the offshore outsourcing location decision	2008	Supply Chain Management: An International Journal	The study presents the negative consequences of global outsourcing, and acknowledges the importance of location factors. The study only suggests less then ten location factors, and no ranking is made.
Hätönen - Making the locational choice - A case approach to the development of a theory of offshore outsourcing and internationalization	2009	Journal of International Management	The study acknowledges the missing research on macro-level factors in outsourcing. It serves to provide propositions regarding whether location-factors influence the sourcing decision, whether the location/supplier considerations differ in sequence, and whether offshore outsourcing facilitates internationalisation. No ranking of the factors is made.
Hätönen and Eriksson - 30+ years of research and practice of outsourcing-exploring the past and anticipating the future	2009	Journal of International Management	The study emphasises the increasing importance of location factors for outsourcing, and suggest further research where FDI literature is used to identify the macro-level factors.
Dou and Sarkis - A joint location and outsourcing sustainability analysis for a strategic offshoring decision	2009	International Journal of Production Research	Based on all the studies identified which combine micro-level and macro-level factors, this respective study is considered the most profound. Numerous factors are here presented, but a ranking is not made.

Table 4.1. Overview of supplier selection literature which include macro-level factors

4.2 Micro-Level Factors - Traditional Supplier Selection Literature

Research conducted within the field of supplier selection dates back to the 1960s and 1970s, when the concept of outsourcing started to proliferate in academia and in practice (See Section 3.2). According to Weber et al. (1991), the groundwork for most supplier selection research is the work conducted by Dickson (1966), who identified 23 supplier selection factors that should to be taken into consideration when a firm seeks to externalise certain activities. Based on input from 273 purchasing managers who were all members of the National Association of Purchasing Managers - which is now a part of ISM - the

23 factors were ranked based on their perceived importance. The factors identified by Dickson (1966), and the final ranking of those, are illustrated in Table 4.2.

Rank	Factor	Mean Rating	Evaluation
1	Quality	3.508	Extreme Importance
2	Delivery	3.417	
3	Performance history	2.998	
4	Warranties and claim policies	2.849	
5	Production facilities and capacity	2.775	Considerable importance
6	Price	2.758	
7	Technical capability	2.545	
8	Financial position	2.514	
9	Procedural compliance	2.448	
10	Communication system	2.426	
11	Reputation and position in industry	2.412	
12	Desire for business	2.256	
13	Management and organisation	2.216	
14	Operating controls	2.211	
15	Repair service	2.187	Average importance
16	Attitude	2.120	
17	Impression	2.054	
18	Packaging ability	2.009	
19	Labour relations record	2.003	
20	Geographical location	1.872	
21	Amount of past business	1.597	
22	Training aids	1.537	
23	Reciprocal arrangements	0.610	Slight importance

Table 4.2. Supplier selection factors and their importance (Dickson, 1966)

The purpose of the research conducted by Weber et al. (1991) was to review all the supplier selection literature which have been composed since the publication of Dickson (1966) and until the beginning of the 1990s, and then subsequently relate the findings of this literature to the criteria from the research of Dickson (1966). Weber et al. (1991) identified that the ranking of factors which is depicted in Table 4.2 did, to a certain extent, maintain its validity throughout the years. That is, top factors such as quality, delivery, capacity, and price did all sustain their importance in supplier selection literature throughout the years. However, due to changes which occurred in various industries from the 1960s and until the 1990s, the importance of some factors changed. Just-In-Time (JIT) - the Japanese manufacturing and management philosophy - did, for instance, become a highly widespread phenomenon in the 1970s (Cheng and Podolsky, 1996), which obviously resulted in 'geographical location' in terms of geographical proximity to a firms suppliers to become a more important factor compared to what is otherwise indicated in the ranking portrayed in Table 4.2. Also, the overall ranking of Dickson (1966) is not specific for any industries, which according to Weber et al. (1991) is a critique point, as the importance of factors in the supplier selection process is contingent to a firms external surroundings. It can, however, be argued that such critique point can be provided to most rankings which have been conducted on an aggregated level, and Dickson (1966) did in fact argue that the ranking of the factors can vary depending on what is outsourced.

In his research, Dempsey (1978) resolved some of the issues which were present in the

work of Dickson (1966). A very similar analysis was conducted by Dempsey (1978), but in various industries in order to show that the supplier selection factors are contingent to the circumstances of an individual buying firm. Eighteen of the factors presented in Table 4.2 were used in the work of Dempsey (1978), and two additional factors were included, those being *'aid and advice'* and *'moral/legal issues'*. The overall results of his findings were that some supplier selection factors are clearly more important than others on a relative level, but not with significant differences. Also, the relative importance of various supplier selection factors were influenced by the type of task which a firm wants to source. Moreover, it was identified that the relative importance of some supplier selection factors were contingent to the type of organisation which were outsourcing certain goods/activities to external actors. In fact, the level of importance of different factors differed significantly between the electronics manufacturing industry and the electric utilities industry, which were taken into consideration in the research (Dempsey, 1978). Nonetheless, despite the fact that a large amount of research within the field of supplier selection was conducted from the early work of Dickson (1966) until the 1990s, little changed in terms of the actual types of factors which were being used for supplier selection. Sure, the ranking of the factors changed in different studies, depending on the sources which was used for the research, etcetera, but the majority of factors remained the same (Weber et al., 1991). Verma and Pullman (1998) did also identify that although some factors were perceived as being more critical than others by managers during interviews, the actual execution of supplier selection processes did not always reflect that particular perception. For instance, although their questionnaires to managers showed that quality was the most important factor for supplier selection, the same managers who answered the questionnaires assigned higher weights to cost and OTD during the actual execution of the supplier selection process (Verma and Pullman, 1998). This might indicate that the factors used in the early research on supplier selection were not well defined, or that managers ranked some factors high, but did not use them due to lacking knowledge regarding how to practically get the necessary data to use the factors.

Since the early work of Dickson (1966) and the literature review of Weber et al. (1991), the magnitude of supplier selection criteria has become more comprehensive and holistic, and this contributes further to the complexity associated with the multi-variable nature of supplier selection - a complexity which was already acknowledge by Weber et al. two decades ago. More strategic factors - which also were more soft in their nature - started to be introduced and considered during the late 1980s and the early 1990s. Spekman (1988) did, for instance, emphasise the importance of considering factors that reflect a suppliers ability to engage in close relationships or partnerships with the buyer on a prospective basis. Choi and Hartley (1996) did also explicitly criticise previous supplier selection research for not considering factors such as *'closeness of the relationship'* and *'continuous improvement capabilities'* which at that time started to gain increasing importance. Choi and Hartley (1996) did also include a *'responsiveness'* criteria into their list of factors, which was not a highly widespread element in the early supplier selection research. However, despite the introduction of those factors, the rest of the factors which Choi and Hartley (1996) presented were very similar to the ones presented in Table 4.2, as they specifically based their work on Dickson (1966). Hence, the list of Dickson (1966) maintained its strong footprint in the supplier selection literature until the end of the 20th

century and beyond. An equivalent factor to responsiveness, which also started to become of greater importance as a result of more changing environments was *'process flexibility'* (Ghodsypour and O'Brien, 1998).

However, despite the fact that traditional hard factors maintained their footprint in supplier selection research until end of the 20th century, Ellram (1990) was the first to comprehensively list micro-level soft factors without considering any traditional supplier-specific hard factors. Ellram (1990) did here propose various soft factors which are related to the compatibility of a supplier relative to a buyer. A number of factors which are of importance when selecting suppliers for strategic partnerships were presented and grouped into four main categories, those being 'financial issues', 'organisational culture and strategy issues', technology issues', and 'other factors' (Ellram, 1990). The first category involves two factors, which are *'economic performance'* and *'financial stability'*, which can be argued to be similar to the 'financial position' factor in Table 4.2; however, in the research of Ellram (1990), the focus is not on the current financial position of the supplier, but rather its projected financial position in the future based on its historical performance.
The second category - organisational culture and strategy issues - involves six factors which have not been covered in in the previous literature. The factors, which can be considered intangible compared to the first category, are *'feeling of trust'*, *'strategic fit'*, *'management attitude/outlook for the future'*, *'top management compatibility'*, *'compatibility across levels and functions of buyers and supplier firms'*, and *'supplier's organisational structure and personnel'*, respectively (Ellram, 1990). As Ellram (1990) states, several of those factors are quite similar - the important thing to notice in this category is that the factors are used to determine the congruence between a buyer and a supplier regarding future collaborative work. Some of the factors, especially *trust*, is often based on the supplier selection decision maker's gut feeling and subjective intuition. Of course, if a firm has already collaborated with a certain supplier, historical data and general experience can be used to assess the intangible factors more effectively.
Within the category of technological issues, factors such as *'assessment of current manufacturing facilities/capabilities'*, *'assessment of future manufacturing capabilities'*, *'supplier's design capabilities'*, and *'supplier's speed in development'* are presented. Just like in the first category, both the current and the future state has to be examined in order to assess the potential for engaging in a close relationship with a supplier. The idea is that suppliers which are technological competitive on the long run are better to use than suppliers who might have good technological capabilities at the current state, but cannot sustain it on a prospective basis (e.g., due to changes in the external environment).
The last category which simply is the "other factors", three factors were presented. Those are *'safety record of the supplier'*, *'business references'*, and *'supplier's customer base'*. The first two factors here are related to the suppliers performance reputation, while the third factor mirrors the importance of a buying firm to the supplier (Ellram, 1990). In recent supply chain management research, the importance of a buying firm to a supplier has been investigated in order to, for instance, identify how a buying firm can obtain a preferred customer status at the supplier side (Schiele, 2012).

Besides the soft factors above, further important soft factors including *'R&D capabilities'*, *'integrity'*, *'professionalism'*, and many more, were introduced in the 21st century (Cheraghi et al., 2011). Recent literature on supplier selection has also emphasised

the importance of sustainability and corporate social responsibility (CSR), thereby proposing various factors that reflect the level of CSR that the individual suppliers possess (Humphreys et al., 2003; Thornton et al., 2013; Deng et al., 2014). Furthermore, various studies from the 21st century discuss the importance of considering a suppliers innovation capabilities in the selection process, but only one of the reviewed studies on supplier selection - the study of Dou and Sarkis (2010) - did in fact mention a couple of sub-factors within the overall construct of 'innovativeness'. For this reason, Kleinknecht et al. (2002) was used to obtain further factors which indicate to what extent a supplier is innovative. The importance of including soft factors such as the ones above in supplier selection activities has also been emphasised by Kannan and Tan (2002), who identified that soft intangible supplier selection factors have a more significant influence on performance than hard more quantifiable factors. It was, however, also identified that such soft factors are considered less important than hard factors by the practitioners who were included in the study. The underlying reason for this is assumed to be the fact that the awareness of soft factors having a strong influence on performance has been unknown between practitioners at the time of the research (Kannan and Tan, 2002).

Overall, the magnitude of micro-level supplier selection factors has become more prodigious since its first introduction in the 1960s, and the trend has gone from only including hard factors to more soft factors, despite the fact that those are less quantifiable (Dulmin and Mininno, 2003; Kar and Pani, 2014). The magnitude of the amount of hard and soft factors for supplier selection is also mirrored in the study of Ho et al. (2010), who argue that hundreds of factors can be taken into consideration in the supplier selection decision. What is important to notice is that all the reviewed studies do not discuss the level of aggregation when presenting supplier selection factors. Some studies do, as mentioned previously, include different factors under certain constructs, but besides that, the level of aggregation is not reflected upon. In their research, Kar and Pani (2014) do, for instance, present numerous of different factors; however, those factors are not clustered, and the level of aggregation is not discussed. *'Quality management'* is, for instance, proposed along with *'Product quality'*, but it could be argued that the latter factor is categorisable under the former (Flynn et al., 1994). As mentioned earlier, a clustering will take place in this thesis in order to structure the large amount of factors; however, a further disaggregation will not take place, meaning that the factors identified from previous literature will just be transferred directly to the list in this thesis. The aggregation issue could be a point for further research.

In the studies which have presented various supplier selection factors, several different methodologies have also been presented regarding how the actual supplier selection process can be conducted by including the different factors. However, these methods - which are considered traditional methods - are presented in Appendix G. As mentioned earlier, a decision-making approach based on CO should be develop in this report, which is why this is done in Part III, and which is the reason why other approaches presented in previous studies are not reflected upon in the base text of this report.

Now that this section has introduced literature within the field of supplier selection, thereby introducing various micro-level factors which can be used in the decision-making process, the next step is to introduce FDI literature, as macro-level factors are presented

herein. As mention in the introduction to this chapter, generic supplier selection literature equivalent to what has presented in this section has not considered macro-level factors in great extent, which is why FDI research will be investigated as well.

4.3 Macro-Level Factors - Traditional FDI Literature

In order to be able to fill the academic gap of not having an extensive overview of both micro-level and macro-level factors for supplier selection purposes, another research stream which presents macro-level factors has to be scrutinised. Macro-level factors have been used in great extent within Foreign Direct Investment (FDI) literature. In this research stream, macro-level location-specific factors are used to assess which locations a firm should invest in on a global scale. The factors which an investing firm then take into consideration in the evaluation process depend on the underlying reason for why the firm is moving abroad. This can, for instance, be in order to reduce cost, to be closer to natural resources, be closer to growth markets, or to be located in innovation clusters (Peng, 2013). Since this research stream presents macro-level factors in an extensive way, it has been decided that it will be considered when macro-level factors are to be identified and included for supplier selection purposes in this report. Other research streams could also be used to gather macro-level factors, but since FDI literature strictly focuses on macro-level factors for location decisions, and since previous scholars such as Hätönen and Eriksson (2009), Hätönen (2009) and Dou and Sarkis (2010) also argue that macro-level factors which can be used for outsourcing engagements primarily are presented in FDI literature, it has been decided that this respective research stream would be suitable to take into consideration. Of course, since the factors in FDI literature are used for in-house facility establishment, it can be assumed that some of the factors from the research stream might not be useful for outsourcing, meaning that some of the factors have to be removed or adapted to an outsourcing context.

As mentioned in Section 3.1, FDIs take place when a firm establishes an internal facility in a foreign location. This facility can either be established as a green field investment (when a new facility is constructed from scratch), a brown field investment (when a facility is being purchased or leased), or as a result of mergers and acquisitions (M&A) (when a consolidation takes place) (Keegan, 2002). The research on FDIs can be traced back to the early stage of the 20th century, when Weber et al. (1929) introduced the *theory of the location of industries* (Farahani et al., 2010). Moreover, the eclectic paradigm involving the OLI framework - *ownership*, *location*, *internalisation* - has likewise been highly proliferated within the field of international business and FDI literature and has propelled the research on location specific factors for FDI engagement decisions (Zhao and Zhu, 2000). In a nutshell, the eclectic paradigm state that a firm should have company specific advantages by going abroad (ownership), that a firm shall obtain location specific advantages which cannot be obtained in the same extent elsewhere (location), and that a firm should be better off by exploiting a foreign opportunity internally compared to if the firm exploited the external market (internalisation). The location aspect of the paradigm is of interest in this report, as the dimension serves to present macro-level attributes which can be of value for a firm in case it establishes a facility in a particular location (Dunning, 2000). The fact that the eclectic paradigm state that firms shall exploit

comparative macro-level advantages based on internalised operations instead of using the external market might seem completely contradictory to what is being investigated in this thesis (i.e., how location factors should be considered when deciding to externalise certain operations based on outsourcing). However, as articulated in the beginning of this section, the usage of FDI literature for outsourcing engagements have already been justified in recent studies (e.g., Dou and Sarkis (2010) and Hätönen and Eriksson (2009)), and since this research stream is one of the most prominent streams when it comes to macro-level factors, it can be argued that it is valuable to consider for the purposes of this thesis, although FDI and outsourcing research might seem to contradict.

According to Blair and Premus (1987), the initial macro-level factors which were considered for FDIs included *'access to markets'*, *'raw materials'*, *'transportation'*, and *'labour cost'*, while the list of factors was later expanded to include the *'level of education'*, *'state and local tax levels'*, *'labour skills'*, *'business climate'*, as well as *'infrastructure'* within regional and national borders. Similarly to the supplier selection literature stream, transaction cost economics played an important role in the early studies, whereafter more social and softer factors were introduced in the later research on location selection for FDIs (Godinez and Liu, 2015). Labour cost has always been considered of great importance when engaging in FDIs, but in recent years it has become even more important to analyse this factor on a more long-term basis, as the increasing level of globalisation is inclining firms to operate abroad, thereby increasing the probability of local inflation in certain areas (Farrell, 2006). Predicting this local inflation can therefore be of value for firms when deciding on which location the FDI has to be established in. Labour skills is also a factor which has to be analysed in great extent before entering a certain location. Farrell (2006) has, for instance, identified that Brazilian and Chinese people often lack English language skills, that Russians often are well educated but lack practical experience, that knowledgeable graduates in emerging countries often live far away from major cities, and that nearly half of all Indian students graduate from major cities but are willing to relocate subsequently to their academic studies.

Besides also presenting the factors mentioned above, Haitani and Marquis (1990) add further factors, including *'right to work'*, *'governmental incentives'*, and *'research institutions'*. Also, Haitani and Marquis (1990) conducted an empirical ranking similar to the ones for supplier selection research (e.g., Dickson (1966) and Kannan and Tan (2002)). In that study, it was identified that accessibility factors, including *'access to markets'*, *'access to suppliers'*, *'access to raw materials'*, and *'access to land/water/air transportation'* were the most important ones for firms engaging in FDIs. Labour and unionisation were the second and third most important factors among the participants of the research. Mudambi (1995) presents further factors, which are all classified within three groups: Infrastructure factors, risk factors, and government policy factors. In addition to the infrastructure related factors mentioned above, Mudambi (1995) adds *'communication services'*, *'electricity'*, as well as *'water and gas'*. The risk factors are on the other hand a set of factors from different avenues and include factors from the political domain, such *'political instability'*, *'the attitude towards foreign capital'*, and *'the countries relation towards various sovereign states in the region'*. Business related risk factors include *'exchange rate volatility'* and labour-related risk. The governmental policy factors include *'rate of taxes'*, *'restrictions on profit repatriation'*, *'the amount of red tape'*. The

exchange rate and tax factors presented in Mudambi (1995) as well as tariffs are according to Blonigen (2005) the factors which have receiving most attention in FDI literature that focuses on macro-level factors. In addition to the factors of Mudambi (1995), Chakrabarti (2001) presents factors such as *'market size'*, *'trade barriers'*, *'growth rate'*, *'openness'*, and *'trade deficit'*. Sarkis and Sundarraj (2002) did later accumulate numerous factors from the historical literature, which they subsequently structured within eight clusters; those being, 'cost', 'regulatory', 'accessibility', 'labour', 'time', 'strategic issues', and 'risk'. Within those clusters, several of the factors above have been included, but additional noteworthy factors are *'government incentives'*, *'supplier accessibility'*, *'unionisation'*, and *'training support'*.
Beside all the factors which consider the direct macro-level attributes of locations, Schotter and Beamish (2013) empirically investigated factors which reflect the personal interest of the decision-makers who have to select where an FDI has to be established. That is, Schotter and Beamish (2013) suggest further factors which might not have the same direct effect on the performance of an FDI (such as economic factors), but rather factors which managers consider based on their personal interest. Such factors include *'hotel standards'*, *'telecommunication and internet access'*, *'medical facilities'*, *'climate'*, and others.

In contradiction to the studies mentioned above, which all proposed a moderate level of macro-level decision-factors, Wheeler and Mody (1992) and Badri (2007) both introduced larger lists of factors based on earlier literature from the FDI domain. The reason why Badri introduced a large compilation of factors was due to the fact that *"[...] there has been no systematic attempt to organize and synthesize the various sets of critical factors influencing industrial location [...]"* until the end of the first decade of the 21st century (Badri, 2007, p. 1). Some of the factors presented earlier in this section, as well as further factors have therefore been included in both those studies due to their comprehensive lists. Badri (2007) did furthermore structure his large amount of factors under certain constructs; some of which have also been used in this report (See Section 7.1).

Overall, a large amount of factors for FDI engagements have been proposed throughout the last decades. The factors included above are just a snapshot of what can be found in the academic landscape. The total list will be presented in the subsequent chapter. As mentioned previously, FDI factors are specific for in-house facility development, which is why not all factors can be considered useful for outsourcing engagements. Furthermore, as mentioned throughout this chapter, the main idea of the last three sections have been to provide an idea of what kind of literature and factors there currently exist for supplier selection and FDIs. The amount of literature that has combined both supplier selection research and FDI research - thereby both presenting micro-level and macro-level factors for supplier selection engagements - is very scarce, which is why this thesis serves to propose a more extensive list that can be used on a prospective basis. The subsequent chapter will therefore present all the factors which have been identified throughout the complete literature research that has been conducted.

Overview of Accumulated Factors From Academia 5

Now that various studies from the supplier selection and FDI research streams have been reviewed, the next step is to present the full list of factors which have been identified within those streams. As articulated in Chapter 4, only an excerpt of all identified factors were presented in the sections which presented supplier selection and FDI literature. Hence, the objective of those sections were to provide an understanding of the research streams and how they have developed over time. Section 5.1 will, however, present the full list of identified factors from academia, thereby being able to answer the first research question. To recall, the research question was formulated as following: **RQ 1:** *"Which decision factors have currently been proposed within the field of supplier selection and FDI literature?"*

5.1 All Identified Factors

In this report, factors from 41 studies have been gathered. However, according to the rules defined for the systematic literature review (See Chapter 2 for the methods used), all the used studies - except for the initial work conducted by Dickson (1966) - presented factors based on various previous studies, which is why the total amount of retrieved factors can be considered high relative to the amount of reviewed studies. As mentioned in Section 4.2, Weber et al. (1991) did, for instance, review 74 studies on supplier selection since the early work of Dickson (1966) in order to identify if changes have occurred regarding the importance of the different supplier selection factors. Cheraghi et al. (2011) did moreover base their research on supplier selection factors from 113 earlier studies on supplier selection. Hence, it is safe to argue that the list of factors presented in the this report is based on the work of several hundred studies. The comprehensive amount of studies behind all identified factors does, however, also indicate that many of the previous studies on supplier selection identified and/or used the same types of decision factors. This is also verified by Ho et al. (2010) who identified that *'quality'* is a factor which is used in 87,18% of all supplier selection studies, while *'delivery'* and *'price/cost'*, for instance, are used in 82,05% and 80,77% of all supplier selection studies, respectively.

The total amount of factors gathered from the 41 studies was 388. Out of those 388 factors, 200 was from a micro-level perspective, meaning that they were identified in

generic supplier selection literature as well as research that has combined both micro-level and macro-level factors. The remaining 188 factors were from the macro-level domain, meaning that they were retrieved from FDI literature or from literature that has already combined micro-level and macro-level factors. In the studies which have been reviewed in this report, the only rule that has been applied in the overall factor gathering process was that duplicates were not included in the total list. Despite the exclusion of duplications, it can still be argued that some of the factors that have been retrieved within the two research streams can be considered similar, which is why those ones can be amalgamated in order to further reduce the total amount of factors. This will be done together with the exclusion of factors macro-level factors in the filtering process in Section 7.2.

As indicated in Section 4.2, early studies on supplier selection proposed various micro-level hard-factors including cost, delivery speed, quality, etcetera. However, having examined various studies, and having examined studies that have compiled numerous factors from earlier research, it is evident that such factors can be used in a much broader sense which in greater extent reflects what the general broad factors actually encompass. For instance, in the reviewed studies, more than ten 'cost' related factors were identified, those including *'initial price'*, *'compliance with cost analysis system'*, *'compliance with sectoral price behaviour'*, *'supplier level cost (contractual, negotiation, etcetera)'*, *'cost reduction capabilities and efforts'*, *'price relative to market price'*, *'cost reduction performance'*, *'fluctuation of costs'*, etcetera. Deshmukh and Chaudhari (2011) also underlines that cost goes far beyond 'cost' as a single factor which was the only cost factor that early supplier selection studies considered ('cost' was here seen as the initial price including transportation costs). However, Deshmukh and Chaudhari (2011) also emphasise that other broad factors, which were used in earlier studies, can be dissected much more, thereby enabling more detailed analyses in the supplier selection process. In general, the fact that one single generic supplier selection criteria such as 'cost' can be evaluated from so many different angles emphasises the magnitude of factors than can be considered for supplier selection purposes. Looking at the cost factors above, it can even be argued that all of them could be included in one specific supplier selection decision, if a buying firm would assess that such configuration of factors would be adequate. Now, since 388 academic factors have been identified in this report, they will not each be described as this will consume too much space. Instead, it is advised to refer to the tables below, which present the total list of factors identified in academia. Table 5.1 and Table 5.2 present all the identified micro-level factors, while Table 5.3 and Table 5.4 depict all the identified macro-level factors. The factors are added in alphabetical order. The complete list of factors might seem a quite overwhelming, which is also one of the reasons that they will be clustered in Chapter 7. A comprehensive set of tables (Table 7.2, Table 7.3, and Table 7.4) will here show the cluster titles (constructs), the factors within them, and the sources from where all the factors have been retrieved.

The tables below are added to portray the magnitude of factors that could be considered for supplier selection, by showing every single factor that has been identified during the literature review. This also provides a clear answer to the first research question, which explicitly asks for all the factors which have been presented in supplier selection literature and FDI literature to date.

Micro-level factors	
After-sales support	Ethical standards
Amount of past business	Exporting status
Assessment of future manufacturing capabilities	Facility planning
Assignment of environmental responsibility	Feeling of trust
Attitude	Financial conditions
Availability of parts	Financial position
Billing accuracy	Financial records disclosure
Certification and standards	Financial stability and staying power
Changeover time for certain activities	Financial strength (long-term stability)
Checking and evaluation of environmental activities	Flexibility in general (customisability)
Collaboration with universities and institutions	Flexible contract terms and conditions
Commitment to continuous improvement (product and process)	Flexible working arrangements
Communication barriers	Fluctuations of costs
Communication openess	Global customer service for day-to-day work
Communication system	Green image
Company size	Honest and frequent communications
Compatibility among levels and functions	Identification of environmental aspects
Competent technical support and technical expertise	Impression
Complaint handling procedures	Indirect cost
Compliance with cost analysis system	Industry knowledge
Compliance with due date	Information quality
Compliance with sectoral price behaviour	Initial price
Conflict resolution	Inspection and control processes
Conflict resolution system	Insurance and litigation history
Conformance quality	Integrity
Consistent delivery	Intellectual property rights
Corporate foresight activities	Internal consumption of energy
Cost of service contract	Internal consumption of raw material
Cost reduction activities	Internal consumption of water
Cost reduction capabilities and efforts	Intimacy of relationships
Cost reduction performance	Inventory cost (e.g., when pursuing VMI)
Current manufacturing facilities/capabilities	Inventory position
Data administration	IT standards
Degree of closeness/supplier proximity	Job opportunities for employees
Delays	Labour relations
Delivery conditions	Lead time
Delivery efficiency	Level of automation
Delivery mistakes	Level of strategic importance to the buyer
Delivery reliability	Long-term relationship
Delivery speed	Management attitude/outlook for the future
Design capability	Management capabilities
Design for environment	Management outlook for the future
Design involvement	Moral issues
Desire for business	Net late deliveries
Disciplinary and security practices	New launch of products
Discrimination	New use of technology
Documentation and self auditing	Number of patents
Domain experience	On-time delivery
E-transaction capabilities	Open to site evaluation
Economic performance	Opportunistic pricing behaviour
Effort in promoting JIT principles	Order entry and invoicing system, including EDI
Electronic data interchange	Order level cost (frequency of ordering, etc.)
Employee contracts	Order-to-delivery lead time
Employment compensation	Organisational culture in general
Environmental competencies	Overall quality standards (e.g., relative to buyers tolerance level)
Environmental image	Overall supplier commitment
Environmental production and technologies	Partnership formation time
Environmental technologies	Past and current relationship with the supplier
Equity labour sources	Percentage of work which is subcontracted
Establishment of environmental commitment and policy	Performance awards

Table 5.1. First 120 factors identified in supplier selection research

Micro-level factors (Cont'd)	
Performance history	Sales rep's competence
Performance relative to industry dynamics	Scope of resources
Planning of environmental objectives	Self-audits
Pollutant effects	Service capability
Price relative to market price	Service quality credence
Price Strategy	Service quality experience
Procedural compliance (e.g., bidding compliance)	Shipment quality
Process improvement	Short set-up time
Product development capabilities	Skill level of staff
Product development time	Socially responsible supplier selection (SRSS)
Product line diversity	Strategic fit
Product volume changes	Sub-component pricing
Production facilities and capacity	Supplier community focus
Professionalism	Supplier diversity focus
Profitability	Supplier environmental focus
Prompt response	Supplier ethical treatment
Quality assurance and control procedures	Supplier human rights focus
Quality certifications	Supplier level cost (contractual, negotiation, etc.)
Quality data available	Supplier safety focus
Quality philosophy and policies (e.g., ISO 9000)	Supplier's customer base
Quality staff	Supplier's safety record
R&D expenditures	Suppliers ability to make a decent profit
R&D support (e.g., prototype development)	Suppliers design capability
Reciprocal arrangements	Suppliers effort to engage in JIT
References	Suppliers organisational structure and personnel
Regulatory compliance	Suppliers speed in development
Relationship closeness	Suppliers willingness to eliminate waste
Relative market share	Supply variety
Relative sales growth	Technical and production capability
Relative sales revenues	Technology compatibility (e.g., IS fit)
Reliability and consistency	Testing capability
Repair service	Top management compatibility
Reputation and position in the industry	Training aids
Reputation for integrity and reputation in general	Value-added productivity
Research in general	Values
Reserve capacity to respond to unexpected demand	Waiting time
Resource investment in social programs	Warranties and claim policies
Response flexibility	Willingness to integrate
Response time for major changes	Willingness to resolve conflicts
Safety adherence	Willingness to share confidential information

Table 5.2. Last 80 factors identified in supplier selection research

As it can be seen in Table 5.1 and Table 5.2, the identified supplier selection factors varies significantly in scope. Furthermore, although the the clusters have not been developed until the current state, it is evident that many of the factors are within the same categories just by looking at the alphabetical order. Within the field of delivery, five factors are for instance included right after each other. The same is the case for some of the factors in the following tables, which portrays the macro-level factors.

Macro-level factors	
Accessibility of customers	Energy use
Accessibility of land	Environmental burden of disease
Accessibility of transportation service	Existing producer market
Accessibility to sub-suppliers	Expansion capabilities
Adequacy of cost of water supply	Extent of labour unionisation
Adequacy of local school	Fire protection and insurance
Adequacy of sewage facilities	Foreign ownership laws
Adequate level of desired language skills	Future expansion opportunities (within or nearby)
Adequate sanitation	Goverment aids
Agricultural subsidies	Goverment incentive (investment incentives, subsidies, etc.)
Air pollution	Government restrictions
Airway facilities	Green consumption
Amount of snow and/or rain fall	Greenhouse gas emission/capita
Anticipation of growth of markets	Greenhouse gas emissions/electricity generated
Attitude of utility agents	Growing stock of forestry
Attitude of workers	Highway facilities
Attitude towards foreign capital	History of the country
Attitue of financing agents	Hometown of company official
Availability of coal and nuclear facilities	Hotels and motels, banks, credit institutions, etc.
Availability of electric power	Income trends
Availability of female labour	Indoor air pollution
Availability of fuels	Industrial carbon intensity
Availability of gas	Inensive cropland
Availability of male labour	Inflation
Availability of natural gas	Infrastructure (state and local)
Availability of postal services	Insurance laws
Availability of public technical training	Insurance rates
Availability of raw materials	Investment controls
Availability of semi and unskilled labour	IT infrastructure quality and cost
Availability of skilled labour	Labour costs
Availability of storage facilities for raw materials/components	Living conditions
Availability of wholesale outlets	Local ozone
Availabiliy of lending institutions	Location of competitors
Balance of payment status	Managerial labour
Bribery and corruption	Marine protected areas
Building ordinances	Marine trophic
Bureaucratic instability	Market size and penetration
Burned land area of agriculture	Materials use
Clarity of corporate investment laws	Medical facilities
Community attitude towards industry	Monthly average temperature
Community industrial development projects	Natural disaster potential
Community race relations	Nearby competitors or complementors of supplier
Compatibility of other industry	Nearness to component parts
Compensation laws	Nearness to related industry
Competition	Nuisance and stream pollution laws
Conservation issues	Openness
Consumer characteristics	Overall geographical distance from buyer
Cost of electric power	Per capita income
Cost of fuels	Pesticite regulation
Cost of industrial land	Physical attractiveness
Crime	Pipeline facilities
Critical habitat protection	Plant building for sale or lease
Cultural distance	Plant site adequacy and costs
Current facilities	Plant site topographic features
Depletion of non-renewable ressource	Police protection
Developed industrial park	Population trends
Disposable facilities of industrial waste	Potential consumer market
Drinking water	Prevalance bureaucratic red tape
Education system (uni, research institutions, etc.)	Protection against expropriation (legal protection)
Effective conservation	Proximity of national markets

Table 5.3. First 120 factors identified in FDI research

Macro-level factors (Cont'd)	
Proximity of natural markets	Sustainability of electrical service
Proximity of production material sources	Sustainability of environmental amenity
Proximity to existing or future consumer market	Sustainability of environmental regulations
Proximity to large cities	Sustainability of houses
Proximity to supplies	Sustainability of medical facilities
Quality of government	Sustainability of repair and maintenance services
Quality of schools	Sustainability of shopping facilities
Quotas on amount of foreign employees	Sustainability of site parking facilities
Railroad facilities	Sustainability of telephone service
Regeneration of renewable ressource	Sustainability of waste disposal service
Regional ozone	Sustainability of zoning restrictions
Regulations concerning joint ventures and M&A	Tax structure (tax free ops., property tax, etc.)
Regulations concerning price control	Taxation of foreign owned companies
Regulations on transfer of earning out of country	Trade deficit
Relation to the "developed world"	Trade policy (e.g., trade barriers)
Relative humidity	Trade tariffs
Religious facilities	Training support
Repatriation allowances	Trawling intensity of fishery irrigation stress
Requirements for setting up local corporations	Treaties and pacts
Right-to-work-law	Trucking Services
Room for expansion	Type of military alliances
Safety inspections	Unionisation
Site development and construction coss	Urban particulates
Size of market	Warehousing and storage facilities
Social make-up of inhabitants	Waste disposal
Space for future expansion	Waste generation
Stability of regime	Waste recycling
Standard of living	Waste treatment
State of local planning assistance	Water quality
State sales tax	Water stress
Strength of currency against the US dollar	Water supply, cost and quality
Sulfur dioxide emmissions	Waterrway transportation
Sustainability of building zones	Worker stability
Sustainability of business, facility and legal services	Zoning codes

Table 5.4. Last 68 factors identified in FDI research (Watts et al., 1995)

The total list of micro-level supplier-specific and macro-level location-specific factors is arguably - based on the investigation of numerous supplier selection studies - the most extensive compilation of factors to date, which potentially can be used for supplier selection purposes. As mentioned earlier, some of the macro-level location-specific factors might not be considered useful for supplier selection purposes as they are retrieved from FDI literature. The ones which are not adequate for supplier selection purposes will therefore be filtered in the subsequent part, where experts are involved in the process.

Overall, now that the total list of supplier selection and FDI factors, which have been retrieved from academic studies, have been presented, the next step is to commence the empirical part of the report. Here, further factors will first be identified based on qualitative interviews conducted with practitioners, while a ranking of the factors will take place based on quantitative research after the factors have been clustered and filtered.

Part II

Empirical Research and Analysis

Approach

The second part of the report is where the empirical research will take place. In addition to the supplier selection factors which were identified in the first part of the report, the initial chapter of Part II will serve to identify further factors from practice which have not been proposed in the examined literature. Subsequently to the empirical factor gathering process, a clustering and filtering process will take place to make the total list of factors from academia and practice more tangible. A more tangible list will make the content more operational for practical purposes, and it will make it useful for the quantitative empirical research which will take place subsequently to the clustering and filtering process. The factors will hence initially be clustered within certain constructs that reflects the different type of factors, whereafter factors retrieved from FDI literature, which are not considered important for outsourcing engagements, will be eliminated. Factors within the different clusters which have a high similarity will also be amalgamated in order to shrink the total list of factors further. The last chapter of Part II will serve to conduct the quantitative empirical study, which is enabled by the preparatory work mentioned above. In the quantitative empirical part, 217 procurement managers have been asked to rank the supplier selection factors (based on the developed clusters within different constructs) on the basis of the individual constructs perceived importance. The ranking will contribute to fill the second academic gap which was presented in the problem statement of the report (See Chapter 1), and will serve as input when the most important factors are implemented in the software solution in Part III.

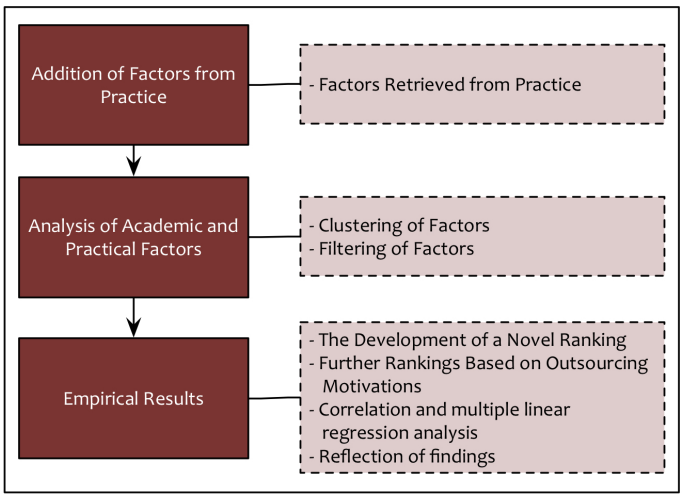


Figure 5.1. Structure of Part II

Addition of Factors from Practice 6

The first chapter of Part II will introduce further factors which practitioners believe are of importance for supplier selection purposes. This is done in continuation of the total list of academic factors which were derived in Chapter 5, thereby adding further factors which have not been included in the reviewed literature. This chapter will therefore serve to initiate the empirical part of the report by answering the first part of the second research question, which to recall is formulated as following: **RQ 2:** *"Which decision factors are further suggested by practitioners [...]"*.

6.1 Factors Retrieved From Practice

As mentioned in the methodology (See Chapter 2), the factors retrieved from academia were scrutinised with the VP EMEA and the SCP on the 02.03.15 and on the 06.03.15 in order to assess if further factors should be added (See Table 2.1 for interview details). Despite the fact that most factors were agreed upon, there still seemed to be a lacking number of factors that reflect the capacity of a supplier. The term 'capacity' is often used in supply chain management and operations research/management and was indeed also proposed in the academic list of factors, but capacity on a more disaggregated level has not been presented in earlier supplier selection research based on the investigation made in this report. During an interview with the VP EMEA on the 6th of May 2015, it was suggested that the actual *'production capacity'* should be considered, as well as the *'capacity utilisation'*. Also, the *'reserve capacity'*, the *'willingness to invest in further capacity'*, and the *'future capacity levels'* should be taken into evaluation when selecting suppliers for long-term outsourcing engagements. Using those capacity factors allow a more dynamic approach to supplier selection, as the future potential of a suppliers ability to meet a certain volume demand and other conditions likewise can be taken into consideration in the supplier selection scenario analysis process. This is in fact also considered in the practical part of the report, where such factors are integrated into the software solution (See Chapter 9).

Despite capacity-related factors, further cost-related factors were suggested by the VP EMEA. In most supplier selection engagements which A. T. Kearney supports, conditional discounts, logistics cost, and packaging cost are also included in the analysis. The

conditional discounts are usually divided into two types of cost factors, those being *'volume discounts'* and *'bundle discounts'*. The first factor is a general quantity discount factor, meaning the decrease in cost which a supplier is willing to take as a function of the buying firm exceeding a certain threshold of acquired goods and/or services. Volume discounts are thereby provided by the supplier to enable the buyer the exploit the opportunity of economy of scales. Bundle discounts are not related to quantity, but rather to a certain combination of business which a supplier wants to win in order to provide a discount to the buying firm. For instance, if a buyer is outsourcing 2.000 components within five different categories, and a supplier wants to win the business of two specific categories, then a bundle discount could be provided. The reason why *'logistics cost'* is added by A. T. Kearney is that this cost is no longer often a part of the actual selling price, which it has often been throughout the last decades. Hence, the cost of transportation - which in this report is referred to as logistics - is a separate cost factor. *'Packaging cost'* is likewise in many cases not a part of the selling price, which is why this is included as a separate cost factor as well. Another interesting cost factors which the VP EMEA proposed is the overall *'product life cycle cost'*. An example here could be the total cost of a certain type of component which eventually needs to be scrapped by the buying firm. If the buying firm will pay for the scrapping process, then this cost factor could be taken into consideration in the analysis as well, thereby evaluating such an offer relative to other offers which, for instance, use raw materials that do not make it necessary for the buying firm to pay for the scrapping process. Hence, in addition to the cost factors identified in academic studies which were presented in the Chapter 5, five further factors have been added to the total list.

The interviewed SCP did likewise propose one additional factor to the total list. The macro-level factors which reflects the environmental risks were according to him not very site-specific, and did therefore need further consideration. In the firm in which the SCP works, the exact geographical coordination of suppliers are used to assess the environmental risk of natural matters within close proximity. Hence, besides considering the overall risk of natural disasters on a country or a regional level for a given location, they also assess the risk of environmental issues which can occur at the exact position of the suppliers site. For instance, the firm once chose not to select a supplier because a lake next to it has fluctuating water levels, which previously has resulted in a supply chain disruptions. This is just one example of certain issues that can occur due to natural conditions within close proximity. The factor *'Close proximity natural issues'* have therefore been added to the total list of factors. The further 11 factors from practice are added in Table 6.1 below.

Factors from practice	Type
Amount of excess capacity	Micro
Bundle discounts	Micro
Capacity utilisation	Micro
Close proximity natural issues	Macro
Cost of packaging	Micro
Future capacity levels	Micro
Logistics costs	Micro
Product life cycle cost	Micro
Production capacity	Micro
Volume discounts	Micro
Willingness to invest in further capacity	Micro

Table 6.1. Additional 11 factors identified from practice

Now that 11 further factors, which have been proposed from practitioners, have been added to the list of 388 academic factors, the next step is to cluster the factors within different constructs, thereby making the total list of factors more tangible and useful for operational and empirical purposes.

Analysis of Academic and Practical Factors 7

In order to answer the second part of the second research question, the large amount of accumulated factors have to be structured and narrowed down into a more tangible list, which can then be used for empirical purposes. Of course, clustering the large list also makes it more operational and useful for A. T. Kearney at practitioners in general. To enable the creation of a more tangible list of factors, Section 7.1 will serve to cluster all the identified factors within certain constructs. In Section 7.2, a filtering of all the factors will then take place, thereby eliminating the ones which are not of value for outsourcing engagements, while amalgamating the factors that can be considered similar. The clustering and filtering process is based on a judgemental approach which has been conducted with the VP EMEA and the SCP in order to reduce subjectivity. Although the term "judgemental approach" has been used for the same type of clustering procedure in previous studies, in this report the term "empirical validation approach" is used instead, due to the negative ambience of the word "judgemental". The approach used in this chapter is portrayed in Figure 7.1.

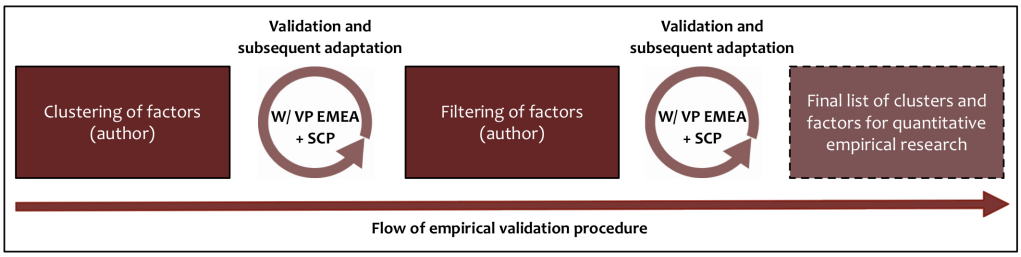


Figure 7.1. Process of clustering and filtering factors

7.1 Clustering of Factors

The need to structure and narrow down the factors in order for them to be useful for empirical purposes is accentuated indirectly by Saunders et al., who articulate that *"[...] there is a limit to the number of questions that any questionnaire can contain if the goodwill of the respondent is not to be presumed on too much."* (Saunders et al., 2011, pp. 144-145). In this report, each cluster will be organised around a construct (e.g., 'innovativeness' is a construct under which various innovativeness factors are clustered), meaning that this

section of the report will both assess which constructs to use, and which factors to cluster within the constructs. The ranking in the empirical study will be based on the constructs, thereby reducing the list of items which the participants in the research have to evaluate. This approach is similar to Kar and Pani (2014), who also narrowed down their 63 decision factors to just 13, in order to make the list more tangible for empirical purposes. It has to be noticed that the clustering of factors is conventionally done through the conduct of a factor analysis; however, since the clusters in this report were necessary to develop prior to the empirical research due to the comprehensive list of factors, a factor analysis could not be conducted as such analysis requires data from an empirical sample.

In the literature which have been examined in this report, some clusters were already developed for various factors, which is why the constructs for those clusters, and the factors within those clusters, will be directly transferred to this report. Nevertheless, since some of the studies did not cluster the factors which were presented for supplier selection or FDI purposes, those particular factors needed further analysis. That is, the factors which were not already clustered based on previous research had to be added within the already developed clusters based on what the author, the VP EMEA, and the SCP believed are adequate. Hence, an empirical validation approach, where the clusters are finalised together with experts, has been pursued. This was also done by Badri (2007), who grouped numerous of FDI factors within fourteen constructs.

Since the constructs for the clusters used in this report are retrieved from previous studies, one may critically ask why the previous chapters which accumulate all supplier selection factors on a disaggregated level (i.e., in Chapter 4 and Chapter 6) are relevant for the empirical research in Chapter 8, as they are not directly being used. There are several reasons, including the following:

1. A. T. Kearney explicitly asked for a list of all decision variables which have been presented in academia;
2. By clustering the total list of factors (thereby showing all factors within different constructs), the output will be more operational and thereby useful for practitioners;
3. By including all the factors which are identified in a systematic literature review, the report is more comprehensive and provides a better overview of decision-factors compared to previous studies. This is especially due to the inclusion of macro-level factors from FDI literature, which also contributes to filling one of the gaps presented in chapter 1;
4. In order to conduct empirical research which actually reflects what is going on in practice, the constructs which have been used in previous literature (i.e., quality, cost, speed, etcetera) should be dissected further in order for the respondents to know exactly what the overall broad variables encompass; and
5. By clustering all the identified factors under constructs retrieved from previous studies, the factors which potentially do not fit under those construct might enable the author to develop new constructs for a certain clusters, which have not been considered in previous research.

Hence, although all the factors identified in the previous chapter are not going to be ranked separately in the quantitative empirical study in Chapter 8, there are several reasons for why it is of value to include the factors in this report.

To provide some examples of already developed clusters, the research of Sarkis and Talluri (2002) can be taken into consideration. In their research, seven clusters were developed in order organise a total amount of 31 supplier selection factors. The constructs in which the clusters were included were here entitled 'cost', 'quality', 'time', 'flexibility',

'culture', 'technology', and 'relationship'. The 'quality' cluster in Sarkis and Talluri (2002) did, for instance, encompass factors such as *'conformance quality'*, *'consistent delivery'*, *'quality philosophy'*, and *'prompt response'*. Similarly to Sarkis and Talluri (2002), Choi and Hartley (1996) also structured their total amount 23 factors into different clusters. Eight clusters were in this case developed, those being *finances*, *consistency*, *relationships*, *flexibility*, *technological capability*, *service*, *reliability*, and *price*. The factors which, for instance, were added to the 'cost' construct included *'low initial price'*, *'compliance with cost analysis system'*, *'cost reduction activities'*, and *'compliance with sectoral price behaviour'*. However, the factors which were included under the 'consistency' construct were the exact same ones which Sarkis and Talluri (2002) added under their quality construct. This indicates that the clustering of factors can be ambiguous, as it is based on subjective judgements, or a unique definition of the construct which a cluster is organised around. It can therefore also be argued that there does not exist one right approach to develop certain clusters for supplier selection factors, when the clusters are based on expert assessments and not factor analyses.

In contradiction to the two former studies, Kar and Pani (2014) did not organise any of their 63 supplier selection factors in any clusters, which is why the clustering of those factors will not be based on already developed clusters from that study, but rather based on the constructs which have been retrieved from other studies in this report (e.g., some of the ones presented in the paragraph above). As mentioned before, the clustering of factors which have not been clustered in previous research will hence fist be based on what the author believes is adequate, whereafter this is validated by the VP EMEA and the SCP.

Based on the 388 factors which have been retrieved from 41 studies on supplier selection and FDI factors, and based on the additional 11 factors which have been suggested by the VP EMEA and the SCP, a total amount of 30 clusters have been included in this report. 16 out of the 30 clusters are for macro-level factors, while the remaining 14 clusters are for micro-level factors. Most of the constructs for the clusters are based on the constructs which have already been used for clusters in previous studies. However, since no factors which are related to CSR have been included under any construct in previous literature, the construct 'CSR' has been developed for this report. Also, since the VP EMEA suggested various capacity-related factors in Chapter 6, it was decided that 'Capacity' likewise should be used as a construct under which the different capacity-related factors can be clustered. Hence, all constructs except for 'CSR' and 'Capacity' have already been used in previous studies and have therefore been directly transferred to this report.

Despite the fact that all construct-titles (except for 'CSR' and 'Capacity') are retrieved from earlier studies, some of the constructs which are used from academia have also been combined, in case the factors related to those constructs were assessed to be similar, or in case the construct titles were synonyms for one another. The 'consistency' cluster from Choi and Hartley (1996) was, for instance, combined with the 'quality' cluster from Sarkis and Talluri (2002), but the 'quality' title was maintained as it was assessed that it reflected the content (i.e., the sub-factors) more profoundly. The 'technology' cluster from Dou and Sarkis (2010), the 'technological capability' cluster from Choi and Hartley (1996), the 'technological issues' cluster from Ellram (1990), and the 'technology'

cluster from Büyüközkan and Çifçi (2011) were also combined under one construct entitled 'technology' as they all included the same type of factors but under different construct title formulations. Also, some constructs used in previous studies were not included in this study, as they were assessed to be inadequate. The 'Others' construct used in Ellram (1990) was, for instance, not included in this study as it was assessed that the factors within that construct could be transferred to other constructs used in this report. Also, the 'Risk' construct from Sarkis and Sundarraj (2002) was omitted, as it was assessed that having a risk cluster would be too broad since numerous factors from various different clusters could technically be transferred to there based on the definition of risk (i.e., the definition of risk based on the ISO 31000:2009 standard is the "effect of uncertainty on objectives" (Purdy, 2010)). All the constructs which will be used to cluster the various factors are presented in Table 7.1, and an overview of the clusters including the sources used to retrieve them is portrayed in Table B.1 which is enclosed in Appendix B.

Constructs	
For Micro-Level Factors	For Macro-Level Factors
Capacity	Accessibility
Cost	Business Climate
CSR	Climate
Finances	Community
Flexibility/agility	Consumption and production patterns
Innovativeness	Economic
Organisational characteristics	Ecosystem vitality
Organisational culture	Environmental health
Quality	Government regulations
Relationship/partnership potential	Industrial site
Service	Labour
Sustainability	Markets
Technology	Political situation of foreign country
Time/delivery	Strategic issues
	Transportation
	Utility

Table 7.1. Overview of constructs

After the constructs, which are shown in Table 7.1, were defined subsequently to the gathering of all supplier selection factors, the actual clustering process was commenced. The total amount of 399 factors (388 from academia + 11 from practice) were initially clustered exclusively by the author. As mentioned earlier, all the construct titles - except for 'CSR' and 'Capacity' - were used from existing studies, and the factors within those constructs were initially preserved; that is, the factors that were already clustered under certain constructs in previous studies were likewise clustered under the same constructs in this report. Some of the factors that were clustered based on previous research were, however, restructured later in the focal clustering process when experts were involved to validate the clusters - this is further elaborated in the subsequent section (See Section 7.1.1). The factors which were not clustered in previous research had to be clustered under the constructs which have been included in this report. Examples of this clustering process could be based on some factors from Kar and Pani (2014), who as mentioned before, did not cluster any of the factors presented in their research. The *'Delivery reliability'* and *'Lead time'* factor were in this case, for instance, both added under the 'Time/delivery' construct as it was assessed that both factors reflects the delivery capabilities of a supplier. *'IT-standards'*, *'Electronic data interchange'* and *'Production capability'* were on the other hand all added under the 'Technology' cluster, as it can be argued that all factors reflects the suppliers technological capabilities. A complete list of factors within the different

constructs is included in three different tables in the subsequent section, as the clusters made by the author first should be validated.

7.1.1 Validation and Restructuring of Constructs and Clusters

As articulated earlier, the clustering process was validated by the VP EMEA and the SCP in order to reduce subjectivity and to make the work more thorough. This was done the 06.03.15 and the 13.03.15 (See Table 2.1 in Chapter 2 for interview details). Throughout the validation process, no remarks were made regarding the selection of constructs. Neither were there any major remarks for the clustered factors within the different constructs, as the process could be considered logical based on the chosen constructs. To recall, the factors which were already clustered under certain construct in previous literature were added under the same construct in this report, while the factors which were not clustered in previous literature had to be clustered under the constructs included in this report. However, despite the few remarks in the validation process, it was jointly decided that some of the factors should be relocated from one cluster to another as it was assessed that other clusters would have a better fit. For instance, the factor which is entitled *'Suppliers organisational structure and personnel'*, which was initially clustered under the 'organisational culture' construct due to the fact that Dou and Sarkis (2010) did so, was moved to the 'organisational characteristics' cluster as it was assessed that it would be more suitable there. So why was the suitability assessed to be higher in the 'organisational characteristics' cluster? In this report, it was argued that organisational structure and the personnel structure of a firm is not reflected by the organisational culture when, for instance, looking at the traits with the organisational culture construct encompass (Denison and Mishra, 1995). The 'organisational characteristics' is on the other hand a broader construct, which involve factors which in greater extent are based on the overall organisational configuration, and not just the internal values, beliefs, managerial directions, etcetera. Another example of a restructured factor is the *'Suppliers speed in development'* factor, which was moved from the 'technology' cluster to the 'time/delivery' cluster during the validation process. The *'Delivery reliability'* factor was as an example also moved from the 'quality' cluster to the 'time/delivery' cluster during the validation process.

Hence, in a nutshell, the constructs for the clusters were not changed during the validation process, but some of the factors where relocated from one cluster to another due to the fact that it would derive a better fit according to the author, the VP EMEA, and the SCP. It can be argued that the main reason for the restructuring of factors is due to the fact that more constructs were used compared to previous studies, which provided a greater breadth for the clustering of factors. The result of the overall clustering process is illustrated in alphabetical order in Table 7.2, Table 7.3, and Table 7.4. All factors within each cluster, the number of factors per cluster, and the references from where factors have been retrieved are included in those tables. Hence, the three tables summarise all the work which have been conducted in the report until the current stage. It has to be noticed that the elimination of redundant factors for outsourcing has not taken place yet, which means that the total list of constructs and factors in the tables does not represent what will be used in the empirical study. This is elaborated further in the subsequent section.

Clusters	Factors	No	Sources
Accessibility	Accessibility to sub-suppliers, accessibility of customers, accessibility of transportation service, proximity of production material sources, proximity to large cities, overall geographical distance from buyer, availability of raw materials, IT infrastructure quality and cost, proximity to supplies, nearness to component parts, and availability of storage facilities for raw materials and components	11	Blair and Premus (1987), Haitani and Marquis (1990), Karakaya and Canel (1998), Sarkis and Sundarraj (2002), Badri (2007), Dou and Sarkis (2010), Farahani et al. (2010)
Business climate	Sustainability of repair and maintenance services, sustainability of business, facility and legal services, compatibility of other industry, sustainability of building zones, sustainability of zoning restrictions, sustainability of environmental regulations, availability of public technical training, state of local planning assistance, bribery and corruption, and cultural distance	10	Blair and Premus (1987), Karakaya and Canel (1998), Dou and Sarkis (2010)
Capacity	Production capacity, capacity utilisation, reserve capacity or the ability to respond to unexpected demand, cost of service contract, willingness to invest in further capacity, amount of excess capacity, future capacity levels, and production facilities and capacity	8	Dickson (1966), Weber et al. (1991), Kannan and Tan (2002), Chan and Kumar (2007), Farahani et al. (2010), Cheraghi et al. (2011), Kar and Pani (2014)
Climate	Amount of snow and/or rain fall, living conditions, relative humidity, monthly average temperature, air pollution, natural disaster potential, and close proximity natural issues	7	Blair and Premus (1987), Haitani and Marquis (1990), Karakaya and Canel (1998), Badri (2007), Dou and Sarkis (2010), Farahani et al. (2010), Schotter and Beamish (2013)
Community	Physical attractiveness, community attitude towards industry, social make-up of inhabitants, sustainability of houses, community race relations, fire protection and insurance, police protection, adequacy of local school, sustainability of environmental amenity, sustainability of medical facilities, sustainability of shopping facilities, quality of schools, religious facilities, medical facilities, hotels and motels, banks, credit institutions, etc., openness, education system (uni, research institutions, etc.), and crime	18	Blair and Premus (1987), Haitani and Marquis (1990), Wheeler and Mody (1992), Karakaya and Canel (1998), Blonigen (2005), Badri (2007), Dou and Sarkis (2010), Schotter and Beamish (2013), Godinez and Liu (2015)
Consumption and production patterns	Materials use, energy use, depletion of non-renewable ressource, regeneration of renewable ressource, green consumption, waste generation, waste treatment, waste disposal, and waste recycling	9	Dou and Sarkis (2010)
Cost	Initial price, compliance with cost analysis system, cost reduction activities, compliance with sectoral price behaviour, volume discounts, bundle discounts, logistics costs, cost of packaging, supplier level cost (contractual, negotiation, etc.), order level cost (frequency of ordering, etc.), cost reduction capabilities and efforts, inventory cost (e.g., when pursuing VMI), sub-component pricing, indirect cost, cost reduction performance, price relative to market price, fluctuations of costs, product life cycle cost, and opportunistic pricing behaviour	19	Dickson (1966), Dempsey (1978), Weber et al. (1991), Swift (1995), Choi and Hartley (1996), Ghodsypour and O'Brien (1998), Kannan and Tan (2002), Sarkis and Talluri (2002), Wang et al. (2004), Kotabe and Murray (2004), Chan and Kumar (2007), Chan et al. (2008), Dou and Sarkis (2010), Ho et al. (2010), Farahani et al. (2010), Cheraghi et al. (2011), Deng et al. (2014)
CSR	Socially responsible supplier selection (SRSS), resource investment in social programs, supplier diversity focus, supplier environmental focus, supplier ethical treatment, supplier human rights focus, supplier community focus, supplier safety focus, relative sales revenues, relative sales growth, relative market share, disciplinary and security practices, employee contracts, equity labour sources, discrimination, flexible working arrangements, job opportunities for employees, employment compensation, and ethical standards	19	Kannan and Tan (2002), Büyüközkan and Çifçi (2011), Thornton et al. (2013)
Economic	Standard of living, per capita income, strength of currency against the US dollar, balance of payment status, attitude of financing agents, trade deficit, trade tariffs, state sales tax, and inflation	9	Blair and Premus (1987), Mudambi (1995), Karakaya and Canel (1998), Chakrabarti (2001), Sarkis and Sundarraj (2002), Kotabe and Murray (2004), Blonigen (2005), Farrell (2006), Badri (2007), Chan and Kumar (2007), Chan et al. (2008), Boardman Liu et al. (2008), Kinra and Kotzab (2008), Dou and Sarkis (2010), Farahani et al. (2010), Kar and Pani (2014)
Ecosystem vitality	Regional ozone, sulfur dioxide emmissions, water quality, water stress, conservation issues, effective conservation, critical habitat protection, marine protected areas, growing stock of forestry, marine trophic, trawling intensity of fishery irrigation stress, agricultural subsidies, inensive cropland, burned land area of agriculture, pesticite regulation, greenhouse gas emission/capita, greenhouse gas emissions/electricity generated, and industrial carbon intensity	18	Dou and Sarkis (2010)
Environmental health	Environmental burden of disease, adequate sanitation, drinking water, indoor air pollution, urban particulates, and local ozone	6	Badri (2007), Dou and Sarkis (2010)

Table 7.2. Overview of clusters and references (After validation and restructuring) - Part 1/3

Clusters	Factors	No	Sources
Finances	Financial position, financial stability and staying power, suppliers ability to make a decent profit, billing accuracy, financial conditions, profitability, financial records disclosure, performance awards, economic performance, price Strategy, financial strength (long-term stability), and performance history	12	Dickson (1966), Dempsey (1978), Ellram (1990), Weber et al. (1991), Swift (1995), Choi and Hartley (1996), Kannan and Tan (2002), Kahraman et al. (2003), Chen et al. (2006), Chan and Kumar (2007), Chan et al. (2008), Ho et al. (2010), Cheraghi et al. (2011), Büyüközkan and Çifçi (2011), Kar and Pani (2014)
Flexibility and agility	Product volume changes, short set-up time, response time for major changes, flexible contract terms and conditions, flexibility in general (customisability), product line diversity, supply variety, response flexibility, availability of parts, and prompt response	10	Swift (1995), Choi and Hartley (1996), Kannan and Tan (2002), Sarkis and Talluri (2002), Wang et al. (2004), Chan and Kumar (2007), Dou and Sarkis (2010), Ho et al. (2010), Cheraghi et al. (2011)
Government regulation	Goverment aids, hometown of company official, goverment incentive (investment incentives, subsidies, etc.), repatriation allowances, tax structure (tax free ops., property tax, etc.), government restrictions, trade policy (e.g., trade barriers), building ordinances, zoning codes, compensation laws, insurance laws, safety inspections, nuisance and stream pollution laws, clarity of corporate investment laws, regulations concerning joint ventures and M&A, regulations on transfer of earning out of country, taxation of foreign owned companies, foreign ownership laws, quotas on amount of foreign employees, prevalance bureaucratic red tape, regulations concerning price control, requirements for setting up local corporations, bureaucratic instability, quality of government, and investment controls	25	Blair and Premus (1987), Haitani and Marquis (1990), Wheeler and Mody (1992), Mudambi (1995), Karakaya and Canel (1998), Chakrabarti (2001), Sarkis and Sundarraj (2002), Kotabe and Murray (2004), Blonigen (2005), Badri (2007), Chan and Kumar (2007), Boardman Liu et al. (2008), Kinra and Kotzab (2008), Dou and Sarkis (2010), Farahani et al. (2010)
Industrial site	Accessibility of land, cost of industrial land, developed industrial park, space for future expansion, insurance rates, availabiliy of lending institutions, community industrial development projects, sustainability of site parking facilities, site development and construction coss, room for expansion, plant site topographic features, plant site adequacy and costs, and plant building for sale or lease	13	Blair and Premus (1987), Haitani and Marquis (1990), Karakaya and Canel (1998), Badri (2007), Dou and Sarkis (2010)
Innovativeness	New launch of products, new use of technology, number of patents, R&D expenditures, performance relative to industry dynamics, research in general, collaboration with universities and institutions, product development capabilities, and corporate foresight activities	9	Kleinknecht et al. (2002), Dou and Sarkis (2010), Kar and Pani (2014)
Labour	Unionisation, labour costs, availability of semi and unskilled labour, availability of skilled labour, extent of labour unionisation, right-to-work-law, training support, attitude of workers, availability of male labour, availability of female labour, worker stability, managerial labour, and adequate level of desired language skills	13	Blair and Premus (1987), Haitani and Marquis (1990), Wheeler and Mody (1992), Mudambi (1995), Karakaya and Canel (1998), Sarkis and Sundarraj (2002), Farrell (2006), Badri (2007), Boardman Liu et al. (2008), Dou and Sarkis (2010)
Markets	Proximity of natural markets, proximity of national markets, proximity to existing or future consumer market, existing producer market, potential consumer market, anticipation of growth of markets, income trends, population trends, consumer characteristics, location of competitors, future expansion opportunities (within or nearby), size of market, and nearness to related industry	13	Blair and Premus (1987), Karakaya and Canel (1998), Chakrabarti (2001), Kannan and Tan (2002), Badri (2007), Dou and Sarkis (2010)
Organisational characteristics	Suppliers organisational structure and personnel, feeling of trust, reputation and position in the industry, desire for business, impression, industry knowledge, references, level of strategic importance to the buyer, scope of resources, insurance and litigation history, company size, percentage of work which is subcontracted, reliability and consistency, professionalism, amount of past business, management capabilities, domain experience, exporting status, facility planning, overall supplier commitment, skill level of staff, supplier's customer base, supplier's safety record, safety adherence, warranties and claim policies, training aids, and labour relations	27	Dickson (1966), Dempsey (1978), Ellram (1990), Swift (1995), Kannan and Tan (2002), Kahraman et al. (2003), Chan and Kumar (2007), Chan et al. (2008), Dou and Sarkis (2010), Ho et al. (2010), Cheraghi et al. (2011), Büyüközkan and Çifçi (2011), Kar and Pani (2014)
Organisational Culture	Conflict resolution, management attitude/outlook for the future, strategic fit, top management compatibility, compatibility among levels and functions, attitude, honest and frequent communications, open to site evaluation, procedural compliance (e.g., bidding compliance), integrity, organisational, culture in general, willingness to resolve conflicts, management outlook for the future, values, conflict resolution system, and regulatory compliance	16	Dickson (1966), Dempsey (1978), Ellram (1990), Weber et al. (1991), Kannan and Tan (2002), Sarkis and Talluri (2002), Chen et al. (2006), Dou and Sarkis (2010), Cheraghi et al. (2011), Kar and Pani (2014)
Political situation of foreign country	History of the country, relation to the "developed world", stability of regime, attitude towards foreign capital, treaties and pacts, protection against expropriation (legal protection), and type of military alliances	7	Wheeler and Mody (1992), Badri (2007), Chan and Kumar (2007), Chan et al. (2008), Boardman Liu et al. (2008), Dou and Sarkis (2010)
Quality	Certification and standards, self-audits, conformance quality, quality philosophy and policies (e.g., ISO 9000), overall quality standards (e.g., relative to buyers tolerance level), service quality credence, service quality experience, information quality, inspection and control processes, documentation and self auditing, quality staff, quality certifications, quality data available, shipment quality, and quality assurance and control procedures	15	Dickson (1966), Dempsey (1978), Weber et al. (1991), Choi and Hartley (1996), Kannan and Tan (2002), Sarkis and Talluri (2002), Kahraman et al. (2003), Kotabe and Murray (2004), Chen et al. (2006), Chan and Kumar (2007), Chan et al. (2008), Dou and Sarkis (2010), Ho et al. (2010), Cheraghi et al. (2011), Büyüközkan and Çifçi (2011), Deng et al. (2014), Kar and Pani (2014)

Table 7.3. Overview of clusters and references (After validation and restructuring) - Part 2/3

Clusters	Factors	No	Sources
Relationship and partnership potential	Long-term relationship, relationship closeness, communication openess, reputation for integrity and reputation in general, past and current relationship with the supplier, willingness to integrate, willingness to share confidential information, reciprocal arrangements, untimacy of relationships, and design involvement	10	Choi and Hartley (1996), Kannan and Tan (2002), Sarkis and Talluri (2002), Chen et al. (2006), Dou and Sarkis (2010), Ho et al. (2010), Cheraghi et al. (2011), Kar and Pani (2014)
Service	Service capability, after-sales support, sales rep's competence, repair service, global customer service for day-to-day work, complaint handling procedures, R&D support (e.g., prototype development, and competent technical support and technical expertise	8	Dickson (1966), Dempsey (1978), Weber et al. (1991), Swift (1995), Choi and Hartley (1996), Ghodsypour and O'Brien (1998), Kahraman et al. (2003), Chan and Kumar (2007), Chan et al. (2008), Ho et al. (2010), Cheraghi et al. (2011), Deng et al. (2014), Kar and Pani (2014)
Strategic issues	Competition, current facilities, market size and penetration, expansion capabilities, and nearby competitors or complementors of supplier	5	Sarkis and Sundarraj (2002), Dou and Sarkis (2010), Farahani et al. (2010)
Sustainability	Pollutant effects, green image, design for environment, environmental competencies, moral issues, environmental production and technologies, environmental image, establishment of environmental commitment and policy, identification of environmental aspects, planning of environmental objectives, assignment of environmental responsibility, checking and evaluation of environmental activities, internal consumption of energy, internal consumption of raw material, internal consumption of water, and environmental technologies	16	Humphreys et al. (2003), Dou and Sarkis (2010), Farahani et al. (2010), Büyüközkan and Çifçi (2011), Thornton et al. (2013), Deng et al. (2014)
Technology	Intellectual property rights, technology compatibility (e.g., IS fit), assessment of future manufacturing capabilities, suppliers design capability, technical and production capability, current manufacturing facilities/capabilities, communication system, commitment to continuous improvement in product and process, suppliers willingness to eliminate waste, order entry and invoicing system, including EDI, process improvement, level of automation, inventory position, data administration, IT standards, design capability, electronic data interchange, communication barriers, E-transaction capabilities, testing capability, and value-added productivity	21	Dickson (1966), Dempsey (1978), Ellram (1990), Weber et al. (1991), Choi and Hartley (1996), Kannan and Tan (2002), Sarkis and Talluri (2002), Kahraman et al. (2003), Chen et al. (2006), Chan et al. (2008), Dou and Sarkis (2010), Ho et al. (2010), Büyüközkan and Çifçi (2011), Cheraghi et al. (2011), Deng et al. (2014), Kar and Pani (2014)
Time/delivery	Effort in promoting JIT principles, consistent delivery, delivery reliability, suppliers speed in development, delivery speed, product development time, partnership formation time, suppliers effort to engage in JIT, lead time, changeover time for certain activities, compliance with due date, delivery mistakes, degree of closeness/supplier proximity, delivery conditions, delays, delivery efficiency, net late deliveries, order-to-delivery lead time, waiting time, and on-time delivery	20	Dickson (1966), Dempsey (1978), Weber et al. (1991), Swift (1995), Ghodsypour and O'Brien (1998), Kannan and Tan (2002), Sarkis and Talluri (2002), Sarkis and Sundarraj (2002), Wang et al. (2004), Chan and Kumar (2007), Chan et al. (2008), Dou and Sarkis (2010), Ho et al. (2010), Cheraghi et al. (2011), Kar and Pani (2014)
Transportation	Infrastructure (state and local), pipeline facilities, airway facilities, highway facilities, waterway transportation, warehousing and storage facilities, trucking Services, railroad facilities, availability of postal services, and availability of wholesale outlets	10	Blair and Premus (1987), Wheeler and Mody (1992), Mudambi (1995), Karakaya and Canel (1998), Kotabe and Murray (2004), Badri (2007), Boardman Liu et al. (2008), Kinra and Kotzab (2008), Schotter and Beamish (2013)
Utility	Sustainability of electrical service, sustainability of telephone service, availability of natural gas, adequacy of cost of water supply, sustainability of waste disposal service, attitude of utility agents, water supply, cost and quality, disposable facilities of industrial waste, availability of fuels, cost of fuels, availability of electric power, cost of electric power, availability of gas, adequacy of sewage facilities, and availability of coal and nuclear facilities	15	Blair and Premus (1987), Mudambi (1995), Karakaya and Canel (1998), Kotabe and Murray (2004), Badri (2007), Kinra and Kotzab (2008), Dou and Sarkis (2010)

Table 7.4. Overview of clusters and references (After validation and restructuring) - Part 3/3

7.2 Filtering of Factors

Now that all factors identified in academia and practice have been clustered, the next step is to filter the factors. The filtering process is conducted due to two main reasons. First of all, the FDI factors which are not considered important for outsourcing engagements

will be removed which will make the final list more valid for outsourcing engagements. Secondly, although the quantitative empirical ranking will be based on the constructs, the factors within the constructs will still be added as a side information in order for the participants to get an overview of what the constructs encompass. Reducing the list of factors will make the surveys for the quantitative empirical part less overwhelming. The filtering will be based on two different approaches. First, the factors which can be considered redundant for outsourcing will be discarded. Secondly, all the factors which are assessed to be similar to each other will be amalgamated. The reason why it was decided to conduct the filtering process *after* having clustered the factors, was due to the fact that clusters would provide a better overview of which factors to maintain and which factors to discard. Also, having developed clusters makes it easier to amalgamate factors, as it was assumed that only factors which are similar (i.e., from the same cluster) would be considered for amalgamation.

7.2.1 Elimination of Factors

As mentioned earlier, since the macro-level location-specific factors have been gathered from FDI literature, some of those do naturally not fit for supplier selection purposes. Of course, as it is also emphasised by the VP EMEA, a supplier selection decision problem can technically contain any factor which one can imagine, as every single outsourcing engagement is unique, and as all decision-makers behind those outsourcing engagements have their own distinct background, cognition, and preferences. This is also supported by the Upper Echelons Theory of Hambrick and Mason (1984). However, since it is acknowledged that many of the FDI factors conventionally are not used for outsourcing engagements, those will be filtered. Similarly to the clustering process, the process of eliminating factors was first executed by the author, whereafter a validation phase with the VP EMEA and the SCP took place in separate interviews.

Equally for all the eliminated factors is; they have been assessed primarily to be useful for when firms establish in-house facilities in a foreign country, or that they could only be used in very distinct outsourcing projects. For instance, the 'industrial site' cluster, which was based on Badri (2007) and Dou and Sarkis (2010), was removed completely, as the factors reflect what need to be considered when establishing a complete physical facility (e.g., *'construction cost'*, *'parking facilities'*, *'cost of industrial land'*, etcetera). The 'ecosystem vitality' cluster from Dou and Sarkis (2010), which included factors such as *'growing stock of forestry'*, *'agricultural subsidies'*, *'pesticide regulations'*, *'regional ozone'*, and *'sulfur dioxide emissions'*), can be argued to be useful for distinct sourcing projects (e.g., the outsourcing of agricultural processes), which is why the whole cluster is eliminated. Other complete clusters, including 'environmental health' 'Consumption and production patterns', and 'Strategic issues' were also removed due to similar reasons as mentioned above. Besides the removal of five complete clusters, some individual factors within other clusters were also removed due to similar reasons as the ones mentioned above. For instance, although many factors under the 'government regulations' construct were assessed to be valuable for outsourcing engagements, some were still assessed to be primarily of value for FDIs. Examples here include *'building ordinances'*, *'repatriation allowances'*, and *'zoning codes'*. Within the 'community' cluster, factors such as *'social make-up of inhabitants'*, *'sustainability of houses'*, and *'community race relations'* were

as examples also eliminated from the total list of factors.
Now, since the process of eliminating factors can be argued to be the most subjective part in this report, a validation process were, of course, conducted with the two experts as when the clusters were developed. However, before this procedure took place, some factors were first amalgamated.

7.2.2 Amalgamation of Factors

Despite the fact that no direct duplicates of factors have been gathered during the process of identifying supplier selection factors, similarities between some factors within certain clusters were present, which is why it seemed natural to amalgamate those factors, thereby reducing the complexity associated with using all identified factors. Out of the remaining list of factors (i.e., the list after the elimination process) 36 of the factors were amalgamated with others, thereby reducing the list of factors further.
All of the factors that were amalgamated were within the same clusters. That is, factors within the 'quality' cluster were only amalgamated with similar factors from the same cluster. For instance, within the 'time and delivery' cluster, the *'delays'* factor was combined with *'net late deliveries'*, and the *'lead time'* factor was combined with the *'order-to-delivery lead time'*. In the 'technological capability' cluster, the *'suppliers willingness to eliminate waste'* factor as well as the *'process improvement'* factor were both combined with the *'commitment to continuous improvement in product and process'* factor, thereby reducing three factors to one single factor. Within the same cluster, three other factors were combined with different three factors. Despite the fact that the amalgamation of factors, for obvious reasons, took place *within* clusters and not *between* clusters, some of the amalgamated factors were in fact within different clusters before the validation of the clusters took place in Section 7.1. For instance, *'consistent delivery'* was originally included in the 'quality' cluster in Sarkis and Talluri (2002), which is why it also was clustered under the same construct in this report initially. However, since it was assessed that this factor had a better fit to the 'time and delivery' cluster, it was moved to that particular cluster during the validation process. However, during the amalgamation process, that same factor was combined with the *'on-time-delivery'*, which was already included in the 'time and delivery' cluster. Another example is the *'environmental technologies'* factors, which was initially moved from the 'technology' cluster to the 'sustainability' cluster. In the 'sustainability' cluster, the *'environmental technologies'* factor was then combined with the *'environmental production and technologies'* factor. It can be argued that the fact that some factors, which were moved from one cluster to another during the cluster validation processes, were amalgamated with other factors in the new cluster justifies the cluster-switch, and thereby the overall clustering approach even further.

7.2.3 Validation of Elimination and Amalgamation of Factors

The validation process yielded some interesting outcomes. The author did ask the practitioners to especially scrutinise the factors which have been marked as *not useful* for outsourcing engagements, to assess whether the filtering was adequate. The *'infrastructure (state and local)'* factor was, for instance, eliminated completely from the list of relevant factors for outsourcing engagements by the author, as it was argued that a supplier which

is able to manufacture a good desired by a buyer can always be delivered (otherwise the supplier would not localise itself in the certain area), and that the complexity of the transportation would be reflected in the purchasing price. However, as the interviewed SCP argued, although a windmill manufacturer, for instance, knows that a certain supplier would be able to produce a newly developed windmill blade for the rotor, the infrastructure around that supplier still has to be considered, as some blades need to be transported on roads with a certain width and on routes which do not have any roundabouts. Hence, due to this being a valid point, the factor was retained, thereby also making it eligible to be included in the surveys which will be presented later in the report. Further factors that were eliminated by the author, including *'highway facilities'*, *'warehousing and storage facilities'*, *'water supply cost and quality'*, which were subsequently added to the list again due to arguments from the SCP and VP EMEA regarding why they could be important for outsourcing engagements.
Overall, the elimination of factors with the practitioners resulted in the removal of further factors, but also the addition of new factors which the author initially removed (as in the examples above). No comments were added to the amalgamation of factors, which is why the work of the author was kept as before the validation process. A total amount of 80 factors were eliminated from the total list of factors, while the list was further trimmed by 34 factors, as those could be amalgamated with others. Hence, a total amount of 114 factors was filtered away from the complete list of 399 factors clustered within 30 constructs, resulting in a total amount of 285 factors clustered within 25 constructs. An overview of the final list of constructs and the number of factors after each filtering process is portrayed in Table 7.5. An overview of the eliminated factors, as well as the factors which have been amalgamated can be found in Appendix C. The final list of constructs and factors, which have been used for the empirical study, can be found in Appendix D as well as in the survey, which is enclosed in Appendix E.

Clusters	No. after elimination	No. after amalgamation	Factor Type
Accessibility	11	11	Macro
Business climate	4	4	Macro
Capacity	8	7	Micro
Climate	7	7	Macro
Community	12	12	Macro
Cost	19	17	Micro
CSR	15	14	Micro
Economic	7	7	Macro
Finances	12	8	Micro
Flexibility and agility	10	8	Micro
Government regulation	19	18	Macro
Innovativeness	9	8	Micro
Labour	13	12	Macro
Markets	12	12	Macro
Organisational characteristics	27	24	Micro
Organisational Culture	16	12	Micro
Political situation of foreign country	7	7	Macro
Quality	15	15	Micro
Relationship and partnership potential	10	9	Micro
Service	8	8	Micro
Sustainability	16	14	Micro
Technology	21	17	Micro
Time/delivery	20	14	Micro
Transportation	8	8	Macro
Utility	12	12	Macro
Total	**319**	**285**	**Micro/Macro**

Table 7.5. List of formulated clusters including number of factors (After filtering)

Empirical Results 8

Now that all the factors have been clustered and filtered, the next step is to conduct the quantitative part of the empirical research, thereby being able to answer the second part of the second research question. To recall, the second part of the second research question is formulated as following: **RQ 2:** *"[...] and which of all the identified micro-level and macro-level factors (i.e., from academia and practice) are of highest importance, when firms today engage in major supplier selection activities?"*. The first section will first develop an overall ranking, while the second section will develop two different rankings based on distinct motivations for the outsourcing engagements. A third section is dedicated to present correlations between the various constructs which have been included in the rankings, and the results of a multiple linear regression analysis will also be presented herein.

8.1 The Development of a Novel Ranking

As mentioned in the methodology chapter of this report (See Chapter 2), the survey instrument used for the empirical research has been inspired by previous studies, and was distributed to a total amount of 217 managers who have more than five years of outsourcing/purchasing experience, and who work in companies which annual revenues are higher that €10 million. A summary of the firms who respondent is portrayed in Table 8.1.

Sample details	
Response rate	N=42, rate = 19,4%
Major industries	35% = engineering and products industry, 12,5% = consumer packaged goods, and 10% pharmaceuticals
Size in employees	From 15 to 45.000, with a mean of 5200 and a median of 600
Size in revenue	From €10 million to €4.5 billion, with a mean of €1.7 billion and a median of €200 million
Annual purchasing volume	From €5 million to €4.5 billion, with a mean of €504 million and a median of €76 million
Average global sourcing rate	55,4%

Table 8.1. An overview of the responding firms

Based on the attributes of the responding firms, the results which have been derived from the empirical study can be considered interesting. As mentioned several times throughout the report, macro-level constructs are now ranked together with micro-level constructs; something which has not been done previously. The reason why macro-level constructs (or factors in general) have not been added previously has not been justified by any scholar, but the results derived in this report clearly indicate that it is not because macro-level constructs are not considered important by practitioners.

Rank	Factor (N=42)	Mean Rating
1	Quality	4.628
2	Cost	4.372
3	Time and delivery	4.302
4	Flexibility and agility	4.000
5	Capacity	3.977
6	Relationship and partnership	3.977
7	Accessibility	3.930
8	Labour	3.860
9	Business climate	3.814
10	CSR	3.791
11	Government regulations	3.605
12	Service	3.581
13	Finances	3.558
14	Economic	3.558
15	Innovativeness	3.535
16	Transportation	3.535
17	Technology	3.465
18	Organisational characteristics	3.419
19	Sustainability	3.419
20	Utility	3.395
21	Markets	3.302
22	Organisational culture	3.233
23	Political situation of foreign country	3.163
24	Climate	2.744
25	Community	2.744

Table 8.2. An updated ranking: with the inclusion of macro-level constructs (highlighted)

Overall, based on the results illustrated in Table 8.2, it can be observed that the top three constructs are used across major outsourcing engagements are 'quality', 'cost', and 'time and delivery'. This result is not surprising, as the rankings of previous studies, including Dickson (1966), Kannan and Tan (2002), Cheraghi et al. (2011), and Kar and Pani (2014) also had more or less the same output. The top three results of this empirical research are furthermore consistent with the research of Ho et al. (2010) who - through a meta-analysis of literature on supplier selection - argued that 87.18%, 82.05%, and 80.77% studies use product quality, delivery compliance and cost as important constructs for when suppliers are evaluated, which is why those constructs are also considered the most important for practitioners.

Nevertheless, despite the obvious results of some of the micro-level constructs, it is interesting to observe how the macro-level constructs are assorted between the micro-level constructs (to clearly distinguish between the two types of constructs, the macro-level constructs have been highlighted in the ranking). The 'accessibility' construct, which contain factors such as *'accessibility to sub-suppliers'*, *'accessibility of transportation services'*, *'proximity of production material sources'*, *'proximity to large cities'*, *'overall geographical distance from buyer'*, *'IT infrastructure quality and cost'*, etcetera, was for instance ranked as the seventh most important aspect for major outsourcing engagements. Two further macro-level constructs, those being 'labour' and 'business climate' followed 'accessibility' on the eight and ninth place. Those three macro-level constructs are

therefore considered more important than micro-level constructs such as 'CSR', 'services', 'finances', and even 'innovativeness' which have generally become of higher importance in recent years. It is especially interesting to note that 'accessibility' factors and 'labour' factors likewise were ranked as the most important in a pure FDI factor ranking (i.e., in Haitani and Marquis (1990)). The exact underlying reason for why those macro-level constructs are ranked highest in both a mere FDI ranking and the focal overall ranking which considers both micro-level and macro-level constructs is not completely clear. However, it can be argued that both types of constructs are often being debated as a function of the increased globalisation, meaning that managers perhaps more often are exposed to such constructs, which could be a reason for why they are perceived as being more important. Despite the fact that some macro-level constructs are considered more important than other more "standard" micro-level criteria used in general supplier selection procedures, it is still important to notice that five out of the sixth lowest ranked constructs are location-specific. This indicates that although some macro-level constructs are considered important in major outsourcing engagements, several of them are still considered of low relevance by practitioners. The least important constructs are 'climate' and 'community' (shared mean rating of 2.774). The low importance of 'climate', which for instance include factors that mirror the risk of natural disasters, can be considered surprising, when comparing this to the increasing amount of natural disasters and thereby the increasing risk of supplier disruptions which is occurring in the globalised world. According to World Economic Forum (2015*a*), natural disasters due to climate issues are in fact the main reason for why supply chain disruptions occur, which is why it can be argued that this perhaps should gain more importance when selecting suppliers in the future. However, the reason why the score is low could be because the respondents misunderstood the 'climate' construct by not observing that natural disasters is one of the underlying factors within the construct. The low score of the 'community' construct does, however, not come as a surprise, as the factors within this construct primarily reflect attributes which are important for people who actually live in the location. Since this is primarily the case for FDI engagements (i.e., when companies establishes new facilities and transfer people in order to manage it), it is not a surprise that the score is low for outsourcing engagements although some of the community factors are relevant for sourcing engagements in certain situations.

8.2 Further Rankings Based on Outsourcing Motivations

Besides developing an overall ranking which illustrates the importance of the different micro-level and macro-level constructs, a further table has been developed in order to portray if the ranking differs between outsourcing engagements where the motive was to reduce cost and outsourcing engagements where the motive was to gain access to innovation and novel technologies. As noted in various previous supplier selection studies, including Dempsey (1978) Weber et al. (1991), Kahraman et al. (2003), and Deng et al. (2014), the choice of factors always depend on the individual sourcing situation and its motive. As mentioned in the methodology chapter (See Chapter 2), the respondents were asked to specify this in the surveys. The results are depicted in Table 8.3.

Rank	Factor - Cost as motivation (n=32)	Mean	Factor - Innovation as motivation (n=10)	Mean
1	Quality	4.571	Quality	4.636
2	Cost	4.457	Time and delivery	4.364
3	Time and delivery	4.286	Capacity	4.182
4	Capacity	3.914	Accessibility	4.182
5	Flexibility and agility	3.912	Flexibility and agility	4.091
6	Labour	3.886	Relationship and partnership	4.091
7	Relationship and partnership	3.886	Labour	3.909
8	Accessibility	3.857	CSR	3.909
9	CSR	3.771	Business climate	3.909
10	Business climate	3.771	Innovativeness	3.909
11	Finances	3.629	Sustainability	3.909
12	Economic	3.571	Cost	3.818
13	Government regulations	3.571	Organisational characteristics	3.727
14	Innovativeness	3.486	Economic	3.636
15	Service	3.486	Technology	3.636
16	Transportation	3.457	Utility	3.636
17	Sustainability	3.371	Finances	3.455
18	Technology	3.371	Government regulations	3.455
19	Utility	3.314	Transportation	3.445
20	Organisational characteristics	3.257	Organisational culture	3.364
21	Markets	3.229	Service	3.273
22	Political situation of foreign country	3.171	Political situation of foreign country	3.182
23	Organisational culture	3.143	Markets	3.091
24	Climate	2.743	Climate	2.909
25	Community	2.743	Community	2.445

Table 8.3. Ranking difference based on outsourcing type (macro-level constructs highlighted)

As illustrated in Table 8.3, it can be seen that the constructs which are ranked as top three for outsourcing engagements where the motivation was to reduce cost are exactly similar as in the overall ranking shown in Table 8.2. The 'accessibility' construct has now moved one position down, which might be due to the fact that outsourcing engagements which strictly focus on reducing cost do not need agile and flexible supply chains, which is why the accessibility - and thereby the proximity - to the supplier, the sub-suppliers, raw materials, etcetera, is not very crucial. It is also interesting to note that both 'organisational culture' and 'organisational characteristics' has have decreased in the ranking. This might simply be due to the fact that cost focused outsourcing engagements are not focused about the organisational attributes of a supplier, as long as the price is low. This is also indicated by the fact that 'relationship and partnership' has decreasing in the ranking. When looking at the results for outsourcing engagements where the motivation was to gain innovative products and technologies, there are several elements which are interesting to pinpoint. For instance, the 'cost' construct has first of all moved from a position in the top three to being the twelfth most important construct to consider. 'Time and delivery', 'relationship and partnership', 'innovativeness', 'sustainability', and 'technology' have all increased in importance compared to in the cost scenario, which based on the theoretical considerations presented in Chapter 3 makes sense when looking at the outsourcing motive. 'Accessibility' is similarly to in the overall ranking once again the most important macro-level construct, while 'climate' and 'community' still maintain their position as the two least important constructs. It can be considered quite surprising that 'labour' decreases in importance in this scenario, as it can be argued that knowledgeable and high-skilled people are needed to obtain innovative technologies. On the other hand, the increasing importance of 'accessibility' can be due to the fact that when a buying firm uses suppliers to gain innovative items, it can also be assumed that the market for those specific items is more dynamic than in the case of items which are desired in order to reduce cost. Having a more dynamic environment requires higher flexibility and shorter lead times in case of

uncertainty, which is why the accessibility to the supplier, sub-suppliers, etcetera, can be considered more important.

8.3 Correlation and Multiple Linear Regression Analysis

Besides developing the rankings which were presented in the previous sections, a correlation analysis has also been conducted in order to examine the relationship strength between the different constructs; and more importantly, to examine the correlation between the constructs and supplier performance. Due to the size of the correlation matrix, it has been enclosed in Appendix F. As it can be seen in the matrix, many of the results are in line with what scientific studies and theories have suggested, especially when looking at correlations between the micro-level constructs. For instance, 'cost' has a significant negative relationship with 'innovativeness', while 'innovativeness' has a significant positive relationship with 'flexibility and agility', and 'relationship and partnership potential'. Other findings, which can be argued to be quite predictable are the significant relationships between 'CSR' and 'sustainability'. The reason why the relationship between 'CSR' and 'sustainability' was predictable is due to the fact that two aspects often are discussed together; this is, for instance, also the case in Thornton et al. (2013) which is the study from where most of the CSR factors for this thesis have been retrieved.
It is also interesting to observe how the micro-level constructs are related to the macro-level constructs. For instance, the positive significant correlations between 'relationship and partnership potential' and 'accessibility', 'economic', and 'markets' might indicate that buying firms are most comfortable with partnering with suppliers which are both easily accessible location-wise (and with easy access to tier to suppliers and raw materials), and that the suppliers should be in countries which are economically stable, while the proximity to other markets (i.e., growth markets with future business potential) are not too distant. Beside examining the correlations between the different type of constructs, it is also interesting to examine the correlation between the various types of constructs and the performance of the selected suppliers (i.e., performance as an overall measure based on the satisfaction of the buyer regarding the latest major outsourcing decisions). Three micro-level constructs have a significant positive relationship with the supplier performance, while seven macro-level constructs have a significant positive relationship with supplier performance. The fact that so many macro-level constructs are significantly positively correlated with performance indicate that such constructs are even more important than what the mean rankings in the previous sections show.

A multiple linear regression analysis was also conducted to model the impact that each construct has on the performance. The coefficients table from the multiple linear regression analysis is illustrated in Figure 8.1 below, while further details are added in an extended table in Appendix F together with the correlation matrix.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.947	1.541		.614	.544
	Factor 1: Capacity	.207	.220	.131	.941	.355
	Factor 2: Cost	-.643	.190	-.523	-3.386	.002
	Factor 5: Flexibility and agility	-.180	.184	-.144	-.980	.336
	Factor 9: Quality	.550	.267	.312	2.062	.049
	Factor 14: Time and delivery	.661	.242	.583	2.731	.011
	Factor 15: Accessibility	-.138	.171	-.115	-.808	.426
	Factor 16: Business climate	-.246	.147	-.259	-1.670	.106
	Factor 19: Economic	-.050	.177	-.053	-.283	.779
	Factor 20: Government regulations	.442	.171	.523	2.584	.015
	Factor 21: Labour	.069	.170	.080	.404	.689

a. Dependent Variable: Satisfaction with the latest supplier (performance)

Figure 8.1. Visualisation of the coefficients table from SPSS

Due to the small sample size (N=42), the regression analysis will only focus on the constructs which were found to be of most importance for practitioners. For this reason, the analysis was narrowed down, thereby taking the five most important micro-level constructs and the five most important macro-level constructs from the overall ranking developed in Section 8.1 into consideration. The reason for this selection is that the factors from those exact constructs will be used for the practical part of the thesis (See Part III), as the author and A. T. Kearney agreed to include factors from the five most important constructs from each domain into the software. This is further explained in Chapter 10. The reason why a regression analysis has not been conducted for each type outsourcing motivation (i.e., cost and innovation as the two motives) is due to the low sample of respondents who scored the constructs based on an innovation-seeking outsourcing engagement (i.e., n=10). If a larger sample size was present, the regression analysis would naturally be conducted for each type of outsourcing motivation. Although it is not used in the multiple linear regression analysis, table that includes the ranking for the two types of outsourcing engagements (See Table 8.3) is still kept in the report due to the interesting results that it portrays.

The results of the multiple regression analysis show some interesting results. First of all, in the model summary it can be seen that R Square equals 0.613, meaning that the independent variables (i.e., the selected constructs) explain 61,6% of the total variation in the dependent variable (i.e., the supplier performance). This can be considered a very good measure. When looking at the coefficient table, it can be seen that 'cost' has a significant impact on the performance ($0.002 < 0.05$), but with a Beta value of -.633. This indicates that when the 'cost' construct (and the factors within the construct) is considered important by the practitioners included in the study, then the performance of the appurtenant selected supplier was considered low, which is why the impact of 'cost' on performance is negative. This is in line with previous research, which for instance argue that when 'cost' related factors are used in isolation from other types of factors in

supplier selection activities, then it might result in low supplier performance due to the short-term focus of a pure cost perspective. This is also insinuated in Chapter 3, where it has been presented how outsourcing practices have moved from being very transaction cost focused to becoming more core competence, agility, and partnership focused, as cost cannot be used as a single measure any longer. 'Cost' is, of course, an important construct to consider in supplier selection, but the regression analysis shows that it should not be used independently without the inclusion of other constructs. 'Quality' and 'time and delivery' also both have a significant impact on performance ($.049 < .05$ and $.011 < .05$), but with a positive Beta value. Considering that industries in general are becoming more dynamic and competitive, it can be argued that those two results are quite inherent.
Looking at the macro-level constructs, only 'governmental regulations' has a significant influence on performance ($.015 < .05$). The fact that this is the only macro-level construct which has a significant positive impact on performance can be considered quite surprising, as 'labour' and 'economic', for instance, both had a significant correlation with performance in the correlation matrix. What is even more surprising is that the standardised coefficients of 'accessibility', 'business climate', and 'economic' become negative, although they all have a strong positive relationship with performance in the correlation analysis. The disordered patterns of beta values might be a result of multicollinearity taking place. Multicollinearity is commonly measured via collinearity diagnostics based on tolerance levels and the Variance Inflation Factor (VIF) - the reciprocal of the tolerance value. Menard (1995) state that a tolerance value below 0.20 is a cause for concern, while Neter et al. (1989) and Hair et al. (2006) articulate that the VIF value should not exceed 10. Craney and Surles (2002) suggest that the cut-off value should be as low as 5 for the VIF measure, which is why this threshold is used in this report when measuring the multicollinearity. The results of the multicollinearity analysis, which is included in the extended coefficient table for the regression analysis in Appendix F, shows that all the tolerance values are above 0.20, and that none of the VIF values exceed the threshold of 5. In fact, only 'time and delivery' exceeds the VIF value of 3, which is why it can be argued that the overall regression model is not affected by significant multicollinearity. Also, since the alphas are very insignificant in the regression when it comes to the macro-level constructs which have a negative Beta, the surprising disordered patterns in the Beta results cannot be generalised. As a function of the multicollinearity results, none of the constructs will be removed from the analysis. Nevertheless, since some of the macro-level constructs have a strong - or even significant - positive correlation with performance in the correlation matrix, and since those same constructs (except for 'governmental regulations' and 'labour') have negative Beta values, it is strongly encourage that this research is duplicated with a larger sample size, in order to identify if the disordered patterns persists.

It has to be noticed that the Alpha values presented above are based on a two-sided regression analysis. Since only positive results are expected due to the performance measures, a table with the results of a one-sided regression analysis would conventionally be included; however, since SPSS do not have this function in the latest version, the two-sided table has been included. Looking at the one-sided level of significance can be done by using the t-values values presented in the coefficients table, and then manually look up the level of significance for a one-sided regression in a t-table. After having done so

for all the t-values presented in the coefficients table in Table 8.1 it was identified that the level of significance do not change for any of the constructs, which is why the values presented in the coefficients of the two-sided regression are used in the former paragraph. That is, none of the none-significant Alphas become significant by changing the view from a two-sided to a one-sided regression.

8.4 Reflection of Findings

Based on the developed rankings, it can overall be argued that macro-level constructs and the appurtenant factors can be considered of importance for not only FDI engagements, but also outsourcing engagements - regardless of the motivation for an outsourcing engagement. This result has not been shown in any previous studies, and it does also emphasise the need of a comprehensive list of decision variables for outsourcing engagements that consists of both micro-level and macro-level factors - a list which was also derived in Part I of this report. As it can be seen in Table 8.2 and Table 8.3 the macro-level constructs do not exceed the importance of generic traditional micro-level constructs (i.e., 'cost', 'quality', and 'time and delivery'), which all maintained their top position in the rankings. However, the fact that some of the macro-level constructs are ranked higher than other micro-level constructs can be argued to be a valuable and novel finding, which both should be further investigated within the academic domain, but also considered by practitioners who engage in major global supplier selection activities.

The significant positive relationships between the macro-level constructs and the supplier performance in the correlation matrix supports the inclusion of macro-level constructs in outsourcing engagements even further. The significant correlations also indicate that although the micro-level constructs are generally ranked as being more important than macro-level constructs for outsourcing engagements, the practitioners who ranked macro-level constructs as being important also had high performing suppliers. This finding can be considered very interesting, and it does in fact insinuate that practitioners are not aware of the value that can be gained by considering macro-level constructs for outsourcing engagements in todays business environments. This finding is also comparable to the results of Kannan and Tan (2002), who identified that soft factors have a stronger influence on performance than traditional hard factors. In conjunction with this finding, it would have been interesting to ask the respondents whether they evaluated the location prior to finding new suppliers, or if they searched directly for suppliers and then evaluated the associated locations subsequently. Such data could potentially indicate whether the positive correlation between the macro-level constructs and performance is a result of the managers choice of evaluating the location first, or whether the outcome was a result of the managers just taking location into account after or concurrently with the identification of suppliers. This consideration has not been addressed in this report, and previous studies have - based on the research of the author - neither examined whether firms first examine the location and then find the suppliers, or vice versa, and whether this impacts performance. Hätönen (2009) raised a similar question in his recent study, and tried to address this issue with two small case studies. Here, it was proposed that firms that outsource to reduce cost evaluate the locations first, and firms which outsource in order to achieve enhanced capabilities evaluate the suppliers first. The study was, however, not

very extensive, which is why the propositions derived should be further investigated.

The results derived in the multiple linear regression did not come as a surprise, but the negative Beta values (although they are insignificant) contradicts some of the results from the correlation analysis. Again, the fact that, for instance, 'governmental regulations' has a significant impact on performance indicates that macro-level constructs are more important than practitioners are aware of, when comparing this result to the mean value of the same construct in all the rankings developed previously (i.e., 'governmental regulation' was ranked as the 11th, 13th and 18th most important construct in the three rankings). Further research with a larger sample size is encourage in order to investigate whether the negative Beta values for some of the macro-level constructs will persist.

Overall, the findings of the quantitative empirical research can be considered highly interesting for both academicians and practitioners. The conduct of a new factor ranking (based on constructs), and the further analysis of the relationship between the constructs and performance, has served to contribute to fill a profound gap in supplier selection research, which is also why a discussion of the underlying reasons for all the interesting results presented above will take place in Chapter 11. However, before discussing all the empirical results, the practical part of the report will first have to be conducted. For this reason, the next part will serve to answer the third research question, thereby fulfilling the last requirements established by the company partner.

Part III

The Usage of The Scientific Findings in Practice

Approach

The first two parts served to accumulate numerous of micro-level and macro-level decision factors from academia and practice, as well as rank the factors to obtain an impression of which ones are of greatest importance. The findings in the first two parts can be argued to be a contribution to filling the two identified academic gaps within the field of supplier selection research. The next step will be to conduct the practical part of this report. As mentioned throughout the report, the academic part of the thesis will serve as a facilitator to be able to integrate the most important decision factors into the software based on a CO approach. The first chapter will therefore first present what CO entails, what differentiates it from more traditional supplier selection approaches, and how it can be pursued in the Trade Extensions software tool. How the factors will be integrated into the software will subsequently be presented. Here, it will be discussed how the data for the factors will be retrieved, from where it will be retrieved, and how it will be structured in the software. Subsequently to this, a discussion of the results in this report (primarily based on the findings from Part II) as well as a discussion will take place. Lastly, the implications and the limitations of the research will be presented, thereby also proposing avenues for further research.

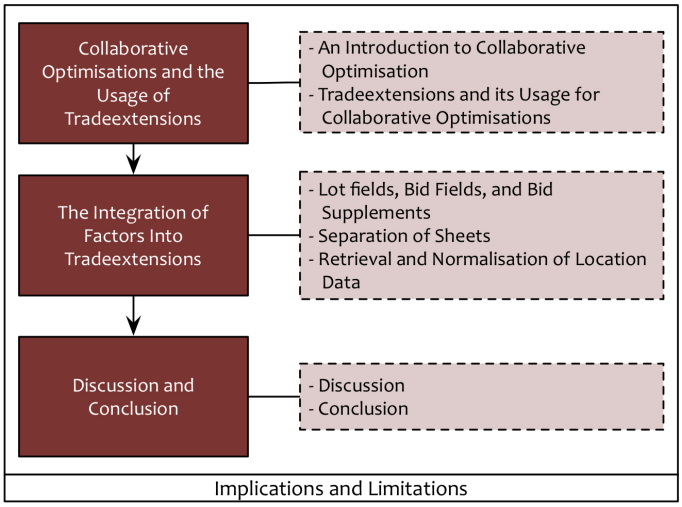


Figure 8.2. Structure of Part III

Collaborative Optimisation and the Usage of Trade Extensions 9

The first chapter of Part III will serve to introduce the general phenomenon of CO and how it is different to more traditional supplier selection approaches. Subsequently to an introduction to the CO phenomenon, a section is dedicated to present the software in which the CO model for outsourcing will be developed. The reason why a description of CO and the software is included in this part is to provide basic knowledge about what it entails, thereby providing a better foundation for the next chapter where the third research question will be answered.

9.1 An Introduction to Collaborative Optimisation

According to A. T. Kearney (2015*a*) and Scharlach (2014), CO sourcing is the best-practice approach when managing outsourcing and procurement activities related to complex categories such as packaging and logistics, as well as when managing more broad outsourcing challenges such as when a large amount of components or other materials are sourced. The CO outsourcing approach involves "expressive bidding" (also referred to as "expressive commerce"), where suppliers add bids for some or all of the items which a company wants to outsource (Sandholm et al., 2006; Sandholm, 2007; Scharlach, 2014). The bidding is usually conducted on a disaggregated level, as the suppliers are not providing offers on whole categories, but rather on individual units within the sourced categories. This enables the buying firm to conduct decisions based on very granular data. However, in contradiction to traditional supplier selection approaches, CO allows flexible and customised expressive bids from suppliers; expressive bids which are built on the internal strength of the participating suppliers, but are still compatible with the internal requirements of the buyer. Hence, suppliers are able to provide bids which deviate from the on-specification (on-spec) initial requirements, thereby being able to leverage their internal capabilities and express this to the buyer during the selection process (A. T. Kearney, 2015*a*). Offers from suppliers are thereby less comparable than in the case of traditional sourcing, where suppliers most often only have the opportunity to provide on-spec bids (i.e., based on detailed specifications and drawings) (Scharlach, 2014). In the case of CO, both types of bidding options are of course available, but the flexible bids are

what makes the approach unique. Hence, in a nutshell, the overall principle behind CO can be formulated in simple terms: To increase the number of ways to fulfil the demand of the buying company (Scharlach, 2014).

The fact that the approach offers flexibility and provides the opportunity for the suppliers to differentiate themselves by submitting proposals that leverage their own strengths can be considered of high value (Sandholm et al., 2006; A. T. Kearney, 2015*a*). This is also the reason why the concept of "collaboration" is included in the title of the sourcing approach. The question is, however, what kind of flexible bids is it exactly that suppliers can offer? The primary feature of the flexible expressive bidding approach is that the suppliers have the possibility to add additional/alternative bids for the items which a buying firm want to outsource (e.g., a different configuration, different usage of resources, a better design, etcetera). Hence, the bid potential of the suppliers is not commoditised, and the method does thereby facilitate and foster creativity and collaboration, which is not the case in traditional sourcing where only onspec bids can be provided (Sandholm et al., 2006; Sandholm, 2007). However, besides enabling the suppliers to add alternative bids which diverts form the on-spec requirements, the suppliers can also add other flexible bids which reflect their quantity discounts, bundle discounts, and other sorts of conditional offers which can benefit the buyer, but based on the suppliers own prerequisites and rules (A. T. Kearney, 2011). Suppliers can thereby express their production efficiencies, which would not have been possible if the buyer simply requested an on-spec bid per outsourced unit (Sandholm, 2007). Lastly, what differentiates CO from traditional supplier selection approaches is that the suppliers who are involved in the bidding rounds continuously receive feedback regarding their position relative to bids from other suppliers. Hence, the suppliers can always see whether they are performing better or worse than the other suppliers who are a part of the game. This does not only provide the suppliers with insights that can motivate them to change their bids throughout the bidding rounds, but also provide a general industry benchmark and an overview of the offerings of their competitors, which might not have been obtainable though conventional market research.

Overall, allowing suppliers to provide differentiated offers create value for the parties involved on both sides of the negotiation table, but it does also increase the complexity when it comes to the final decision making process. Not only does the decision-maker of the buying firm have to fulfil the expectations of the internal stakeholders as in traditional outsourcing engagement (i.e., by outsourcing items in a way which fulfils the internal requirements), but the decision-maker does also have to manage the alternative customised offers from multiple suppliers for often hundreds or even thousands of items. As Scharlach articulate, *"Procurement managers often find themselves between a rock and a hard place, reconciling the demands of internal stakeholders with the offers of external suppliers"* (Scharlach, 2014, p. 3). This does not make the decision-making process more simple, but when using optimisation and scenario analysis tools, the complexity which the decision-maker in the buying firm is facing can be overcome. The complexity that procurement managers face nowadays, specifically when flexible expressive bids are allowed from the supply-side, is portrayed in Figure 9.1.

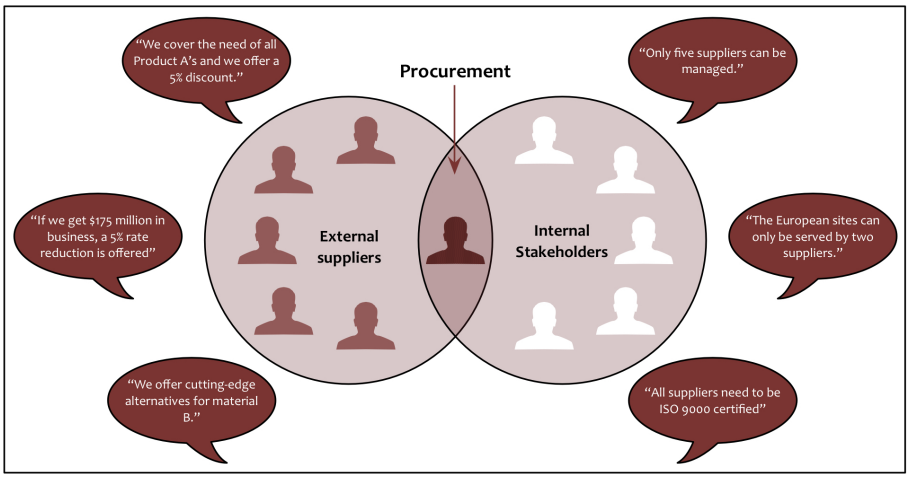


Figure 9.1. The increase in complexity due to expressive bidding - inspired by Scharlach (2014)

The optimisation part of CO is commenced when each bidding round is completed and the needed data has been obtained. The buyer can here start to run multiple scenario's with the CO software in order to investigate the sourcing cost when different constraints are formulated, thereby being able to award optimal allocations of business based on on-spec and alternative offerings - given the constrains in the most desirable scenario. The buyer does here express preferences over business allocations based on, for instance, strategic considerations, legal constraints, business rules, and prior contractual obligations (Sandholm, 2007). Constraints modelling will enable the buying firm and its stakeholders to quantify the costs as well as the benefits of various business constraints throughout the scenario navigation, which thereby also allow the buyer to evaluate trade-offs in a fact-based way (Sandholm, 2007; A. T. Kearney, 2011). In constraints modelling, the used constraints in a scenario can technically be based on all the factors which have been identified in Chapter 5. Examples of constraints which enables the buying firm to understand the impact of the self-developed constraints could be when creating a limit on how many suppliers the engagement should include, how much business a buyer will award to a certain set of suppliers, which geographical region(s) the suppliers should be from, how strong the financial position of the suppliers should be, or to what extent the suppliers need to be in the possession of quality certifications such as ISO 9000 (Sandholm et al., 2006; Sandholm, 2007; A. T. Kearney, 2015*a*). Macro-level factors can easily be added as constraints in the software, which is why the CO tool is adequate for this project. Adding location constraints will tell the decision-maker how much it will cost if certain rules about the locations are established (e.g., "how much will the cost increase if we run a scenario where only suppliers from countries with low political instability are used"). The quantification is based on mathematical algorithms and linear programming - which in the case of this research is the back-end of the Trade Extensions software tool - that will compute the maximum savings potential and the highest value contribution in each scenario.

In each individual scenario analysis, all the supplier offers are compared to a baseline, which either is the cost based on the status quo sourcing configuration, or the cost of manufacturing the same component(s) in-house (i.e., make versus buy). The constraint-

scenarios can then also be compared to the unconstrained scenario in order to assess whether it is worth to select suppliers based on the established constraints. The unconstrained scenario is usually referred to as "cherry picking", and is in many cases the most impracticable scenario to implement (A. T. Kearney, 2011). Also, it should be noted that the buying firm can maximise the cost-cutting potential by simply re-configure the conditions of the framework throughout the different bidding rounds, thereby being able to continuously run different types of scenarios to assess which outsourcing decisions creates the highest value. Figure 9.2 depicts the main aspects of CO; that is, both the 'collaboration' and the 'optimisation' aspects which have been presented throughout this section.

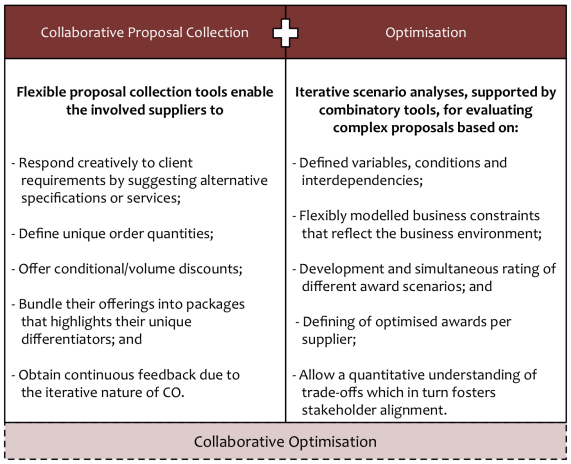


Figure 9.2. Collaborative optimisation - inspired by A. T. Kearney (2011)

Since the purpose of this thesis is to directly use CO as a supplier selection approach to manage the important factors (i.e., the factors within the most important constructs) identified in the earlier chapters of the thesis, an extensive screening of more traditional approaches are not included in the base text of this report. However, examples of traditional supplier selection approaches are enclosed in Appendix G i case further information is desired.

Now that the basics of CO has been presented based on knowledge gained from A. T. Kearney and a couple of studies, the next section will serve to examine the software which can be used to conduct CO analyses. Subsequently to this, a new chapter will be dedicated to describe how the software implementation will take place. The information included about the software is retrieved from the online certification programme called TESS Academy.

9.2 Trade Extensions and its Usage for Collaborative Optimisation

In a nutshell, it can be argued that the Trade Extensions software is infinitely customisable; that is, any type of factor regardless of whether it is a hard, soft, micro-level, or macro-level can be added to in the software. In the software, a sourcing engagement is referred

to as a 'tender', however, since outsourcing and supplier selection engagements are the terms which have been used throughout this report, those terms will be retained in this part as well.
As always, an overall outsourcing engagement is commenced with a buying firm defining the goods or services, which have to be outsourced. Those are referred to as lots, line items, lanes or items in Trade Extensions. In this report, only the term 'lot' is used to refer to the goods or services which will be outsourced. The properties or attributes of what the buying firm wants to outsource are added as 'lot fields'. Hence, each lot can be based on, for instance, three lot fields, which hypothetically could be; 1) component ID, 2) component description, and 3) quantity needed. The offers - also referred to as bids - which the suppliers add per lot are dependent on the bid fields which the buying firm establishes for the lots. The bid fields can technically be based on any of the factors presented in Chapter 5. Hence, for some outsourcing engagements, the buyer might add bid fields such as price, quality, lead time, logistics cost, additional packaging costs, etcetera, which the suppliers then have to fill out for the lots that they want to provide to the buying firm.
Bid supplements can also be added by the buying firm. Those kinds of bids contain data that are applicable on some or all of the bids (e.g., the suppliers overall capacity, or a quantity discount which can be added for a bid in case certain requirements are fulfilled by the buyer). Bid supplements can also be used to include selection criteria which are not applicable to include on a bid level; that is, the data for a bid supplement might be applicable across all lots instead of providing different bid for each single lot. Examples here could be the overall innovativeness of the supplier, the suppliers engagement in CSR, the extent to which the supplier can be considered sustainable, whether a supplier is ISO 9000 certified, or other factors which are not specific to the single bids provided for the different lots. Hence, soft factors which are not adequate to include per lot are commonly included as bid supplements. Since bid supplements are often not directly quantifiable, scores such as "low, medium, high", or a score from 1-10 or 1-100 can be used. In some cases, factors which are usually added as bid supplements can also be added as bid fields, if the decision-maker knows in advance that the bids might vary for the different lots. Some suppliers might, for instance, provide bids from different locations where the extent to which CSR is implemented might vary.

All lot fields, lot supplements, lots, bid fields, and bid supplements have to be added in the software in order to be able to run scenario's, but they can also be included in an Excel template, as this is the form that each supplier has to populate in order to provide the data to the buyer. Different Excel templates can be downloaded from the software and subsequently be customised by the buyer. The usage of Excel templates is enabled through the utilisation of 'tags' and 'pipe-commands', which allow the software to crawl the Excel sheets and thereby assess what to include in the platform and what to reject when the suppliers have handed in their populated sheets. The Excel template is not a must to use, but buying firms usually configure the bid sheet in the template as this is more flexible. This will be further elaborated in the subsequent chapter where the process of including different factors into the software will be explained (See Chapter 10). An overview of the most basic, but yet most important terms used in Trade Extensions are depicted in Table 9.1.

Trandeextensions Terms	Description
Lot	A lot is the product or service which a company wants to outsource to a supplier/bidder
Lot Field	Lot fields include the properties or attributes of what the buying firm wants to outsource
Bid	A bid is the offer which a supplier provides for a lot. The bids are dependent on the bid fields which are developed for the lots.
Bid Field	The bid fields are the parameters which a supplier needs to fill out to provide a final bid.
Bid Supplements	Bid supplements contain data that are applicable on some or all of the bids. Bid supplements can also be used to include selection criteria on a supplier level, if those criteria are not applicable to include on a bid level
Tags	Tags are used for a set of predefined texts - prefixed with "«" and suffixed with "»". All the tags are placed in hidden columns and rows of Excel files to make them readable by the platform
Pipe Commands	Pipe Commands are used to configure the behavior of the tagged tables, or certain columns or rows

Table 9.1. Overview of important terms in Trade Extensions

9.2.1 Time Phases of The Sourcing Project

The continuous feedback loops, which as mentioned earlier is one of the benefits of CO, is enabled by the multiple rounds which each sourcing engagement goes through.
When the Excel sheet has been configured based on the attributes mentioned in the previous section, the actual project can go live, and the bidding processes for the first stage can begin. When suppliers download the Excel sheet in order to provide bids, they obtain a so-called 'bid form'. A bid form contains all the attributes which were included in the Excel template and the software, but all the algorithms and tags which the buying firm has developed in order for the software to read the Excel sheet are locked and hidden, thereby making the Excel sheet very user friendly to populate. The bidding processes - or bidding rounds - are formally referred to as request for quotation (RFQ) stages. Request for information (RFI) documents are usually also provided to all suppliers in the initial part of the project, in order to obtain general information about each supplier (e.g., the locations in which it operates, its number of manufacturing sites, etcetera). The RFI is usually included in the bid form along with all the factors for the different lots. The RFI data is attached to each supplier throughout the entire project. In the first RFQ phase, the suppliers can add bids for the different lots. When the RFQ phase is over, all the bids from the multiple suppliers will be evaluated and run through various scenarios. The buyer can thereby leverage the information and insight obtained in the first bidding round and decide whether further rounds of bidding are needed or whether business allocations should be made directly. Figure 9.3 portrays how the RFQ rounds are being conducted.

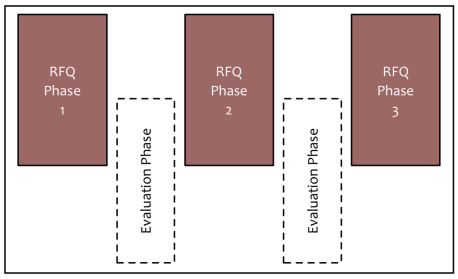


Figure 9.3. Overview of bidding rounds

10 The Integration of Factors Into Trade Extensions

Now that the basics of CO and Trade Extensions have been presented, the next step of this report is to discuss how to integrate the most important micro-level and macro-level factors into the software and the appurtenant Excel file. Hence, the practical aspect of this report will be presented in this chapter, and will serve to answer the third research question, which to recall, is formulated as following: **RQ 3:** *"How can the most important micro-level and macro-level factors from the empirical research be integrated in the collaborative optimisation software?"*. It is important to notice that in the base text of this chapter, the structure of the excel sheet, how the micro-level and the macro-level factors should be used, and from where the data can be obtained, will be presented. The actual configuration of the Excel file and the appurtenant codes needed for the software to read the Excel file (i.e., how the factors should be integrated based on pipecommands, tags, etcetera), is described in Appendix H. In order to configure the Excel file to enable the software to use the data that will be populated in the sheet, and in order to get input in regards to how data for the different factors can be obtained, information gained from all the qualitative interviews conducted with the VP EMEA since the 20th of October 2014 has been used (See Chapter 2 for further interview details).

10.1 Lot Fields, Bid Fields, and Bid Supplements

As mentioned in Section 9.2, the lot and bid fields represents what a buyer wants to outsource, and what data a supplier has to provide in order to be evaluated for business allocations. Since the Excel sheet and the software configuration for this project is not configured for any current outsourcing engagement, the lots that have been included in the software are hypothetical. However, five lot fields which are commonly used to reflect the specifications of the components which are being outsourced have been added. It is, however, important to notice that more lot fields can be added depending on the desired level of detailing. The five lot fields which are added in this project are: "lot name", "lot ID", "description", "quantity needed", and "delivery destination". The first three lot types specify what products or services a supplier can provide bids for. Based on the lot

name and the lot ID, the supplier can access the further product specifications which are attached to each outsourcing project. The lot ID can also be used by the decision-maker to distinguish between different types of lots (e.g., different categories) when running scenario analyses in the software. The further specification may include technical drawings, further descriptions of the lot, etcetera. The quantity needed is, of course, important for the buyer to stipulate so that each supplier can add a number of units to each bids based on, for instance, its internal capacity constraints. The delivery destination to which the product or service has to be supplied does also have to be specified in order for the supplier (or the buyer) to assess the logistics costs as well as the total lead time. Figure 10.1 below shows how the lot fields are visualised when they are entered in the software. The Excel file can be found in Appendix I.

New | Delete | Download | Upload

	Name	Name in formulas	Type		Visibility to bidders
1	Quantity needed	l_quantityneeded	Lot Field	Numeric	Visible
2	Material number	l_materialnumber	Lot Field	Plain Text	Visible
3	Lot ID	l_id	Lot Field	Numeric	Visible
4	Description	l_description	Lot Field	Plain Text	Visible
5	Delivery Destination	l_deliverydestination	Lot Field	Plain Text	Visible

Figure 10.1. Visualisation of lot fields and lots from the Trade Extensions model

The hypothetical lots, also referred to as 'Test lots' in the software, are added in order to make the model resemble one which is being used for a practical outsourcing engagement. The lots would usually contain the different components or services which would be outsourced. The number of lots can range from just a few to several thousands. However, due to the comprehensiveness of the CO approach and the extensiveness of the Trade Extensions software tool, at least several hundred lots are usually used in outsourcing engagements where the tool is utilised. It has to be noticed that in the software configuration in this project, it has been decided to add three input cells per lot, which enables each suppler to add data for three time periods (e.g., the price per unit for the next three years). This is due to the fact that the suppliers might be willing to invest in some resources/processes in order to provide better conditions for the buyer in the future.

In order to be able to configure a generic Excel sheet which can be used as a baseline for prospective CSS engagements, the most important constructs and some of the factors within the constructs are taken into consideration for the bid fields. The question is, however, which of the most important constructs identified in Chapter 8 should be included? Although there is no standard approach for such a decision, the author and the VP EMEA has jointly decided to integrate the top five constructs from each group (i.e., micro-level supplier-specific factors and macro-level location-specific factors) into the software. To recall, the top five constructs for each domain were also used in the regression analysis which was conducted earlier in this report (See Chapter 8). Since each individual factor within the construct have not been ranked separately in the quantitative empirical part of this report, different types of factors within the constructs will be added in the software in order to exemplify how the data differs between some factors. The reason why

not all factors from the ten constructs are integrated into the software is due to the fact that it would require prospective suppliers to add too much data. The factors which are considered most practical according to the VP EMEA and the author, and the factors for which the data is most easily accessible, will therefore be included in the software, thereby not making it too overwhelming. After all, the configuration in the software is only hypothetical in this thesis and will not be used for an engagement immediately. It is, however, important to notice that a larger amount of data could be required from the suppliers, but this also requires that the buyers spend-value should be accordingly high. The amount of data that a supplier should provide in practice does according to the VP EMEA depend on the potential business that they can win. If the suppliers are a part of an outsourcing engagement where they can potentially win millions - or perhaps even billions - of Euros in business, then it is justified to require them to spent a lot of time on providing a profound amount of information; however, if the buyers spend-value is not low, the amount of details required from the suppliers should be lower. It is thereby important to make sure that there is a balance between the time that suppliers spent during the RFQs, and the amount of business they can potentially win. All micro-level data is gathered through RFQs and RFIs, while the data for the macro-level factors is gathered from various third party providers. According to the VP EMEA, those third-party providers include - but are not limited to - think tanks, research institutions, online indexes, authorities, etcetera.
It is also important to notice that not all the factors from the ten most important constructs are added as bid fields; some of them are also added as bid supplements, as the data which is required for those factors typically are not on a bid field level, but on a bid supplement level (i.e., on an overall supplier level). In the initial part of the software implementation, it was uncertain whether the location data should be added per lot (i.e., as a bid field), or as bid supplements. Adding it as a bid supplement is adequate if it is assumed that each involved supplier only provide bids from one single location (e.g., if only one facility is used to supply the items to the buyer). However, if more sites are used by the supplier to provide bids for the different lots, then it becomes necessary to add the macro-level factors as bid fields. This might result in duplicated data throughout the overall bid form which is used to gather data from each supplier. However, since it has been decided to include all the location data into a "Data Location Center" in the excel sheet related to the software, which enables the location bid fields to be populated automatically as a function of the location that the supplier enters per lot, it has been assessed that adding the macro-level factors as bid fields is not an issue. Hence, all the macro-level factors are added as bid fields in the software, while the micro-level factors are added on a bid field and bid supplement levels.

As it can be seen in the empirical results (See Chapter 8), the 'quality', 'cost', 'time and delivery', 'flexibility and agility', and 'capacity' constructs are considered the most important on a micro-level. When it comes to the location of potential suppliers, the five most important constructs are 'accessibility', 'labour', 'business climate', 'governmental regulations', and 'economic'. The most important constructs, and how some of the factors within the constructs, can be integrated into the Trade Extensions software tool and the associated Excel sheet will be elaborated in the following subsections. It is suggested that the Excel files, which is enclosed in Appendix I, is examined while going through the

following sections.

10.1.1 Quality

As mentioned in Part II, the quality construct includes factors such as *'certification and standards'*, *'conformance quality'*, *'overall quality standards (e.g., relative to buyers tolerance level)'*, *'inspection and control processes'*, *'quality staff'*, *'quality data available'*. In this project, it has been decided to add two quality measures in the software. These measures will not be added on a bid field level but on a bid supplement level, as the expected answers are valid across all lots which potentially will be provided by each supplier. A bid supplement called *'certification and standards'* will be added, thereby enabling the supplier to express what kind of certification it possesses (e.g., ISO 9000). The suppliers will also be asked to add their annual failure rate for the categories which the buyer is outsourcing. This also enables the buyer to assess the amount of quality data that the supplier has.

10.1.2 Cost

The cost factors which can be considered for supplier selection purposes include, *'initial price'*, *'compliance with cost analysis system'*, *'volume discounts'*, *'bundle discounts'*, *'logistics costs'*, *'cost of packaging'*, *'cost reduction capabilities and efforts'*, *'price relative to market price'*, and many more. In this project, it has been assessed that four cost factors will be included. According to the VP EMEA, the hard prices are important to consider in order to examine the direct cost. Hence, the price per unit (initial price) which is being outsourced without transportation or any further expenses should be asked for. Thus, price *ex works* will be one of the bid fields for the cost related factors. 'Transportation cost' is another bid field that will be added, as it is valuable to know the exact transportation cost per lot item. If the supplier is in control of the transportation cost, this could be merged with the initial price which was separated into ex works before. However, since the buying firm in some instances is in control of the transportation (i.e., by using in-house transportation means or using third party transport providers), it has been decided to add it as a separate bid field. A bid field for the transportation mode has also been added in order to better evaluate that respective cost. 'Packaging cost' is also added as a separate bid field, as the buyers often are in control of this respective process and thereby also the costs associated with it, or as the suppliers have this as a separate cost. The three cost factors above are also summed up in a bid field entitled price *DDP*, also referred to as Delivery Duty Paid. This field is simply used for analyses purposes, and for the buying firm to get an overview of the total "tangible" price per lot.

10.1.3 Time and Delivery

Within the time and delivery construct, factors such as *'delivery speed'*, *'product development time'*, *'partnership formation time'*, *'changeover time for certain activities'*, *'compliance with due date'*, *'delivery mistakes'*, *'order-to-delivery lead time'*, and others are included. In this project, the delivery speed will be asked for, in order for the supplier to indicate how long time it will take to ship the product based on the transportation mode. If the buyer is in charge of transportation, he will add the information in this bid field.

The order-to-delivery lead time does also have to be specified by the suppliers, in order to indicate how quick they are with the actual manufacturing processes. Another valuable bid field to add is OTD, which is why this should also be specified by the suppliers.

10.1.4 Flexibility and Agility

Factors related to flexibility and agility include *'short set-up time'*, *'response time for major changes'*, *'flexibility in general (customisability)'*, *'product line diversity'*, *'availability of parts'*, and others. In this project, it has been decided to add three factors from the flexibility and agility construct. Two of the factors will be added as bid fields, while one is added as a bid supplement. On a bid field level, the suppliers will be asked to at the set-up time in hours for the manufacturing process of each lot, while they likewise will be asked for the service level (thereby reflecting the availability of parts) for each lot. On a bid supplement level, the suppliers will be asked to include the total amount of manufactured product types, thereby reflecting the product line diversity.

10.1.5 Capacity

As mentioned in the chapter where the clustering took place (See Chapter 7), the capacity construct was developed by the author after having derived several different capacity factors from an interview with the VP EMEA. Those included, *'production capacity'*, *'capacity utilisation'*, *'reserve capacity or the ability to respond to unexpected demand'*, *'amount of excess capacity'*, *'future capacity levels'*, and others. In this project, three capacity factors will be included. The suppliers will have to indicate the total manufacturing capacity per lot, which means that this will be added on a bid field level. This enables the buyer to examine whether the supplier has more capacity for the lot relative to the quantity that will be supplied. The amount of excess capacity does also have to be specified on a bid field level, thereby enabling the buyer to assess whether a buffer is available. The future capacity levels can be added in the total amount of capacity bid field, but in the other time periods which have been added in the software. Hence, if the supplier will invest in capacity in the future, this can be specified in 'time 2' and 'time 3' for each lot.

10.1.6 Accessibility

Accessibility is the first macro-level construct which have been added in the software. To recall, this construct include factors such as *'accessibility to sub-suppliers'*, *'accessibility of customers'*, *'accessibility of transportation service'*, *'proximity of production material sources'*, *'proximity to large cities'*, *'overall geographical distance from buyer'*, and others. The accessibility factors are based on the physical distance between a supplier and another geographical point (i.e., the buyer, sup-suppliers, raw materials, competitors, etcetera). In contradiction to the other macro-level factors which will be presented in the following sections, the suppliers have to fill in the accessibility specific data themselves in the model. In this project, the suppliers will be asked to specify the distance between the different manufacturing sites that they will supply the goods from and the buyers location, thereby indicating the proximity to the buyer. Since the components used for the lot that the buyer is purchasing might be based on input from various tier two suppliers, one distance

cannot be included in a bid field per lot to measure tier two distance. However, since it can be assumed that some of the goods which the supplier will provide involves some key components which is provided by a specific tier two supplier, the distance to this supplier will be asked for. Hence, the key geographical distances for each offer per lot will be known by the buying firm.

10.1.7 Labour

The factors within the 'labour' construct include *'labour costs'*, *'availability of semi and unskilled labour'*, *'availability of skilled labour'*, *'extent of labour unionisation'*, *'attitude of workers'*, *'worker stability'*, *'managerial labour'*, and others. In this project, three labour-related factors are included, those being labour costs, availability of semi and unskilled labour, and availability of skilled labour. In order to obtain data for those factors different sources have to be used. For the labour costs, the Occupational Wages dataset from the World Bank can be used. Since the dataset contains average wages for 161 different types of occupations, the average labour cost that fits the outsourcing engagement best can be included. Of course, the labour costs fluctuates from company to company, but to obtain a general estimate of the labour cost for a certain occupation on a country level, this data can be considered a good indicator. The average annual wage data will be populated automatically into the model as a function of the country that the supplier enters for every bid. Unfortunately, based on extensive online research, there are no institutions who have developed an index - or another type of measure - which indicates to what extent skilled and unskilled labour force is present in different countries. However, according to Farrell (2006), local human resource agencies or HR departments in companies which are already working in the given location can provide insights regarding the amount of labour availability. Also, according to Farrell (2006), head of global-resourcing centres can be interviewed in order to retrieve the desired data. Farrell (2006) did, for instance, do this on a global scale, and identified that only 13% of all educated labour is adequate for MNEs, which is much lower than one would expect. For this reason, labour skill factors are included as bid fields in the software due to their importance (both based on the empirical research in this report, and based on the emphasis of previous studies), but the data has to be populated by the buying firm based on research that they conduct themselves.

10.1.8 Business climate

The business climate construct is based on factors such as *'availability of public technical training'*, *'state of local planning assistance'*, *'bribery and corruption'*, and *'cultural distance'*. After a discussion with the VP EMEA, it was evident that the factors which seems most important, and the factors for which data is available from third party providers, are bribery and corruption, and the cultural distance. Several indexes have been developed in order to reflect the corruption which takes place in a country. In order for buying firms to reduce the risk of having suppliers which engage in such endeavours, thereby having a negative impact on, for instance, the reputation of the buying firms, countries which score high corruption values in those indexes should be avoided. *Transparency International*, which is the world's leading non-governmental anti-corruption organisation, publishes its Corruption Perception Index on an annual basis. The data from this index will be integrated into the software. However, it should also be

noted that in the dataset for the political instability provided by the World Bank, there is a separate sheet just for corruption. These measures could also be used as alternatives to the data offered by Transparency International. For the cultural differences between the country of the buying firm and the countries of the suppliers can be evaluated through the cultural index developed by Geers Hofstede. There has been a lot of criticism in previous studies towards using the measure of Geert Hofstede, however, due to the convenience of obtaining the data from the online source, it has been decided to use it in this project.

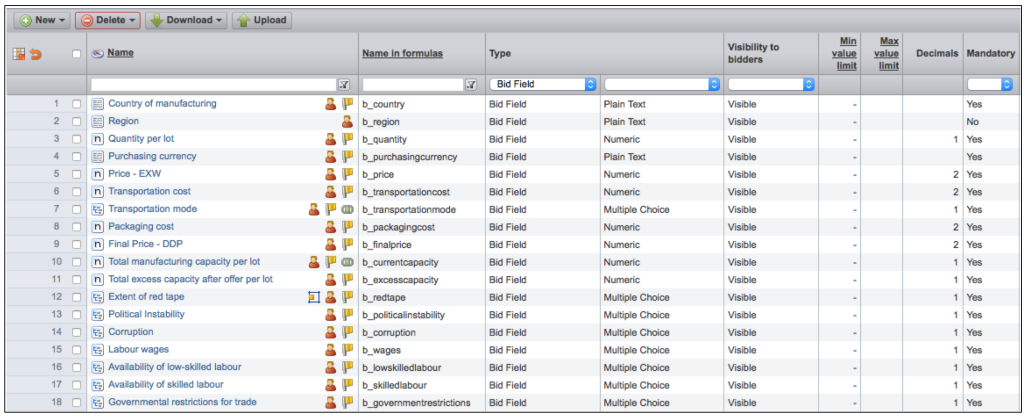
10.1.9 Governmental regulations

Numerous of different factors were clustered under the governmental regulations construct. Those included *'government incentives'*, *'tax structure'*, *'government restrictions'*, *'prevalence bureaucratic red tape'*, *'bureaucratic instability'*, *'quality of government'*, and others. In this project, it has been decided to include four factors, those being bureaucratic red tape, political instability of the country, the governmental restrictions for international trade, and the potential to receive subsidies. The data for the red tape is obtained from the Ease of Doing Business Index. As part of the overall measure in the Ease of Doing Business Index, there is a sub-measure entitled 'Trading across borders', which generally indicates to what extent it is complex to use a supplier from a given country due to bureaucratic issues. The data for the political instability is based on the detailed index conducted by the World Bank, which based their political ranking of countries on data from survey institutes, think tanks, non-governmental organisations, international organisations, and private sector firms. The political instability index developed by The Economics could also be used to assess the vulnerability of a political system; however, due to the World Bank index being more comprehensive, this will be used. In order to reflect the governmental restrictions for trade, the KOF Index of Globalisation developed by ETH Zürich is used. The index values indicates how high the hidden import barriers, mean tariff rate, taxes on international trade, and the capital account restrictions are in different countries. The government incentives bid field is added due to the fact that the VP EMEA has had experience with influencing the local subsidies in order to benefit the buyer. When companies engage in CO sourcing engagements with a substantial spent value, local authorities can sometimes be influenced. Of course, the percentage-wise subsidy has to be derived based on interaction with location authorities, which is why the buying firm has to add this data themselves into the Excel sheet.

10.1.10 Economic

Under the economic construct, factors such as *'standard of living'*, *'strength of currency'*, *'balance of payment status'*, *'trade tariffs'*, and others are included. According to the VP EMEA, currency is an important bid field to include, but the way it has to be integrated into the software depends on the individual sourcing situation. It all depends on who is best at managing the risk related to exchange rate differences. If the buying firms is better in doing so, then the buyer should specify which currency they are quoting in. If the supplier is better, then the buyer should ask the suppliers to quote directly in Euros - or any other currency that the buyer defines - but then the currency would be added as a lot field and not a bid field. The most common approach according to the VP EMEA is simply that buyers enforce suppliers to quote in a given currency as the risk is then

shifted to the shoulders of the suppliers (although the buying firm might still theoretically be better). This is generally a result of pure "laziness" from the buying side. From a CO perspective, however, the VP EMEA recommends that the entity taking the risk is the one who is simply better at hedging risk. An excerpt of the bid fields, and how they are presented in the software, is included in Figure 10.2.



	Name	Name in formulas	Type		Visibility to bidders	Min value limit	Max value limit	Decimals	Mandatory
			Bid Field						
1	Country of manufacturing	b_country	Bid Field	Plain Text	Visible	-			Yes
2	Region	b_region	Bid Field	Plain Text	Visible	-			No
3	Quantity per lot	b_quantity	Bid Field	Numeric	Visible	-		1	Yes
4	Purchasing currency	b_purchasingcurrency	Bid Field	Plain Text	Visible	-			Yes
5	Price - EXW	b_price	Bid Field	Numeric	Visible	-		2	Yes
6	Transportation cost	b_transportationcost	Bid Field	Numeric	Visible	-		2	Yes
7	Transportation mode	b_transportationmode	Bid Field	Multiple Choice	Visible	-		1	Yes
8	Packaging cost	b_packagingcost	Bid Field	Numeric	Visible	-		2	Yes
9	Final Price - DDP	b_finalprice	Bid Field	Numeric	Visible	-		2	Yes
10	Total manufacturing capacity per lot	b_currentcapacity	Bid Field	Numeric	Visible	-		1	Yes
11	Total excess capacity after offer per lot	b_excesscapacity	Bid Field	Numeric	Visible	-		1	Yes
12	Extent of red tape	b_redtape	Bid Field	Multiple Choice	Visible	-		1	Yes
13	Political Instability	b_politicalinstability	Bid Field	Multiple Choice	Visible	-		1	Yes
14	Corruption	b_corruption	Bid Field	Multiple Choice	Visible	-		1	Yes
15	Labour wages	b_wages	Bid Field	Multiple Choice	Visible	-		1	Yes
16	Availability of low-skilled labour	b_lowskilledlabour	Bid Field	Multiple Choice	Visible	-		1	Yes
17	Availability of skilled labour	b_skilledlabour	Bid Field	Multiple Choice	Visible	-		1	Yes
18	Governmental restrictions for trade	b_governmentrestrictions	Bid Field	Multiple Choice	Visible	-		1	Yes

Figure 10.2. Visualisation of bid fields from the Trade Extensions model

As mentioned in Section 9.2, the decision-model can be developed both directly in the software, or in Excel templates which subsequently can be uploaded in the software. In the case of this project, the lot and bid fields were first added in the software (See Figure 10.1 and Figure 10.2), whereafter an Excel template which included those respective fields were downloaded for further development. Working in Excel is generally more flexible, which is why this is recommended after the initial boundaries of the model (i.e., all the factors which fits the purpose of the outsourcing engagement) have been defined in the software.

10.2 Separation of Sheets

As mentioned in the previous section, micro-level data is gathered through RFIs and RFQs, while the macro-level data is gathered via various different sources. Since the micro-level data will be populated by each individual supplier, and since the macro-level data will be populated by the buyer, it has been decided to divide the overall bid table into two different sheets. The suppliers will then only have access to the sheet with micro-level bid fields and bid supplements, while the sheet with macro-level bid fields is managed by the buyers. As mentioned earlier, all the macro-level data which can be gathered via indexes, and the like, will be populated automatically in the Excel sheet as a function of the location of the manufacturing site which the supplier adds for each individual bid. In order to split the bid tables into two different sheets, but still make sure that the bids are connected to the same lots, technical pipe commands had to be used. For further elaboration on this, please refer to Appendix H. The split-up of macro-level and micro-level bid fields were done three times, which resulted in six sheets based on three overall tables. The first overall bid table (i.e., for the first two sheets), is for on-spec bids, which means the supplier can only add offers based on the exact requirements for each individual lot.

The second overall bid table (i.e., for the two subsequent sheets), were again for on-spec bids, but it enables the buyer to add another offer, but from a different manufacturing site. The location-data from that site might after all be better than for the first offer, which is why this could be valuable information to the buyer. The third overall bid table (i.e., the last two sheets for bids), is for alternative bids. Here, the supplier can provide flexible expressive offers, and again specify where the items will be supplied from, thereby enabling the buyer to again evaluate the macro-level data for those exact bids. At the end of each bid table, three columns are used to illustrate the suppliers position relative to the other bids provided by other suppliers. These columns are populated automatically when exporting the bid form after the different RFQ phases. To enable the columns to be populated, bid analysis codes have been used. Those are explained in the technical description in Appendix H. To get a better understanding on the structure of the Excel template, please open the Excel file which is enclosed in Appendix I.

10.3 Retrieval and Normalisation of Location Data

In order to enable the decision-makers to effectively use the macro-level data which have been retrieved from indexes - or other sources which provides values based on different scoring systems - all such values had to be normalised into one unit of measure. The conversion of different types of scores into one unit of measure can be considered a design problem. The macro-level factors for which data from indexes or similar sources will be needed are the following: Corruption (from the Corruption Perception Index), cultural distance (from the Hofstede Index), extent of bureaucratic red tape (from the Ease of Doing Business Index), the political instability (from the Worldwide Governance Indicators), and governmental restrictions for trade (from the KOF Index of Globalisation). The remaining macro-level data will be populated based on hard data, e.g., the distance from a suppliers manufacturing site to the delivery destination, the average labour cost in a given country, the potential value of subsidies, etcetera. All scores, regardless of what measure each individual index use, have been normalised into a score between 0 and 1 based on the feature scaling technique, which formula is illustrated below.

$$X' = \frac{X - X_{min}}{X_{max} - X_{min}} \tag{10.1}$$

Where X' is the normalised value of X

The values were then categorised as "low", "medium", or "high" depending on their individual percentile in the dataset. A simple IF sentence were here used.

IF(Normalised Value < (0,33 * 1);"Low";IF(AND(Normalised Value < (0,67 * 1) ; Normalised Value > (0,33 * 1));"Medium";"High"))

Despite the fact that the approach can be considered highly simplistic, it is in fact not a large problem when running scenarios in Trade Extensions. If, for instance, a scenario is

run where "low", "medium", and "high" are used to assess potential macro-level factors, and two suppliers are scored very close to each other, then a further investigation can be made. However, if the spread between the suppliers in each scenario is high, then no further analysis is needed, and the simplistic scoring system can be considered adequate. To exemplify this: If a buyer runs a scenario where constrains, for instance, are that the political instability, the bureaucratic red tape, and the corruption all should be "low", then suppliers which fulfil those criteria in this scenario will be considered for business allocation. If the spread in the ranking of those suppliers is large, then no further investigation is needed; however, if some suppliers are close to each other, then it might be valuable to dissect the location factors further (if they of course are the reason for the close match).

One of the main drawbacks of categorising the normalised values into three categories (i.e., "<33%", ">33% ; <67%", and >67% ; <100%) is that scores which are just on the border might be hard do evaluate. If an index value is normalised into 0.32, then it will be categories as "low", although it is technically at the border to "medium". This issue is acknowledged, and is one of the limitations of the study.

11 Discussion and Conclusion

This research has made several contributions to the academic field of supplier selection. Firstly, numerous of decision variables for supplier selection as well as for foreign direct investments were investigated in order to create a comprehensive list of micro-level and macro-level factors which can be used for outsourcing engagements. The factors were later clustered within various constructs, which where subsequently ranked based on quantitative empirical research in order to identify which constructs are of greatest importance, thereby also being able to identify if macro-level factors are considered important by practitioners for outsourcing engagements. The list of factors and the ranking of those based on constructs contribute to fill the two academic gaps, which were presented in the beginning of this report. Lastly, the most important factors were integrated into a software solution in order to be able to conduct effective supplier selection decisions based on a CO approach. Using CO to execute supplier selection is considered a best-practice approach by A. T. Kearney, but other methods could also be used to execute a supplier selection engagements with the inclusion of macro-level factors.

11.1 Discussion

Since macro-level factors have not been considered extensively in previous supplier selection studies, the results of this research can be considered novel and value-adding. The empirical ranking of constructs did clearly indicate that macro-level constructs - and the factors within - are important in major global supplier selection activities, and that such factors should indeed be considered by practitioners in prospective outsourcing engagements. Of course, the fact that factors within micro-level constructs such as 'cost', 'quality', and 'time and delivery' are ranked as the most important ones does not come as a surprise. However, the result of macro-level factors such as 'accessibility', 'labour', and 'business climate' being more important than, for instance, 'CSR', 'service', 'finance', 'innovativeness', and 'technology' is a very interesting finding. The underlying reason for why 'accessibility' is considered more important than various other micro-level constructs can be a result of today's industries which in general are becoming more uncertain and volatile due to the increasing globalisation and appurtenant competition (Gottfredson et al., 2005; Maskell et al., 2007). Flexibility and agility is becoming of increasing importance for companies, and this does also require that the proximity to suppliers,

sub-suppliers, raw materials, natural resources, etcetera, is taken into consideration in modern outsourcing engagements. The importance of 'labour' was prominent in all three rankings developed in the report, meaning that 'labour' was both considered important on an overall level, but also for outsourcing engagements which motives are to either get access to innovation or reduce cost. The concept of 'the war for talent' has been flourishing in the corporate communities in the 21st century, and recent studies have indicated that the war for talent is not just about the extent to which quality labour is accessible, but also the quantity of labour in general (Beechler and Woodward, 2009). This indicates that firms nowadays have to look closely for the desired type of labour in different geographical regions regardless of whether high-skilled or low-skilled labour is needed. This is especially important in FDIs, but the focal research also clearly shows that such parameters are taken into consideration by practitioners who are engaging in major global outsourcing engagements. According to the VP EMEA, some outsourcing engagements does in fact require that certain type of people are identified in one location, and then transferred to the firm which a buying company is outsourcing activities to in another location. Labour should therefore be examined beyond the boundaries of the supplying firms which are being evaluated in the supplier selection process. The importance of 'business climate' was also emphasised in all rankings, and this can also be considered an interesting result. It can be argued that the business climate, which for instance is reflected by the amount of bribery and corruption that is present in a certain location, can have a positive and/or a negative impact on the image of a firm who might outsource certain activities to that respective location. Based on a literature screening by the author, it is evident that the research on outsourcing and geographical business climate is scarce. However, the results in this report indicate that further investigations have to be made in order to assess why the business climate of an outsourcing location matters for a buying firm.

The underlying reasons for why some of the macro-level constructs are considered more important than some micro-level constructs by practitioners could be discussed in much greater extent; however, it is also interesting to have a look at the relationship between the inclusion of macro-level constructs in outsourcing engagements, and the actual performance of the selected supplier(s). The correlation and the regression analysis conducted in this report indicate that although macro-level constructs are assorted in-between micro-level constructs in the rankings, the macro-level constructs are in fact even more important that what is seen in the rankings. Only three micro-level constructs have a significant positive relationship with the supplier performance, while seven macro-level constructs have a significant positive relationship with supplier performance. Also, in the regression analysis, 'governmental regulations', which is consistently ranked in the middle or lower part of the rankings, had a significant positive impact on performance. The results indicate that regardless of whether a firm is outsourcing to reduce cost or to gain access to innovation, macro-level decision factors should be considered as they have a positive relationship or impact on the performance of the supplier selection engagement. The mismatch between the rankings and the performance analyses results generally indicates that practitioners nowadays are unaware of the actual positive impact - and thereby potentials - of including macro-level factors in supplier-selection decision making processes. The findings does thereby not only suggest the need to perhaps reduce the focus on traditional micro-level factors, but it also suggests the need to evaluate the location in

which a supplier is embedded in more profoundly. The supplier selection tactics (i.e., the decision variables used to make the final decision) should therefore be reconfigured in practice in the future. The lack of scientific evidence between the usage of macro-level factors and performance may have been a contributing factor to this outcome, but the lack of understanding regarding how to use macro-level factors in outsourcing engagements could also be a reason for why they are generally considered less important than some micro-level factors which have a less significant relationship or impact with/on performance.

In order for managers to consider macro-level factors in outsourcing engagements in greater extent, a first step is to to proliferate the idea of including such factors in supplier selection decisions. It is especially important to provide propositions for *how* macro-level factors should be used in outsourcing engagements. In this report, it was suggested that the macro-level factors were used as constraints in optimisation software, but whether other approaches are more effective could be discussed in future research. The further research which might be conducted as an extension to this study could thereby potentially help to increase the awareness of considering macro-level factors more profoundly, meaning that the research also creates an opportunity for buyers to increase their success-rate in future outsourcing engagements.

11.2 Conclusion

In order to provide a clear answer to each research question presented in Chapter 1, a conclusion section has been developed with direct answers to each question.

Answer to Research Question 1: The first research question was answered based on a systematic literature review which screened all the prominent studies from supplier selection research and foreign direct investment research. Here, a total amount of 388 decision factors were identified; 200 factors were from a micro-level perspective, meaning that they were identified in generic supplier selection literature as well as research that has combined both micro- and macro-level factors. The remaining 188 factors were from the macro-level domain, meaning that they were retrieved from FDI literature or from literature that has already combined micro-level and macro-level factors. The micro-level factors range from being cost-related to more relationship, sustainability, corporate social responsibility, and technology-related, while the macro-level factors range from reflecting the political landscape of a country, to being more economically, accessibility, market, and labour-related. The total list of decision factors from both the micro-level and the macro-level domain, which have been derived based on the systematic literature review, can be considered the most comprehensive list developed to date, and can be used for future research where decision-factors for outsourcing are needed. The development of a list of factors which comprehensively considers both types of factors does also fill an academic gap, which is why the list can be considered a value-adding contribution to science.

Answer to Research Question 2: The second research question was answered based on empirical research. First, qualitative in-depth and semi-structured interviews were conducted with experts in order to identify if further factors can be added to the total

list of 388 factors identified in academia. 11 further factors were here proposed, primarily form the micro-level domain. A clustering and filtering procedure of all those factors were then conducted based on an empirical validation approach, and resulted in large table which clearly and transparently shows from where all the data has been retrieved. The filtering process resulted in a total amount of 25 clusters including a total amount of 285 factors which would be used for the quantitative empirical study. The quantitative empirical study was then conducted in order to identify which factors are of highest importance thereby answering the second research question completely. It was identified that on an overall level, 'quality', 'cost', and 'time and delivery' are the most important types factors to consider, which is not surprising when examining previous studies that have ranked supplier selection factors. However, it was also identified that several macro-level factors are considered more important than general micro-level decision factors. For instance, factors within the constructs of 'accessibility', 'labour', and 'business climate' were all considered more important than factors from micro-level constructs such as 'CSR', 'service', 'finances', and 'innovativeness'. Despite the overall ranking, situation dependent rankings were also developed in order to identify if any changes would occur. Naturally, the results differed to the overall ranking, which means that the perceived importance of decision-factors *depends* on the individual situation. A correlation and a multiple linear regression analysis also showed that macro-level factors in fact have more strong relationships with performance compared to micro-level factors, and that some macro-level factors also have a significant positive impact on performance. This indicates that although macro-level factors are considered important by practitioners, they should in fact gain even more attention on a prospective basis.

Answer to Research Question 3: The third research question were based on the practical part of the thesis. Here, factors from the most important constructs identified in the second part of the report were integrated into a software solution which enables decision-makers to conduct in-depth supplier selection procedures based on CO. The chosen factors from the most important constructs of each domain were integrated into the software, while an Excel sheet with technical input that enables the software to read the data that suppliers enter during RFQ rounds was orchestrated. The factors were both included as bid fields and bid supplements, depending on what was agreed with the company partner. Several sheets were developed in the Excel file in order for the supplier to fill in different type of data which fulfils the requirements of the CO approach. All the macro-level data which is based on unique scores or indexes have also been normalised into one unit of measure, in order to standardise the measures for the macro-level constraints in the software. The macro-level data, which is based on such indexes have been gathered from organisations such as the World Bank, Transparency International, and research institutions like ETH Zürich. This is just one idea for how macro-level factors can be used for major supplier selection engagements; other approaches might be proposed in future research.

Based on the answers which have been provided to each research questions, the overall problem formulating question has likewise been answered. To recall, it was formulated as following: *"Which micro-level and macro-level decision factors should be considered in major supplier selection engagements, and how can the factors be integrated into decision-making software which is based on a collaborative optimisation approach?"*.

Implications and Limitations 12

Now that the discussion and the conclusion of the findings have been presented, the next step is to present the managerial and theoretical implications of the findings. Also, a last section is dedicated to present and acknowledge the limitations of the study, whereafter avenues for further research are proposed.

12.1 Managerial and Theoretical Implications

The novel findings in this report have several implications for practitioners. The fact that it has been identified that macro-level factors are considered important relative to some micro-level factors by practitioners, and the fact that the macro-level factors also have significant relationships and impacts on the performance of supplier selection engagements, clearly emphasise the need for considering such factors in future supplier selection engagements. The most important implications according to the author range from the theoretical findings, to the empirical results and the description of how macro-level factors potentially can be used in practical supplier selection engagements. All the important implications are listed below.

1. The comprehensive list of decision variables developed in Part I and the more organised list based on clusters which was developed in Part II, can both be used to gain insight about which variables *could* be useful for certain outsourcing engagements. As mentioned in Momme (2002), defining the assessment criteria is one of the initial steps of the overall outsourcing process, but it is not mentioned from where the criteria - specifically macro-level criteria - should be retrieved. This list can help resolve this problem, and the comprehensive number of factors under the different constructs might enable the decision-maker to include criteria which were not thought of in the first place.
2. The ranking of factors which was included in Part II can help managers to decide among which type of factors to include for certain outsourcing engagements (e.g., by only including the most important ones on an overall level as in the case of this project). However, the fact that several macro-level factors where considered even more important than traditional micro-level factors, and the fact that such factors also are strongly related to the performance of the selected suppliers, might encourage managers to consider more macro-level factors in practice on a prospective basis. The constructs which have the strongest relationship or impact on performance could also be used instead of the ones which are ranked the highest. The decision is completely up to the individual decision-maker.
3. The Excel sheet which has been developed in this report as well as the associated configuration in the software tool of Trade Extensions, can be argued to be a good foundation to use for firms who

want to conduct a CSS engagement based on CO. As mentioned previously, the factors included in the model are based on the overall ranking which was developed in Part II, which is why some further factors might be added - or removed - depending on the individual outsourcing engagement. However, all the pipecommands, tags, rating names, etcetera, can remain the same, which is why the additional workload for the practitioners who will use it can be considered low.

In order to realise the positive practical implications presented above, managers within the field of outsourcing and purchasing need to become more aware of the advantages of considering macro-level factors in supplier selection decision. Future research might contribute to increase this awareness, but training of managers, as well as better communication regarding macro-level attributes between the players in a value-chain can also help to propel this awareness. The importance of macro-level factors might also require firms to reconfigure their supply base in the future, in order to exploit the comparative advantage of other locations, which different suppliers are embedded in. In case large suppliers are used at the current state, then buying firms could also re-configure their current supply chain by using other sites from the same suppliers, but in different locations. This requires a new RFQ to be established, but new suppliers do not have to be identified and investigated in such a scenario.

When looking at the implications from a theoretical perspectives, it can also be argued that this thesis provide valuable insights. As mentioned throughout the report, the scarcity of supplier selection studies which consider macro-level factors can be considered high. Some studies (See Table 4.1 in Chapter 4) have already proposed some macro-level factors for supplier selection, but none of them have done it comprehensively, and none of them have assessed the importance of the factors. This report has contributed to resolve these issues, and can thereby be argued to be a first large step to integrate macro-level factors into the sphere of supplier selection research. Hätönen and Eriksson (2009)'s proposition of conducting further research that consider FDI determinants in supplier selection studies have thereby been exploited in this research, but in order to make the results more profound and thereby useful within the academic domain, further research which mitigate the limitations of this report has to be conducted. The limitations, and the proposition for future research, are therefore described in the subsequent section.

12.2 Limitations and Future Research

Although many aspects of the report can be considered comprehensive, there are still several limitations which have to be acknowledged and emphasised. One of the major limitations in the report is the clustering process which took place in Chapter 7. Here, the clustering was based on previous studies, the opinion of the author, and the opinion of industry experts (i.e., the VP EMEA and the SCP). Nevertheless, in order to increase the validity of the clustering process, it can be argued that further sources should have been used in the validation process, and the overall clustering procedure should also be duplicated in order to identify if the same results would be derived once again. The approach used in this report is not based on any formal methodology, but the studies which have used a similar approach in previous literature refer to it as a judgemental approach (referred to as an empirical validation approach in this report). Other studies which have developed clusters for supplier selection factors used a general factor analysis;

however, since the clustering process in this report took place prior to the empirical study due to the substantial amount of factors, this was not an option. An approach inspired by the Delphi methodology might be a more comprehensive alternative which could be used in future research, in case new clusters will be developed.

Another limitation of the report, which is similar to many of the supplier selection studies which have been reviewed in Chapter 4, is that the interdependencies between the different factors have not been considered in great extent. In the total list of 399 factors, it can be argued that many of them are strongly related based on academic and practical considerations. For instance, 'labour cost' and 'initial price' are two factor which for obvious reasons can be argued to be interrelated, as the initial price most likely - among other things - is a function of the cost of labour in the area of a firm. The 'management capability' factor can also be argued to have an influence on the 'financial position' and 'financial staying power' of the firm. The list of interdependencies generally goes on, and in order to identify those, further research must be conducted. The correlation analysis which have been conducted in Chapter 10 was conducted on a construct level, and since the sample size can be considered relatively low, further research in this field is strongly encouraged.

Several limitations regarding the empirical results of this report has also been acknowledged. The low sample size (i.e., 42 useful responses with a response rate of 19,4%) can be considered low for a quantitative empirical study, which is why the results have to be interpreted and used with caution. In order to increase the validity of the empirical results, a larger sample size should be used in potential future studies. In the case of this report, it was not possible to receive further responses due to time and resource constraints, and due to the fact that an agreement with a large institute, which could potentially have lead to hundreds of responses by purchasing managers, did not work out as expected. As mentioned in Chapter 2, earlier studies which served to rank the importance of various factors for supplier selection purposes used sample sizes ranging from 273 purchasing managers to 4,500 purchasing managers. Also, the sample of the focal report came from Denmark, Germany and the Netherlands, respectively, which means that further research with firms from other countries should be conducted, in order to identify if the importance of the different kind of factors - especially the macro-level factors - are similar to the results in this report. Lastly, the ranking of factors was in this report based on the most recent *major* outsourcing engagement, which the respondents were a part of. Now, the threshold for what is considered *major* has not been specified in this report or any previous studies. Cheraghi et al. (2011) argue that the larger and more complex an outsourcing engagement is, the more factors have to be included for the final evaluation. However, whether the importance of especially macro-level factors increase with the increase in magnitude of an outsourcing engagement have not been examined in this research, which is why it could be interesting to investigate this on a prospective basis.

When conducting supplier selection procedures which involve macro-level factors, it would be interesting to investigate if buying firms first evaluate the countries, and then identify potential suppliers, or if buying firms simply look for potential suppliers and subsequently evaluate the locations in which the suppliers are embedded. This thinking has not been

considered in this report, although both micro-level and macro-level factors have been scrutinised and included in the Trade Extensions software solution, but it can be assumed that the choice of sequence that a firms pursue can have an impact of the perceived importance of the decision factors. For instance, if a buyer looks directly for potential suppliers, then the location decision (and thereby the importance of location factors) may be distorted, as the buying company might simply capitalise on the suppliers advise. On the other hand, if the location is examined prior to the potential suppliers, then the macro-level factors might be weighted more importantly. Hätönen (2009) also emphasise that this way of thinking is limited in the current outsourcing literature, and has therefore - based on two case studies - proposed that for cost reduction outsourcing engagements, buying firms should first examine the location and then identify the suppliers, while outsourcing engagements which purpose is to enhance the internal capabilities of the buyer should do it the other way around. These propositions could have been investigated further in this report, but due to limited space and resources, it was neglected, which is why it is also considered a limitation. Future research in this domain is therefore also encouraged.

The measures used to reflect the macro-level factors which have been integrated into the software solution can be considered quite subjective. There does not exist any guidelines for how various types of macro-level factors exactly should be evaluated, which is why subjective judgement and creativity is needed for this. For instance, in order to measure the red tape of countries when it comes to outsourcing engagements, the measure used from the ease of doing business index is just one way of doing it. Further approaches could also have been used, but since no guideline for what to use exist, this index has been used due to the easy access to its data. Majocchi and Strange (2007) also emphasise that the operationalisation of macro-level factors can be difficult. For instance, how can the state of communications infrastructure be operationalised? Kinoshita and Campos (2003) did, for instance, use the number of telephone lines per capita from the World Development Indicators, while Mariotti and Piscitello (1995) used the actual physical infrastructure network of a country to assess the communications infrastructure. Again, no clear guidelines exist, especially not for 399 factors (188 macro-level factors), but the fact that the selection was based on the input of just two people it can be considered a limitation. Macro-economic experts would have been value-adding sources of knowledge. Also, the macro-level data was in this report based on country-level data. More disaggregated data based on regions might be more appropriate in some sourcing events; however, the scarcity of such data is higher.

Bibliography

A. T. Kearney (2011), 'Collaborative optimization for complex categories: Helping supply management to excel in a world of growing complexity', Available at: https://www.cips.org/Documents/Membership/Branch%20Event%20uploads/ATKearney%20CIPS%20Branch%20meeting%20Collaborative%20optimization.pdf. Accessed: 02/06/15.

A. T. Kearney (2015*a*), 'Collaborative optimization sourcing', Available at: https://www.atkearney.com/paper/-/asset_publisher/dVxv4Hz2h8bS/content/collaborative-optimization-sourci-1/10192. Accessed: 25/05/15.

A. T. Kearney (2015*b*), 'Industries', Available at: http://www.atkearney.com/industries. Accessed: 12/03/15.

A. T. Kearney (2015*c*), 'Research studies', Available at: http://www.atkearney.com/research-studies. Accessed: 12/03/15.

A. T. Kearney (2015*d*), 'Services', Available at: http://www.atkearney.com/services. Accessed: 12/03/15.

A. T. Kearney (2015*e*), 'Vision 2020', Available at: http://www.atkearney.com/vision-2020. Accessed: 12/03/15.

A. T. Kearney (2015*f*), 'Who we are', Available at: http://www.atkearney.com/about-us/who-we-are. Accessed: 10/03/15.

A. T. Kearney PAS (2015*a*), 'A. t. kearney procurement & analytical solutions', Available at: http://www.atkearneypas.com/knowledge/brochures/Supply-Chain-Management.pdf. Accessed: 12/03/15.

A. T. Kearney PAS (2015*b*), 'About us', Available at: http://www.atkearneypas.com/about/index.html. Accessed: 12/03/15.

A. T. Kearney PAS (2015*c*), 'Corporate background', Available at: http://www.atkearneypas.com/about/background.html. Accessed: 12/03/15.

A. T. Kearney PAS (2015*d*), 'Our solutions', Available at: http://www.atkearneypas.com/solutions/index.html. Accessed: 12/03/15.

Abdur Razzaque, M. and Chen Sheng, C. (1998), 'Outsourcing of logistics functions: a literature survey', *International Journal of Physical Distribution & Logistics Management* 28(2), 89–107.

Arnold, U. (2000), 'New dimensions of outsourcing: a combination of transaction cost economics and the core competencies concept', *European Journal of Purchasing & Supply Management* 6(1), 23–29.

Badri, M. A. (2007), 'Dimensions of industrial location factors: review and exploration', *Journal of Business and Public Affairs* 1(2), 1–26.

Beechler, S. and Woodward, I. C. (2009), 'The global "war for talent"', *Journal of international management* 15(3), 273–285.

Blair, J. P. and Premus, R. (1987), 'Major factors in industrial location: A review', *Economic Development Quarterly* 1(1), 72–85.

Blonigen, B. A. (2005), 'A review of the empirical literature on fdi determinants', *Atlantic Economic Journal* 33(4), 383–403.

Boardman Liu, L., Berger, P., Zeng, A. and Gerstenfeld, A. (2008), 'Applying the analytic hierarchy process to the offshore outsourcing location decision', *Supply Chain Management: An International Journal* 13(6), 435–449.

Bozarth, C., Handfield, R. and Das, A. (1998), 'Stages of global sourcing strategy evolution: an exploratory study', *Journal of Operations Management* 16(2), 241–255.

Büyüközkan, G. and Çifçi, G. (2011), 'A novel fuzzy multi-criteria decision framework for sustainable supplier selection with incomplete information', *Computers in Industry* 62(2), 164–174.

Calvi, R., Le Dain, M.-A., Fendt, T. C. and Herrmann, C. J. (2010), 'Supplier selection for strategic supplier development'.

Cavusgil, S. T., Yaprak, A. and Yeoh, P.-L. (1993), 'A decision-making framework for global sourcing', *International business review* 2(2), 143–156.

Chakrabarti, A. (2001), 'The determinants of foreign direct investments: Sensitivity analyses of cross-country regressions', *Kyklos* 54(1), 89–114.

Chan, F. T. and Kumar, N. (2007), 'Global supplier development considering risk factors using fuzzy extended ahp-based approach', *Omega* 35(4), 417–431.

Chan, F. T., Kumar, N., Tiwari, M., Lau, H. and Choy, K. (2008), 'Global supplier selection: a fuzzy-ahp approach', *International Journal of Production Research* 46(14), 3825–3857.

Chen, C.-T., Lin, C.-T. and Huang, S.-F. (2006), 'A fuzzy approach for supplier evaluation and selection in supply chain management', *International Journal of Production Economics* 102(2), 289–301.

Chen, I. J. and Paulraj, A. (2004), 'Understanding supply chain management: critical research and a theoretical framework', *International Journal of Production Research* 42(1), 131–163.

Chen, Y.-J. (2011), 'Structured methodology for supplier selection and evaluation in a supply chain', *Information Sciences* 181(9), 1651–1670.

Cheng, T. and Podolsky, S. (1996), *Just-in-time manufacturing: an introduction*, Springer Science & Business Media.

Cheraghi, S. H., Dadashzadeh, M. and Subramanian, M. (2011), 'Critical success factors for supplier selection: an update', *Journal of Applied Business Research (JABR)* 20(2).

Choi, T. Y. and Hartley, J. L. (1996), 'An exploration of supplier selection practices across the supply chain', *Journal of Operations Management* 14(4), 333–343.

Coase, R. H. (1937), 'The nature of the firm', *economica* 4(16), 386–405.

Consulting Magazine (2013), 'Consulting - top 25 consultants',
Available at: http://www.atkearney.com/documents/10192/1045169/2013+Top+25+May+Consulting+cover.pdf/eb53f778-0453-4140-bcb7-69e697c674c3.
Accessed: 12/03/15.

Cox, A. (1996), 'Relational competence and strategic procurement management', *European Journal of Purchasing and Supply Management* (1), 57–70.

Craney, T. A. and Surles, J. G. (2002), 'Model-dependent variance inflation factor cutoff values', *Quality Engineering* 14(3), 391–403.

Dempsey, W. A. (1978), 'Vendor selection and the buying process', *Industrial Marketing Management* 7(4), 257–267.

Deng, X., Hu, Y., Deng, Y. and Mahadevan, S. (2014), 'Supplier selection using ahp methodology extended by d numbers', *Expert Systems with Applications* 41(1), 156–167.

Denison, D. R. and Mishra, A. K. (1995), 'Toward a theory of organizational culture and effectiveness', *Organization science* 6(2), 204–223.

Deshmukh, A. J. and Chaudhari, A. A. (2011), A review for supplier selection criteria and methods, *in* 'Technology Systems and Management', Springer, pp. 283–291.

Dibbern, J., Goles, T., Hirschheim, R. and Jayatilaka, B. (2004), 'Information systems outsourcing: a survey and analysis of the literature', *ACM SIGMIS Database* 35(4), 6–102.

Dickson, G. W. (1966), 'An analysis of vendor selection systems and decisions', *Journal of Purchasing* 2, 5–17.

Dou, Y. and Sarkis, J. (2010), 'A joint location and outsourcing sustainability analysis for a strategic offshoring decision', *International Journal of Production Research* 48(2), 567–592.

Dulmin, R. and Mininno, V. (2003), 'Supplier selection using a multi-criteria decision aid method', *Journal of Purchasing and Supply Management* 9(4), 177–187.

Dunning, J. H. (2000), 'The eclectic paradigm as an envelope for economic and business theories of mne activity', *International Business Review* 9(2), 163–190.

Ellram, L. and Billington, C. (2001), 'Purchasing leverage considerations in the outsourcing decision', *European Journal of Purchasing & Supply Management* 7(1), 15–27.

Ellram, L. M. (1990), 'The supplier selection decision in strategic partnerships', *Journal of Purchasing & Materials Management* 26(4), 8.

Everaert, P., Sarens, G. and Rommel, J. (2006), 'Outsourcing of accounting tasks in smes: an extended tce model', *Faculteit Economie en Bedrijfskunde Hoveniersberg, Universidad de Gent, Bélgica. Documento de trabajo* .

Falagas, M. E., Pitsouni, E. I., Malietzis, G. A. and Pappas, G. (2008), 'Comparison of pubmed, scopus, web of science, and google scholar: strengths and weaknesses', *The FASEB journal* 22(2), 338–342.

Farahani, R. Z., SteadieSeifi, M. and Asgari, N. (2010), 'Multiple criteria facility location problems: A survey', *Applied Mathematical Modelling* 34(7), 1689–1709.

Farrell, D. (2006), *Offshoring: understanding the emerging global labor market*, Harvard Business Press.

Flynn, B. B., Schroeder, R. G. and Sakakibara, S. (1994), 'A framework for quality management research and an associated measurement instrument', *Journal of Operations Management* 11(4), 339–366.

Gehanno, J.-F., Rollin, L. and Darmoni, S. (2013), 'Is the coverage of google scholar enough to be used alone for systematic reviews', *BMC medical informatics and decision making* 13(1), 7.

Ghodsypour, S. H. and O'Brien, C. (1998), 'A decision support system for supplier selection using an integrated analytic hierarchy process and linear programming', *International Journal of Production Economics* 56, 199–212.

Gilley, K. M. and Rasheed, A. (2000), 'Making more by doing less: an analysis of outsourcing and its effects on firm performance', *Journal of Management* 26(4), 763–790.

Godinez, J. R. and Liu, L. (2015), 'Corruption distance and fdi flows into latin america', *International Business Review* 24(1), 33–42.

Gottfredson, M., Puryear, R. and Phillips, S. (2005), 'Strategic sourcing', *Harvard Business Review* 83(2), 132–139.

Graf, M. and Mudambi, S. M. (2005), 'The outsourcing of it-enabled business processes: A conceptual model of the location decision', *Journal of International Management* 11(2), 253–268.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E. and Tatham, R. L. (2006), *Multivariate data analysis*, Vol. 6, Pearson Prentice Hall Upper Saddle River, NJ.

Haitani, K. and Marquis, C. T. (1990), 'Japanese investment in the southeast united states: factors, obstacles, and opportunities', *Economic Development Review* 8(3), 42.

Hambrick, D. C. and Mason, P. A. (1984), 'Upper echelons: The organization as a reflection of its top managers', *Academy of Management Review* 9(2), 193–206.

Hätönen, J. (2009), 'Making the locational choice: A case approach to the development of a theory of offshore outsourcing and internationalization', *Journal of International Management* 15(1), 61–76.

Hätönen, J. and Eriksson, T. (2009), '30+ years of research and practice of outsourcing–exploring the past and anticipating the future', *Journal of International Management* 15(2), 142–155.

Ho, W., Xu, X. and Dey, P. K. (2010), 'Multi-criteria decision making approaches for supplier evaluation and selection: A literature review', *European Journal of Operational Research* 202(1), 16–24.

Humphreys, P., Wong, Y. and Chan, F. (2003), 'Integrating environmental criteria into the supplier selection process', *Journal of Materials Processing Technology* 138(1), 349–356.

Jarillo, J. C. (1988), 'On strategic networks', *Strategic management journal* 9(1), 31–41.

Jonsson, P., Andersson, D., Schiele, H., Horn, P. and Vos, B. (2011), 'Estimating cost-saving potential from international sourcing and other sourcing levers: Relative importance and trade-offs', *International Journal of Physical Distribution & Logistics Management* 41(3), 315–336.

Kahraman, C., Cebeci, U. and Ulukan, Z. (2003), 'Multi-criteria supplier selection using fuzzy ahp', *Logistics Information Management* 16(6), 382–394.

Kakabadse, A. and Kakabadse, N. (2005), 'Outsourcing: current and future trends', *Thunderbird International Business Review* 47(2), 183–204.

Kannan, V. R. and Tan, K. C. (2002), 'Supplier selection and assessment: Their impact on business performance', *Journal of Supply Chain Management* 38(3), 11–21.

Kar, A. K. and Pani, A. K. (2014), 'Exploring the importance of different supplier selection criteria', *Management Research Review* 37(1), 89–105.

Karakaya, F. and Canel, C. (1998), 'Underlying dimensions of business location decisions', *Industrial Management & Data Systems* 98(7), 321–329.

Keegan, W. (2002), *Global Marketing Management*, seventh edition edition, New Jersey: Prentice Hall.

Kinkel, S. and Maloca, S. (2009), 'Drivers and antecedents of manufacturing offshoring and backshoring - a german perspective', *Journal of Purchasing and Supply Management* 15(3), 154–165.

Kinoshita, Y. and Campos, N. F. (2003), 'Why does fdi go where it goes? new evidence from the transition economies'.

Kinra, A. and Kotzab, H. (2008), 'A macro-institutional perspective on supply chain environmental complexity', *International Journal of Production Economics* 115(2), 283–295.

Kleinknecht, A., Van Montfort, K. and Brouwer, E. (2002), 'The non-trivial choice between innovation indicators', *Economics of Innovation and New Technology* 11(2), 109–121.

Kotabe, M. and Murray, J. Y. (2004), 'Global sourcing strategy and sustainable competitive advantage', *Industrial Marketing Management* 33(1), 7–14.

Kraljic, P. (1983), 'Purchasing must become supply chain management: How managers can guard against materials disruptions by formulating a stregy for supply', *Havard Business Review* September-October(1), 109–117.

Lacity, M. C. and Hirschheim, R. (2012), 'The information systems outsourcing bandwagon', *Sloan Management Review* 34.

Lambert, D. M., Stock, J. R. and Ellram, L. M. (1998), *Fundamentals of Logistics Management*, Vol. 1, first edition, McGraw-Hill.

Lin, Z.-K., Wang, J.-J. and Qin, Y.-Y. (2007), A decision model for selecting an offshore outsourcing location: using a multicriteria method, *in* 'Service Operations and Logistics, and Informatics, 2007. SOLI 2007. IEEE International Conference on', IEEE, pp. 1–5.

Longhurst, R. (2003), 'Semi-structured interviews and focus groups', *Key Methods in Geography* pp. 117–132.

Mahnke, V., Overby, M. L. and Vang, J. (2003), *Strategic IT-outsourcing: What do we know and need to know?*, Citeseer.

Majocchi, A. and Strange, R. (2007), 'The fdi location decision: does liberalization matter?', *Transnational corporations* 16(2), 1.

Mariotti, S. and Piscitello, L. (1995), 'Information costs and location of fdis within the host country: empirical evidence from italy', *Journal of International Business Studies* pp. 815–841.

Maskell, P., Pedersen, T., Petersen, B. and Dick-Nielsen, J. (2007), 'Learning paths to offshore outsourcing: from cost reduction to knowledge seeking', *Industry and Innovation* 14(3), 239–257.

McGovern, G. and Quelch, J. (2005), 'Outsourcing marketing', *Harvard Business Review* 83(3), 22–26.

McIvor, R. (2000), 'A practical framework for understanding the outsourcing process', *Supply Chain Management: An International Journal* (5), 22–36.

McIvor, R. (2008), 'What is the right outsourcing strategy for your process?', *European management journal* 26(1), 24–34.

Menard, S. (1995), 'Applied logistic regression analysis: Sage university series on quantitative applications in the social sciences'.

Min, H. (1994), 'International supplier selection: a multi-attribute utility approach', *International Journal of Physical Distribution & Logistics Management* 24(5), 24–33.

Momme, J. (2002), 'Framework for outsourcing manufacturing: strategic and operational implications', *Computers in Industry* 49(1), 59–75.

Monczka, R., Handfield, R., Giunipero, L. and Patterson, J. (2008), *Purchasing and supply chain management*, Cengage Learning.

Motwani, J., Youssef, M., Kathawala, Y. and Futch, E. (1999), 'Supplier selection in developing countries: a model development', *Integrated Manufacturing Systems* 10(3), 154–162.

Mudambi, R. (1995), 'Empirical evidence', *Managerial and Decision Economics* 16(3), 249–257.

Neter, J., Wasserman, W. and Kutner, M. H. (1989), 'Applied linear regression models'.

Nydick, R. L. and Hill, R. P. (1992), 'Tjsing the analytic hierarchy process to structure the supplier selection procedure'.

Peng, M. W. (2013), *GLOBAL*, second edition edition, South-Western CENGAGE Learning.

Prahalad, C. K. and Hamel, G. (1990), 'The core competence of the corporation', *Harvard Business Review* pp. 79–91.

Premus, R. (1982), *Location of high technology firms and regional economic development: a staff study*, Vol. 4, USGPO.

Purdy, G. (2010), Iso 31000:2009 - setting a new standard for risk management, Vol. 30, Society for Risk Analysis, pp. 881–886.

Quinn, J. B. (1999), 'Strategic outsourcing: leveraging knowledge capabilities', *Sloan Management Review* 40(4), 9–21.

Rittenberg, L. and Covaleski, M. A. (2001), 'Internalization versus externalization of the internal audit function: an examination of professional and organizational imperatives', *Accounting, Organizations and Society* 26(7), 617–641.

Sako, M. (2006), 'Outsourcing and offshoring: implications for productivity of business services', *Oxford Review of Economic Policy* 22(4), 499–512.

Sandholm, T. (2007), 'Expressive commerce and its application to sourcing: How we conducted $35 billion of generalized combinatorial auctions', *AI Magazine* 28(3), 45.

Sandholm, T., Levine, D., Concordia, M., Martyn, P., Hughes, R., Jacobs, J. and Begg, D. (2006), 'Changing the game in strategic sourcing at procter & gamble: Expressive competition enabled by optimization', *Interfaces* 36(1), 55–68.

Sarkis, J. and Sundarraj, R. (2002), 'Hub location at digital equipment corporation: a comprehensive analysis of qualitative and quantitative factors', *European Journal of Operational Research* 137(2), 336–347.

Sarkis, J. and Talluri, S. (2002), 'A model for strategic supplier selection', *Journal of Supply Chain Management* 38(4), 18–28.

Saunders, M. N., Saunders, M., Lewis, P. and Thornhill, A. (2011), *Research methods for business students, 5/e*, Pearson Education India.

Scharlach, A. (2014), 'Collaborative optimization: When doing another rfp is not enough', *Insights - A. T. Kearney Korea LLC* 1, 1–12.

Schiele, H. (2012), 'Accessing supplier innovation by being their preferred customer', *Research-Technology Management* 55(1), 44–50.

Schiele, H., Horn, P. and Vos, B. (2011), 'Estimating cost-saving potential from international sourcing and other sourcing levers: Relative importance and trade-offs', *International Journal of Physical Distribution & Logistics Management* 41(3), 315–336.

Schotter, A. and Beamish, P. W. (2013), 'The hassle factor: An explanation for managerial location shunning', *Journal of International Business Studies* 44(5), 521–544.

Spekman, R. E. (1988), 'Strategic supplier selection: understanding long-term buyer relationships', *Business Horizons* 31(4), 75–81.

Swift, C. O. (1995), 'Preferences for single sourcing and supplier selection criteria', *Journal of Business Research* 32(2), 105–111.

Thornton, L. M., Autry, C. W., Gligor, D. M. and Brik, A. B. (2013), 'Does socially responsible supplier selection pay off for customer firms? a cross-cultural comparison', *Journal of Supply Chain Management* 49(3), 66–89.

Ulset, S. (1996), 'R&d outsourcing and contractual governance: An empirical study of commercial r&d projects', *Journal of Economic Behavior & Organization* 30(1), 63–82.

Verma, R. and Pullman, M. E. (1998), 'An analysis of the supplier selection process', *Omega* 26(6), 739–750.

Wadhwa, V. and Ravindran, A. R. (2007), 'Vendor selection in outsourcing', *Computers & Operations Research* 34(12), 3725–3737.

Wang, G., Huang, S. H. and Dismukes, J. P. (2004), 'Product-driven supply chain selection using integrated multi-criteria decision-making methodology', *International Journal of Production Economics* 91(1), 1–15.

Watts, C. A., Kim, K. Y. and Hahn, C. K. (1995), 'Linking purchasing to corporate competitive strategy', *International Journal of Purchasing and Materials Management* 31(1), 2–8.

Weber, A., Friedrich, C. J. et al. (1929), 'Alfred weber's theory of the location of industries'.

Weber, C. A. and Current, J. R. (1993), 'A multiobjective approach to vendor selection', *European Journal of Operational Research* 68(2), 173–184.

Weber, C. A., Current, J. R. and Benton, W. (1991), 'Vendor selection criteria and methods', *European Journal of Operational Research* 50(1), 2–18.

Wheeler, D. and Mody, A. (1992), 'International investment location decisions: The case of us firms', *Journal of International Economics* 33(1), 57–76.

Williamson, O. E. (1975), *Markets and hierarchies*, New York.

Woffinden, K. (2007), 'Surfing the next wave of outsourcing: The ethics of sending domestic legal work to foreign countries under new york city opinion 2006-3', *BYU L. Rev.* p. 483.

World Economic Forum (2015*a*), 'Building resilience in supply chains',
Available at: `http://www.weforum.org/reports/building-resilience-supply-chains`.
Accessed: 25/05/15.

World Economic Forum (2015*b*), 'Strategic partners',
Available at: `http://www.weforum.org/strategic-partners`.
Accessed: 12/03/15.

Xia, W. and Wu, Z. (2007), 'Supplier selection with multiple criteria in volume discount environments', *Omega* 35(5), 494–504.

Zhao, H. and Zhu, G. (2000), 'Location factors and country-of-origin differences: An empirical analysis of fdi in china', *Multinational Business Review* 8(1), 60.

Zhu, Z., Hsu, K. and Lillie, J. (2001), 'Outsourcing-a strategic move: the process and the ingredients for success', *Management Decision* 39(5), 373–378.

List of Figures

List of Tables

Appendix

Company Description A

This chapter serves to introduce the company partner for this thesis. First, an overall description of the firm will be made in order to provide some background information about the firm and the avenues in which it operates. Subsequently, a section is dedicated to the Procurement and Analytical Solutions practice, which is the division which this report is developed in collaboration with.

A. T. Kearney - The Firm in a Nutshell

A. T. Kearney is one of the leading global management consulting companies, and has been a trusted advisor for firms in various industries since 1926. The company does currently has 61 offices in more than 40 countries, and it employs more than 3,500 people across the globe (A. T. Kearney, 2015*f*). In the year of 2014, the firm reached $1.1 billion in revenues, and the Managing Partner and Chairman of the Board seeks to double that number by the end of 2020, meaning that the firm has to average double-digit growth continuously during the next six years (Consulting Magazine, 2013; A. T. Kearney, 2015*f*). The 2020 vision of the firm does furthermore entail the aspiration to become the most admired full-service management consulting company in the world, specifically distinguished by the way the firm operates as well as its unique corporate culture (A. T. Kearney, 2015*e*). The most prominent direct competitors of A. T. Kearney are at the current state McKinsey & Company, Boston Consulting Group, Bain & Company, Strategy&, and Roland Berger in Germany.

The firm operates in various industries, including aerospace and defence, automotive, chemicals, financial institutions, oil and gas, the public sector, and transportation (A. T. Kearney, 2015*b*). Within those industries, services within the field of analytics, digital business, innovation, marketing and sales, mergers and acquisitions (M&A), operations, organisation and transformation, procurement, strategic IT, strategy, and sustainability are offered (A. T. Kearney, 2015*d*). Besides advising clients around the world within the aforementioned industries, A. T. Kearney is also one of the 100 companies which have been selected as a strategic partner for the World Economic Forum, and the firm does moreover conduct in-depth research which yields publications and indexes useful for practitioners and academicians (World Economic Forum, 2015*b*; A. T. Kearney, 2015*c*). Examples of the indexes developed by A. T. Kearney are the Foreign Direct Investment Confidence Index, the Global Cities Index, the Global Services Location Index, and the Globalization

Index.

Procurement and Analytical Solutions at A. T. Kearney

The corporate supervisor for this thesis is one of the Vice Presidents of Europe, Middle East, and Africa (EMEA) from the Procurement and Analytic Solutions (PAS) practice at A. T. Kearney. The PAS practice of A. T. Kearney has more than 600 procurement professionals employed, and it has analysed more than $1 trillion in spend, sourced approximately $600 billion, and have achieved more than $60 billion in savings for 300+ clients in various industries around the world (A. T. Kearney PAS, 2015*a*). The practice provides extensive strategic services to clients who seek to enhance their supply chain and procurement performance, as well as to clients who want to develop in-depth analytical sourcing knowledge (A. T. Kearney PAS, 2015*b*). Projects range from tactical cost saving projects to more long-term strategic sourcing programmes which serves to implement complete procurement transformations within a firm (A. T. Kearney PAS, 2015*b*). PAS is known for being able to effectively address complex supply chain issues by providing visibility to the overall supply chain and procurement processes within the business system of their clients (A. T. Kearney PAS, 2015*c*). Each generated solution is customised for the individual client, meaning that no recommendations are similar across the various projects which are being conducted by A. T. Kearney PAS.

A. T. Kearney PAS acknowledges the fact that firms in the current economy have become much more aware of the importance of promoting innovation within their supply chain and procurement units, and that those firms in greater extent understand the critical roles of *"visibility to spend data, strategic sourcing, supply relationships, market intelligence, technology and analytics.* (A. T. Kearney PAS, 2015*d*, p. 1). Exploiting and implementing best practices is, however, something which various firms across industries have challenges with, thereby being able to continuously derive great results. These are exactly the type of challenges which A. T. Kearney PAS addresses for their clients around the world. Novel technologies as well as unique knowledge and value-added flexible solutions are here key aspects in deriving value for their clients (A. T. Kearney PAS, 2015*d*). Some of the approaches used to resolve the problems encountered by their clients include advanced analytics, complexity reduction strategies, risk management assessments, value chain optimisation, supply chain road maps, collaborative strategies, and integrated service delivery (A. T. Kearney PAS, 2015*a*). An overview of the different types of services as well as the approaches and tools used for the services can be found in Table A.1.

Services	Approaches and Tools Used
Category Solutions and Market Intelligence	Category Assessments, Benchmarking & Analytics Category Strategy Development & Implementation Category Solution: Integrated Facilities Management Commodity Price Volatility/ Hedging Strategies Group Purchasing Organization (GPO) Supply Market Analyses Supplier Identification & Qualification
Collaboration Enablement and Process Reengineering	Collaboration & Process Management Tools Knowledge Enablement Process & Tools Training: Academy of Excellence
Low Cost Country (LCC) - Best Cost Country	Assessment of Excellence in Procurement Procedures and Benchmarks Category Assessments, Benchmarking & Analytics Category Strategy Development & Implementation Emerging Markets Sourcing International Procurement Office Design, Development & Implementation LCC Program Development & Implementation Opportunity Assessment & Benchmarks Program Design & Implementation Savings Tracking and Visibility Supplier Identification & Qualification Supply Risk Assessment & Management Training: Academy of Excellence
Logistic Supply Chain Management Solutions	Assessment of Excellence in Procurement Procedures and Benchmarks International Procurement Office Design, Development & Implementation Organization Change Management ROSMASM enabled Procurement Performance Management Source-to-Pay Process and Technology Assessment Supply Management Skills Competency Assessment Supply Management Stages of Excellence Framework Supply Management Transformation ROI Model
Predictive Analytics	Future Growth Framework Marketing and Sales Effectiveness Customer Analytics Analytics Enabled Pricing CI Transformation Analytics Transformation Consumer First Complexity and Inventory Management Predictive Medicine
Procurement & Sourcing Effectiveness	Assessment of Excellence in Procurement Procedures and Benchmarks Purchase-to-pay Effectiveness Assessment ROSMASM enabled Procurement Performance Management Spend Assessment & Refreshable Spend Cube
Procurement & Sourcing Technologies	Program Management Tools Procurement & Sourcing Technology Effectiveness ROSMASM enabled Procurement Performance Management Supplier Management Tools
Spend Analysis & Procurement Analytics	Advanced Segmentation & Behavioral Modeling Collaborative Complexity Management Cost Regression Analysis (CRA) Value Chain Optimization
Supplier Performance & Relationship Management	Assessment of Excellence in Procurement Procedures and Benchmarks Performance Management & Visibility Program Design & Implementation Supplier Identification & Qualification Supply Risk Assessment & Management Training: Academy of Excellence

Table A.1. Overview of services offered by A. T. Kearney PAS (A. T. Kearney PAS, 2015*d*)

Current Usage of Factors at A. T. Kearney

For many of the outsourcing engagements conducted by A. T. Kearney, modern optimisers and scenario planning tools are used to manage and structure the complexity of all the data which is obtained throughout different RFQ rounds with various potential suppliers of a buying firm. The most profound tools are from Trade Extensions, SciQuest, AIMMS, Lamasoft, Llamasoft, and Supply Chain Guru. In the case of this thesis, Trade Extension will be the tool in which the most important micro-level and macro-level factors will be

implemented in. Usually, Trade Extensions is used in outsourcing engagements where; 1) no cherry picking is desired, 2) no single sourcing is pursued, and 3) the spent is >€20 million. the The factors included in the multi-criteria optimisation decision-making software do always depend on the individual sourcing situation. However, as mentioned in the introduction to this thesis (See Chapter 1), A. T. Kearney do not possess an exhaustive list of all the factors that could potentially be included, and they do neither have an overview of which macro-level factors are of greatest importance, and how they should be measured (e.g., by normalising various macro-level factor values into a common measure that can be used as constraints in the optimisation software). The conduct of the academic part of the thesis will hence, as articulated in the beginning of the report, automatically enable the author to resolve parts of this problem, as all factors from supplier selection and FDI literature will be retrieved and ranked. Subsequently, the most important ones can be translated into a common measure for the purpose of using the software and execute different scenario's.

References For All Used Constructs B

As mentioned throughout the report, all the constructs used to cluster the factors (except for 'Capacity' and 'CSR') has been retrieved from previous studies. In the table below, the sources are included, thereby providing a clear overview over from where the constructs are from.

Construct-titles of different clusters	Scientific sources
Capacity	Addition from practice
Cost	Choi and Hartley (1996), Sarkis and Sundarraj (2002), Sarkis and Talluri (2002), Chan and Kumar (2007), Chan et al. (2008), Dou and Sarkis (2010)
CSR	Added due to the fact that various CSR factors have been presented, but without having a construct to cluster them
Finances	Choi and Hartley (1996), Ellram (1990), Büyüközkan and Çifçi (2011)
Flexibility/agility	Choi and Hartley (1996), Sarkis and Talluri (2002)
Innovativeness	Kleinknecht et al. (2002), Dou and Sarkis (2010)
Organisational characteristics	Büyüközkan and Çifçi (2011)
Organisational culture	Ellram (1990), Sarkis and Talluri (2002), Dou and Sarkis (2010)
Quality	Sarkis and Talluri (2002), Büyüközkan and Çifçi (2011), Chan and Kumar (2007), Chan et al. (2008), Dou and Sarkis (2010)
Relationship/partnership potential	Choi and Hartley (1996), Sarkis and Talluri (2002), Dou and Sarkis (2010)
Reliability	Choi and Hartley (1996)
Service Sustainability	Choi and Hartley (1996), Chan and Kumar (2007), Chan et al. (2008) Sarkis and Talluri (2002), Büyüközkan and Çifçi (2011), Dou and Sarkis (2010)
Technology	Choi and Hartley (1996), Ellram (1990), Büyüközkan and Çifçi (2011), Dou and Sarkis (2010)
Time/delivery	Sarkis and Sundarraj (2002), Sarkis and Talluri (2002), Dou and Sarkis (2010)
Accessibility and markets	Sarkis and Sundarraj (2002), Badri (2007), Dou and Sarkis (2010)
Business Climate	Dou and Sarkis (2010)
Climate	Badri (2007)
Community	Badri (2007), Dou and Sarkis (2010)
Consumption and production patterns	Dou and Sarkis (2010)
Economic	Badri (2007), Dou and Sarkis (2010)
Ecosystem vitality	Dou and Sarkis (2010)
Environmental health	Dou and Sarkis (2010)
Government regulations	Sarkis and Sundarraj (2002), Badri (2007)
Industrial site	Badri (2007), Dou and Sarkis (2010)
Labour	Badri (2007), Dou and Sarkis (2010)
Political situation of foreign country	Badri (2007)
Strategic issues	Sarkis and Sundarraj (2002), Dou and Sarkis (2010)
Transportation	Badri (2007)
Utility	Badri (2007), Dou and Sarkis (2010)

Table B.1. Overview of used constructs and their sources

Eliminated and Amalgamated Factors C

The following two tables portrays all the factors which have been eliminated and amalgamated in Section 7.2. A total amount of 80 factors (specifically macro-level factors) were removed in in the analysis part of the report. All the 80 removed factors, as well as the clusters-titles (constructs) from where they have been removed, are illustrated in Table C.1. After the eliminated process, 63 factors were amalgamated, resulting in just 30 factors based on the combination. Table C.2 mirrors the factors which have been amalgamated with one another.

Eliminated factors	Constructs in which factors were clustered
Compatibility of other industry, sustainability of building zones, sustainability of business, facility and legal services, sustainability of environmental regulations, sustainability of repair and maintenance services, and sustainability of zoning restrictions	Business climate
Community race relations, religious facilities, social make-up of inhabitants, sustainability of environmental amenity, sustainability of houses, and sustainability of shopping Depletion of non-renewable ressource, energy use, green consumption, materials use, regeneration of renewable ressource, waste disposal, waste generation, waste recycling, and waste treatment	Consumption and production patterns
Equity labour sources, relative market share, relative sales growth, and relative sales revenues	CSR
Balance of payment status, and per capita income	Economic
Agricultural subsidies, burned land area of agriculture, conservation issues, critical habitat protection, effective conservation, greenhouse gas emission/capita, greenhouse gas emissions/electricity generated, growing stock of forestry, industrial carbon intensity, inensive cropland, marine protected areas, marine trophic, pesticite regulation, regional ozone, sulfur dioxide emmissions, trawling intensity of fishery irrigation stress, and water stress	Ecosystem vitality
Adequate sanitation, drinking water, environmental burden of disease, indoor air pollution, local ozone, and urban particulates.	Environmental health
Building ordinances, foreign ownership laws, investment controls, repatriation allowances, taxation of foreign owned companies, and zoning codes	Governmental regulation
Accessibility of land, availabiliy of lending institutions, community industrial development projects, cost of industrial land, developed industrial park, insurance rates, plant building for sale or lease, plant site adequacy and costs, plant site topographic features, room for expansion, site development and construction coss, space for future expansion, and sustainability of site parking facilities	Industrial site
Pipeline facilities, and waterrway transportation	Transportation
Adequacy of sewage facilities, attitude of utility agents, and disposable facilities of industrial waste	Utility

Table C.1. Overview of the eliminated factors

Amalgamated Factors	Maintained Factor Names
On-time delivery + delivery reliability + consistent delivery	On-time-delivery
Order-to-delivery lead time + lead time	Order-to-delivery lead time
Delays + net late deliveries	Net late deliveries
Suppliers effort to engage in JIT + effort in promoting JIT principles	Suppliers effort to engage in JIT
Product development time + suppliers speed in development (from technology)	Product development time
Design capability + suppliers design capability	Design capability
Order entry and invoicing system, including EDI + electronic data interchange	Order entry and invoicing system, including EDI
Commitment to continuous improvement in product and process + suppliers willingness to eliminate waste + process improvement Environmental production and technologies + environmental technologies	Commitment to continuous improvement in product and process Environmental production and technologies
Green image + environmental image	Green image
Willingness to share confidential information + communication openness	Willingness to share confidential information
Willingness to resolve conflicts + conflict resolution + conflict resolution system	Willingness to resolve conflicts
Management attitude/outlook for the future + management outlook for the future + attitude	Management attitude/outlook for the future
Supplier's safety record + safety adherence	Supplier's safety record
Overall supplier commitment + desire for business	Overall supplier commitment
References + supplier's customer base	References
Proximity to existing or future consumer market + anticipation of growth of markets	Proximity to existing or future consumer market
Extent of labour unionisation + unionisation	Extent of labour unionisation
New launch of products and development capabilities + product development capabilities	New launch of products and development capabilities
Government incentives (investment incentives and subsidies) + government aids	Government incentives (investment incentives and subsidies)
Product line diversity + supply variety	Product line diversity
Response time for major changes + prompt response	Response time for major changes
Economic performance + performance history	Economic performance
Profitability + suppliers ability to make a decent profit	Profitability
Financial stability and staying power + financial strength	Financial stability and staying power
Financial position + financial conditions	Financial position
Supplier ethical treatment + ethical standards (from culture)	Supplier ethical treatment
Cost reduction capabilities and efforts + cost reduction activities	Cost reduction capabilities and efforts
Order level cost (frequency of ordering, etc.) + indirect cost	Order level cost (frequency of ordering, etc.)
Production capacity + Production facilities and capacity (from technology)	Production capacity

Table C.2. Overview of the amalgamated factors

List of Factors Used in The Empirical Study D

The two tables below contain the final list of constructs and factors which have been used in the quantitative empirical research.

Clusters	Factors	No
Accessibility	Accessibility to sub-suppliers, accessibility of customers, accessibility of transportation service, proximity of production material sources, proximity to large cities, overall geographical distance from buyer, availability of raw materials, IT infrastructure quality and cost, proximity to supplies, nearness to component parts, and availability of storage facilities for raw materials and components	11
Business climate	Availability of public technical training, state of local planning assistance, bribery and corruption, and cultural distance	4
Capacity	Production capacity, capacity utilisation, reserve capacity or the ability to respond to unexpected demand, cost of service contract, willingness to invest in further capacity, amount of excess capacity, and future capacity levels	7
Climate	Amount of snow and/or rain fall, living conditions, relative humidity, monthly average temperature, air pollution, natural disaster potential, and close proximity natural issues	7
Community	Physical attractiveness, community attitude towards industry, fire protection and insurance, police protection, adequacy of local school, sustainability of medical facilities, quality of schools, medical facilities, hotels and motels, banks, credit institutions, etc., openness, education system (uni, research institutions, etc.), and crime	12
Cost	Initial price, compliance with cost analysis system, compliance with sectoral price behaviour, volume discounts, bundle discounts, logistics costs, cost of packaging, supplier level cost (contractual, negotiation, etc.), order level cost (frequency of ordering, etc.), cost reduction capabilities and efforts, inventory cost (e.g., when pursuing VMI), sub-component pricing, cost reduction performance, price relative to market price, fluctuations of costs, product life cycle cost, and opportunistic pricing behaviour	17
CSR	Socially responsible supplier selection (SRSS), resource investment in social programs, supplier diversity focus, supplier environmental focus, supplier ethical treatment, supplier human rights focus, supplier community focus, supplier safety focus, disciplinary and security practices, employee contracts, discrimination, flexible working arrangements, job opportunities for employees, and employment compensation	14
Economic	Standard of living, strength of currency against the US dollar, attitude of financing agents, trade deficit, trade tariffs, state sales tax, and inflation	7
Finances	Financial position, financial stability and staying power, billing accuracy, profitability, financial records disclosure, performance awards, economic performance, and price Strategy	8
Flexibility and agility	Product volume changes, short set-up time, response time for major changes, flexible contract terms and conditions, flexibility in general (customisability), product line diversity, response flexibility, and availability of parts	8
Government regulation	Hometown of company official, goverment incentive (investment incentives, subsidies, etc.), tax structure (tax free ops., property tax, etc.), government restrictions, trade policy (e.g., trade barriers), compensation laws, insurance laws, safety inspections, nuisance and stream pollution laws, clarity of corporate investment laws, regulations concerning joint ventures and M&A, regulations on transfer of earning out of country, quotas on amount of foreign employees, prevalance bureaucratic red tape, regulations concerning price control, requirements for setting up local corporations, bureaucratic instability, and quality of government	18
Innovativeness	New launch of products, new use of technology, number of patents, R&D expenditures, performance relative to industry dynamics, research in general, collaboration with universities and institutions, and corporate foresight activities	8
Labour	Labour costs, availability of semi and unskilled labour, availability of skilled labour, extent of labour unionisation, right-to-work-law, training support, attitude of workers, availability of male labour, availability of female labour, worker stability, managerial labour, and adequate level of desired language skills	12

Table D.1. Overview of clusters (After validation, restructuring and filtering) - Part 1/2

Clusters	Factors	No
Markets	Proximity of natural markets, proximity of national markets, proximity to existing or future consumer market, existing producer market, potential consumer market, income trends, population trends, consumer characteristics, location of competitors, future expansion opportunities (within or nearby), size of market, and nearness to related industry	12
Organisational characteristics	Suppliers organisational structure and personnel. feeling of trust, reputation and position in the industry, impression, industry knowledge, references, level of strategic importance to the buyer, scope of resources, insurance and litigation history, company size, percentage of work which is subcontracted, reliability and consistency, professionalism, amount of past business, management capabilities, domain experience, exporting status, facility planning, overall supplier commitment, skill level of staff, supplier's safety record, warranties and claim policies, training aids, and labour relations	24
Organisational Culture	Management attitude/outlook for the future, strategic fit, top management compatibility, compatibility among levels and functions, honest and frequent communications, open to site evaluation, procedural compliance (e.g., bidding compliance), integrity, organisational, culture in general, willingness to resolve conflicts, values, and regulatory compliance	12
Political situation of foreign country	History of the country, relation to the "developed world", stability of regime, attitude towards foreign capital, treaties and pacts, protection against expropriation (legal protection), and type of military alliances	7
Quality	Certification and standards, self-audits, conformance quality, quality philosophy and policies (e.g., ISO 9000), overall quality standards (e.g., relative to buyers tolerance level), service quality credence, service quality experience, information quality, inspection and control processes, documentation and self auditing, quality staff, quality certifications, quality data available, shipment quality, and quality assurance and control procedures	15
Relationship and partnership potential	Long-term relationship, relationship closeness, reputation for integrity and reputation in general, past and current relationship with the supplier, willingness to integrate, willingness to share confidential information, reciprocal arrangements, intimacy of relationships, and design involvement	9
Service	Service capability, after-sales support, sales rep's competence, repair service, global customer service for day-to-day work, complaint handling procedures, R&D support (e.g., prototype development, and competent technical support and technical expertise	8
Sustainability	Pollutant effects, green image, design for environment, environmental competencies, moral issues, environmental production and technologies, establishment of environmental commitment and policy, identification of environmental aspects, planning of environmental objectives, assignment of environmental responsibility, checking and evaluation of environmental activities, internal consumption of energy, internal consumption of raw material, and internal consumption of water	14
Technology	Intellectual property rights, technology compatibility (e.g., IS fit), assessment of future manufacturing capabilities, technical and production capability, current manufacturing facilities/capabilities, communication system, commitment to continuous improvement in product and process, order entry and invoicing system, including EDI, level of automation, inventory position, data administration, IT standards, design capability, communication barriers, E-transaction capabilities, testing capability, and value-added productivity	17
Time/delivery	Delivery speed, product development time, partnership formation time, suppliers effort to engage in JIT, changeover time for certain activities, compliance with due date, delivery mistakes, degree of closeness/supplier proximity, delivery conditions, delivery efficiency, net late deliveries, order-to-delivery lead time, waiting time, and on-time delivery	14
Transportation	Infrastructure (state and local), airway facilities, highway facilities, warehousing and storage facilities, trucking Services, railroad facilities, availability of postal services, and availability of wholesale outlets	8
Utility	Sustainability of electrical service, sustainability of telephone service, availability of natural gas, adequacy of cost of water supply, sustainability of waste disposal service, water supply, cost and quality, availability of fuels, cost of fuels, availability of electric power, cost of electric power, availability of gas, and availability of coal and nuclear facilities	12

Table D.2. Overview of clusters (After validation, restructuring and filtering) - Part 2/2

Visualisation of Survey Instrument E

The following pages serves to present the survey instrument, which was used for the quantitative empirical research in Part II. As mentioned in the methodology chapter (See Chapter 2, the respondents were asked to answer further questions besides the ones related to the individual constructs. The orange text boxes throughout the survey specifies what type of information the respondents had to add in the survey.

SURVEY ON SUPPLIER SELECTION FACTORS

Dear respondent,

Thank you very much for taking part in this survey, which purpose is to assess the importance of various supplier-specific and location-specific factors for outsourcing engagements. All the results will be included in a management summary that will be submitted to you when the research is finalized.

It is strongly believed that the final results of this research will be beneficial for the procurement profession, which is why your participation is highly valued. The Technical University of Berlin, the University of Twente, and A. T. Kearney are the institutions supporting the research.

The survey is anonymous, and it will take approximately **10 minutes** to complete.

There are 40 questions in this survey.

Load unfinished survey

Next

UNIVERSITEIT TWENTE.

SURVEY ON SUPPLIER SELECTION FACTORS

0%
100%

Please read the introductory text in the orange textboxes on every page before answering the questions.

COMPANY BACKGROUND INFORMATION

Please add the background information of your company.

Company name (The name is kept confidential)

Country of headquarters?
Choose one of the following answers

Please choose...

Position of the respondent?
Choose one of the following answers

Please choose...

E-Mail address of the respondent?

? *Please add your e-mail address in order to receive a management summary when the research is completed, and to participate in the lottery to win an Amazon Kindle for E-Book reading.*

Industry?
Choose one of the following answers

Please choose...

Total number of employees?

Only numbers may be entered in this field.

Annual turnover in dollars?

Only numbers may be entered in this field.

Annual purchasing volume in dollars?

Only numbers may be entered in this field.

Amount of global sourcing (In %)?

Only numbers may be entered in this field.

? *Please add the approximate percentage.*

Resume later

Next

UNIVERSITEIT TWENTE.

SURVEY ON SUPPLIER SELECTION FACTORS

0%
100%

Please read the introductory text in the orange textboxes on every page before answering the questions.

RANKING OF FACTORS FOR SUPPLER SELECTION

How important are the following factors when selecting a key supplier for your organization? Please relate the importance of the factors to a recent major outsourcing engagement that you were a part of. The scores range from 1 to 5, where each score has the following meaning:

1: Very unimportant
2: Unimportant
3: Undecided
4: Important
5. Very important

The first 14 factors are supplier-specific, while the rest are location-specific.

The ranking of the factors is conducted on an aggregated level. Hence, if you have any comments to some of the sub-factors (e.g., that some are significantly more important than others to your firm), then please add this in the textbox at the end of this page.

Factor 1: Capacity
This includes: production capacity, capacity utilization, excess/reserve capacity, willingness to invest in further capacity, and future capacity levels.

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 2: Cost
This includes: initial price, compliance with cost analysis system, cost reduction activities, compliance with sectoral price behavior, discounts (volume and bundle), logistics cost, cost of packaging, supplier-level costs (contracting, negotiations, etc.), order level costs (frequency of ordering, etc.), inventory cost (VMI), sub-component pricing, cost reduction performance, price relative to market price, product life cycle cost (e.g., when additional costs are added when the buying firms pays for scrap), and fluctuations of cost.

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 3: CSR
This includes: socially responsible supplier selection, resource investment in social programs, supplier diversity focus, supplier environmental focus, supplier ethical treatment, supplier human rights focus, supplier community focus, disciplinary and security practices, employee contracts, discrimination, job opportunities for employees, flexible working arrangements (i-deals), and employment compensation.

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 4: Finances
This includes: financial position, financial stability and staying power, billing accuracy, profitability, financial records disclosure, performance awards, economic performance, and price strategy.

1 2 3 4 5

Factor 5: Flexibility and agility
This includes: Speed in product volume changes, short set-up time, response time for major changes, flexible contract terms and conditions, flexibility in general (customizability), product line diversity, response flexibility, and availability of parts (i.e., a suppliers service level)

1 2 3 4 5

Factor 6: Innovativeness
This includes: new product launches, new use of technology, number of patents, R&D expenditures, performance relative to industry dynamics, research in general, and collaboration with universities and institutions.

1 2 3 4 5

Factor 7: Organizational characteristics
This includes: suppliers organizational structure, feeling of trust, reputation and position in the industry, impression, industry knowledge, references, level of strategic importance, scope of resources, percentage of subcontracted work, litigation history, company size, reliability, consistency, professionalism, amount of past business, management capabilities, domain experience, exporting status, facility planning, overall supplier commitment, skill level of staff, labour relations, internal training aids, and supplier safety records.

1 2 3 4 5

Factor 8: Organizational culture
This includes: management attitude/outlook for the future, strategic fit and management compatibility, honest and frequent communication, open to site evaluation, procedural compliance, integrity, willingness to resolve conflicts, values and beliefs, and organizational culture in general.

1 2 3 4 5

Factor 9: Quality
This includes: conformance quality, quality philosophy, certifications and policies (e.g., ISO 9000), overall quality standards, service quality credence, service quality experience, information quality, inspection and control processes, documentation and self auditing, quality staff, quality certifications, quality data available, shipment quality, and quality assurance and control procedures.

1 2 3 4 5

Factor 10: Relationship and partnership potential
This includes: long-term relationship, relationship closeness, reputation for integrity, past and current relationship with supplier, willingness to integrate, willingness to share confidential information, reciprocal arrangements, intimacy of relationships, and design involvement.

1 2 3 4 5

Factor 11: Service

This includes: service capability, after-sales support, sales rep's competence, repair service, global customer service for day-to-day work, complaint handling procedures, R&D support (e.g., prototype development), and competent technical support and technical expertise.

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 12: Sustainability
This includes: suppliers green image, design for involvement, environmental competencies, moral issues, environmental production and technologies, establishment of environmental commitment and policy, identification of environmental aspects, planning of environmental objectives, assignment of environmental responsibility, pollutant effects, internal consumption of energy, internal consumption of raw material, internal consumption of water, and checking and evaluation of environmental activities.

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 13: Technology
This includes: technology compatibility (e.g., ERP system), future manufacturing capabilities, suppliers design capability, technical and production capability, manufacturing facilities, communication systems, commitment to continuous improvement, order entry and invoicing system (including EDI), level of automation/mechanization, inventory position, data administration, IT standards, design capabilities, communication barriers, e-transaction capabilities, value-added productivity, and intellectual property rights.

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 14: Time and delivery
This includes: delivery speed, product development time, partnership formation time, suppliers effort to engage in JIT, changeover time for certain activities, compliance with due date, delivery mistakes, supplier proximity, delivery conditions, delivery efficiency, net late deliveries, order-to-delivery lead time, waiting time, on-time delivery.

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 15: Accessibility
This includes: accessibility to the supplier (i.e., proximity from the supplier to the buyer), sub-suppliers (i.e., proximity from the supplier to its sub-suppliers), customers (i.e., proximity to the end-customers in case the supplier has to provide the good/service directly), proximity to distribution services, proximity to the desired material resources, availability of storage facilities for the raw materials, and proximity to large cities,

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 16: Business climate
This includes: degree of bribery and corruption, local planning assistance, availability of public technical training, and the cultural distance between the supplier country and the country of the buying firm.

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Factor 17: Climate
This includes: risk of earth quakes, tornados/storms, tsunamis, and other natural disasters, and proximity to possible environmental issues (e.g., local environmental issues that could lead to potential supply chain disruptions)

1 2 3 4 5

Factor 18: Community
This includes: physical attractiveness, community attitude towards the focal industry, hotels, police and fire protection, credit institutions, general openness of the people, quality of schools, and the level of educational institutions and think tanks.

1 2 3 4 5

Factor 19: Economic
This includes: strength of currency relative to the currency of the buyer, trade tariffs, standard of living, state sales tax, trade tariffs, and attitude of financing agents.

1 2 3 4 5

Factor 20: Government regulations
This includes: government incentives (e.g., subsidies), political instability, quality of the government, tax structure, insurance laws, government restrictions, trade barriers, compensation laws, corporate investment laws, regulations concerning joint ventures and M&A, safety inspections, employment quotas, nuisance and stream pollution laws, red rape, and investment and price control.

1 2 3 4 5

Factor 21: Labour
This includes: labour cost, availability of semi- and unskilled labour, availability of skilled labour, availability of managerial labour, broad gender availability, extent of labour unionization, training support, attitude of workers, stability of workers, and level of desired language skills.

1 2 3 4 5

Factor 22: Markets
This includes: Proximity to existing or future consumer market(s), future expansion opportunities, existing producer markets, nearness of related industries, proximity to national and natural markets, income trends, population trends, consumer characteristics in the area, as well as the localization of competitors.

1 2 3 4 5

Factor 23: Political situation of foreign country
This includes: suppliers country's relations to the western world, the stability of the regime, attitude towards foreign capital, protection against expropriation, type of military alliances, and treaties and pacts.

1 2 3 4 5

Factor 24: Transportation
This includes: Infrastructure in the country/area, airway facilities, highway facilities, railroad facilities, warehousing and storage facilities, trucking services, availability of postal services, and availability of wholesale outlets.

1 2 3 4 5

Factor 25: Utility
This includes: availability and cost of fuel, electrical power, water, gas, coal & nuclear facilities, sustainability of communication systems such as telephony and internet, and sustainability of electrical services as well as the water supply.

1 2 3 4 5

Comments to the sub-factors presented above (voluntary).

Resume later

Next

SURVEY ON SUPPLIER SELECTION FACTORS

0% 100%

Please read the introductory text in the orange textboxes on every page before answering the questions.

DETAILS ABOUT THE RECENT OUTSOURCING ENGAGEMENT

Please answer the questions below in order to add further information about the recent major outsourcing engagement, which you were a part of.

What was your firms motivation to engage in the recent outsourcing engagement?
Check any that apply

- [ ] To achieve cost savings?
- [ ] To obtain innovative products or a technology that would be otherwise unavailable?
- [ ] To exploit sales opportunities in the sourcing region?
- [ ] Other:

Where was the supplier located?
Choose one of the following answers

Please choose...

? *If multiple suppliers were used for the outsourcing engagement, then please add the location of the supplier which is considered most important*

What amount of turnover was assigned to the supplier(s) related to the outsourcing engagement?

Only numbers may be entered in this field.

How satisfied are you with the supplier(s), which have been selected in your recent outsourcing engagement?

The scores range from 1 to 5, where each score has the following meaning:

1: Very dissatisfied
2: Dissatisfied
3: Undecided
4: Satisfied
5. Very satisfied

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Overall, how satisfied are you with your firms ability to select good suppliers?

The scores range from 1 to 5, where each score has the following meaning:

1: Very dissatisfied
2: Dissatisfied
3: Undecided
4: Satisfied
5. Very satisfied

1 2 3 4 5

Resume later Submit

UNIVERSITEIT TWENTE.

Correlation and Multiple Linear Regression Results F

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783[a]	.613	.475	.747

a. Predictors: (Constant), Factor 21: Labour, Factor 2: Cost, Factor 15: Accessibility, Factor 9: Quality, Factor 19: Economic, Factor 1: Capacity, Factor 5: Flexibility and agility, Factor 16: Business climate, Factor 20: Government regulations, Factor 14: Time and delivery

Figure F.1. Visualisation of the model summary from SPSS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.947	1.541		.614	.544		
	Factor 1: Capacity	.207	.220	.131	.941	.355	.717	1.394
	Factor 2: Cost	-.643	.190	-.523	-3.386	.002	.579	1.727
	Factor 5: Flexibility and agility	-.180	.184	-.144	-.980	.336	.637	1.571
	Factor 9: Quality	.550	.267	.312	2.062	.049	.604	1.655
	Factor 14: Time and delivery	.661	.242	.583	2.731	.011	.303	3.301
	Factor 15: Accessibility	-.138	.171	-.115	-.808	.426	.681	1.469
	Factor 16: Business climate	-.246	.147	-.259	-1.670	.106	.573	1.746
	Factor 19: Economic	-.050	.177	-.053	-.283	.779	.392	2.554
	Factor 20: Government regulations	.442	.171	.523	2.584	.015	.337	2.969
	Factor 21: Labour	.069	.170	.080	.404	.689	.356	2.808

a. Dependent Variable: Satisfaction with the latest supplier (performance)

Figure F.2. Visualisation of the coefficients table including collinearity statistics

Correlations

		Factor 1: Capacity	Factor 2: Cost	Factor 3: CSR	Factor 4: Finances	Factor 5: Flexibility and agility	Factor 6: Innovativeness	Factor 7: Organizational characteristics	Factor 8: Organizational culture	Factor 9: Quality	Factor 10: Relationship and partnership potential	Factor 11: Service	Factor 12: Sustainability	Factor 13: Technology	Factor 14: Time and delivery	Factor 15: Accessibility	Factor 16: Business climate	Factor 17: Climate	Factor 18: Community	Factor 19: Economic	Factor 20: Government regulations	Factor 21: Labour	Factor 22: Markets	Factor 23: Political situation of foreign country	Factor 24: Transportation	Factor 25: Utility	Satisfaction with the latest supplier (performance)
Factor 1: Capacity	Pearson Correlation	1	.327*	.281	.129	.354*	-.008	.412**	.176	.174	.004	-.008	.294	.347*	.345*	-.082	.187	.274	.102	.066	.116	.196	.053	.220	.073	.207	.197
	Sig. (2-tailed)		.034	.071	.416	.023	.959	.007	.265	.271	.979	.961	.059	.024	.025	.604	.237	.079	.520	.677	.466	.213	.739	.162	.648	.189	.224
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 2: Cost	Pearson Correlation	.327*	1	.180	.171	.012	-.379*	.291	.158	.173	-.045	.295	.065	.129	.376*	-.114	.080	.155	.323*	.168	.259	.096	.128	.256	.085	.136	-.068
	Sig. (2-tailed)	.034		.255	.280	.943	.013	.062	.319	.274	.779	.058	.684	.414	.014	.471	.616	.328	.037	.288	.097	.546	.419	.101	.590	.390	.677
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 3: CSR	Pearson Correlation	.281	.180	1	.223	.378*	.169	.586**	.455**	.050	.225	.297	.609**	.458**	.491**	.166	.390*	.385*	.384*	.421**	.343*	.302	.289	.361*	.270	.324*	.284
	Sig. (2-tailed)	.071	.255		.155	.015	.284	.000	.002	.754	.153	.056	.000	.002	.001	.294	.011	.012	.012	.005	.026	.052	.063	.019	.084	.036	.076
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 4: Finances	Pearson Correlation	.129	.171	.223	1	.067	-.024	.215	.321*	-.091	.312*	.074	.276	-.012	.094	.072	.066	.291	.129	.403**	.079	-.206	-.021	.144	.194	.352*	-.181
	Sig. (2-tailed)	.416	.280	.155		.677	.882	.172	.038	.568	.044	.641	.076	.939	.553	.651	.680	.062	.415	.008	.617	.190	.895	.365	.219	.022	.264
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 5: Flexibility and agility	Pearson Correlation	.354*	.012	.378*	.067	1	.317*	.431**	.453**	-.173	.315*	.254	.210	.464**	.412**	.073	.233	.250	.083	.136	.117	.466**	.076	.176	.334*	.419**	.093
	Sig. (2-tailed)	.023	.943	.015	.677		.043	.005	.003	.280	.045	.109	.188	.002	.007	.652	.142	.115	.606	.398	.466	.002	.637	.271	.033	.006	.575
	N	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39
Factor 6: Innovativeness	Pearson Correlation	-.008	-.379*	.169	-.024	.317*	1	-.035	.007	-.053	.306*	.004	.103	.226	-.023	.106	.288	-.047	-.201	.024	.070	.315*	.235	.037	.156	.136	.142
	Sig. (2-tailed)	.959	.013	.284	.882	.043		.826	.965	.740	.049	.981	.515	.150	.883	.503	.065	.769	.201	.882	.658	.042	.134	.814	.324	.390	.384
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 7: Organizational characteristics	Pearson Correlation	.412**	.291	.586**	.215	.431**	-.035	1	.518**	.142	.307*	.465**	.376*	.368*	.499**	.244	.383*	.391*	.277	.371*	.317*	.251	.269	.333*	.323*	.472**	.215
	Sig. (2-tailed)	.007	.062	.000	.172	.005	.826		.000	.368	.048	.002	.014	.017	.001	.119	.012	.010	.076	.016	.041	.108	.085	.031	.037	.002	.184
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 8: Organizational culture	Pearson Correlation	.176	.158	.455**	.321*	.453**	.007	.518**	1	.299	.601**	.448**	.381*	.426**	.324*	.394**	.438**	.521**	.472**	.436**	.188	.063	.280	.440**	.510**	.322*	-.007
	Sig. (2-tailed)	.265	.319	.002	.038	.003	.965	.000		.054	.000	.003	.013	.005	.037	.010	.004	.000	.002	.004	.233	.690	.072	.004	.001	.038	.968
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 9: Quality	Pearson Correlation	.174	.173	.050	-.091	-.173	-.053	.142	.299	1	.163	.275	.033	-.053	-.017	.113	.443**	.244	.281	.111	.166	-.173	.273	.173	-.034	-.013	.178
	Sig. (2-tailed)	.271	.274	.754	.568	.280	.740	.368	.054		.303	.078	.837	.739	.916	.476	.003	.119	.071	.484	.295	.275	.080	.274	.829	.935	.273
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 10: Relationship and partnership potential	Pearson Correlation	.004	-.045	.225	.312*	.315*	.306*	.307*	.601**	.163	1	.444**	.222	.292	.179	.432**	.285	.273	.140	.448**	.272	.116	.328*	.345*	.622**	.451**	.224
	Sig. (2-tailed)	.979	.779	.153	.044	.045	.049	.048	.000	.303		.003	.158	.060	.257	.004	.067	.080	.376	.003	.082	.465	.034	.025	.000	.003	.165
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 11: Service	Pearson Correlation	-.008	.295	.297	.074	.254	.004	.465**	.448**	.275	.444**	1	.071	.268	.306*	.413**	.270	.250	.309*	.219	.134	-.001	.307*	.148	.285	.214	.027
	Sig. (2-tailed)	.961	.058	.056	.641	.109	.981	.002	.003	.078	.003		.656	.087	.049	.007	.083	.110	.046	.164	.399	.997	.048	.348	.068	.174	.868
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 12: Sustainability	Pearson Correlation	.294	.065	.609**	.276	.210	.103	.376*	.381*	.033	.222	.071	1	.407**	.324*	.278	.239	.529**	.551**	.442**	.441**	.292	.301	.340*	.263	.276	.375*
	Sig. (2-tailed)	.059	.684	.000	.076	.188	.515	.014	.013	.837	.158	.656		.008	.036	.074	.127	.000	.000	.003	.003	.061	.052	.027	.093	.077	.017
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 13: Technology	Pearson Correlation	.347*	.129	.458**	-.012	.464**	.226	.368*	.426**	-.053	.292	.268	.407**	1	.593**	.204	.228	.354*	.441**	.349*	.357*	.543**	.398**	.598**	.458**	.371*	.493**
	Sig. (2-tailed)	.024	.414	.002	.939	.002	.150	.017	.005	.739	.060	.087	.008		.000	.196	.147	.021	.003	.024	.020	.000	.009	.000	.002	.016	.001
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 14: Time and delivery	Pearson Correlation	.345*	.376*	.491**	.094	.412**	-.023	.499**	.324*	-.017	.179	.306*	.324*	.593**	1	.306*	.344*	.402**	.370*	.505**	.382*	.592**	.400**	.390*	.250	.524**	.484**
	Sig. (2-tailed)	.025	.014	.001	.553	.007	.883	.001	.037	.916	.257	.049	.036	.000		.049	.026	.008	.016	.001	.013	.000	.009	.011	.111	.000	.002
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 15: Accessibility	Pearson Correlation	-.082	-.114	.166	.072	.073	.106	.244	.394**	.113	.432**	.413**	.278	.204	.306*	1	.204	.216	.328*	.159	.200	.116	.451**	.193	.298	.115	.201
	Sig. (2-tailed)	.604	.471	.294	.651	.652	.503	.119	.010	.476	.004	.007	.074	.196	.049		.194	.169	.034	.315	.205	.465	.003	.220	.055	.469	.213
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 16: Business climate	Pearson Correlation	.187	.080	.390*	.066	.233	.288	.383*	.438**	.443**	.285	.270	.239	.228	.344*	.204	1	.441**	.349*	.299	.370*	.313*	.485**	.256	.056	.197	.208
	Sig. (2-tailed)	.237	.616	.011	.680	.142	.065	.012	.004	.003	.067	.083	.127	.147	.026	.194		.003	.023	.054	.016	.043	.001	.102	.723	.211	.197
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 17: Climate	Pearson Correlation	.274	.155	.385*	.291	.250	-.047	.391*	.521**	.244	.273	.250	.529**	.354*	.402**	.216	.441**	1	.712**	.621**	.427**	.289	.446**	.587**	.326*	.376*	.269
	Sig. (2-tailed)	.079	.328	.012	.062	.115	.769	.010	.000	.119	.080	.110	.000	.021	.008	.169	.003		.000	.000	.005	.063	.003	.000	.035	.014	.093
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 18: Community	Pearson Correlation	.102	.323*	.384*	.129	.083	-.201	.277	.472**	.281	.140	.309*	.551**	.441**	.370*	.328*	.349*	.712**	1	.535**	.656**	.312*	.509**	.655**	.415**	.320*	.340*
	Sig. (2-tailed)	.520	.037	.012	.415	.606	.201	.076	.002	.071	.376	.046	.000	.003	.016	.034	.023	.000		.000	.000	.044	.001	.000	.006	.039	.032
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 19: Economic	Pearson Correlation	.066	.168	.421**	.403**	.136	.024	.371*	.436**	.111	.448**	.219	.442**	.349*	.505**	.159	.299	.621**	.535**	1	.640**	.260	.451**	.614**	.462**	.662**	.450**
	Sig. (2-tailed)	.677	.288	.005	.008	.398	.882	.016	.004	.484	.003	.164	.003	.024	.001	.315	.054	.000	.000		.000	.096	.003	.000	.002	.000	.004
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 20: Government regulations	Pearson Correlation	.116	.259	.343*	.079	.117	.070	.317*	.188	.166	.272	.134	.441**	.357*	.382*	.200	.370*	.427**	.656**	.640**	1	.477**	.665**	.651**	.430**	.455**	.547**
	Sig. (2-tailed)	.466	.097	.026	.617	.466	.658	.041	.233	.295	.082	.399	.003	.020	.013	.205	.016	.005	.000	.000		.001	.000	.000	.005	.002	.000
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 21: Labour	Pearson Correlation	.196	.096	.302	-.206	.466**	.315*	.251	.063	-.173	.116	-.001	.292	.543**	.592**	.116	.313*	.289	.312*	.260	.477**	1	.463**	.352*	.166	.353*	.454**
	Sig. (2-tailed)	.213	.546	.052	.190	.002	.042	.108	.690	.275	.465	.997	.061	.000	.000	.465	.043	.063	.044	.096	.001		.002	.022	.293	.022	.003
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 22: Markets	Pearson Correlation	.053	.128	.289	-.021	.076	.235	.269	.280	.273	.328*	.307*	.301	.398**	.400**	.451**	.485**	.446**	.509**	.451**	.665**	.463**	1	.511**	.253	.243	.417**
	Sig. (2-tailed)	.739	.419	.063	.895	.637	.134	.085	.072	.080	.034	.048	.052	.009	.009	.003	.001	.003	.001	.003	.000	.002		.001	.105	.120	.007
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 23: Political situation of foreign country	Pearson Correlation	.220	.256	.361*	.144	.176	.037	.333*	.440**	.173	.345*	.148	.340*	.598**	.390*	.193	.256	.587**	.655**	.614**	.651**	.352*	.511**	1	.524**	.468**	.471**
	Sig. (2-tailed)	.162	.101	.019	.365	.271	.814	.031	.004	.274	.025	.348	.027	.000	.011	.220	.102	.000	.000	.000	.000	.022	.001		.000	.002	.002
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 24: Transportation	Pearson Correlation	.073	.085	.270	.194	.334*	.156	.323*	.510**	-.034	.622**	.285	.263	.458**	.250	.298	.056	.326*	.415**	.462**	.430**	.166	.253	.524**	1	.545**	.209
	Sig. (2-tailed)	.648	.590	.084	.219	.033	.324	.037	.001	.829	.000	.068	.093	.002	.111	.055	.723	.035	.006	.002	.005	.293	.105	.000		.000	.195
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Factor 25: Utility	Pearson Correlation	.207	.136	.324*	.352*	.419**	.136	.472**	.322*	-.013	.451**	.214	.276	.371*	.524**	.115	.197	.376*	.320*	.662**	.455**	.353*	.243	.468**	.545**	1	.500**
	Sig. (2-tailed)	.189	.390	.036	.022	.006	.390	.002	.038	.935	.003	.174	.077	.016	.000	.469	.211	.014	.039	.000	.002	.022	.120	.002	.000		.001
	N	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40
Satisfaction with the latest supplier (performance)	Pearson Correlation	.197	-.068	.284	-.181	.093	.142	.215	-.007	.178	.224	.027	.375*	.493**	.484**	.201	.208	.269	.340*	.450**	.547**	.454**	.417**	.471**	.209	.500**	1
	Sig. (2-tailed)	.224	.677	.076	.264	.575	.384	.184	.968	.273	.165	.868	.017	.001	.002	.213	.197	.093	.032	.004	.000	.003	.007	.002	.195	.001	
	N	40	40	40	40	39	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Traditional Supplier Selection Approaches G

As Weber and Current argue, *"Vendor selection problems are application-specific. That is, the appropriate constraints and the relative importance of the objectives vary with the problem setting"* (Weber and Current, 1993, p. 175). The uniqueness of each individual sourcing decision does also insinuate that different decision models - or decision approaches - can be used to select the best suppliers. According to Ho et al. (2010), various models have been developed within the academic domain throughout the last decades, which enables the supplier selection decision-makers to manage the complexity of all used factors and to subsequently conduct the final selection decision. Some of the most common decision approaches according to Min (1994) and Ho et al. (2010) are AHP, ANP, case-based reasoning, fuzzy set theory, data envelopment analysis, mathematical programming, genetic algorithm, simple multi-attribute rating techniques, and combinations of those approaches.

As mentioned in the section on CSS (See Section 4.1), Dou and Sarkis (2010) did already use the ANP approach to manage the complexity of their numerous factors, thereby being able to conduct effective decisions. In contradiction to the AHP approach, which structures a certain selection problem into a hierarchy containing an objective, decision variables, as well as further alternatives, the ANP structures the problem as a network. Both approaches use pairwise comparisons which are used to measure the weights of the variables included in the decision problem, and eventually to rank the alternatives in the overall decision, thereby enabling the possibility to conduct effective decisions. This can, for instance, be a final ranking of all included suppliers in a supplier selection decision, or a ranking of locations in case a firm has to establish a new FDI. The AHP and ANP approaches do, according to Dou and Sarkis (2010) fall in-between the two extremes of decision making approaches used in supplier selection, those being simple matrix and scorecard approaches and more comprehensive mathematical programming approaches. The fact that the approach takes elements from both the extremes into consideration is the reason why Dou and Sarkis (2010) used the approach in their research, as they needed to be able to incorporate soft location-specific factors together with soft and hard supplier-specific factors. In fact, they argue that integration of tangible, intangible, operational, and strategic factors are of importance if CSS is to be conducted effectively, and the ANP is one approach which makes this possible.
Overall, based on the focal research, and the literature review conducted in Part I, it can

be argued that the AHP and ANP approaches are some of the most widely used approaches when soft factors are added to the supplier selection decision problem. Examples of studies which use AHP or ANP to conduct supplier selection decisions include, but is not limited to, Min (1994), Nydick and Hill (1992), Ghodsypour and O'Brien (1998), Sarkis and Talluri (2002), Kahraman et al. (2003), Wang et al. (2004), Chan and Kumar (2007), Chan et al. (2008), Boardman Liu et al. (2008), Dou and Sarkis (2010), Büyüközkan and Çifçi (2011), and Deng et al. (2014).

Despite the fact that AHP and ANP are some of the most widely used decision approaches for supplier selection problems that involves soft factors (e.g., location factors), A. T. Kearney still classifies those approaches as traditional techniques and too simplistic to effectively and competitively select the right suppliers. For instance, if suppliers offer a volume discount, or perhaps a bundle discount, then it is not just a question of which suppliers to choose, but also to determine and evaluate the quantities that have to be procured from each supplier in a more profound way. Hence, when various hard factors are included in the overall decision problem, then models such as the ones described here can be considered too simplistic. This is also supported by Xia and Wu (2007), who articulate that when supplier selection decision problems involve elements such as discounts, when capacities from different suppliers are limited, etcetera, then more quantitative approaches have to be considered. Since those approaches, however, often cannot consider soft factors such as location-specific factors, alternative methods have to be used. In fact, Xia and Wu (2007) solved the problem of not being able to include soft factors in mathematical programming models by integrating AHP with a multi-objective mixed integer programming approach. Nonetheless, although previous literature such as the study by Xia and Wu (2007) has enabled the possibility to conduct supplier selection decisions with the inclusion of soft factors such as location-specific factors in a more analytical way than when using AHP or ANP, A. T. Kearney still believes that there exist better approach that should be pursued. As mentioned in the very beginning of this report (See Chapter 1), the decision-model that has to be developed in this project need to be based on CO, which according to A. T. Kearney currently is the best-practice approach for major outsourcing engagement A. T. Kearney (2015*a*); Scharlach (2014). For this reason, the following section will serve to present what the CO approach encompasses. Figure G.1 illustrates the main differences between the traditional models and the new - also referred to as 'next generation' - decision models.

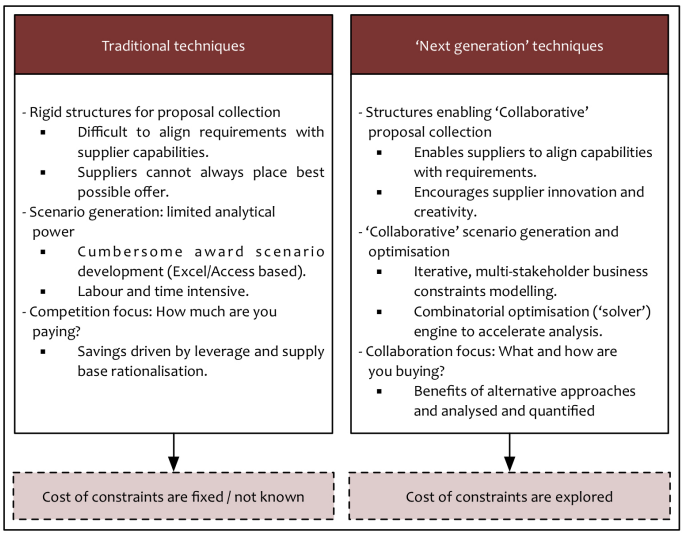


Figure G.1. Difference between traditional and novel supplier selection approaches (A. T. Kearney, 2011)

It has to be noticed that the objective of this overall part of the report is not to develop new mathematical algorithms for collaborative optimisation; what has been requested from A. T. Kearney is to configure the model in an innovative software solution called Tradeextensions, based on the knowledge gained through the empirical research conducted in Part II. Thus, the most important supplier-specific and location-specific factors will be included in the model, whereafter the model will be configured in a way that enables a prospective execution of decisions.

Technical Description of Software Usage H

As mentioned in the practical chapter of this report (See Chapter 10), the technical part of the implementation of factors into the optimisation platform is added in the appendix. For this reason, the subsequent sections serve to present how the factors had to be incorporated into the software, thereby enabling the platform to run optimisation scenarios.

Separating Supplier-Specific and Location-Specific Bid Fields

When the lot fields, the bid fields, and the bid supplements were defined on the Tradeextensions platform (The fields are clarified in Chapter 10), an Excel template was downloaded in order to increase the flexibility when designing the Excel sheet. As it can be seen in Figure 10.2, all micro-level and macro-level factors are in the same pool of bid fields when defining them in Tradeextensions. For this reason, all those factors were also in the same tab when exporting the content from Tradeextensions into a 'Prepared' Excel template. Since the micro-level factors will have to be filled out by the supplier via the bid form in each RFQ phase, and since the macro-level bid fields have to be populated by the decision-maker of the buying firm, it was decided to split the two types of factors into two different tabs in the overall bid sheet. The tab with the micro-level bids should be visible to each supplier filling out the bid sheet, while the macro-level bids should be hidden from the suppliers. In order to split the factors, certain pipe commands had to be used. Now, two primary pipe commands were used to split up the table: The first one was the ID command, which makes it possible to split up a bid table, but still base the new bid table on the same lots (i.e., the lot fields and the lots will stay the same for both the micro-level bids and the macro-level bids in the two separate tables). The exact command, which was added in the start tag (i.e., the first command which define all subsequent tags) of the first table in the tab with micro-level single bids, was the following: 'id:bidTableA'. The complete start tag was formulated as following:

«single|id:bidTableA|Prepared|titlesBelow:4»

The 'single' command tells the software that only one bid per lot can be added in the table. The 'id:bidTableA' command does, as mentioned before, define the table in the software.

The 'prepared' command tells the software which kind of template is being used. In this case it is a prepared template, but other templates can be used as well depending on the preferences of the model designer. The last command which is entitled 'titlesBelow:4' simply tells the software that there are three rows with header information, meaning that data is populated after that. The start tag can be found in cell B2 in the Single Bids tab (See Appendix I).

In order to continue the bid table in a new table in a separate tab for the location-specific bids, a 'continue' command was used for the bid fields, thereby continuing the table which was defined in the previous tab (i.e., 'id:bidTableA'). The command was in this case formulated as following: «continue:bidTableA». The command can be found in cell J9 in the Single Location Bids tab. This command is, however, only the command for the bid fields in the new table; in order to duplicate the lot field columns in the Single Location Bids tab, it was necessary to create a lot supplement just as a trigger for a lot supplement table in the bid form template. The lot fields columns - including the lot supplement start tag - was therefore copied into the second tab before the continuation table was added for the bid fields. The complete start tag was here formulated as following:

«lotSupplement|Prepared|copyFormat|titlesBelow:4»

The 'lotSupplement' command is used to enable the addition of the same lots as in the Single Bids tab. Lot supplements can be related to a specific lot, which contradicts bid supplements which are decoupled from any lots. The 'prepared' command does ones again tell the software which template is being used, while the 'titlesBelow' tells the software that there are three rows with header information.

As it was assessed that the suppliers likewise should have the opportunity to include additional bids, two tabs similar to the 'Single Bids' tab and the 'Single Location Bids' tab were added, but with the term 'Additional' in front (i.e., 'Additional Single Bids' and 'Additional Single Location Bids'). Additional bids enable suppliers to add further bids for each lot (i.e., the same on-spec bid as on the Single Bid tab, but from a different location). The pipe commands used were in this case similar to the ones related to the two first tabs; however, instead of using the 'single' command for the start tag in the micro-level additional single bid table, and instead of using the 'bidTableA' as an ID for the table, the 'additionalSingle' command was used along with a new ID command entitled 'id:bidTableB' command. Hence, the following complete start tag was used, and can be found in cell 1A in the 'Additional Single Bids' tab:

«additionalSingle|id:bidTableB|bidsperlot:1|prepared|titlesBelow:3»

In the 'Additional Single Location Bids' the «continue:bidTableB» was used to continue the micro-level table from the previous tab. In order to duplicate the lots, the following start tag was used:

«lot|copyFormat|prepared|titlesBelow:3»

As mentioned in Chapter 9, one of the essential aspects of CO is to enable a supplier to add alternative bids, which go beyond the on-spec requirements which the buyer asked for in the first place. This is the aspect where the suppliers can really unfold their creativity and innovative as well as collaborative capabilities. In order to enable this, a third tab entitled 'Alternative Single Bids' where added. Of course, similar to the other tables, a further tab which reflects the location-specific attributes of the area from where the supplier will deliver the alternative items has been added. The pipe commands are inspired by the ones mentioned for the normal Single Bids table and the Additional Single Bids, as presented above.

«additionalSingle|id:bidTableC|bidsperlot:1|prepared|titlesBelow:4»

«lot|copyFormat|prepared|titlesBelow:4»

«continue:bidTableC»

The pipe commands presented above are very simple in their nature, but they are basically the tags which developed the boundaries and structure of the overall model. When including them in the Excel sheet, the software platform will automatically know *what* it should be looking for. The further tags in the model will then enable the software to determine *where* to look. In order for the model to function, a further development of the model is obviously necessary. The cost function has to be defined, and the bid analysis fields, which enables to each participating supplier to see its performance relative to other suppliers, does likewise have to be formulated. For this reason, the subsequent sections will serve to do so.

The Bid Analysis Fields

As mentioned in Chapter 10, besides the fact that suppliers can add alternative bids in outsourcing engagements based on CO, another essential aspect of the sourcing approach is that the suppliers are able to see their bidding performance relative to one another. In order to enable this, different codes have to be developed. In the case of this project, the bidding performance will only be based on cost; however, technically, the ranking can be made on any type of bid field.

In order to enable the suppliers to see their performance directly in the excel sheet, bid analysis fields had to be developed. Bid analysis fields are used when values from different bids will be compared, or when bid values have to be transferred between bids. In this case, only the former approach is pursued.

The cost which will be ranked is in this case the initial price per item (ex works) as well as the total price (DDP). This is in order to show each supplier how each of their price offers are on an item level relative to the other players who are a part of the game, but also to show how they perform when other costs such as packaging and transportation are added. If a supplier, for instance, is ranked well on an ex works level, bud worse on

an DDP level, then it might indicate that the supplier should try to reduce the cost of transportation and packaging (if they are, of course, in charge of this cost). The codes are illustrated below.

The first code presented below serves to read all the bids within one specific bid field. In the case of this project, the bid field will be the 'Price - EXW', which is simply the price per unit for each bid for every lot. The code below is entered in the software, and serves to compute the rank automatically based on the data which each supplier populates in the Excel bid form, which is uploaded to the optimisaion platform. The code below is not visible to the suppliers.

```
if(b_price_exw == 0
   , 0,
bidaggregate(
   aggregate.countunique,
   biddername(),
      validnonzeronumber(b_totalprice_exw)
      && (b_totalprice_exw < this(b_totalprice_exw))
   ) +1)
```

The subsequent code serves to show the rank based on the computation which takes place in the code presented above. The if-sentence refers to the code above which have that respective rating name. The choice of how the ranking should be shown depends on the decision maker, and it can be argued that it is a "strategic game". The default setting is that the absolute rank is shown (i.e., if a supplier has the best position, this supplier will be ranked as number one). In most cases when A. T. Kearney conduct large-scale sourcing decisions based on CO, the exact position of the suppliers is not disclosed; instead, the relative position in percentage is shown. This is enabled through a convert statement. This will make the competition less fierce and more collaborative. For this reason, it has been decided to use this approach in this project, thereby enabling the suppliers whether they are in the top 3, in the top 5, or simply below the five best suppliers. The code for doing this is portrayed below.

```
if(ba_rank_exw == 0, "N/A",
if(ba_rank_exw <4, "Top 3",
if(ba_rank_exw <6, "Top 5",
if(ba_rank_exw >5, "Below 5","N/A"))))
```

As mentioned previously, despite the ranking of the ex works prices, a ranking of the DDP will also be shown to the suppliers. Here, the exact same code will be used, but instead of retrieving data from the Price Ex-Works bid field in the Excel sheet, the data will now be extracted from the DDP price bid field.. Hence, the following code.

```
if(b_finalprice == 0
   , 0,
bidaggregate(
   aggregate.countunique,
   biddername(),
      validnonzeronumber(b_finalprice)
      && (b_finalprice < this(b_finalprice))
   ) +1)
```

Again, in order to show the relative position as in the case of Price ex works, the code which was used before has been duplicated and adapted. Hence, the code was configured as shown below.

```
if(ba_rank_ddp == 0, "N/A",
if(ba_rank_ddp <4, "Top 3",
if(ba_rank_ddp <6, "Top 5",
if(ba_rank_ddp >5, "Below 5","N/A"))))
```

Besides showing the position of the suppliers based on a percent-wise ranking, a bid analysis field which mirrors the distance between the bids from the different suppliers will be added as well. As in the case of the ranking, the default setting in Tradeextensions is that the distance is shown in absolute terms; however, to make the bidding less fierce, a percentage is used again. In order to compute the actual distance between the leading bid per lot, a bidaggregate code was first used to the best value per lot (i.e., the lowest cost for each bid per lot), whereafter this value is used to calculate the distance to the remaining bids. The two codes are shown below.

```
bidaggregate(aggregate.min, b_finalprice, ba_rank_ddp == 1)
```

```
leading = ba_leading_ddp;
distance = ( b_finalprice - leading) /  b_finalprice;

distance * 100
```

In order to activate those codes, thereby showing the results to each individual supplier in the bid form, a subsequent code has to be used. This is very similar to the approaches used above, when the ranking of bids have to be generated. The distance will be specified from 0-25% distance, where the bids which are more than 25% beyond the leading will just be marked with +25%. The code is added below.

```
distance = ba_distance_ddp;

if (ba_rank_ddp == 0, "N/A",
if (distance <5.1, "0-5%",
if (distance <10.1, "5-10%",
if (distance <25.1, "10-25%",
if (distance >25, "+25%",

    "N/A")))))
```

CD I

The following documents can be discovered on the Appendix CD located on the last page of the report. The Excel documents which have been developed in conjunction with the integration of factors into the Trade Extension optimisation platform is enclosed. Also, a bid form (i.e., the final form that suppliers will download during an RFQ) has been enclosed. It has to be mentioned that this in an extended version, which is why some of the factors included are not some of the factors which have been ranked as most important in the empirical part of this thesis. Lastly, recordings of all interviews conducted with the VP EMEA have been enclosed.

1	*01-Excel Template for Trade Extensions*
2	*02-Bid Form (Extended Version with Test Bids)*
3	*03-Qualitative Interview with the VP EMEA* ***(Folder 3)***

Table I.1. Total list of appendices.

1	*Meeting 1 - 20.10.2014*
2	*Meeting 2 - 12.11.2014*
3	*Meeting 3 - 18.11.2014*
4	*Meeting 4 - 16.02.2015*
5	*Meeting 5 - 06.03.2015*
6	*Meeting 6 - 18.03.2015*
7	*Meeting 7 - 27.03.2015*
8	*Meeting 8 - 15.04.2015*
9	*Meeting 9 - 16.05.2015*
10	*Meeting 10 - 18.05.2015*
11	*Meeting 11 - 11.06.2015*
12	*Meeting 12 - 25.06.2015*

Table I.2. Documents in ***Folder 3***.


ATKearney
UNIVERSITY OF TWENTE.
59 MI
ZURICH 4961 MI
MANILA
SEOUL
LADIES
1210 MI
MONTREAL
TOKYO 5043 MI
NANTWICH
EASIEST
Run