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KAI SIRÉN
DEVELOPING THE PROCUREMENT OF PRODUCTION SER-
VICES

Master of Science Thesis

Examiner: Professor Jarkko Rantala
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ABSTRACT

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The role of procurement and supply chain management has changed tremendously, since companies are increasingly engaging in outsourcing. In recent years this trend has especially concerned services. Most common activities outsourced are related to logistics or transportation, which often aims for increasing the flexibility and efficiency of these functions. In the steel industry, transportation and handling of materials performed internally is considered highly significant due to the notable volume. Hence, the effectiveness of material handling and internal transportation has a direct influence on the profitability and competitiveness of steel production companies.

This thesis aimed to develop the procurement of production services in a steel production company. The main objective was to improve the cost effectiveness of the services by optimizing contract portfolio. The research was conducted in two parts: theoretical and empirical. The theoretical section focused on previous literature concerning the general features of service procurement and the management of company's external resources. This section provided basis for the empirical part.

In the empirical section the current state of production service procurement in the factory of Raahe was first analyzed in terms of main characteristics and possible areas of development. Additionally, a small-scale comparative analysis of another case company factory in Luleå was conducted. Second, the current service contracts were analyzed in terms of resource utilization for finding possible synergies. These findings were studied further qualitatively by exploiting interviews.

The results indicated that synergies between different services occurred. This thesis suggests the combining of three different service contracts. The first consists of two services related to handling and transportation activities in the iron production and harbor area. The second combination includes the contracts of internal product transportation, and the handling and transportation of slab materials. The third combination comprises of three truck machinery services situated in various locations. By implementing these recommendations the challenges found in the current state can be reduced. As a result, the cost effectiveness of production services is increased by optimizing the structure of contract portfolio. Hence, significant savings can be achieved.

TIIVISTELMÄ

KAI SIRÉN: Tuotantopalveluhankintojen kehittäminen

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Hankinnan ja toimitusketjun hallinnan rooli ja merkitys ovat muuttuneet ulkoistamisen yleistyessä. Viime vuosien aikana ulkoistamisen trendi on koskenut erityisesti palveluja. Yleisimmät ulkoistamisen kohteet liittyvät logistiikkaan ja kuljetuksiin, joiden ulkoistamisella pyritään kasvattamaan toimintojen joustavuutta ja tehokkuutta. Terästeollisuuden sisäisten materiaalikuljetusten ja -käsittelyjen merkitys on suuri, sillä käsiteltävät määrät ovat usein moninkertaisia verrattuna lopputuotteiden uloskuljetuksiin. Kyseisten toimintojen tehokkaalla ja järkevällä toteuttamisella onkin suuri vaikutus terästeollisuusyhtiöiden tuottavuuteen ja kilpailukykyyn.

Tämä tutkimus pyrki kehittämään tuotantoon liittyvien palveluiden hankintaa terästuotantoyhtiössä. Työn päätavoitteena oli tuotantopalveluiden kustannustehokkuuden parantaminen optimoimalla sopimussalkun rakennetta. Tämä työ koostuu kahdesta osasta; teoriakatsauksesta ja empiirisestä tutkimuksesta. Teoriaosuus keskittyy aikaisemman tutkimustiedon tarkasteluun, liittyen palveluhankintoihin sekä yrityksen ulkoisten resurssien hallintaan. Tämän osuuden tarkoituksena oli tarjota perusteet empiirisen tutkimuksen pohjaksi.

Empiirisessä osuudessa kuvattiin aluksi tuotantopalveluiden hankinnan nykytilan ominaispiirteet ja mahdolliset kehityskohteet Raahen tehtaalla. Lisäksi pienimuotoinen vertaava analyysi muodostettiin kohdeyrityksen toisen tehtaan vastaavasta tilanteesta Luulajassa Ruotsissa. Raahen tehtaan osalta suoritettiin resurssianalyysi, jossa nykyisissä sopimuksissa hyödynnettyjä resursseja tutkittiin sopimusten välisten synergioiden löytämiseksi. Löydösten käytännön soveltuvuutta tutkittiin tarkemmin kvalitatiivisesti haastatteluja hyödyntäen.

Tulokset osoittivat, että synergioita eri tuotantopalvelusopimusten välillä on. Työn perusteella nykyisiä sopimuksia yhdistämällä voidaan muodostaa kolme uutta sopimuskokonaisuutta. Ensimmäinen yhdistelmä koostui kahdesta käsittelyyn ja kuljetukseen liittyvästä palvelusta rautatuotannon ja sataman alueella. Toinen kokonaisuus muodostui sisäisestä tuotekuljetuksesta sekä aihoiden ja ahiomateriaalien käsittely- ja kuljetuspalvelusta. Kolmas yhdistelmä sisälsi kolme trukkikonesopimusta, jotka sijaitsevat tehtaalla useissa kohteissa. Nykytila-analyysissä esiin tullesiin ongelmiin voitiin vastata muodostamalla ehdotetut kokonaisuudet. Näin palvelujen kustannustehokkuutta voitiin parantaa sopimussalkun rakenteen optimoinnilla. Kustannustehokkuuden seurauksena voidaan saavuttaa merkittäviä säästöjä.

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In Raahe, 25.5.2015

Kai Sirén

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APPENDIX A: TABLE OF THE INTERVIEWS CONDUCTED

APPENDIX B: RAAHE PRODUCTION FLOW

KEY TERMS AND ABBREVIATIONS

ERP	Enterprise Resource Planning
GPS	Global Positioning System
KPI	Key Performance Indicator
MRO	Maintenance, Repair and Operations
SLA	Service Level Agreement
SPC	Statistical Process Control
SQM	Supplier Quality Management

1. INTRODUCTION

In today's competitive business environment companies are increasingly focusing on their core know-how and other services and products are more often purchased from external suppliers. Firms are seeking for cost savings, better capabilities and the freeing of own resources to the use of more important functions. In fact, for many firms outsourcing is not just a trend, but more and more a viable business strategy. (Van Weele, 2010) Hence, the role of procurement and supply chain management has changed tremendously. Since companies are spending an increasing share of their total revenue on purchased goods and services the biggest saving potentials can be found in the procurement function. (Baily et al. 2008)

In recent years the trend has especially concerned business services since companies are increasingly buying services instead of goods. The buying of services is often far more complicated comparing to the buying of products and materials. Due to the intangible nature of services and the fact that services are actually produced in close collaboration between the buying company and the service provider, purchasing of them requires focusing on relationships with suppliers. This highlights the importance of supplier relationship management. Additionally, the buyer-supplier relationships are facing a shift from price-based adversarial relationships towards deep strategic alliances, which makes the buying company to concentrate on the size of its supplier base. The relationships require continuous evaluation of the supplier's actions and the quality of the services provided. As a result, focusing on supplier base management and supplier quality has been emphasized. Therefore, managing the buying of business services requires the entirety of managing company's external resources. (Van Weele 2010)

The types of activities and functions outsourced have developed over time. Nonetheless, one of the main activities, which are often regarded as not being the company core know-how, is related to logistics or transport. (Van Weele 2010, Jalanka et al. 2003) However, the logistics performed internally have become an important basis of competition for enterprises. The outsourcing of these functions often aims for increased flexibility and efficiency. (Stock & Lambert 2001) In heavy process industries, especially in the steel industry, the amount of required transportation and handling of materials internally is considered fairly significant. In fact, according to the Swedish Transport Research Institute, the amount of internally transported material measured in tons, is somewhere around five times as large as the amount of the actual finished products leaving the facilities. Hence, the effectiveness of material handling and rational internal transport is of great importance for the profitability and competitiveness of steel production companies. (Swedish Transport Research Institute)

Although there seems to be a great amount of research regarding the outsourcing of different services, less studies are focusing on the management of service contracts with the existing suppliers. Contract management is often found challenging and it demands resources from the buying company. (Rekonen 2007) This study aims to develop the procurement of services, focusing on the management of case company's production related service contracts.

1.1 Research problem and research questions

The research problem concerns the management of company's production service contracts. Currently the amount of contracts is quite substantial which affects the internal customer, procurement function and the quality of services. These factors have a major effect on the cost efficiency of services. The case company in this thesis is SSAB Europe, factory of Raahe. Taken the company's current situation into account the main research question can be formed, which can further be supported by secondary questions.

The primary research question can be addressed as follows:

- How to improve the cost effectiveness of production services by optimizing contract portfolio?

The primary research question can be supported by secondary questions:

- What are the best practices in purchasing of business services?
- How a company should manage its external resources?
- What is the current situation of production service procurement in the case company?
- What is the outsourcing strategy and how are the outsourced services arranged in Luleå, another plant of case company?
- What kind of resource synergies occurs between services and how they can be analyzed and exploited in Raahe?

1.2 Research objectives and limitations

This Thesis studies the procurement of services. There are various ways of classifying different kind of services and services are different by nature. The main interests of this research are production services. Production services at SSAB Europe are defined as transport and handling of raw materials and other production materials, intermediate products, end products, by-products and recycled materials. Production services also include transport and crane services executed with mobile machines and cleaning services of production sites and production equipment.

The Thesis focuses on the steel factory of Raahe and aims to develop the current state of production service procurement at the factory. However, a small-scale comparing analysis is performed in the factory of Luleå, which investigates the current state of similar services on a broad level. Although, this is not the primary focus of the study and the objective is only to get an overview of the situation at Luleå and compare their situation and identify some challenges and redeeming features there. Additionally, the information concerning Luleå is only based on few interviews and the exact related data is lacking due the insufficiency of time used to investigate Luleå case in this research. In Luleå, the services in question are not similarly defined and managed as production services and the information concerning these is more scattered, which also complicated the gathering of data.

Service contracts related to production are often focused on a certain part of the process or a production area. However, some of the services concern various different locations and areas of the process, for example some cleaning services. Additionally, cleaning services differ from the other required production services by nature and some main features, which make them less feasible to discuss. In this thesis, this type of service contracts are left out from the research and the focus is targeted only on services that have similarities with others and are primarily targeted to certain production area. This is due the fact that it is fairly challenging analyze these types of service contracts, and discuss them further. Nevertheless, many of the services researched in this study have interfaces with other production areas and few exceptions in terms of locations occur.

The main objective of the study is to form a vision of how the production service contract portfolio could be optimized in order to achieve better cost effectiveness of services.

1.3 Research methodology

There are various underlying concepts related to research. Whether the research is completely theoretical or highly practical, researcher must recognize the background for the choices that are made during the study. The decisions made are often based on assumptions about how we view the world. These assumptions about human knowledge and about the nature of the realities encountered often guide the researcher to form research questions and the general design of the study. Commonly used term for these background assumptions is research philosophy. (Saunders, Lewis & Thornhill 2012) Additionally research philosophy affects the research approach, research strategy and the actual techniques of how the data related to the study is gathered and how the data analysis is conducted. In Figure 1 the concepts of research and their relations are described. It is also illustrated how the research question is being reflected by the concepts when making choices between alternatives (Ghauri and Gronhaug 2010).

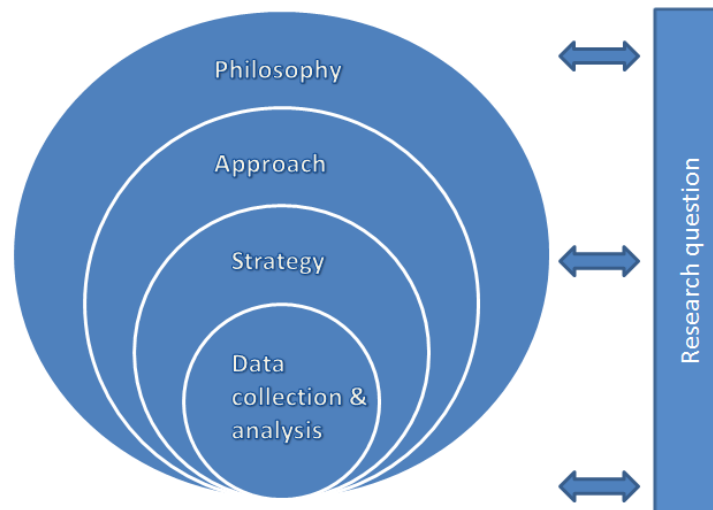


Figure 1: Research concepts and their relations (adapted from Saunders et al. (2012))

1.3.1 Research philosophy

Johnson and Clark (2006) highlight the importance of how well we are able to reflect upon our philosophical choices. The researcher may adopt various different alternatives and therefore it becomes essential how he/she can defend the philosophical choices made in relation to other alternatives. Saunders et al. (2012, p. 108) differentiate between four research philosophies; positivism, interpretivism, realism and pragmatism. None of the mentioned is any better than another and the limitation between these philosophies does not necessarily have to be narrowed down into one. In fact, it is often found challenging to form an answer to the research question within one philosophical domain. (Saunders et al. 2012, p. 129)

In positivism, proven facts and substantial empirical material which can be measured with “hard” research methods such as mathematical statistics are considered valuable. Typical for positivism are researchers who rely on cause and effect relations and doesn’t approve meditation based results as facts. Additionally, evidence has to be observable and positivism is regarded as objective by nature. (Saunders et al. 2012, p. 114) On the contrary to positivism, interpretivism is seen as a philosophy that does not value law-like generalizations. Interpretivism highlights that it is necessary for the researcher to understand that it is different to conduct a research among people rather than computers or machines. Therefore qualitative data is far more appreciated compared to quantitative data. (Saunders et al. 2012, p. 116)

The third philosophy, realism, is considered quite similar as positivism due to the fact that both of these utilize quantitative research methods. However, a researcher committed to realism might also exploit qualitative methods in addition. (Boyd 2008) Realism indicates that what the researcher senses is the truth and there is a reality quite inde-

pendent of the mind. The fourth philosophy mentioned by Saunders (2012, p. 108) is pragmatism. Pragmatism includes various different orientations, which are all related to highlighting practical actions and empirical part of research, whether the focus is on problem solving or producing knowledge. In pragmatism the used methods might be both qualitative and quantitative and furthermore mixed methods. These are highly depended on which choice is the most suitable considering the research question. (Hookway 2008)

However, Olkkonen (1994, p. 33-38) mentions hermeneutics and positivism as two of the most common philosophical backgrounds, especially in the case of business economic studies. Hermeneutical philosophy often requires qualitative research methods, which are studied with forming single observations of the focus of the study. Based on these observations, norms are formed, which can be applied without an exception to the whole material. As it is, hermeneutics cannot offer independence in terms of researcher, because different researchers might understand the same information and its meaning with different ways. (Olkkonen 1994, p. 35-37)

In the field of business economics, a strictly hermeneutic or completely positivism based philosophy is rarely seen. (Olkkonen 1994, p. 53) In this study, and often in the field of business, the objective truth for the problem is impossible or at least difficult to find. This indicates that a hermeneutic view is suitable for this case. Additionally, a generalization for a unique situation such as the subject in this case is hard to find. The findings in this research cannot be applied into every other context which is why interpretivism is the most suitable research philosophy in this thesis.

1.3.2 Research approach

As said, research philosophy guides the researcher with different decisions throughout the study process. It also has an effect on the decision about research approach. Making the choice between different approaches has a remarkable influence on the general design of the study. This is due to the fact that the approach defines how the theory is utilized and how the general conclusions are drawn. (Saunders 2012, p. 124) The choice between different approaches is important since it enables the researcher to take more informed decision about the research design. Additionally, it helps to think about research strategies. (Easterby-Smith et al. 2008) According to various authors (e.g. Saunders 2012, Yin 2011) there are two generally accepted approaches; inductive and deductive approach. In some cases, researchers have named a third one, which is called abductive approach.

The deductive approach is about testing the theory researched. In general, in deduction the researcher develops a theory and hypothesis (or hypotheses) and forms the research strategy to show if the hypothesis are valid. This approach is dominant in the natural sciences and it is often the assumed approach in scientific research. (Saunders 2012, p.

124) Deduction is based on logic and it requires that there are previous studies and publications related to the subject researched. Deduction often uses quantitative data, however, to test the hypothesis qualitative data might also be utilized. In terms of relation to philosophies, deduction is regarded as more of positivism based approach, rather than for example interpretivism based. However, this kind of generalization might be misleading. (Saunders 2012, p. 125)

On the contrary, the inductive approach is more focused on data collection and data analysis. Hence, the results and the theory are developed as a result of the data analysis. A study of a small sample of subjects is more appropriate compared to a larger number, when it comes to inductive approach. This is because using an inductive approach is particularly concerned with the context of the events taking place. Induction emphasizes the gaining of an understanding of the meaning of humans attach to events and has a less concern with the need to generalize, comparing to deduction. In general, induction generates new theory with forming conclusions on empirical observations. (Saunders 2012, p. 125-126) The third and the most rarely used approach, abductive, begins on a practical level and the conclusion happens by taking turns with both theory and empirical data. Similarly with induction, abduction is based on empirical data. Although it does not completely exclude the existence of the theory behind the subject. (Van Hoek & Aronsson 2005)

In this thesis the selected approach is mainly inductive, although it includes some characteristics of deductive approach. As said, inductive approach aims to form conclusions on observations made based on the empirical research. As it is, this study can be regarded using more of inductive approach. Furthermore, the analysis is not based on assumptions made based on the theory nor the theories are tested with the empirical section. Additionally, the stress in the empirical part is somewhat more on qualitative than quantitative data. However, the theory has its purpose and it defines the existing knowledge of the subject in matter. According to Van Hoek & Aransson (2005) this kind of combination of inductive and deductive approach can be seen as abductive. They state, that abductive approach has been used commonly in the field of logistics research. To conclude, it can be said that this thesis does not completely rely on any specific approach; it is more of a hybrid of different approaches.

1.3.3 Research strategy

There appears to be different ways of classifying different research strategies in the literature. According to Saunders (2012), case study, narrative research, ethnography and action research are the most common ones. Whereas Hirsijärvi (2007, p. 134) names experimental research, survey research and case study as the three main research strategies. Research strategies define the way of collecting and gathering the data and information related to the subject. (Olkonen 1994, p. 65)

Experimental research is often connected to deductive approaches. This is because the main objective with experimental research usually involves hypotheses testing. Typically this strategy measures how different variables affect each other. Whereas survey research uses mainly structured interviews and questionnaires conducted with group of people. This strategy aims to discover the attributes and features of different phenomena and it is highly based on quantitative research. However, the analyzing of data can be conducted both with qualitative and quantitative methods. (Miller 2007) The third most common strategy according to Hirsijärvi (2007) is case study. Case study aims to produce intensive and detailed knowledge of the object of research. It considers the environment of the study and investigates the phenomenon within its real-life context. Case study describes the research matter as wholeness and usually it focuses on one specific case, however, it can be used to compare different corresponding cases with each other. (Saunders 2012, Routio 2007)

The nature of this research is case study. This thesis aims to answer questions such as “why”, and “how”. According to Yin (2011) this is a typical characteristic of case studies. Additionally, the data used in this study is fairly diverse and the amount of previous empirical research conducted within this area is quite modest. Yin (2011) states that in case studies the researcher is not part of the studied phenomena and hence does not have an effect on the events studied. The phenomena in a certain real-life context is only temporary, which also indicates that the research is following the guidelines of a case study.

1.4 Structure of the research

This Thesis consists of eight chapters. The introduction describes the context and background of the topic studied. In addition, the research problem and research questions are specified. The chapter also includes defining the objectives, limitations, research methodologies and the structure of the study. In second and third chapter, literature review, it is aimed to give the reader a basic understanding of the theory behind the subject. Service purchasing – chapter describes procurement in general as a function of a company and the buying of business services are discussed in more detail. In Managing external resources – chapter the focus is turned into supplier relationships and supplier base management. The chapter also introduces contract management and service quality management. The objective is also to provide basis to the empirical part.

The fourth chapter describes the research methodology of the empirical part of the study, also introducing the case company and operational environment. Chapter 5 focuses on describing the current state of production service contracts. This includes the scope of contracts, supplier base, spend analysis and revenue logic, contract validities and agreement periods of the current services. The situation with similar service contracts in Luleå’s factory is also introduced and compared to Raahé. The chapter is concluded with outlining the main challenges and possible areas of development. The fol-

lowing chapter, Results, consist of describing the contents of the resource analysis conducted. Second, the main results are indicated and the focus is aimed to discuss the results and recommendations and the possible fulfillment of them. The objectives of chapter 7 are to discuss the combining of the implications from the theoretical part and empirical part and describe the recommendations made for procurement. The chapter additionally outlines some predictions for future state. The last chapter, Conclusions, defines the conclusions, critical evaluation and further research topics. The structure of the thesis is described in Figure 2.

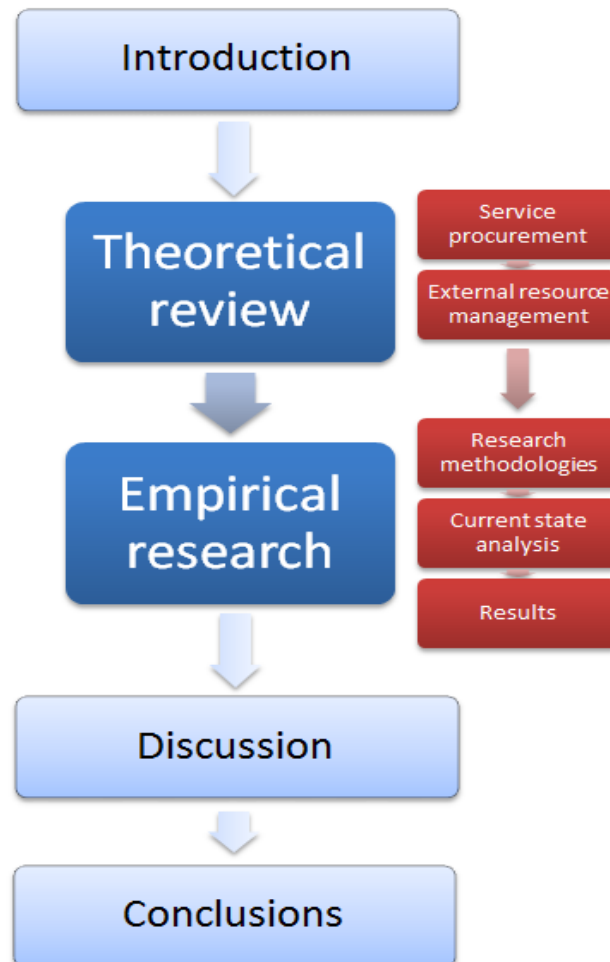


Figure 2: Structure of the thesis

2. SERVICE PURCHASING

The purpose of this chapter is to present purchasing of services as a function of an industrial company. At first the terms procurement and purchasing and their role in the supply chain are defined. Then it is illustrated what are the main characteristics of service purchasing and how it differs from buying of goods. Lastly, the chapter describes the process of service purchasing and some appearing classification types.

2.1 Procurement

The competition among global companies is increasing rapidly. Firms increasingly emphasizing their core know-how and sourcing other components and services from external organizations. As a result, managing the supply chain has become highly essential. This has changed the role of the procurement function. Procurement is no longer considered as a reactive function which only ensures the flow of materials and production and achieves the cheapest price. The role has changed to more proactive - efficient and constructive relationship management with suppliers and designing networks of connections. (Schary & Skjott-Larsen 2001, p. 177) Consequently, organizations are spending a greater proportion of their income externally, whereas the expenditure on labour and overheads is decreasing. (Baily et al. 2008, p. 10) According to Van Weele, (2005, p. 3) companies spend more than half of their sales turnover on purchased parts and services.

In the literature, there appears to be no universally accepted term or concept in the area of procurement. Procurement, purchasing, supply management, sourcing and buying are examples of the terms that are often used interchangeably. (Van Weele 2010, p. 8) In general, purchasing and procurement are defined as the acquisition of goods, materials and services to accomplish organizational goals. (Lightsey 2001) Aljian (1984, p. 3) amplifies that purchasing should obtain the proper equipment, material, supplies and services of the right quality, in the right quantity at the right place and right time. In recent years, many authors have stated that procurement is a broad term which includes the more narrow sub-terms such as purchasing, sourcing and buying. (E.g. Van Weele 2010, Spina et al. 2013) According to Van Weele (2010, p. 8) purchasing is defined: *“The management of the company’s external resources in a such a way that the supply of all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company’s primary and support activities is secured at the most favourable conditions.”* The terms in the area of procurement and their relations are defined in Figure 3.

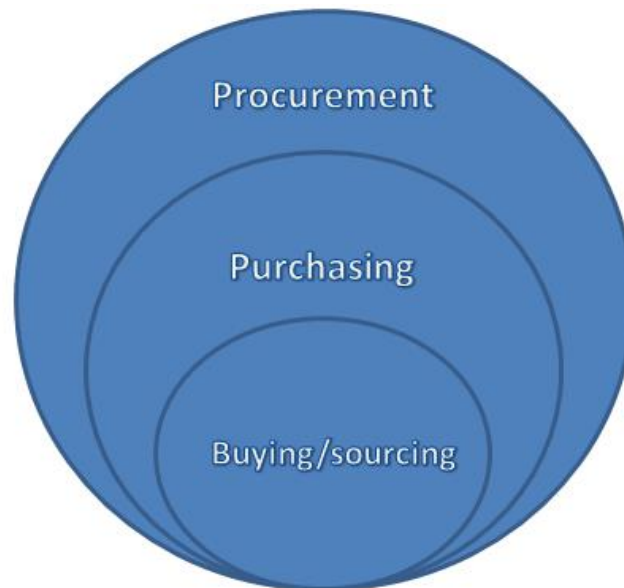


Figure 3: Related terms and their relations (modified from Spina et al. (2013) and Van Weele (2010))

2.1.1 The role of purchasing, direct and indirect purchasing

Typically the business chain of a firm is described with outgoing materials flow and incoming materials flow. The business chain includes the customer-end and the supplier-end while main processes of a firm are located in between these two ends (described in Figure 4) (Van Weele, 2010, p. 254) Marketing, manufacturing, logistics and purchasing add value to the bought material and the outcome is sold to customers. The purpose of purchasing is described as being the manager of suppliers before company's own production. (Hoffman et al. 2011)

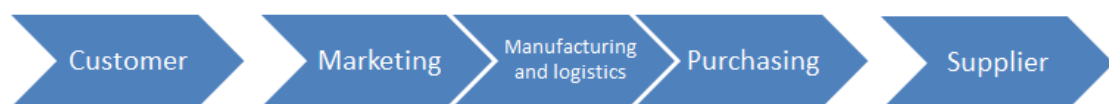


Figure 4: Business chain (adapted from Van Weele (2010, p. 254))

Van Weele (2010, p. 5) introduces the role of procurement with the value chain model. Value chain management, originally introduced by Porter (1985), is a concept which states that all stakeholders belonging to the same chain are challenged to improve the company's proposition to its customers. The concept has played a key role in many business strategies. The value chain (described in Figure 5) is composed with primary activities and support activities and a margin, which is achieved by these activities. Primary activities are required to offer the company's value proposition to its customers, including logistics, operations, marketing and sales and service. Support activities, including procurement, technology development, human resource management and facili-

ties management, enable and support the primary activities. Procurement relates to purchasing of inputs used in the company's value chain. (Van Weele 2010, p. 6)

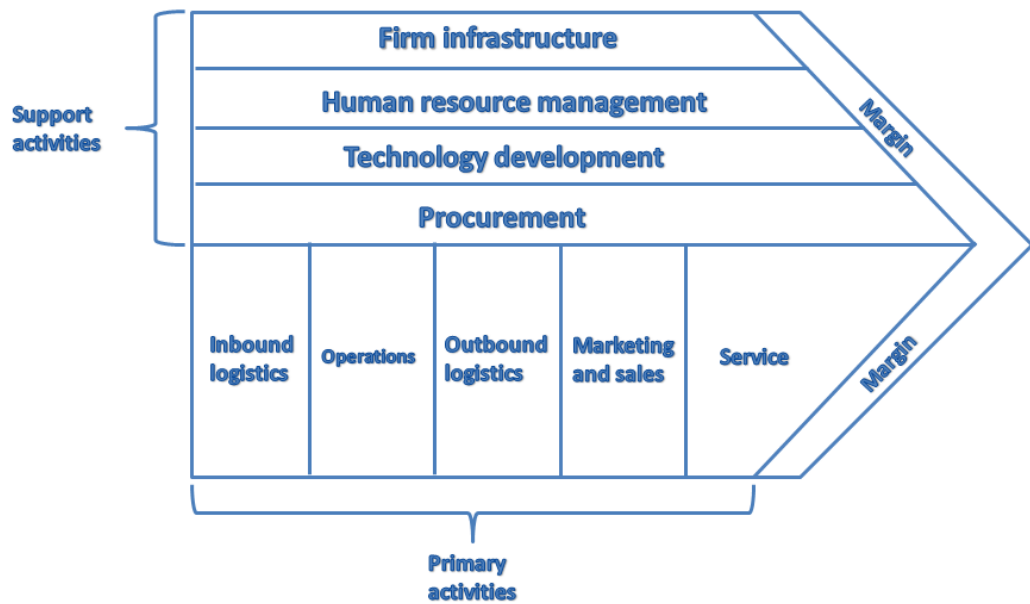


Figure 5: The value chain and procurement (adapted from Van Weele (2010, p. 5))

Procurement should provide support to primary activities and support activities. Procurement for primary activities comprises the buying of materials and components for manufacturing. This refers to buying for production or purchasing of direct materials. (Van Weele 2010, p. 6-7) Van Weele (2010, p. 7) specifies that direct materials includes all purchased materials and services that become part of the value proposed by the company such as raw materials, semi manufactured goods, components and modules. In contrast, the procurement for support activities refers to buying of supplies and services for support activities. These are defined as indirect material purchasing or non-production purchasing. These include all the purchased materials and services that do not become part of the value company is proposing for example maintenance, repair and operating supplies, investment goods and services. (Van Weele 2010, p. 7) In this Thesis the emphasis will be on direct goods, focusing on services.

2.1.2 Trends in procurement

As said earlier, the strategic role and contribution of purchasing and supply is well recognized. Schary & Skjott-Larsen (2001, p. 177) described the change of the procurement function as evolving from focus on products to supplier capabilities. The new role includes interorganizational relationships, utilizing the resources of suppliers, supplier development, cost management and the stages of logistics. More emphasis is given to supplier relationships and purchasing is being involved at all stages and levels of decision making. (Baily et al. 2010, p. 32) There are number of reasons for this shift in importance. (Baily et al. 2010, p. 9, Gadde & Haakansson 1994)

One of the major factors influencing the change are the leading-edge concepts. For example best practice benchmarking, total quality management (described in Subchapter 3.2), just-in-time purchasing, supply chain concepts, relationship management (described in Subchapter 3.1.2), customer focus and tiering (described in Subchapter 3.1.3) and empowerment of suppliers. These approaches to the management of materials are, at least indirectly, based on a strategic and integrated role of purchasing. (Baily et al. 2010, p. 9) Additionally, concentration in the supply market has increased tremendously. This means the change from acquiring from large amount of suppliers to fewer but larger organizations. This has been the trend in the supply market for several years and the process of concentration through amalgamations and takeovers continues. (Baily et al. 2010, p. 9)

According to Baily et al. (2010, p. 9) the increasing environmental awareness, competitor activity, customer demands, advancing technology and finite natural resources are also influencing the change of purchasing. Furthermore, Schary & Skjott-Larsen (2001, p. 180) mentions the increasing proportion of revenue spent externally and the information technology as factors which have caused this development. In the past decade there has been a strong tendency towards buying from outside suppliers. Outsourcing (defined in Subchapter 3.1.1) increases the expenditure on externally provided resources which in other words increases the responsibility for purchasing. The pace of information technology process has increased the potential to make the procurement process more effective. The term is called e-procurement, which describes the use of electronic methods in every stage of the buying process.

2.2 Differences between buying goods and services

For the most part, studies made in the field of purchasing are focused on the purchasing process and supplier selection for industrial goods. Academic knowledge about services is highly limited in comparison to product purchasing. However, business services have experienced a fast growth and they have become a substantial part of organizations purchasing of external sources. (Van der Valk & Rozemeijer 2009, p. 3) In some studies it has been shown, that over half of the purchasing value were spent on services. The ratio spent on goods and services varies depending on the field of operation. Altogether, purchasing departments are becoming more involved with service purchasing. (Smeltzer & Ogden 2002)

For to understand the buying of services, the term service needs to be defined. In the literature the term service has many definitions and characteristics. According to Grönroos (1998, pp. 49) service might comprehend of how a customized machine is developed and delivered for the customer. Vargo & Lusch (2008) state, that service means the interaction between the customer and the supplier and especially the exchange of intangible elements. Quinn, Baruch & Paquette (1987) say that service is generally consumed at the time it is produced and that its output is not a physical product. Although

there are many different definitions for service, it can be said that services can include both intangible and physical elements.

Several studies have stated that the characteristics of service are the ones that make the main difference between services and commodities. (E.g. Van Weele 2010, Cowell 1984) The features are: intangibility, inseparability, heterogeneity and perishability. Intangibility is the most distinguishing factor between services and products. Service cannot be touched or grabbed. Services are ideas and concepts whereas products are plain things. (Fitzsimmons & Fitzsimmons 2008, p. 20) Inseparability means the simultaneous production and consumption of the service. Products are first manufactured whereas services often are sold first followed by other parts of the process. Therefore, customer participates in the service process. Heterogeneity refers to the potential of high variability in service quality. Services can include high labor content and the service performance is delivered by different people. Hence, it may be challenging for marketing to prove the quality of the service in advance. At last, perishability in general means that services cannot be stored and carried forward to a future time period. For instance, an empty hotel room represents a lost service capacity. (Cowell 1984, Fitzsimmons & Fitzsimmons 2008)

Some researchers illustrate the difference of goods and services with a continuum. (Neu & Brown 2005, p. 4) This continuum has been applied to purchasing also. Schonberger (1980) defines the purchasing continuum from highly tangible goods such as simple production components to highly intangible services such as consulting. The purchasing continuum is presented in Figure 6. Usually goods and services are located somewhere in between these two ends. (Schonberger 1980)

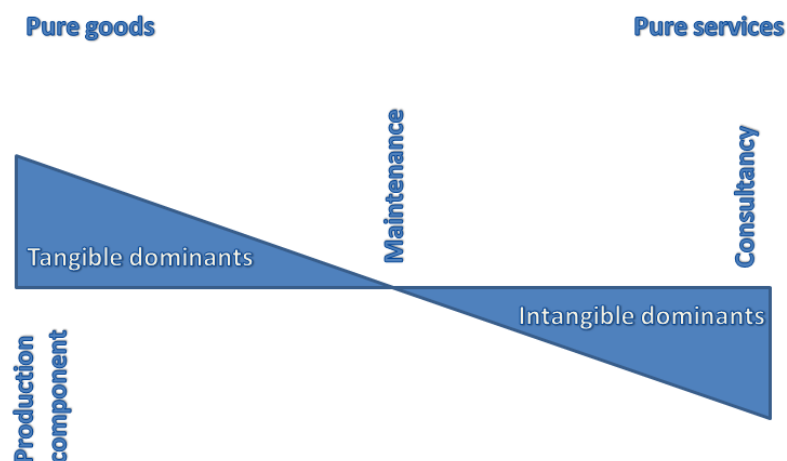


Figure 6: Purchasing continuum (adapted from Schonberger (1980), Neu & Brown (2005, p. 4))

The research available has demonstrated that service purchasing substantially differs from purchasing of goods. Many of the differences found originate from the four characteristics of services mentioned. The intangibility makes the evaluation of the pro-

curement difficult. It is considered far more troubled to make a decision between service providers than to understand the decision between brand alternatives or a product class. Additionally, because of the inseparability consuming and producing of services are often simultaneous, the buying company has a dual role in the process (both consumer and co-producer). This makes it difficult to determine the supplier's and the customer's areas of responsibility. The perishability, services exist only during the time of production, highlights the importance of thorough planning and forecasting, so that the supplier's expertise and resources are supplied at the right time. (Van der Valk & Rozemeijer 2009 et al., 4)

The nature of the services buying community is different than buying goods. In many companies, services aren't seen as strategic as goods and therefore they are often bought indiscriminately. This may enable orders with an unapproved supplier. In addition, internal customers and specialists have strong relationships with the suppliers and the buying can be performed by non-purchasing specialist. (Van der Valk & Rozemeijer 2009) Therefore, it is more likely with services that the purchasing department becomes by-passed. According to Smetzer & Ogden (2002, p. 69), it may be necessary to implement specialized procedures to ensure qualified procurement professionals are involved.

Several studies concluded that the main difference between these two is the process itself. (E.g. Van Weele 2005, Van der Valk & Rozemeijer. 2009, Fitzsimmons 1998) (The process is presented in Subchapter 2.3.) The process has different steps and the steps are often more demanding and troubled. Therefore, Van Weele (2005) states, that more expertise is required from the purchasing department with buying services than with buying goods. Often this expertise can be lacking and the service provider may have to educate the buying company about the service they are offering. With services, it is also more difficult to make estimation of the profits. The value gained from purchasing the service in relation to the cost of acquiring the service is challenging to measure. (Van der Valk & Rozemeijer 2009, p. 5)

2.3 The process of service purchasing and its challenges

As a result of the characteristics of services, certain parts of the purchasing process become different. Some aspects of the process are more difficult and more important and the process is more complex. (Axelsson & Wynstra 2002) In this chapter, the process of purchasing services and the challenges to different phases of it are defined.

Van Weele (2005) defined the purchase process with a four-step model, which is presented in Figure 7. The process starts by determining specifications. Second and third parts concern the selection of a suitable supplier and contracting. The post-contractual period involves the ordering of goods and services from the supplier and this action should be monitored and controlled. Also the evaluation of the contractor is part of post-contractual phase. By the same token, Fitzsimmons (1998, s. 374) outlines the process

with four steps; Identification (Do-or-buy-analysis), information search, vendor selection and performance evaluation. The process is fairly similar, only exception is the outsourcing decision, which in Van Weele's model is assumed to be considered in advance from the four-step model. (Van Weele 2005)



Figure 7: The process of buying services (modified from Van Weele (2005))

This process can be divided to three major parts; Specifying, supplier selection and the contractual management.

2.3.1 Specifying the service

The first and one of the most significant parts of the process is determining the specifications. This is often considered as one of the most difficult parts of the process, due to challenging determination of what the service provider exactly should accomplish. (Axelsson & Wynstra 2002) They argue that there are three different ways in defining the scope of work for the supplier. The first way is describing the specification of the inputs that should be used to produce the required services. This contract type takes a stand only mildly on the performance or the output of the acquired service. The second way focuses on the throughputs or the process that are desired to produce the requested service. Contract is based on the activities such as number of employee hours or materials that will be used for the project. According to Van Weele (2010, p. 96-97) the third and the most preferred way is specifying the service with outputs or outcomes that need to be generated by the service provider. This type of specifying allows the supplier more degrees of freedom and therefore pricing, flexibility and quality become more convenient. (Van Weele 2010, p. 97)

Specifying the service has certain challenges. One of the major difficulties is identifying the content of the service properly before purchasing it. The intangible nature of services makes the specification often desired less precise. (Smeltzer & ogden 2002) Van der Valk & Rozemeijer (2009) also claim, that service specification are particularly difficult to write and are often less complete. Research shows, that buying companies seem to be reluctant to conduct proper specification, however, the consequences of neglecting this step are often underestimated. Van der Valk & Rozemeijer (2009, p. 6) proposes, that the buying company should take additional steps before moving on to the phase of supplier selection. These steps are; requesting for information and detailed specification. This way the buying company can make sure that the specifications are accurate and complete.

2.3.2 Selection of service provider

Second phase is the supplier selection, which is highly dependent on the first stage. This is for the simple reason, that with poor specifications it will be difficult to determine the qualifications of the future supplier. Van Weele (2010, p. 98) claims that the duration of the process depends on the intangibility of the service. The more intangible it is the more time-consuming it is to select a service provider. At first, an assessment of the organization of the provider, its operational processes and its expertise and capacity is being performed. In case of an input specification the buying company is often interested in certain certificates of the supplier. In case of an output specification, for example positive references from customers can be useful. (Van Weele 2010, p. 98)

According to Van der Valk & Rozemeijer. (2009) supplier selection is found to be more difficult with buying services. Firstly, the beforehand evaluation of services is hard. With goods, “hard” criteria is commonly use, which are e.g. price and quality. These should also be taken into consideration with services, but also non-cost factors become of interest. Supplier’s staff competencies and skills or reputation are criteria that should be taken into consideration. (Fitzsimmons 1998, p. 376) Similarly, Degraeve, Labro & Roodhooft (2004) reported that in terms of buying services, more “personality” factors should be supporting the “competence” factors. For example when selecting a consultant engineering company, capable staff and honest sales personnel are possible criteria. All of these “soft” features are often explicitly demanding to measure or assess (Degraeve et al. 2004)

2.3.3 Contracting and post-contractual stage

When supplying services, the contracting is often not so clear-cut. Assessing of what has been contractually agreed upon is far more complicated. (Baily, Farmer, Crocker, Jessop & Jones 2008, p. 366) Van Weele (2010, p. 98-99) suggests some guidelines for contracting services. As a conclusion, it is emphasized that the contract should have clear specifications about the performance, activities, quality and working arrangements of the supplied service. It should be explicitly presented, when and where the service needs to be provided and what kind of communication structure are been used. The buying company should aim for a service level agreement which includes critical performance indicators, detailed work plan and time schedule. (Van Weele 2010, p. 99) In Subchapter 3.2, the service quality and supplier performance measurement are being presented in more detail.

The post-contractual stage is defined as the most important part of the process. To achieve a successful service delivery, the interaction and collaboration between the buying organization and the supplier are remarkably important. (Van Weele 2010, p. 99) Provider’s staff is often on the client’s premises (E.g. transportation and cleaning services) and for this reason, supervision, confidentiality, access permits and safety must

be agreed on. (Baily et al. 2008, p. 377) Post-contractual stage also includes establishing the expedite routine and handling of exception reports and invoices. At an early stage, the implementation phase likely shows whether the indicators of performance and bonus arrangements function properly. Supplier's performance is highly influenced by these indicators and therefore it is critical to have a detailed picture of how the service in reality will be conducted.

According to Van der Valk et al. (2009, p. 5) it is considered more difficult to evaluate the performance of service providers. With goods the quality can be easily measured, for example in the incoming inspection of deliveries of material goods. In the case of high-tangible services, incurring the quality becomes more challenging. First off, the evaluation process often requires more time and more personnel. (Fitzsimmons et al. 1998, p. 371) Also, Van Weele (2010, p. 100) claims that once a service is being outsourced, it is commonly no longer considered as own responsibility. This might lead to inadequate quality and performance, when effective supervision and relationship management are lacking.

2.4 Classification of services

The number of different types of services and service characters is high. Some might be short-term or long-term, some can be highly customized or rather standard or service can be plain simple or remarkably complex. Consequently, a generalization of services is found difficult to create. The type of service might also have an effect on the buying process. (Van der Valk, Wynstra & Axelsson 2005, p. 2) In a study made from the perspective of organizational buyers, it was found that the interactions and tasks are different with the purchasing process depending on the service bought. (Jackson, Neidell & Lunsford 1995) Although the literature indicates that there is no universally accepted classification of services, several authors have developed classification schemes. (Van der Valk et al. 2005)

According to Jackson et al. (1995) services can be divided into two categories. These are MRO services and production services. MRO stands for maintenance, repair and operations. These are the services that are purchased by an organization to run its operations. Whereas production services are a part of the production process for a (set of) product (s). This is a clear classification in general, although some services cannot be classified as being either MRO or production services because the classification depends on the way the customer uses the service. For example advertising agency can be promoting an overall organizational program or campaigning for a specific product. In these cases, the same service could be classified as MRO and production service. (Jackson et al. 1995)

Alijan & Farrell (1982) categorized services into four different groups; professional, facilities and equipment-related, personnel-related and labor and craft services. Similar-

ly, Graw & Maples (1994) proposed a listing of business services including facility-related, materials/logistics-related, communication, employee-support, and professional services. According to Fitzsimmons et al. (1998), these studies failed to provide a classification which would recognize unique aspects of industrial purchasing situations. They presented a taxonomy-matrix for purchasing services, which took both the importance (high or low) of the service and the focus (property, people, process) of the service into account. Additionally, companies can modify their classification depending on the specific business circumstances because the importance of the service is always relative. (Fitzsimmons et al. 1998, p. 3)

Martinsuo (2012, p. 10) mentions the term industrial services when discussing the nature of different service types. According to Martinsuo (2012) industrial services are quite exceptional when comparing to others; some of the traditional features of services cannot be applied to them. For example, an industrial service might be commonly repeated and therefore the heterogeneity of services can be questioned. Additionally, industrial services are often connected to company's product or technology and a part of them might be touched. This challenges the statement that services can always be considered as intangible. Martinsuo (2010, p. 11) doesn't specifically categorize these services, however, some examples of industrial services are mentioned; maintenance, strategic planning, technical consultancy and transport services.

Axelsson & Wynstra (2002) introduce a typology which contains four types of services; component services, semi-manufactured services, instrumental services and consumption services (presented in Table 1). In this model, the application of a business service is one of the main factors that influence the effective design of buyer-supplier interfaces. They argue, that same service can belong to different categories, because it can be used differently by the customer.

Table 1: Different types of services (adapted from Axelsson & Wynstra (2002))

Type of service	Definition
Component services	Can add value to buying company's offering, and are passed on to end-customer unaltered. Supplier has knowledge of the offering of the buying company and the end-customers use of that offering.
Semi-manufactured services	Are altered to some extent before reaching end-customer.
Instrumental services	Are used to produce the buying company's offerings. Have an impact on production processes as tools and instruments. Need to fit to the buyers production procedures.
Consumption services	Aren't part of the offering and used within the buying firm.

Axelsson & Wynstra (2002) have furthermore amplified this typology by categorizing services according to operational environment. These are divided into eight classes: real estate, financial, IT, operative, research and development, transport and distribution, human resources and marketing services.

In conclusion, the diversity of services makes it difficult to make general recommendations on how services should be classified. Van der Valk et al (2005) states, that companies seem to have different ways of categorizing services. According to their study, classification should be planned in a way which supports the company's strategy and the purchasing of these services. (Van der Valk et al. 2005)

3. EXTERNAL RESOURCE MANAGEMENT

The purpose of this chapter is to describe the features of external resource management. First, the subjects related to supplier base management are discussed, including outsourcing, supplier relationship management and supplier base reduction. Second, the focus is turned into service quality management, focusing on the quality, development and monitoring of the supplier and other relevant aspects. Lastly, the chapter outlines the features of contract management, which is discussed in terms of challenges and responsibilities, service level agreements and the importance of knowledge management.

3.1 Supplier base management

It can be said that the most significant procurement decisions are somewhat related to selecting and managing the right sources of supply. Careful decision making is present in major part of purchases and all the relevant factors and risks need to be considered thoroughly. Sourcing involves managing the relationships with both existing and potential suppliers which need to be performed systematically. The supplier relationship management varies depending on the type of the purchase being made and different frameworks and models have been developed to cover all these relations. (Baily et al. 2008) The following section presents the features of outsourcing, various types of customer-supplier relationships and ways to manage them accordingly. Lastly, supplier base reduction is introduced and discussed in terms of methods and process.

3.1.1 Outsourcing

Organizations are increasingly turning into outsourcing. The changes in the business environment and new management concepts have caused the risen attention towards outsourcing. (Van Weele, 2010, p. 160) According to Prahalad & Hamel (1990) the business development of a firm is based on a corporation's ability to identify and cultivate and to use its core competencies. Essentially, outsourcing is the contracting of non-core activities. For many companies, it is no longer considered as a trend but more like a business strategy. Outsourcing has its own benefits but there are also pitfalls to avoid. (Baily et al. 2008, p. 115-117)

In the literature, there are many different definitions and related concepts to outsourcing. The outsourcing institute (2015) defines it as the strategic use of outside resources to perform activities which are traditionally handled by internal staff and resources. The difference with subcontracting is the divestment of infrastructure, people and competen-

cies. (NEVI) According to Van Weele, (2010, p. 162) there are four major characteristics related to outsourcing:

- Activities originally performed in-house are transferred to an external supplier,
- Assets, knowledge and people go over to the external supplier,
- A relationship between the firm and to supplier will be for long period of time,
- Buying company is exposed to cost and risk profile, both which are new to the organizations involved.

Outsourcing of services has different forms. Various authors have differentiated between turnkey and partial outsourcing (E.g. Van Weele, 2010, Sells 2006). Partial outsourcing refers to the case in which only a part of an integrated function is being outsourced. The buyer is responsible for the co-ordination of the function and the activities. On the contrary, turnkey outsourcing applies when the responsibility is entirely on the external provider. The execution of the outsourced function or a set of functions or activities and the co-ordination lies with the external provider. (Van Weele, 2010, p. 162) Furthermore, Allen & Chandrashekar (2000) divide partial to two sub-categories, labour outsourcing and mixed outsourcing. In labour outsourcing the contractor provides only some employees and the rest of the service is handled by the host firm. Whereas in mixed outsourcing the service provider might offer for example facilities, management and materials in addition to employees. In Table 2, the forms of outsourcing services are described.

Table 2: Forms of outsourcing services (combined from Allen & Chandrashekar (2000) and Van Weele (2010, p. 163))

	Partial outsourcing		Turnkey outsourcing
	Labour outsourcing	Mixed outsourcing	Complete outsourcing
Contractor provides	<ul style="list-style-type: none"> • Some employees 	Some or all the following: <ul style="list-style-type: none"> • Employees • Materials • Process and systems • Technology and Equipment • Facilities • Management/Supervision 	<ul style="list-style-type: none"> • Employees • Materials • Process and systems • Technology and Equipment • Facilities • Management/Supervision
Host firm provides	<ul style="list-style-type: none"> • Some employees • Materials • Process and systems • Technology and Equipment • Facilities • Management/Supervision 	Some or all the following: <ul style="list-style-type: none"> • Employees • Materials • Process and systems • Technology and Equipment • Facilities • Management/Supervision 	<ul style="list-style-type: none"> • Programme management

There are various reasons why firms are engaging in outsourcing. Monczka, Carter-Markham, Blascovich & Slaight (2005, p. 22) outlined operational cost reduction, core business focus improvement and increased flexibility and responsiveness as being the

most significant reasons for supplying from external source. By the same token, Baily et al. (2009, p. 118) mentioned reduction in costs, external supplier's better capability, desire to focus on core know-how, reducing risk and freeing resources for other purposes. Quinn (1999) adds innovation as a major benefit of outsourcing. Companies can decrease their innovation cycles and enhance the value of their innovations when outsourcing certain services. Van Weele (2010, p. 164) divides the rationales for outsourcing to two categories, tactical and strategic. Tactical reasons are related to for example cost reduction and to receive an important cash infusion. Strategic reasons indicate to improvement of focus, risk sharing, acceleration of reengineering benefits and improvement of customer satisfaction. To conclude, all the reasons aim for improving the overall performance of the firm and increasing the revenue of the outsourcing company. (Van Weele, 2010, p. 16)

Outsourcing also has its risks and pitfalls. According to Baily et al. (2008, p. 125) research shows that large part of companies underestimate the effort involved in managing the supplier relationship and the time invested in determining the specifications of the service they need. They also state that only 21 % of suppliers felt that customers communicated their objectives well. Van Weele (2010, p. 174) claims that outsourcing contracts have four kinds of risks: technical, commercial, contractual and performance risks. Technical risks refer to question of how to maintain crucial knowledge in the company that is needed to manage the outsourced activity effectively and how to make sure that the service is being supplied applying leading edge technology and solutions. Commercial risk is related to the uncertainty with the price the buying company pays and the costs that will incur when having outsourced the activity. Contract and performance risk concern the fact that the contract may not have enough detailed description of the expected performance from the supplier and the chance that the supplier is not capable of doing the job it was hired for. (Van Weele, 2010, p. 174-175) The risks and the success factors are illustrated in Table 3.

Table 3: Risks and success factors of outsourcing (modified from Van Weele (2010) and Baily et al. (2008))

Risks	Technical risk	Can the actual performance to be delivered by the provider be stated in objective forms?
	Commercial risk	Uncertainty with the price buying company pays and the costs that will incur when having outsourced the activity
	Contractual risk	Are the specifications about the expected performance being sufficiently detailed in the contract?
	Performance risk	Chance that supplier is not capable of delivering service at the desired capacity and flexibility
Success factors	Supplier relationship	The relationship should be an open partnership and proper communication needs to be enabled
	Right vendor	Selecting the right provider of services or goods is vital for ensuring quality and efficiency
	Contract monitoring	The ongoing management of supplier's performance and monitoring suppliers actions
	Company's goals and objectives	Company has to make sure that the outsourced activity is not its best know-how and that supplier's actions fit company's goals and objectives

Avoiding these risks can be easier said than done. Detailed contracts can be helpful but they will not solve the problem. The details of the contract may be depending on the maturity of the relationship between parties. If the buyer and the supplier have been dealing with each other for a long time in other business areas, the less they need to put in writing in the contract. It is considered that the best chance for a successful outsourcing relationship is with already familiar suppliers. The outsourcing Institute (2015) suggests few factors that are important when implementing an outsourcing process; Understanding company goals and objectives, strategic vision and plan, selecting the right vendor, properly structured contract, open communication with supplier, ongoing management of the relationship, senior executive support and careful attention to personnel issues. (Van Weele, p. 176-177) Baily et al. (2008, p. 118) also names well defined activities, relationship with the supplier, high quality of the supplier and effective contract management and monitoring as the most important contributors to successful outsourcing.

3.1.2 Supplier relationship management

Numerous authors have identified two main patterns of relations; arm's-length contractual relations and obligational contractual relations. (e.g. Helper 1993, Schary & Skjott-Larsen) These can be considered as the two extremes of possible trading relationships

spectrum. The arm's-length contractual relation stands for the single specific, discrete economic transaction. There are no personal ties or partnership between the parties and the contract specifies the duties and tasks explicitly. On the contrary, obligational contractual relations emphasize mutual trust and the relationship among supplier and customer. The contract still plays a central role, but both parties recognize the incentives to do more than required for the partner. The relationship is often important and there is a mutual willingness to continue collaborating even if one partner fails. Similarly Helper (1993) compares these forms of relations to the automobile industry in Japan. Terms exit and voice illustrate the same type of relations as arm's length and obligational relations. Voice relations are the ones where the customer and the supplier work together to solve problems whereas exit relations aim for finding new suppliers to find a solution.

Cox (1996) presented a continuum from adversarial relationships and close integration. If the degree of asset specificity and core competence are low, the relationship is more likely to be adversarial. On the other hand closer to core competencies or relation to highly specific dedicated assets, relationship becomes more strategic. Cox (2006) introduces the main types of relationships as follows: adversarial, preferred supplier, single sourcing, network sourcing and strategic alliance. The continuum of supplier-customer relationships are described in Figure 8. The horizontal axis illustrates the type of competencies offered by the supplier and the vertical axis picture the level of asset specificity.

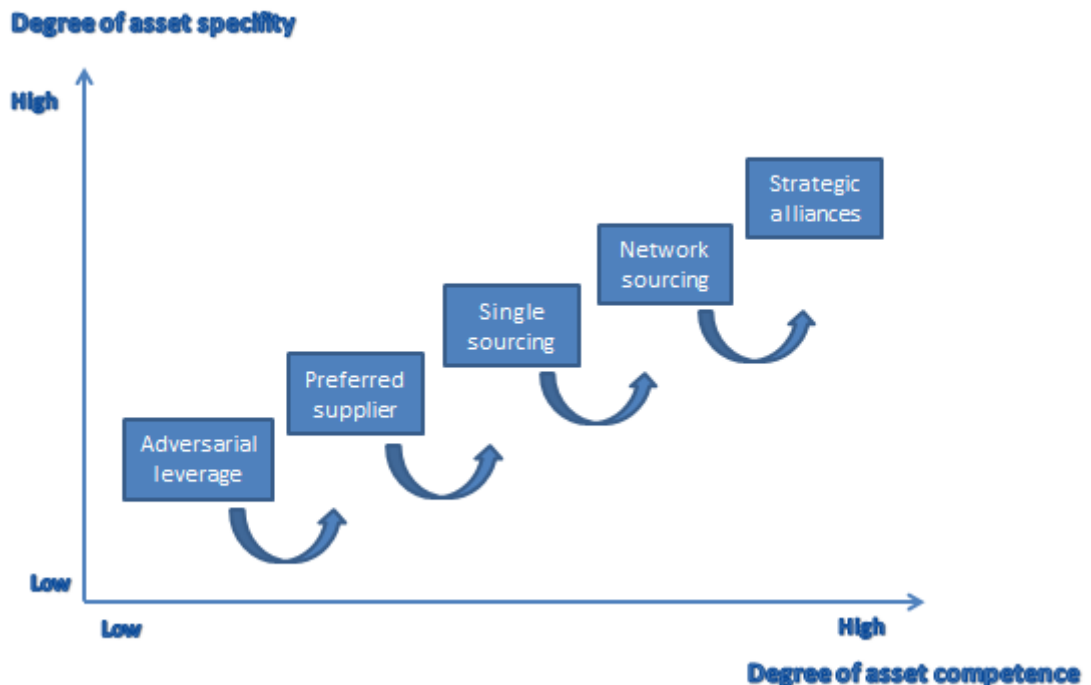


Figure 8: Supplier relationship continuum (adapted from Cox (1996))

Adversarial relationships are a good example of the change in the field of procurement. These relationships focus on comparing the price of products and services rather than

aiming for supplier-customer relationship. Even though the procurement has changed to concentrating on strategic purchasing, arm's length adversarial relationships still has their place. These occur especially in the commodity markets where low asset specificity and little market uncertainty are present. Also the increasing use of the internet as a catalog for comparing specifications and prices across supplier markets has reduced transaction costs for buying products and services. A step from adversarial relationships to medium asset specificity, the products and services are provided by preferred suppliers. Still, the purchased goods or services have low strategic value to the buying company but the contract period is normally longer. Buyers generally use a bidding process to choose a few suppliers which are considered as preferred suppliers. The relationship includes some exchange of forecasts and process plans which makes planning for both parties more explicit. (Schary & Skjott-Larsen 2001, p. 184-185)

Single-sourcing means a relationship where a product or service is acquired from a single source for a specific period of time. These types of relationships are usually related to goods or services linked directly to the core competencies of the buying company.) On the contrary, in multiple-sourcing buying firm uses two or more suppliers to purchase product or service. Much debate has taken place in the last decades about the relative merits of single and multiple sourcing. (Schary & Skjott-Larsen 2001, p. 186)

Both strategies have their benefits and drawbacks. With single sourcing a personal relationship can be more easily established which can enhance the cooperation and sharing of benefits. Additionally the buyer has less administrative work, quality control and scheduling is easier and buyer-tied research can be undertaken. On the other hand, the buying company can become greatly depended on the supplier and the vulnerability of supply might be increased. Whereas in multiple sourcing advantages are with increased competition among suppliers, reduced probability of bottlenecks due to insufficient capacity and more alternatives of sources of services or goods. The downsides of multiple sourcing are related to suppliers' reduced efforts to match buyer's requirements and higher costs for purchasing organization. (Costantino & Pellegrino 2009)

Increasing the degree of asset specificity and competence, a term called network sourcing is introduced. Hines (1994) described network sourcing as a combination of many different aspect of cooperation between suppliers and their suppliers. The unique supplier network structure was popularized by the Japanese automobile industry. The network consisted of multiple layers of suppliers; first tier suppliers provided key components and services, second tier suppliers provided first tier suppliers with components or performed specific services. (Hines 1994) Further, second tier suppliers had their own subcontractors providing them with process capabilities. This kind of customer-supplier relationship is often used in the process of the buying company reducing the number of suppliers whom they deal with (defined in more detail in Subchapter 3.1.3).

Strategic alliances are deep relationships, voluntarily arranged between firms involving exchange and sharing of products, technologies or services. (Gulati 1998) These kinds of relationships appear in the procurement of materials and services such as third-party logistics and transportation. Strategic alliances add value, complementing partners' capabilities with matching of skills, resources and activities. Partners focus on specific activities performing only a part of the process. Partnerships become long-lasting flexible arrangements without a vertical integration. (Schary & Skjott-Larsen 2001, p.193) Baily et al. (2008, p. 220) describe partnership sourcing as commitment by suppliers/customers to a long-term relationship, which is based on mutually agreed objectives. Additionally they name flexibility, co-working, quality and openness and trust as few main characteristics of partnership sourcing. Strategic alliances are located at the top right corner on the range of supplier relationships – scale.

According to numerous authors (e.g. Albronda & Gelderman 2001, Schary & Skjott-Larsen 2001) companies need a model to effectively manage their supplier relationships. Purchasing portfolio analysis have been developed to help companies in resource allocation decisions, maximizing the supply security and to develop purchasing strategies. Kraljic (1983) introduced a model that classifies products on the basis of profit impact and supply risk. This model was expanded by Olsen & Ellram (1997) to analyze firm's supplier relationships. It consists of two dimensions; strategic importance and difficulty of managing the purchasing situation. The strategic importance includes the considering of competence factors, economic factors and image factors. Whereas the managing difficulty is related to product characteristics, supply market characteristics and risk and uncertainty. Purchases are classified to four categories; leverage, non-critical, bottleneck and strategic, which are shown in Figure 9. (Olsen & Ellram 1997)

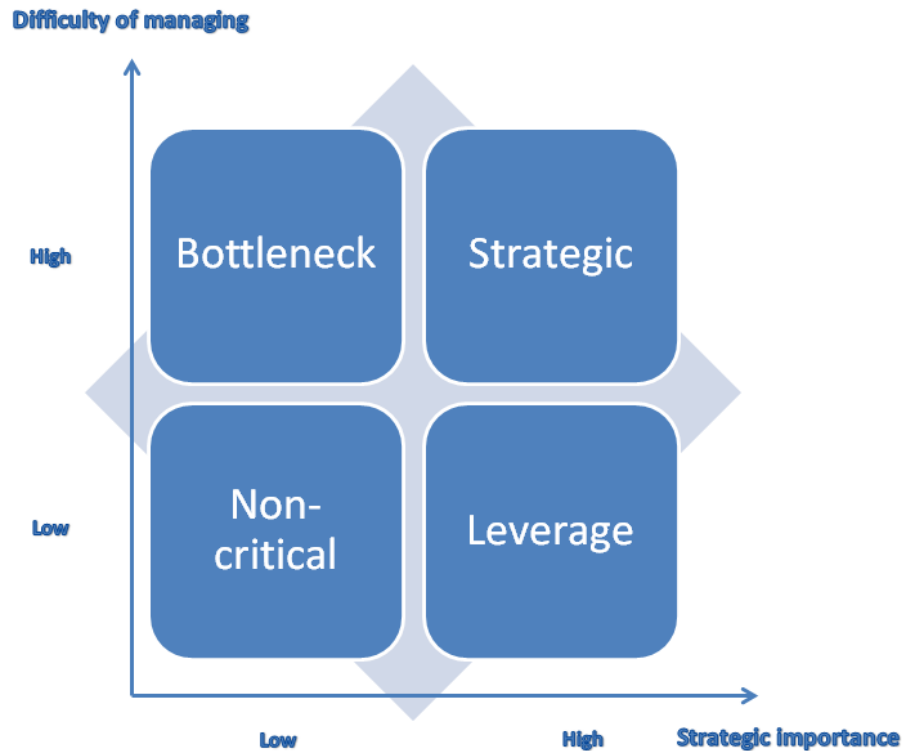


Figure 9: Purchasing portfolio model (adapted from Olsen & Elram (1997))

Non-critical items are low on managing and low with strategic importance. These kinds of items are often standardized and could be outsourced to an external provider. Leverage purchases have a high strategic importance but managing is fairly easy. Schary & Skjott-Larsen (2001) suggest concentrating on single supplier sourcing with leverages for the simple reason that it might enable discounts and lower transportation costs. With bottleneck items standardization of the purchasing process is recommended to keep administration costs down. Substituting suppliers might be searched due the high managing difficulty and low strategic importance nature of the items. Strategic items are high on both the difficulty of managing and the strategic importance. The relationship with the supplier should be close partnership and supplier's firm ought to be integrated to the firm's supply chain. (Schary & Skjott-Larsen 2001)

Additionally, different types of suppliers require different management methods. Supplier management might mean frequent site visits, negotiations and ongoing contacting whereas with some suppliers communication happens irregularly and rarely. Usually with services or great volume components the suppliers require constant attention. On the contrary, commodity suppliers might be seen once a year or even less. Araujo et al. (1999) have introduced a classification of four types of interfaces between the supplier and the customer. The model discusses interfaces mainly related to the component market but it can be applied to services also. The model includes standardized, specified, translation and interactive interfaces. Selecting the appropriate interface is made from the buyer's perspective depended on the nature of the service or goods purchased. (Araujo et al. 1999)

The literature presents various ways to successfully manage different kinds of relationships with different suppliers. Current trends in procurement have decreased the amount of traditional transaction based relationships and increased the kind of customer-supplier relations that need more communication between parties. Relationships can be managed based on the degree of specificity and core competence or purchasing portfolio models. The actions for managing communication expected from the buying company also depend on the amount of suppliers and on the supplier network structure. To conclude, there is no single best way to deal with suppliers and all relationships need to be handled case-specific.

3.1.3 Supplier base reduction

External suppliers are influencing company's success and failure. Without a competent supplier network, companies' own competitiveness is threatened. The ability to manage external resources depends on the proper executing of supply base management strategies. According to Chen & Paulraj (2004) the shift from adversarial buyer-seller relationships to limited number of deep relationships has increased the attention towards supplier base management. Supplier base management is said to be a required element of present-day supply chain management. (Chen & Paulraj 2004) An important part of supply base management is the determination of the number of suppliers that will be utilized for a certain product or service, called supplier base reduction. In this section the benefits and pitfalls, different approaches and the process of supplier base reduction are discussed.

Various authors have recommended reducing the overall supplier base regardless of the supplier relationship strategy (e.g. Ogden & Carter 2008, Goffin et al. 1997, Cousins 1998) According to Trent and Monczka (1999) modern sourcing strategies, which increasingly require closer interaction between buyer and customer, are not feasible with a large supplier base. Therefore, it is not surprising that a number of examples of supplier base reduction can be found in the literature. Goffin et al. (1997) mentions multiple companies that have reduced their vendor base by even 50-90%. Different reasons for reducing vendor base can also be found in the literature. Many authors have listed a number of main benefits, which drive firms to increasingly decrease the amount of suppliers. (Ogden & Carter 2008, Millington 2011)

The most valuable benefits of reducing vendor base (defined in Table 4) seem to be quite similar when comparing different publications. Goffin et al. (1999) state, that the main reason for smaller vendor base is the fact that it leaves more time to buyer to concentrate on ongoing relationships with remaining suppliers. Ogden & Carter (2008) also mention that reducing vendors on a particular service or product frees up resources that can be utilized effectively elsewhere. Consequently, concentrating on the relationship with key suppliers may lead to competitive advantage with for example reduced costs and higher quality. Similarly, Ogden & Carter (2008) argue that such reduction might

improve availability and capacity, increase flexibility, improve quality levels, increase services and responsiveness and lower transportation costs. Additionally, they state that innovation is often increased when co-operating closely with suppliers and that created partnerships with close suppliers have many benefits. Axelsson (2006) also emphasizes the improvement of quality when moving towards fewer vendors. To conclude, it seems that the benefits and importance of reducing supplier base has been widely recognized.

Supplier base reduction has its pitfalls also (defined in Table 4). Although the possible advantages of reducing vendor base are well acknowledged companies aren't focusing enough on the proper implementing of it. (Karlsson & Eriksson-Ritzen 2011) In the literature there is also very little information on the actual utilizing of different strategies to reduce vendor base. Additionally purchasing managers rarely consider the possible risks of these strategic moves which might endanger the implementation of it. (Goffin et al. 1999) Similarly Ogden & Carter (2008) argue that the disadvantages of supplier base reduction are often forgotten for a particular product or service and that once it is implemented, it is no longer considered worth focusing on. They state that the process takes time and effort before, during and after the implementation. According to Cousins (1999) one of the major misunderstandings is to focus on transaction costs and not considering the total long-term costs which tend to be realized later on. Many of the pitfalls of supplier base reduction seem to be connected to the pitfalls of single-sourcing. Various authors mention that having fewer suppliers a number of different risks related to sourcing from sole supplier arise. (Cousins 1998, Goffin et al. 1999) Probably the major impact of this is the reduced competition among suppliers. Due to this, prices and quality might be effected negatively in the perspective of the buying company. Furthermore the close relationship makes the buying company more depended on the remained providers of services or goods. Altogether avoiding these pitfalls is essential for successful supplier base reduction. Although some of the benefits and downsides might not be noticed due to the difficulty of measuring them (Goffin et al. 1999)

Table 4: Benefits and pitfalls of supplier base reduction (combined from Ogden & Carter (2008), Goffin et al. (1999) and Axelsson et al. (2006))

Main benefits of supplier base reduction	Main pitfalls of supplier base reduction
Improved focus on partnership with suppliers	Lack of proper implementation
Reduced costs	Lack of risk assesment and focus on short-term costs
Improved quality	Decrease in competition
Increased flexibility	Dependance on suppliers

The literature indicates some factors for achieving a successful supplier base reduction (Ogden & Carter 2008, Goffin et al. 1998) These include a proper cross-functional team, selecting the right supplier, functional relationship and communication and the support from key management. A decent cross-functional team assures that qualified staff is involved in different parts of the process. Getting inputs and securing the participation of other departments is vital for a successful implementation. Additionally the relationship with the selected supplier should be a win-win type. If this kind of situation is achieved, proper communication, trust and long-term contracts can be accomplished. Hence it will have to be carefully determined which suppliers are chosen as main providers of services or goods. The initiative should also have key-managements support. Key decision makes are suggested to be involved early to the process so that unnecessary delays and efforts are avoided. (Ogden & Carter 2008)

As said earlier, there is a lack of literature in the implementation strategies of supply base reduction. Although Ogden has discussed the topic in few articles (e.g. Ogden 2003, Ogden & Carter 2008). The three main approaches are systematic elimination, standardization and tiering which are described in the following section. In addition, fourth way called bundling is presented in another study (Oh & Rhee 2010) which is also defined in this thesis as an alternative method to supply base reduction.

Systematic elimination is the simplest way of reducing suppliers. It can be accomplished by systematically sending request for quotations to fewer suppliers or decrease the names of suppliers from an organizations database, that are not considered as often utilized suppliers. Sometimes systematic elimination doesn't really decrease the amount of suppliers the company uses, due to the fact that databases might include various supplier that aren't utilized at all. This type of elimination might happen gradually or suddenly decreasing a number of suppliers. According to Ogden & Carter (2003) companies tend to use both of these, in a way which best suits their goals. Systematic elimination might also be utilized using more strategic approach which consists of detailed

analysis of the supply base. Suppliers are valued for example in terms of cost performance, quality delivery or performance.

More often it is recommended to reduce suppliers gradually. The sudden elimination is not suggested due to the fact that it might have effect on supply risk. With gradual elimination suppliers have more time to adjust and increase their capabilities. (Ogden & Carter 2008) According to Ferrin and Plank (2002) regardless of the choice between sudden and gradual elimination this is the most recommended form when reducing supplier base. They take the emotional side of supplier relationships into consideration arguing that it is one of the main factors in generating trust. Systematic approach makes it easier to remove the emotional side of the supplier relationship. Although, this requires the correct management support in order to succeed.

Standardization is considered as a far more complex process than systematic elimination. This form of supplier base reduction requires the collaboration of various departments, such as research and development and technical support. Additionally the process is time consuming and it demands significant amount of planning. Basically, standardization means the cutting of suppliers by reducing the part count in components. This approach is usually exemplified with components but it can also be applied to services. To begin with, the product or service design is simplified or the component parts of services across product lines are standardized. For example, nearly identical parts of a product, which are purchased from different suppliers, are standardized in a way that the parts can be bought from a single supplier. This way, the supplier base can be reduced and supply chain simplified. As a result, supply risk is decreased and inventory might be reduced. (Ogden & Carter 2008, p. 9)

A third way of reducing supplier base is called tiering. The supply base is, in a way, kept the same but the control of whole components or services are delegated to few key suppliers. Hence, the supplier management is outsourced to important suppliers. Consequently these suppliers, which are first tier suppliers, manage the second tier which are now their sub-contractors. This approach is described in more detail in Figure 10. Tiering enables firms to co-operate with a smaller number of suppliers and focus on these relationships. Again, the same benefits as with single sourcing or outsourcing, company can effectively concentrate on its core functions and reduce administrative work. (Ogden & Carter 2008)

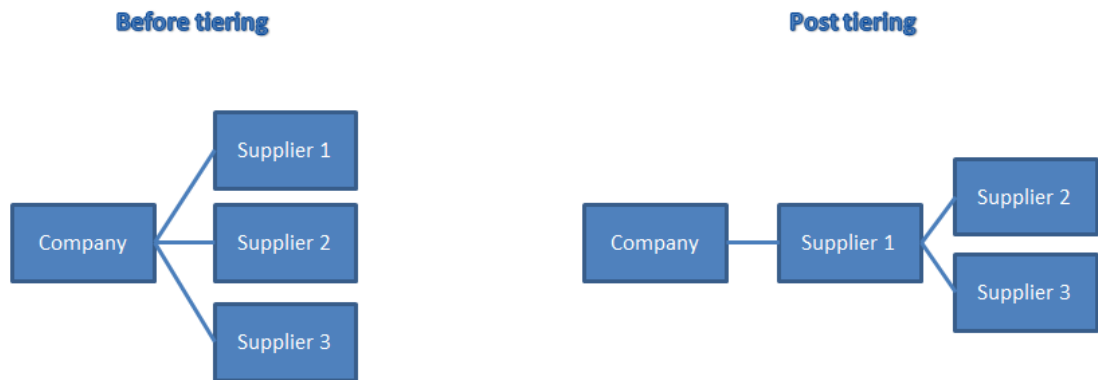


Figure 10: Tiering approach (adapted from Holweg (2005))

The concept was popularized by the automobile industry in the 1990's. Companies outsourced the whole assembling to first tier suppliers. 1nd tier suppliers then acted as integrators which shared the risk with the main manufacturing company. Typically there were about 200 to 300 first-tier suppliers per assembler. Quality and efficiency improved since the buying company could concentrate on monitoring the suppliers' actions. With the stable membership suppliers could safely invest in new technologies and contribute their own knowledge of production processes. Hence the automotive firms had only a small part of the manufacturing process to be handled by them. (Schary & Skjott-Larsen 2001)

The fourth approach, bundling, is rarely presented in literature. In the same way which in tiering, suppliers are put to co-operate together. However, instead of tiering the suppliers they are working together to provide the same service or product (defined in Figure 11). For example, suppliers can be used to buy sub-assemblies instead of individual parts. Again, for the buying company this means outsourcing the supplier management and the real amount of supplier is not necessary decreased. (Pryjma 2011, p. 24) Bundles of suppliers are handled as entities and the company has less interfaces to deal with. Although the approach can be rather useful, it is considered challenging due the fact that the suppliers are needed to work together as teams. This kind of arrangement is often easier said than done and therefore it needs proper planning and management. (Oh & Rhee 2010)

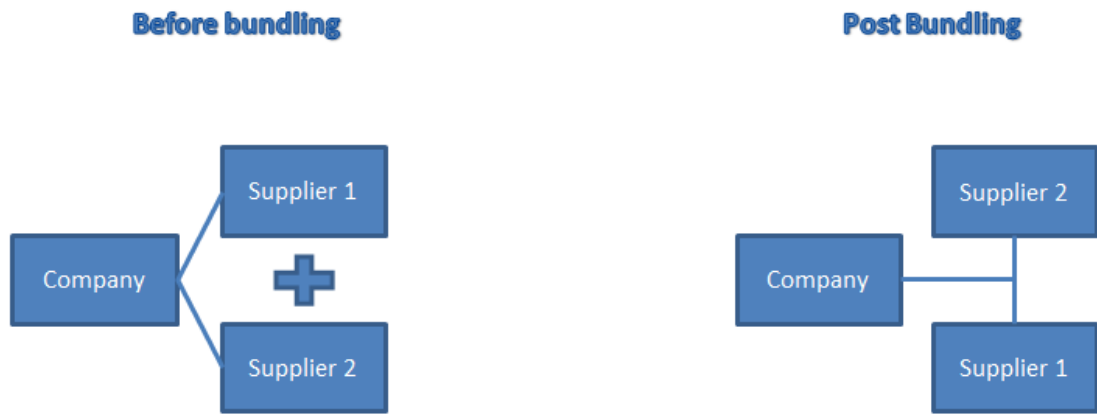


Figure 11: Bundling approach (adapted from Pryjma (2011, p. 24))

All the mentioned methods aim for reorganizing companies' supplier base. Standardization and systematic elimination specifically reduce the amount of suppliers for the buying organization. Whereas tiering and bundling aren't necessary considered as reduction methods as they reduced don't effect to the amount of suppliers in company's supply chain but they do change the amount of suppliers that the company has to handle and deal with. According to Carter (2008) selecting the approach is just a part of a multi-step process of supplier base reduction. In order to accomplish a successful base reduction the process needs to be carefully planned and efficiently implemented. Carter (2008, p. 15) describes the process with six steps which are defined in Figure 12.

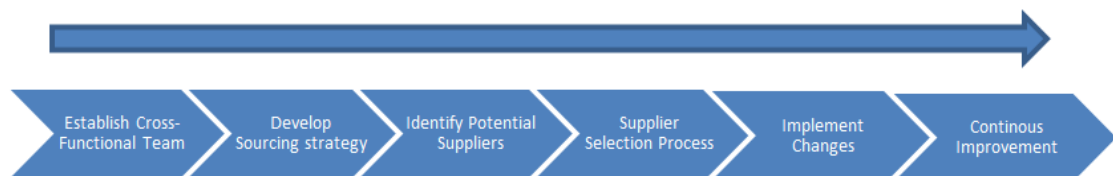


Figure 12: Process of supply base reduction (adapted from Ogden & Carter (2008 p. 15))

At first, a cross-functional team is established. Carter (2008) states that nearly all of the companies in his study utilized cross-functional teams as a part of the reduction process. In other words involving all the relevant stakeholders during the process helps the implementation phase since everyone feel that they have had a voice in it. Furthermore cooperation between different departments, such as field engineers helping the purchasing department, can decrease potential problems and risks. Simultaneously with the first step a sourcing strategy is developed. In this step, goals and objectives of the project are defined. (Nafie 2012) Carters study (2008) shows that some companies hired outside consultants whereas others devoted internal team resources to discover the process. Although the strategies varied in different firms, all of the companies highlighted the importance of a decent plan for achieving the set goals and objectives. The third and the fourth phase consist of identifying potential suppliers and selecting them. For most companies, this step involved developing lists of potential suppliers and criteria for re-

quest for quotations and visiting suppliers' sites for information gathering. Suppliers might be selected through negotiating with them or evaluating the information gathered. (Carter 2008)

Despite the fact that the first three parts of the process are time-consuming, the implementation can be considered as the most difficult one. Some of the major risks related to this phase are for example system integration, process control, supplier validation, quality and communication issues. Implementation step might consist of supplier exit and new supplier entrance, new supplier plans, IT integration plan and communication plans. The final phase of the process, benchmarking and continuous improvement, involves ongoing measurement and management of the supplier. According to Carter (2008) although this phase is also carried out differently in different companies, some similarities can be found. Most firms establish some type of periodic re-evaluation for monitoring supplier performance. Additionally, continuous benchmarking, applying lessons learned and forming continuous improvement teams were found useful among companies. (Carter 2008)

To conclude, it can be seen that supplier base reduction hasn't got much of attention in the literature. Nevertheless, in recent years studies have been conducted and companies have developed different ways of approaching supplier base reduction and investigated the benefits and pitfalls of it. Maybe the biggest challenges of supplier base reduction are still concerned with the actual process, which highly differ between different companies reducing suppliers. If planned and implemented correctly, supply base reduction can have a tremendous impact on organizations competitiveness.

3.2 Service quality management

Managing service quality differs from managing the quality of goods or products. In product quality, quantitative tools are often used as measurements. Instead, with services a customer expects a consistent, reliable and timely provision of a service and a service provider who possesses the skills necessary to perform the required activities. Additionally, the supplier is assumed to be communicative, respectful and understanding in terms of customer needs. Thus, the measuring of service quality requires the measuring of supplier quality, amongst other things. (Miller, Byrd & Kriger 1999) This chapter introduces the factors related to service quality management.

3.2.1 Supplier quality management

During the last decade, the importance of quality and its benefits have been well acknowledged (Baily et al. 2008). The success of a supply chain is depended on optimizing resources but also the effectiveness of partner firms in executing mutually beneficial activities at the lowest possible cost (Christoper 1998). Numerous studies suggest how supplier can effectively improve the performance of its purchasing units in a dy-

dynamic environment as far as consumer expectations are concerned. The impact of supplier quality on an organization's performance is broad and direct and it can be said that company's quality performance (output) can only be as good as the quality performance of its suppliers (input). (Samson, Jonathan & Wycliffe 2013)

There has been multiple different approaches and models postulated by recent literature on the supplier quality management (from now on referred as SQM). Many of the authors have identified similar criteria pertinent to managing supplier quality (combined in Table 5). Fai Pun (2006) mentions strategic alliance, supplier development and supplier monitoring as the key attributes of SQM, and these attributes include several sub-elements. Strategic alliance includes the buyer-supplier partnership and technology and information sharing. Supplier development contains sourcing strategies, potential supplier evaluation and supplier motivation. Supplier monitoring consists of supplier performance measurement and supplier performance improvement. Similarly, Yeng & Lo (2002) describe SQM with factors such as management responsibility, supplier selection, supplier development, quality measurement, supplier audits and supplier integration. In this chapter, a combined model of the presented approaches will be formed and described in more detail.

Table 5: Supplier quality management attributes (combined from Fai Pun (2006) and Yen & Lo (2002))

Supplier quality management attributes	
Strategic alliance and management responsibility	<ul style="list-style-type: none"> • Buyer-supplier partnership • Technology and information sharing • Total quality management
Supplier development	<ul style="list-style-type: none"> • Sourcing strategies • Potential supplier evaluation • Supplier motivation • Supplier training and education • Supplier integration
Supplier monitoring	<ul style="list-style-type: none"> • Supplier performance measurement • Supplier performance improvement • Feedback

3.2.2 Strategic alliance and management responsibility

Probably one of the most significant factor of SQM is the buyer-supplier relationship. This has been emphasized by numerous authors. (e.g. Baily et al. 2008, Van Weele et al. 2010, Stevenson 2012, p. 679) The partnership changes the business practices and improves performance of alliance partners in a competitive environment. This enhances sharing of technology and information and promotes strategic integration and communication. The relationship should include mutual respect, equal participation in decision-

making, mutual accountability and transparency. Additionally Fai Pun (2006) claims, that efficient and accurate information exchange activities amongst partners need to be organized. The sharing of technology refers to accessing critical information and compatible information systems, examining how buyer shares intellectual, human and physical assets with the supplier and establishing confidentiality and non-disclosure agreements with key-suppliers.

Management responsibility has been seen as the driver of the SQM system. Managing supplier's quality has to be a strategic procurement process. Fai Pun (2006) Baily et al. (2010, p. 134) introduces the concept of total quality management. The philosophy is based on the active involvement of all concerned. Suppliers and customers and the company's own workforce should together be involved in determining quality. Because suppliers are seen as allies, inspections and supplier assessment are regarded as more of elimination and prevention of defective work. The core ideas of total quality management are working as teams with the suppliers, involving supplier and focus on the process. (Baily et al. 2010, p. 134)

3.2.3 Supplier development

In supplier development it is highly essential that both customer and supplier are committed working together for achieving long-term benefits. Buying firms can perform various activities to develop supplier performance and capabilities, such as supplier evaluation, raising performance expectations, recognition and awards, supplier training and education, technical and financial assistance and exchange of personnel between the buying firm and the supplier. (Fai Pun 2006, Yeng & Lo 2002) Research shows that companies operating in competitive markets are putting more effort in their supplier development programs. (Hahn et al. 1990)

The evaluation and selection of suppliers can be seen as the first step of supplier development. The potential suppliers need to be evaluated with proper selection process with adequate rating systems so that the prospective suppliers meet the requirements satisfactorily. It is crucial that the selected supplier shares the buyer's vision and has commitment to the relationship. (Weber et al. 2000, Fai Pun 2006) The buyer-supplier relationship is no longer based on only the price factor. Quality, delivery, flexibility are examples of important strategic and operational factors in supplier selection decisions. Additionally, buying company needs to make sure that suppliers are fully engaged in organizations total quality management. This involves the identification of key performance indicators (KPI) e.g. reliability, quality and service level. (Yeng & Lo 2002)

Supplier integration is an approach that consists of firms collaborating to leverage strategic positioning and improve operational efficiency. Many companies today use the integration and supplier involvement to gain competitive advantage. The buying company needs to make a decision in what stage of the process the supplier is involved.

(Baily et al. p. 143) Allen and Chandrashekar (2000) highlight the importance of orienting the contractor. Most companies provide a thorough orientation for their new internal employees, whereas contract workers report to work with inadequate information to complete given tasks. To address this issue, companies should include external employee orientation to reduce performance failures, anxiety and resentment later. (Allen & Chandrashekar 2000) Other major aspect of supplier development is supplier motivating. Supplier motivation is defined as the willingness to enhance supplier performance and attain long-term buyer-supplier relationships. Performance expectations, training and educating supplier's staff and technical and financial assistance are examples of commonly used motivation factors. Furthermore, recognition and rewards can be the source of motivation for the supplier. Awarding can be a certification system, which has multiple stages the supplier can qualify. Rewarding can also occur in a form of promises of future benefits. (Krause & Scannell 2002)

3.2.4 Supplier monitoring

According to Gordon (2005) most organizations are deploying supplier performance measurement in some forms but the increased reliance on suppliers own ability, organizations are under pressure to avoid supplier problems. Therefore it is vital to effectively use internal resources to improve key suppliers' performance. Gordon (2005) introduces a seven step process for developing supplier assessment, which is described in Table 6.

Table 6: Supplier assessment development process (adapted from Grodon (2005))

Step	Topic
1	Align supplier performance goals with organizational goals and objectives
2	Determine an evaluation approach
3	Develop a method to collect information about suppliers
4	Design and develop a robust assessment system
5	Deploy a supplier performance assessment system
6	Give feedback to suppliers on their performance
7	Produce results from measuring supplier performance

First it is critical to determine a strategy for supplier that relates to overall organizational goals and objectives. After assuring that the performance goals of supplier and customer are aligned, an appropriate evaluation approach should be chosen. Certain aspects of supplier performance that would be beneficial to evaluate are: financial health, operational performance metrics, business processes and practices, enabling behaviors or cultural factors and risk factors. The challenging part is the collecting of the above information. Nonetheless, Gordon (2005) suggests questionnaires, site visits and third-party standard certifications as ways to gather the required information. Typically the supplier surveys are completed by quality managers, site managers or owners. Methods for the

surveys can include reporting on survey results, supplier performance metrics such as KPI's, supplier assessment reporting or scorecards. As a downside, the validity might be questionable due to too few data points gathered from too few people. (Gordon 2005, p. 23)

Furthermore, the chosen assessment system should be designed with care. Approaches may include third-party standards, benchmarking performance against industry leaders, audits or KPI's based on internal customer feedback. Above all, the metrics of the approaches have to be relevant to the business and based on generally accepted best practices. Designing and developing such supplier performance measurement system requires deep business knowledge and knowledge of measurement methodologies. By the same token, expertise is also needed with avoiding the pitfalls in deploying the system. A functional deployment requires subject matter expertise, survey instrument development expertise and knowledge of the IT. (Gordon 2005, p. 23-24)

A major part of the process, highlighted by numerous authors, is the giving and processing of actionable feedback. (e.g. Gordon 2005, Yeng & Lo 2002, Baily et al. 2008) Customer companies should work on the critical issues on the relationship and have real dialogues with their suppliers. A two-way information flow has to be developed between the supplier and the customer and expectations of actions should be communicated or those actions will not occur. To conclude, supplier monitoring is about measuring supplier performance which can lead to supplier development and supplier performance improvement. Companies should systematically implement supplier performance tracking systems to gain financial and competitive advantage. (Baily et a. 2008)

3.2.5 Statistical process control

Baily et al. (2008, p. 135) introduces an aspect of quality management which is often used as a key part of quality strategy. Statistical process control, SPC, manages quality in process with statistical methods. Quality is maintained by monitoring, feedback and adjustment system. The main idea behind SPC is the prevention of defective work and controlling quality as a proactive approach. Oakland (2008) defines SPC as a tool that measures and achieves quality control providing managers the ability take actions for controlling quality. SPC can be employed in manufacturing context but the ideas may be applied to any activity where a process takes place. The input can be anything from materials to knowledge and the output may be a product or a service. (Baily et al. 2008, p. 135) The feedback loop of SPC is presented in Figure 13.

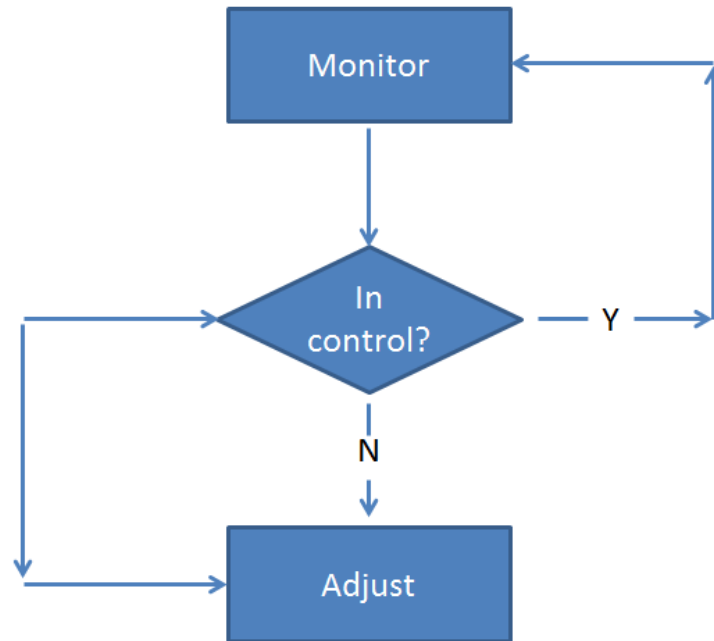


Figure 13: Feedback loop in SPC (adapted from Baily et al. (2008, p. 135))

If the process is considered not to be in control, adjusting is recommended. The loop comes back to the controlling question and in case of a yes-answer, SPC guides to monitor the process. Attention must be paid to ensure that the process is meeting the requirements. SPC is reliant on the operators of the process, which has the responsibility for quality. If the inputs and process are coordinated decently, the outputs are expected to meet the specification. (Woodhall & Montgomery 1999) In addition if the supplier is applying SPC correctly, the customer knows that their own inputs are in accordance with the specification and requirements agreed. This is due the fact that the service of the supplier is regarded as suppliers output and as customers input.

One of the commonly used key tools in SPC are control charts. The data from measurements of variations on the process map are monitored with control charts which ensure that deviations are detected before defective production takes place. (Woodhall & Montgomery 1999) The control chart usually includes a mean area and upper and lower control limit. If the process is exiting mean and achieving a control limit, controlling actions will be taken. Control charts are one of the approaches to SPC, focus on continuous improvement and the design of experiments are examples of other techniques employed in SPC. (Oakland 2008)

3.2.6 Other aspects of quality management

Quality management has faced a change in recent decades, from controlling quality to assuring quality. In other words, attention is no longer paid to only measuring and assessing of services and products but to the management systems employed by suppliers and the buying firm itself. As a result, several approaches to managing quality have

been developed in the literature. (Van Weele 2010) In this section the seven wastes, costs of quality and value analysis are introduced.

As a part of lean thinking, the concept of seven common wastes was suggested. These wastes are considered as non-value-adding activities and they increase unnecessary costs. The wastes usually appear in almost every process and above all, services that include internal and external workers might increase the amount (Womack & Jones, 1996). Paluch (2009) defines the wastes as overproduction, waiting, transportation, extra processing, inventory, motion and defects. In terms of services, especially waiting, transportation, motion and defects are highlighted. Example of typical waiting occurs when another employee is finishing a job which has to be done first. Unnecessary transportation might take place if communication is ineffective or if people, plants and processes aren't properly linked. Motions are also considered as wasted effort if someone for instance crawls over around equipment to get another piece of equipment or a truck is incorrectly. Defects, such as poor quality means waste. Quality assurance should always be considered as an investment instead of a cost. To conclude, waste means costs. Therefore wastes need to be named, identified and more importantly, eliminated. (Paluch 2009, Baily et al. p. 155)

Crosby (1984) argued that it is not the quality, but the lack of quality that adds costs. For a long time, costs of quality were considered equal as the costs of correcting errors. Although, the emphasis shift to quality assurance reduced the costs of correcting and somewhat increased the costs of preventing errors. (Van Weele, 2010, p. 240-241) Van Weele (2010, p. 240) amplifies that total costs of quality consists of three types: prevention costs, assessment costs and correction costs. Prevention costs are the ones caused by deliberate prevention. Assessment costs are related to the timely recognition of errors and correction costs result from fixing errors. By the same token, Baily et al. (2008, 153) describes economics of quality with prevention and divides failure costs to internal and external. Internal costs arise from errors within the operation whereas external costs are caused by error being passed to an external customer. Both the authors (Baily et al. 2008, Van Weele, 2010) describe the development of total costs of quality with the same manner; failure and appraisal costs have decreased whereas prevention costs are increased. Nevertheless, the total costs of quality decline over time.

Value analysis or value engineering refer to the same basic techniques. These terms are often used interchangeably and they both aim to increase value for money whether by reducing the cost of providing a service to satisfy given needs or by increasing the satisfaction gained from a service. The idea is to form a team, which consist of members for example from procurement, production and design. These teams operate part-time, select target for analysis and proceed systematically through information, speculation, investigation, recommendation and implementation. (Baily et al. 2008. p. 156-157) Although value analysis is often presented in the context of products, Ma, Xu, X-F & Wang (2010) introduce the utilization of value model with services. They argue, that in

service engineering, customer's service requirements are difficult to express accurately and that with value models both functional and non-functional aspects of requirements can be described.

3.3 Contract management

There appears to be different definitions for the term contract management in the literature. According to some authors the term refers to the entity of governing contracts, referring to preparing, signing, controlling and ending of contracts (Tieva 2009, Rekonen 2007). However, some authors define contract management more as a post-contractual process to ensure all the parties fulfil their contractual obligations (Baily et al. 2008, Van Weele 2010). Nevertheless in the case of services studies are fairly unanimous of the fact that properly planned and implemented specifications and monitoring of supplier's quality and performance are regarded as highly important factors in managing of company's contracts with suppliers. (e.g. Gordon 2005, Smeltzer & Ogden 2002) In the following section the challenges and responsibilities of contract management and the requirements for service level agreements are discussed.

3.3.1 Challenges and responsibilities

According to Baily et al. (2008, p. 420) contract management is often given overly less attention. Additionally, companies find difficult to define who is responsible for ensuring the supplier delivers promised goods or service and performs as expected. (Baily et al. 2008, p. 420) Van Weele (2010, p. 100) adds that especially with services, contract management and the responsibilities related to it are often blurred since the nature of services. If contract aren't managed co-operatively between company's different functions, service levels previously agreed might not be met and the expected benefits negotiated are failed to reap.

Rekonen (2007) also introduces challenges related to contract management. Above all, companies are having hard time to managing all the contracts since resources aren't balanced properly. This might be caused by oversized amount of contracts and the lack of properly planned responsibilities. Furthermore, there are often too many low-importance contracts that demands wasted resources. Although companies might acknowledge this, the decision making on which contracts are kept and which are reduced can be challenging. (Rekonen 2007) According to Haapio & Haavisto (2005) contract management should be delegated to a team which has the adequate technical, business, implementation and judicial know-how. If these sectors can be linked and proper communication among parties succeeds, contract management is far more likely to be functional.

Baily et al. (2008) argues that companies up to 20 per cent don't have a contract management strategy or do not involve procurement function in the contract management

phase. They state that companies that align procurement with other departments can extract the most value of their contracts. The amount of involvement of the procurement department is depended on the organization's model and culture. Likewise Van Weele (2010, p. 101) state that the role of procurement depends on the importance of the service bought. In case of highly critical services company experts pay an important role and often they already have a deep relationship with the supplier and the technical know-how of the service acquired. Hence it may be difficult for the buyer to interfere. The procurement will take fair price, clear contractual agreements and some performance specifications into account when evaluating the supplier. Whereas, the internal customer might prefer focusing on supplier's flexibility, quality and loyalty which aren't always easy to measure with qualitative indicators.

It seems that there are no standard approaches to the challenge of responsibilities. The internal customer will keep the pace with critical services and the buyer cannot go any faster than the company expert will allow. However, buyer can provide information concerning for example the purchasing spent of that is related to services, supplier base and the quality suppliers have provided. If the buyer can offer information and transparency that are beneficial to the internal customer, more factual discussions can take place. If the roles and responsibilities are clear to both parties, superior value can be gained for the money spent on the service. Hence, the buyer should act in the interests of internal customers to create credibility. To conclude, company experts might not see the value of interfering procurement unless the buyer can offer some objective information and strategic and commercial interests of the company to dealing with suppliers. Buyer has to have a facilitating and supportive role rather than taking lead by being strictly cost driven (Van Weele 2010, p. 101)

3.3.2 Service level agreements

As mentioned earlier the planning of proper specifications is necessary yet demanding when contracting for services. In many cases there exists a gap between customer's needs and what the service provider is really able to provide. Bridging this gap is often a matter of identifying the needs of the customer and designing of comprehensive specifications (Trienekens, Bouman & Van der Zwan 2004). Since specifications based on outputs or outcome requires the supplier to modify its value proposition it is considered as an advisable method for specifying services. With this type of specifying service level agreements are often used in the relationship with the service provider. Service level agreements include certain key aspects and benefits.

SLA (used from now on) is a contract based on performance, which aims for achieving a mutual understanding among the supplier and the buying organization of what is expected from the service and the supplier. (Iloranta & Pajunen-Muhonen 2008) Similarly, Wustenhoff (2002) defines SLA as an expectation setter between consumer and provider. However, the objective of a SLA is to clearly specify the service. In other words, the

specifications of the service have to be described in detail, which in practice means defining certain key performance indicators. The fee paid for providing the service can be in relation to the performance being fulfilled. In this case, if the requirements of the SLA aren't met properly the fee will be reduced and vice versa. (Iloranta & Pajunen-Muhonen 2008)

Different services have different kind of contracts. Hence, the planning of a SLA should be performed case-specificly. Iloranta & Pajunen-Muhonen (2008) suggest some general questions that should be considered when drawing up a contract.

- What is needed?
- What are the benefits of the bought service and how they can be measured?
- What resources are required from the parties for the expected results to be enabled?
- What costs occur when certain resources are being used?
- What inputs does the production of the service demand?
- How and with what criteria it is evaluated when the service is completed or when the objectives of it have been achieved?
- Which is the ratio of fees and results and what it is based on?

By the same token, Wustenhoff (2002) argues that SLA has five key points: the promising of the service provider, the delivering of these promises, measuring of the delivery and responsibilities, actions when the service provider fails and the changing of the SLA over time. He underlines that non-performance can be costly for the service provider. However, defining penalties clearly in advance decreases the amount of failed performance since the provider truly believes in its ability to achieve these levels. Trienekens et al. (2004) concludes that the SLA should be thoroughly investigated together with the service provider and the buying company so that both parties can agree on the contents of it. Iloranta & Pajunen-Muhonen (2008) highlights that objectives of the performance and key performance indicators has to be understood alike. SLA requires that the service level is continuously monitored and evaluated. Hence, the planning of the supervision and reporting to the supplier of the results and occurred problems is important. According to Baily et al. (2010, p. 424) the agreement should also have mechanisms for regular reviews of service, price and strategy and preparations for an exit plan if the service provider doesn't meet the expected results in an adequate level.

The preparation and planning of a decent SLA require time and effort. However, a carefully drafted one can have various benefits. Firstly, SLA clarifies the relationship of the parties by setting boundaries, conditions, penalties and expectations. It also creates a link between the service levels and service cost. The ability to measure against key performance indicators sets goals for both the internal organization and the service provider. Therefore, continuous quality improvement might be enhanced. (Wustenhoff 2002) Although SLA's are fairly depended on the service bought, certain recommendations for

it can be found in the literature. Most frequently appearing recommendation is keeping the SLA simple. Complicated agreements are more likely to fail and hard to follow. Measurable and realistic SLA improves the ability to perform accordingly and enables the goals to be achieved. Another highlighted point is bringing the procurement and technology managers together during drafting of an SLA. Co-operation within these departments clarifies objectives and responsibilities of monitoring. As a result, the commitments to KPI's can be arranged properly. (Baily et al. 2010, Wustenhoff 2002).

3.3.3 Importance of knowledge management

Knowledge has become a strategically significant resource for companies. (Liebeskind 1996) By knowledge it is referred to information whose validity has been established through tests of proof. Although knowledge as itself doesn't represent much of a value, with proper capturing, storing, sharing and using of that knowledge competitive advantage can be gained and sustained. (Davenport & Prusak 1998) This process is defined as knowledge management. Lee (2001) states, that the major issue for management is the changing of individual to organizational knowledge. Additionally managing the organizational knowledge in a way that successful performance can be achieved is challenging. Knowledge management and its impact on service outsourcing partnerships and service outsourcing success have been studied in the literature by different authors (e.g. Lee 2001, Gallivan & Oh 1999) According to Lee (2001, p. 323) knowledge sharing between the service provider and the buying organization is one of the key factors of outsourcing partnerships based on mutual trust.

Knowledge sharing can be defined as activities of transferring knowledge from an individual, group or organization to another. (Lee 2001, p. 324) Hence, in an outsourcing relationship the sharing has to be both internal and external if the major benefits of it are wanted to achieve. Although organizational knowledge is inherently created and resides within individuals, learning can also be acquired externally. (Lee & Kim 1999) More often, new competencies and capabilities are developed through strategic alliances between service providers and customer companies. Lee (2001) argues that the knowledge shared includes both tacit (which cannot be expressed in verbal or written form) and explicit (which exists in symbolic or written form) knowledge. The sharing of knowledge is connected to partnership quality which has a direct impact on outsourcing success. In addition to knowledge sharing, another key factor for achieving outsourcing success is the ability to learn or acquire the needed knowledge. Lee's (2001) model of different aspects effecting to outsourcing success are described in Figure 14.

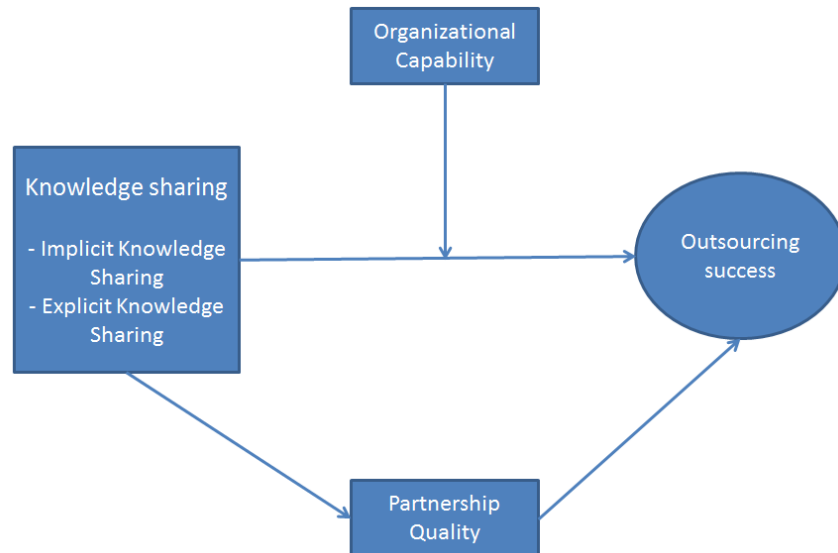


Figure 14: Aspects influencing outsourcing success (adapted from (Lee 2001))

According to Lee (2001, p. 325) many organizations have struggled with forming and managing a successful outsourcing relationship. This originates from the fact that the nature of outsourcing with service providers is evolved from a contractual relationship to partner relationship. Hence, numerous firms have established intimate relationships to overcome this problem. Lee (2001) argues that the knowledge sharing between the supplier and the buying company, both implicit and explicit is directly connected to the partnership quality. However, the sharing of explicit knowledge is found to be even more effective when compared to the implicit one. Therefore, companies should aim for transferring the implicit knowledge into more appropriate form, explicit knowledge. This is highlighted especially in terms of services buying. Since these factors have an impact on the partnership quality, they also affect the outsourcing success. The sharing of knowledge between service provider and customer company enables relationships based on trust, business understanding, benefit and risk sharing and mutual goals.

Knowledge sharing and the outsourcing success are also depended on the internal organizational capability. Hendriks & Vriens (1999) view organization as a knowledge system, which creates shares and uses knowledge. Therefore, knowledge management should be considered as a continuous managerial activity. According to Lee (2001) in terms of services this especially concerns the internal relationships such as the purchasing function and the internal client. Organizations capacity and capability to arrange the sharing of knowledge in terms of internal resources is considered vital for the succeeding of the outsourcing activity.

4. RESEARCH METHODOLOGY

In this chapter the case company of the study is introduced. Second, the operational environment of the company and the areas of focus of the study are presented in more detail. As a follow-up to researching the literature of the subject, the focus is turned to empirical research. This section introduces the different forms of research methodology utilized. In addition the steps of the research process and methods of gathering and analyzing collected data are described.

4.1 Case company and operational environment

SSAB is a Nordic and US-based steel company. SSAB has a global reach and it is the leading producer of Advanced High Strength Steels, Quenched and Tempered steels, standards strip, plate and tubular products. Although the core business is focused on steels, SSAB offers construction solutions also. Recently in July 29, 2014 Ruukki became a part of SSAB. Ruukki was a Finnish industrial company with a focus on steel and construction business. The merger created a global steel company which promises to offer value-added products and services. The new company has five divisions: SSAB Special Steels, SSAB Europe, SSAB Americas, Tibnor and Ruukki Construction. The major steel production sites are located in three countries; Oxelösund, Borlänge and Luleå in Sweden, Raahel and Hämeenlinna in Finland and in Motpelier and Mobile in USA. SSAB is an exchange listed company with approximate net sales of 6.4 billion euros. Currently the number of employees is around 17 300 located in 50 countries and the company has an annual steel production capacity of 8.8 million tonnes. The production locations of SSAB and the sales coverage are presented in Figure 15.

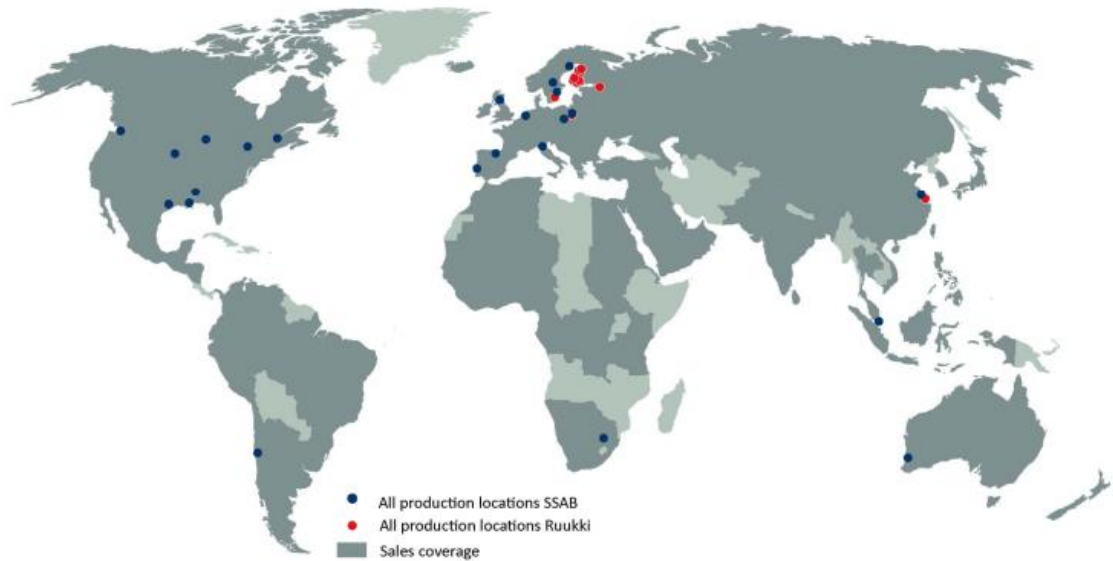


Figure 15: SSAB's global production locations and sales coverage

This thesis was conducted in Raahe, which is SSAB's biggest Finnish site. Raahe's factory provides employment to approximately 2400 employees. In recent years the hot metal production has been at around 2.3 million tons whereas the maximum annual hot metal production is around 2.6 million tons. The main products are hot rolled plates and coils and the future focus will be on special steel production. The site of the Raahe Works is around 500 hectares and it includes around 40 kilometers of roads and 30 kilometers of railway track. The site also has its own harbor, where roughly 600 ships call yearly.

The most essential parts of the production process of Raahe steel factory are coking plant, blast furnaces, steel mill and rolling mills. Most of the raw materials, such as coal, arrive by ship to the plant harbor, from which they are transported and fed to production. Coke, which is needed to make iron, is produced from the coal at the coke plant. In the blast furnace, raw materials are melted and the created raw iron is transported to steel mill through desulphurization. With converters at the steel plant, recycled steel is added to the raw iron and extra coil is removed. This is how steel is produced. Furthermore, the steel is mixed with different alloys, so that the desired composition can be created. The molten steel is then casted and cut to slabs, which are transported to plate mill or strip mill for further processing. The process is illustrated in appendix B - Raahe works production flow.

The procurement function is divided according to divisions. However, the Nordic procurement includes the sourcing of both SSAB Europe and Special Steels – divisions. The organization consists of four categories; raw materials, production related, maintenance & investments and procurement development. The organization is described in Figure 16. The categories are managed by category managers, who report to chief procurement officer. The structure of different categories vary, nevertheless, production

related is separated to countries, Finland and Sweden. Furthermore, Finland and Sweden have somewhat different characteristics in terms of organizational structure. In Finland, production related - category concludes production related materials, indirect sourcing and subcontracting & production services. The position of production services in the organization chart is indicated with bolded lines in Figure 16.

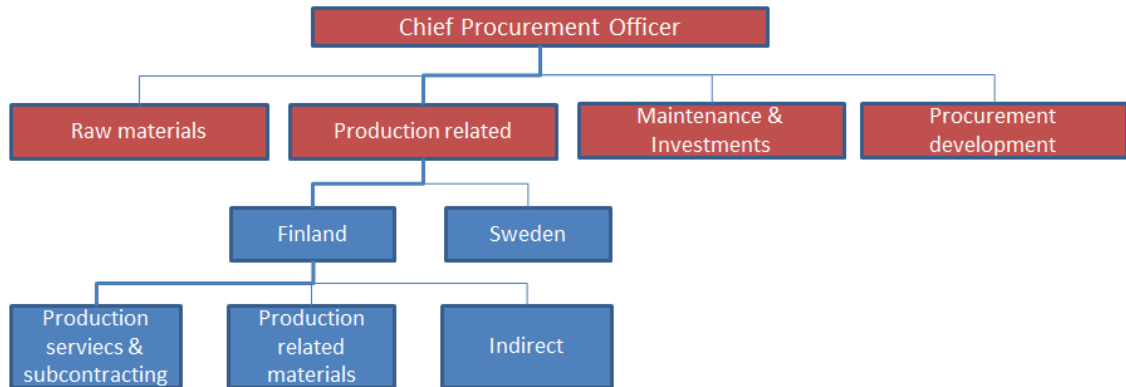


Figure 16: SSAB Europe and Special Steels - procurement organization

4.2 Data gathering and analysis

The gathered and utilized data in this study is both qualitative and quantitative. The collection of this data has been conducted with various methods. Most of the quantitative data has been collected using case company's information systems (SAP ERP, ARTTU) and databases. On the contrary, most of the qualitative data has been gathered with interviews, which are described in more detail in this chapter.

4.2.1 Quantitative data

According to Saunders (2012, p. 417) quantitative data can be classified into data types. The main types are categorical and numerical data. Numerical data refers to a type which can be measured numerically as quantities. Instead, categorical data is unfeasible to measure numerically. Furthermore, categorical data is classified to descriptive or ranked data, whether it can be ranked or classified into more than two sets. Numerical data can be defined as interval or ratio data. This classification is based on the ability to calculate the difference between the data values. Moreover, if this data can take any value within a specific range it is considered as continuous data. Conversely, if not, the data is discrete. The differences between the data types are important to understand for two reasons. Firstly, with the right data types it is more feasible to conduct the analysis of the data. Secondly, the more precise the scale of measurement is, the more feasible it is to choose the right analytical technique.

In this Thesis, the quantitative data gathered and analyzed are both numerical and categorical. For the most part, the categorical data is descriptive nominal data or ranked

original data. With these are namely referred to data concerning relevant names and locations. Additionally, different attributes, features and types of subjects are regarded as categorical data. Although the data can be classified into more than two sets, the sets cannot always be placed in rank order. On the contrary, numerical data concerns the figures for example related to dates, shares and values. All of the data values are ratio data, since the relative differences can be calculated or for that matter pointed. The ratio data is appearing in both types, continuous and discrete data.

Before the actual analyzing of data, Saunders (2012, p. 416) recommends preparing, inputting and checking of data. Then, the data is often arranged to a data matrix. In this research, all of the numerical values were firstly arranged to tables in order to conduct proper coding. By this is meant the recording by using numerical codes for the data. This enables the researcher to enter the required data more soundly. (Saunders 2012) The data was also checked for possible errors before the actual analysis. Lastly, the collected and analyzed data was explored and presented in summarized forms.

4.2.2 Interviews

Interviews are used to gather valid and reliable data concerning the research questions and objectives. Typical for a qualitative research are often methods based on qualitative data, which can be gathered with interviews. One of the most important aspect of interviews is that both participants understand the theme and the subject similarly (Järvinen & Järvinen 1996). According to Saunders (2012) there are many different typologies of interviewing types. Nevertheless, it seems that the most common way to categorize these is into three different classes; structured, semi-structured and unstructured interviews. (Saunders 2012, p. 320)

Structured interviews are predetermined and standardized. The set of questions are identical and the most common way is to use questionnaires. The questions are often multiple choice and the different alternatives are given. Structured interviews are used to collect mostly quantitative data or data which can be modified to quantitative form. (Saunders 2012, p. 320) On the contrary, both semi-structured and unstructured interviews are often regarded as qualitative research interviews since the format is non-standardized. In semi-structured interviews the researcher has a list of predetermined questions, similarly with structured interviews. The difference is that the alternatives are not given beforehand in the semi-structured version. The order of questions might also be varied depending on the flow of each different conversation. The third type, unstructured interviews are the most informal ones. These are also regarded as in-depth interviews. There is no list of questions or a structure of what the researcher should follow. However, the interviewer needs to have a clear idea about the aspects that has to be covered. (Saunders 2012)

In this thesis, the interviews conducted are either unstructured or semi-structured, depending on the interviewee and the theme. The themes and the interviewed personnel are outlined in appendix A. All of the interviews included a clear topic beforehand and in some cases, partly arranged and planned questions. Additionally, some of the interviews can be considered utilizing multiple methods, which support each other. The gathered data is analyzed by summarizing the interviews and categorizing the received data. According to Saunders (2012) summarizing involves the compression of long statements into more brief concise statements. Whereas by categorizing is referred to development of categories and sorting the data according to these categories.

5. CURRENT STATE ANALYSIS

This chapter outlines the current situation of production service contracts at case company in the factory of Raahe. The purpose is to describe the services in general and to present features of current contracts of these services. This includes the scope of contracts, supplier base, spend analysis, revenue logics and the current contract validities and agreement periods. Additionally, it is presented how the contracts are managed and what are the responsibilities of different departments at case company and the supplier. As a comparison, the situation with similar services in the steel factory of Lulea is introduced briefly. Finally, the chapter concludes the main characteristics and the challenges and possible areas of development of current situation. This chapter is based on the personnel interviews and quantitative information gathered from case company's information systems.

5.1 Production services and contracts

In the steel factory of Raahe, there are numerous activities which support the production and are vital for the process. These include for example the internal transportation of raw and other production materials, different stage products and recycled materials. Also the handling of the mentioned and other work performed by mobile cranes and other movable machinery are regarded as these activities. Additionally, cleaning services of production facilities and production equipment are functions which can be highly critical for the production reliability. All of the above are defined as production services. However, as said earlier, this Thesis only focuses on the transportation, handling and other movable machinery related work, leaving out the cleaning services. Moreover, services and contracts that are challenging or unfeasible to discuss and combine with others are considered advisable to exclude.

The handling and transportation and other work with movable machinery related to production are currently outsourced entirely at Raahe factory. None of these services are completely performed by own work force and SSAB doesn't own the machinery related to these services. However, in some contracts certain equipment utilized in the services are owned by case company. Additionally, some machinery rental service contracts are carried out by own employees. Nevertheless, for the most part, the investments and the labor required to perform these services are handled by suppliers. As said in the theoretical part of the study, this kind of outsourcing often leads to a situation where the sourcing department becomes responsible for the overall management of the services in ques-

tion. Similarly, in this case, the procurement is in charge of purchasing and management of these services to the steel factory of Raahe.

The costs of production services can be regarded as significant. Currently, the total purchasing spend of Production related - category in Finland is somewhere around 150 – 160 million euros. Production services represent an estimation of nearly fifth of the category spend. Therefore, it can be considered highly advisable to invest in rational procurement of the services in question.

5.1.1 Scope of contracts

Currently there are dozens of contracts in the field of production services. The amount has changed throughout recent decades and it seems that the number has been even greater in the past. According to some interviews, there have been numerous minor agreements and that the quantity of them is much lower present. However, the contract portfolio still consists of a fair amount of contracts and the scopes of the agreements are quite varying. This kind of situation has caused some challenges. First off, the amount of interfaces between different services and agreements is high. This can cause some difficulties in terms of narrowing down which work can be considered whose responsibility. Additionally, numerous agreements in the same production area are not necessarily optimized according to the production processes.

Production services are located factory-wide. Most of the services include transportation or handling or they might be a combination of these two. There are also various rental services, which mainly consist of machinery and also in some cases labor leasing. Most of the purchased services are located in a certain production area. These contracts often have interfaces with other services inside the same area. Additionally, the location might be in a given site yet the service might somehow be attached to other production units. Hence, some services can't be targeted to only one particular production area and the services might occur in multiple locations or at least have direct connections with other production units. The amount of services in different production areas, and the ones that concern multiple locations are defined in Figure 17. As the figure shows, production services are located in each parts of the process. This figure also includes the quantity of interfaces that each services has with others. As it can be seen, a significant part of the agreements have a direct interface with another service. Additionally, service interfaces are present in almost every production areas. Due to these facts, some complications might take place.

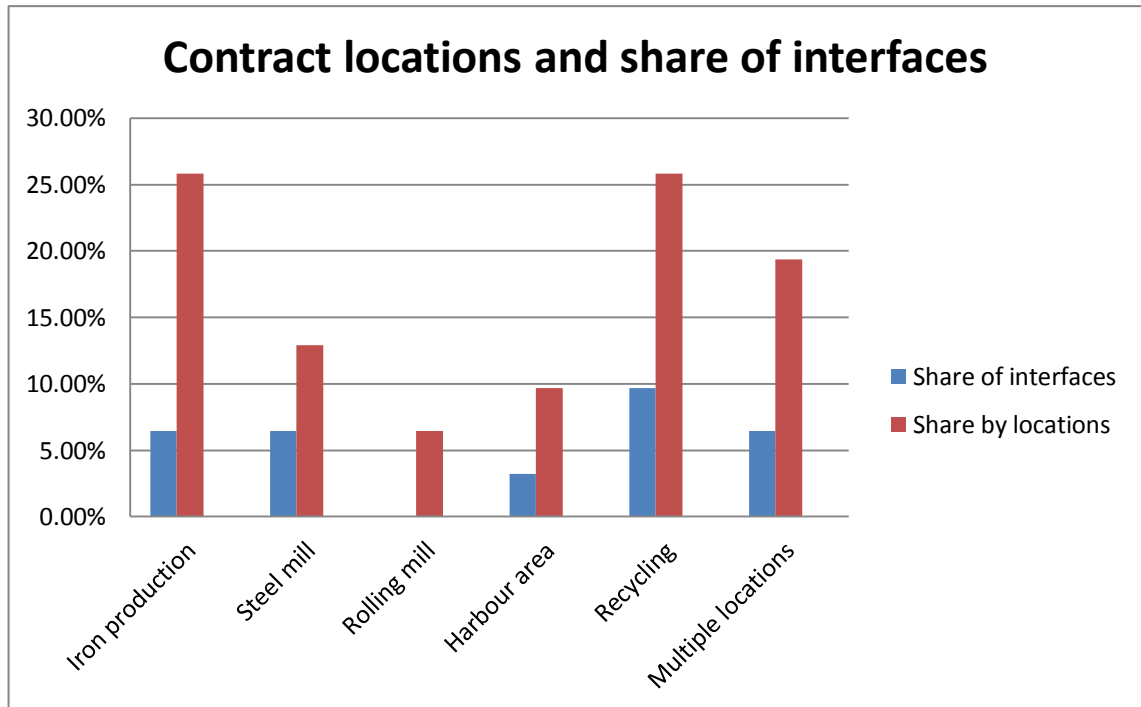


Figure 17: Shares of service locations and share of contracts that have interfaces with other services

Many of the employees interviewed in the study mentioned the amount of interfaces when questioning about the challenges of current state. Some of the major problems caused by this are troubled specifications. It is found difficult to define which part of the service is the responsibility of a certain service provider, when another contract is present at the same location. An example of attached services could be a situation where a services provider transports material to a certain location, from where another supplier is supposed to transport the material further. This has caused occasions where the same work is being charged several times in different interface related contracts. This is not necessarily done deliberately and in most cases, it is probably unintentional. However, this induces groundless costs, which are challenging to prevent due to the troubled monitoring of the middle ground.

Another challenge which is related to the scopes of the services is the adjustment to the company processes. Currently some of the transporting and handling performed might not be optimized along with the process. This kind of arrangement can lead to a situation where the supplier optimizes only the service provided neglecting the customer company's production process. This kind of optimization decreases the service quality and effects to cost-effectiveness. This is also related to the specifications. The service should be specified so that the service and the process are cooperating and that the customers process is not negatively impacted. At the same time, the supplier should benefit from optimizing its actions. The service wholeness's should be designed and planned so that scope is in line with the particular part of the production and the logistics process.

However, the optimization does not necessarily correlate with the scope and the amount of contract areas. It seems that for the most part the optimization can be avoided by carefully drafting suitable specifications. In fact, a large wholeness might also lead to this kind of challenges. If the supplier has an overly significant share of a particular production area services, same kind of concentration on own benefits might occur. The importance of specifications has also appeared numerous times in the literature review part of the study.

5.1.2 Supplier base

Currently the case company has contracts with eight suppliers for all the services discussed in this study. The distribution of agreements between suppliers is described in Figure 18. As the figure shows, few contractors have the majority of the services while others provide the services in only one or two contracts. According to interviews, a situation where the services are purchased from numerous suppliers can have multiple challenges. These problems are related to the earlier mentioned blurred areas of responsibilities. Additionally it might have an effect to the flexibility of the service provided. However, some found that having various different suppliers around the factory can lead to certain benefits.

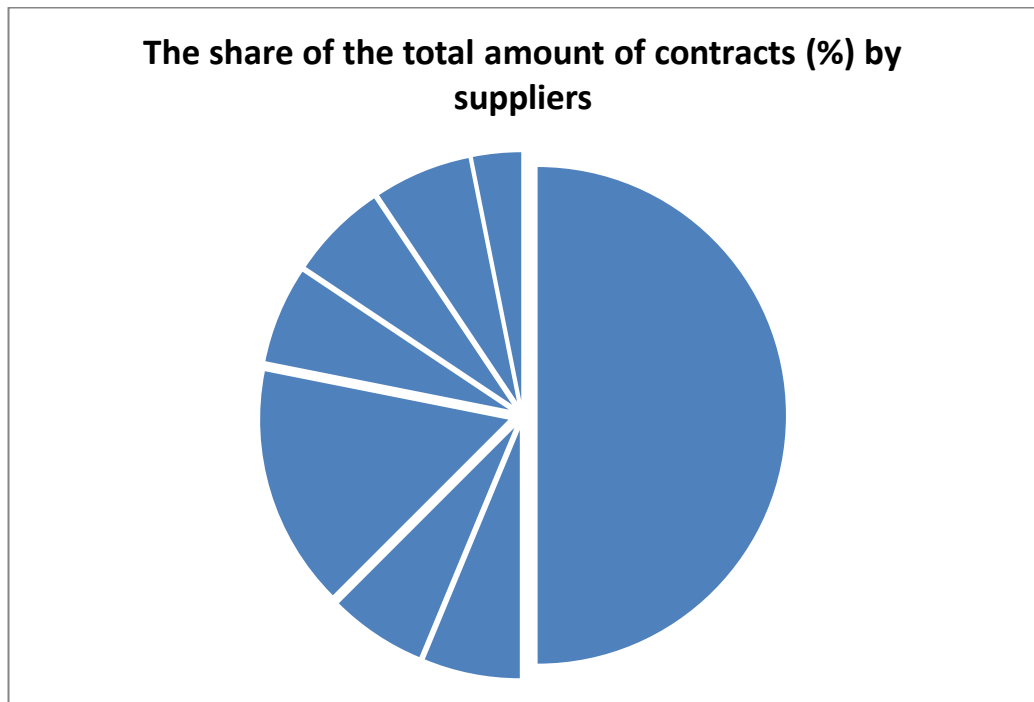


Figure 18: The cuts of different contractors with production service contracts

As said earlier, contracts have numerous interfaces with others. This might also cause some unclear occasions when for example deviations occur. It is often found difficult to sort out the reasons and causes for the happening, since two different suppliers are working in the same area. This causes problematic situations where the actual responsi-

ble party is challenging to find. Moreover, the blurry middle ground has direct influence on the flexibility of the service. When different services providers are responsible for two consecutive parts of the process, it is found challenging to connect these seamlessly. The contractors are usually each other's competitors in the markets, which means that the level of cooperation with the other supplier is not necessarily a financial benefit to them. The cooperation of suppliers might also hamper the work of the internal customer, when monitoring and supplier performance follow-up becomes tougher.

One of the disadvantages of having a number of suppliers working on the same site is the lack of development of the services. It has been seen as one of the main barriers of actual development and innovativeness that suppliers only have a minor part of the services on certain production area. The service provider and the customer can't properly concentrate on the contents of the services and develop them in tandem if the scopes are narrow and contractors might be replaced after the agreement period.

On the other hand, a situation where numerous different contractors are offering services to the same area might raise some benefits. For example, when some extra work appears or the circumstance requires some exceptional services, the internal customer has more alternatives when deciding who could have the work done. The customer can invite the possible firms to tender for the required task and that way the costs might be lower than with only one provider. This kind of tendering can happen factory-wide and it has not necessarily need to concern only a certain site in the factory area. Some minor tasks are easier to contract out to the suppliers already working in the factory, since it would be time-consuming and inefficient to involve other outside companies. In fact, some argued that this kind of tendering would be beneficial and that the amount of suppliers working in the factory could be even greater for this reason.

To conclude, the amount of suppliers working in the field of production services has its benefits and downsides. Many of the mentioned factors can also be found in the literature review. In Subchapter 3.1. the main pitfalls of having a reduced or minor supplier base are the decrease in competition and dependence on the existing service providers. On the other hand, with only a few suppliers the quality might be improved through enhanced service development and increased flexibility.

5.1.3 Spend analysis and revenue logic

The costs caused by production services are valued as significant at the case company. For the most part, the services are conducted with machines and other equipment. The machines are rarely considered as inexpensive and they often involve a lot of maintenance costs. Since, the company purchasing these services doesn't necessarily own many of the required machines and often at all. As said, in this case the majority of the related equipment and machines are outsourced along the service to the contractors. Therefore, most of the services require remarkable machine and equipment investments

from the service provider. Additionally, the supplier needs to be able to provide enough staff members to do the required work. These can be considered as the major causes of spend in terms of production services.

The contracts have two different main types of revenue logics; ton-based and hour-based. In the ton-based services the suppliers are paid according to the amount of tons. For example, a contract consisting of transporting and handling of a certain material or product defines specific unit prices. These are defined individually depending on the form of transportation or handling. The purchasing company usually sends request for quotations for potential suppliers who propose unit prices in their offer. The final prices are defined in the proposal negotiations. If the amount of tons, for example per year, can be defined rather accurately and are expected to remain stable, the unit prices are often more lower. However, if the quantity is fluctuating, hardly predictable or considered low the unit prices are increased. Furthermore, these contracts include a possible position for extra and alteration work. This part is usually hour-based, which might be determined for example according to contractor's price list.

By way of contrast, in hour-based contracts the service providers charges customer by the hours. Similarly, suppliers determine the prices in their proposals. The hour prices are usually listed by machines; different types of machines and equipment utilized in the service are priced separately. Although, some rental contracts include a certain machine or machines, which is/are charged monthly or every half months regardless of the actual usage. These are considered as fixed hour-based contracts. As with the ton-based contracts, the estimations and predictions about the usage of various equipment and machines has the major influence on the prices. These hour-based contracts include either only machines or machines and work force. The prices of work force are included in the hour prices or defined singly.

Currently the spends of production services vary notably. Partly, the variation in spend value result from the difference of hour-based and ton-based contracts. In general, hour-based contracts have lower spend value than ton-based. This originates from the fact that most of the transportation and handling is advisable to observe in terms of tons. Hence, the services including significant quantity of material handling are more often priced per tons. Hour based services in general consist of less activities and are usually easier to attach to some machinery or workforce rental contracts.

As the Figure 19 illustrates, only a couple of contracts represent a significant share of the total purchasing spend on production services. More accurately, it seems that the share of the five most significant contracts in value is over 50 %. On the other hand, a number of contracts have a fairly minor share of the purchasing spend. There also seems to be some services that locate in between these two extremes, however, the fluctuation of the service spends is considerable. The pale column refers to a contract which is already signed, coming into effect later this year. Hence, that particular spend column is

an estimation, which at this point only describes the general vicinity. The amount of contracts discussed in this study, is 33.

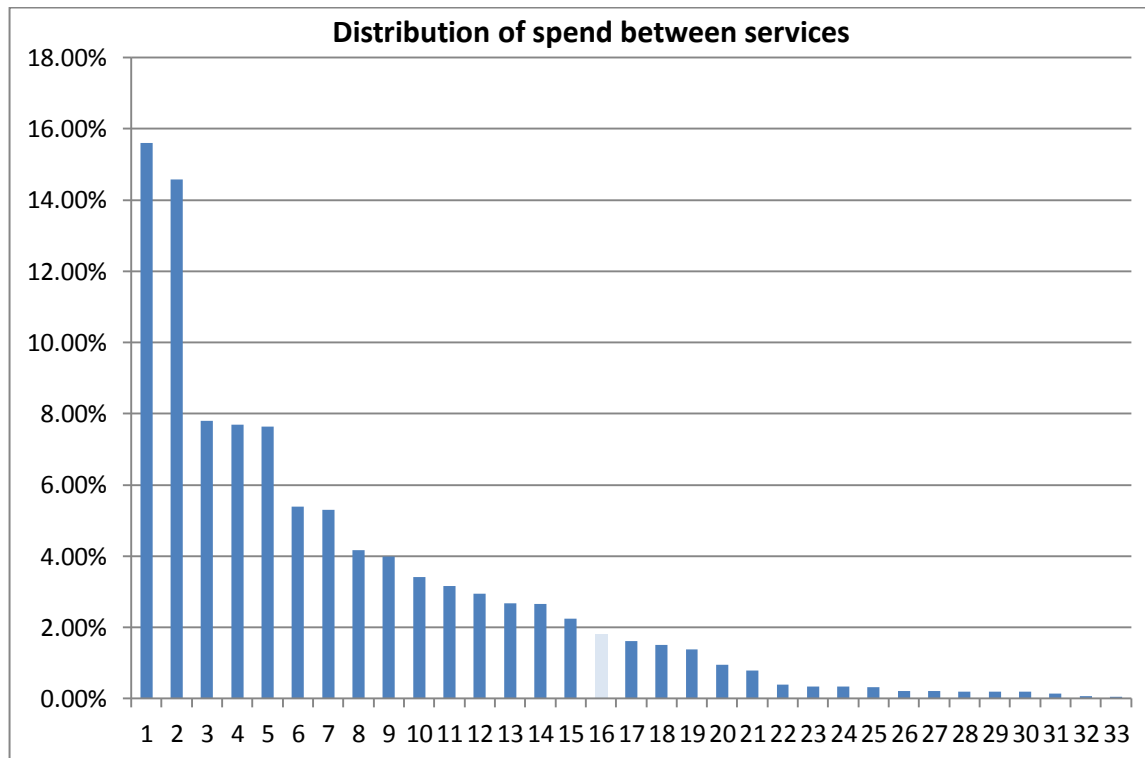


Figure 19: The spend distribution of different production services

The narrow scope of different services can be explicitly illustrated with the spend distribution in Figure 19. The amount of low value contracts is quite significant, which can lead to some challenges. As said earlier, one of the main factors that might have an influence to suppliers' pricing is the volume of the contract. Hence, if the amount of tons or hours is fairly modest and expected to remain low, it is considered rather unfeasible for the service provider to offer reasonable unit prices. Additionally, the size and the value might have an effect on the attractiveness of the contract in the markets. Suppliers aiming to increase their revenue are often primarily interested in greater contracts, which might lead to modest amount of quotations.

Conversely, there seems to be some issues relating the other extreme of the spend distribution also. In the few services that represent the majority of the total spend, the supplier has a fairly substantial service wholeness on its hands. This can lead to decreased competition among suppliers, since there are no competitors inside that particular service area. When competition is compromised, the only supplier might gain an excessively strong position, which further might have negative impact on the service quality. Moreover, due to the accumulated knowledge and experience concerning the service, the current supplier possibly has the upper hand when tendering for the next contract period.

Some of the same factors were found in the literature review. In Subchapter 3.3 it was mentioned that companies often have an excessive amount of minor and low-important contracts which require wasted resources. This might cause spare costs. Additionally, the poor balance and planning of resources endures when the contract portfolio is oversized.

5.1.4 Contract validities and agreement periods

When considering the proper length of the agreement period and deciding the dates for starting and ending of the contract validity, few issues need to be addressed. To begin with, the agreement period is somewhat depended on the scope and value of the agreement. Although there are also multiple other factors affecting the form of the agreement period, contracts are always made individually. For example, the timing must be adjusted so that proper specifications and request for proposals can be drafted accordingly. Comparing proposals and organizing proposal negotiations also takes time and effort. Especially in high value contracts the supplier is required to make significant investments, which often call for time. Therefore, the preparation for new contract must be started off way beforehand of the actual start date of the contract.

Currently, the contract period ending dates are quite variable. However, as it can be seen in Figure 20, a major part of the contracts are ending within few years. As said, the preparations for new agreement period should be arranged in advance, hence, most of the current services need to be planned and contracted in the near future. Therefore, if some changes regarding the contracts and service wholeness's are found reasonable to consider, the implementation should be executed relatively soon. On the contrary, there are agreements that are still valid for over 5 years. In these cases, the studying for possible adjustments or modifications isn't as urgent as with others. However, these contracts are also part of the research in this thesis. Although the demand for possible structural changes with these long lasting agreements isn't such immediate, all the prospective alternatives for future contracts need to be considered carefully.



Figure 20: The share of contracts by ending dates

As said, the agreement period length depends on the scope of the contract. When a service is fairly narrow and excludes major investments on machinery and equipment the contract period is often quite short. Since the supplier is only responsible for the work force and the machinery required is modest, it is neither necessary nor advisable for the buying company to make longer-lasting agreements periods. On the other hand, a broad service including major investments and planning from the supplier calls for a more extensive contract period. In Figure 21, the current shares of contract period lengths are described. At present, the majority of the contract periods are less than ten years. As the figure shows, less than five years is the most common length of agreements. However, there are also service contracts with longer lasting periods. Over 15 % of the contracts have a long-term, over ten year contract period.

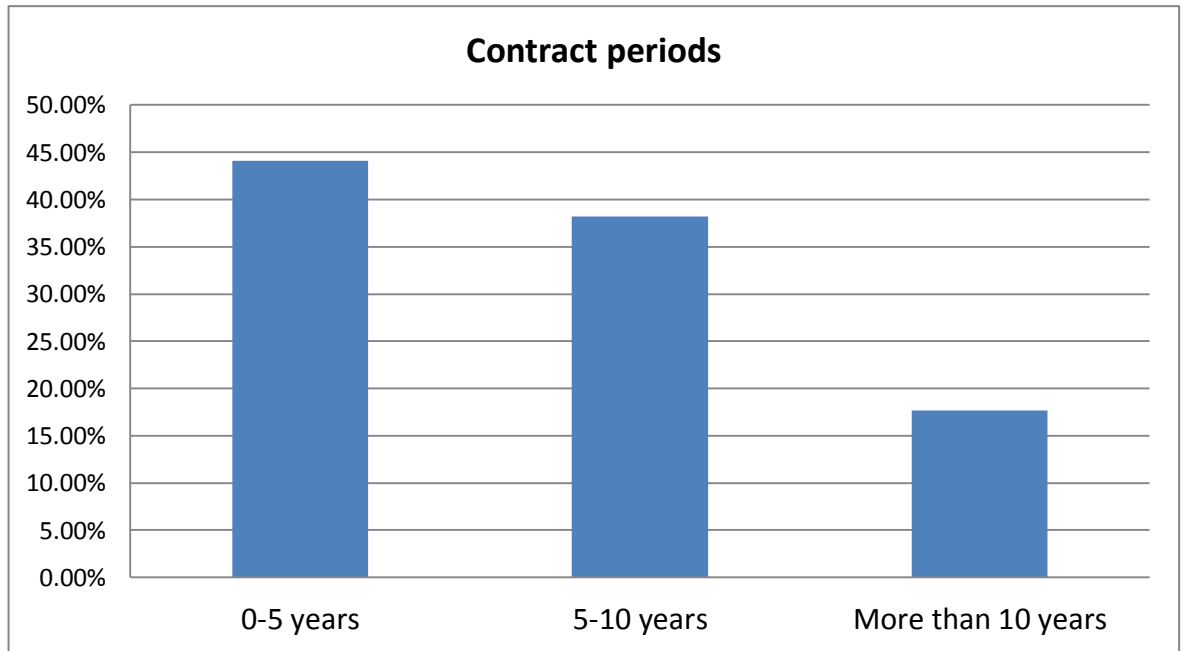


Figure 21: The share of contracts by contract period lengths

The amount of short-term contracts is currently quite significant and these contracts have some challenges. Above all, when the period is temporary the costs of investments to the buying company made by the supplier are increased considerably. If the list of required machinery or equipment isn't part of suppliers' proprietary, the contractor has to charge for the uncertainty of the continuity of the service. The risks are increased if the supplier has to make investments that aren't necessarily utilized in the future and possibly need to be sold after the short contract period. Not to mention the continuous improvement of the service. With a short agreement period the partnership between the buying company and the supplier might endure. This does not contribute the development of the service in the long-run. As said in the literature review in Subchapter 3.2. a lack of development effects the quality of the service. Moreover, it isn't the quality, but the lack of quality that increases costs.

Conversely, long-lasting agreement periods can have their pitfalls. Again, the investments are the major influencing factor. With an agreement period of more than 10 years, the supplier is often required to make major investments. On the contrary to shorter periods, the costs of investments aren't the most negative subject. If the same contractor provides services for a longer period the amount of investments might increase so that the competition situation after the agreement period is found poor. Having major investments and possible equipment and depots for the machinery already on the customer's premises, the current supplier is commonly regarded as a potential service provider for the next period. Additionally, a competitive proposal from an outside contractor might be unlikely, since service the specifications and earlier experience with the service is missing when compared to the operative supplier.

5.2 Responsibilities and roles

Production services provide employment to various interested groups. From the buying company's side, the procurement function and internal customers of the operational site are the main stake holders. Whereas the supplier offers the work force and the machinery to the production site and contact persons related to the sale of the service. From the customer company's perspective, the responsibilities and roles of different quarters depend on the service acquired. Although in general, the areas of responsibilities are fairly similar between different services.

The process of purchasing production services from an external service provider starts in touch with the outsourcing process. Notification of the need for buying the service from outside supplier comes from the production site. The required service and its specifications are drafted by specialists of the production area in question. Procurement department is responsible for the correct pricing and ensuring that the drafted specifications are suitable for tendering. Additionally, purchaser and the production specialist have to make sure that the service requirements are measurable and that supplier's performance can be monitored. After drawing up request for proposals and selecting the service provider, the contract is signed. Post-contractual stage involves all the stakeholders, when the supplier is monitored and the operation is supervised. The tendering for next contract period starts when approaching the current agreement expiry. The responsibilities of different interested groups are defined in Figure 22.

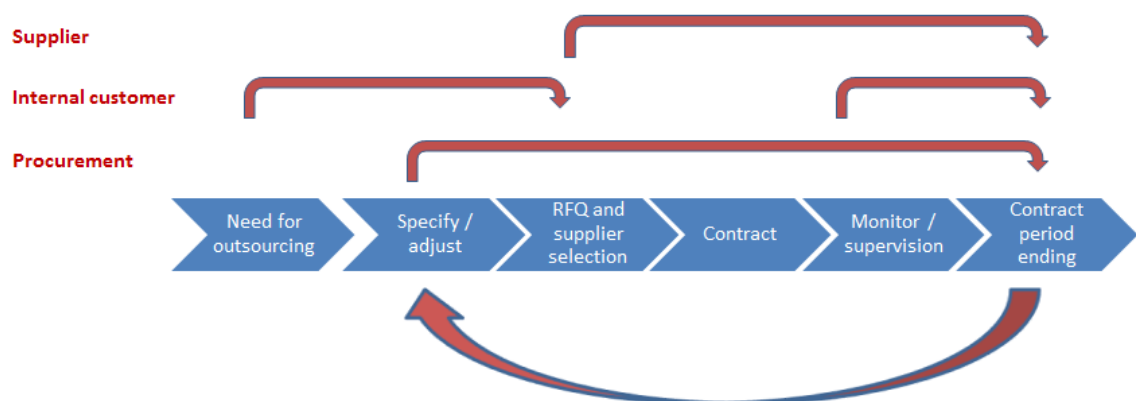


Figure 22: The process of purchasing production services and involvement of stakeholders

The lifecycle of a service contract in the case company seems to be fairly similar with the process of buying services by Van Weele (2005) in Subchapter 2.3. Seemingly, the most relevant phase is the post-contractual phase, due to the fact that it involves all the stakeholders. Additionally, the step often takes a number of years.

5.2.1 Procurement

The procurement department is responsible for the process and is present at every phase of the life cycle. The purchaser in charge of production services is responsible for managing the whole contract portfolio. This includes all the prospective, ongoing, and ending agreements and possible new services to be outsourced. The underway contracts require drafting specifications and other terms of the contract and selecting the service provider. The ongoing services engage the purchaser with follow-up procedures. These consist of periodically arranged meetings with the supplier and the internal customer. What is more, the purchaser is in frequent contact with the internal customer in terms of feedback and possible deviations. Soon to be ending agreements need to be evaluated and the specifications might be adjusted. After sending the request for quotations, the supplier is selected for the following agreement period and the lifecycle starts over.

Since there is a great amount of production service contracts presently, some issues arise in procurement. Purchasing is involved in every phase of each contract lifecycle, which means that the amount of different services can be seen as almost directly proportional to the amount of work required from the procurement department. The handling of the portfolio causes a tremendous amount of management. Currently, the portfolio is considered as disorganized, which complicates the managing. Main reasons for the tangled portfolio, apart from the quantity, are the variety of unequal value and unequal scope contracts. However, some steps of the process do not concern procurement as much as others. For example, specifications aren't the main responsibility of procurement and in most cases when the service contents remain fairly constant throughout the contract renewal, only minor adjustments need to be considered. Additionally, the actual contracting and contract ending aren't such troublesome and the amount of work required from procurement is low. The most time-consuming phases are supplier selection and contract monitoring.

Having a number of suppliers and contracts causes the company buyer a load of work. Currently the purchaser has to focus on multiple bidding competitions and monitoring of numerous ongoing agreements. The periodically arranged meetings with the service provider and internal customer consist of a few check-up procedures. For example, the prices and price indexes are evaluated. Additionally, the participants go through the planned and actual ton or hour quantities. These kind of meetings are arranged on a contract bases, but are kept at least once a year, more often every quarter or even monthly. The bidding for the upcoming contract period means drafting up request for proposals and contract details, selecting potential suppliers, arranging proposal negotiations and selecting the supplier. As said in Subchapter 3.1 a situation where the buyer has to deal with numerous suppliers and contracts, less time is left for focusing on the ongoing relationships and services.

As seen in Subchapter 5.1.4 in Figure 20, the majority of the contracts are ending in the near future. As a result, the next years are fairly critical for the purchasing department. In most of these cases, planning of the competitive bidding needs to be launched quite briefly. However, the overlapping of the ending periods will stay the same in the future also if the amount of service contracts is remained equally substantial.

5.2.2 Internal customer

Every contract has a named main supervisor and operative supervisors. These can be considered as the internal customers of the service purchased. The main supervisor is often the production or quality manager of a particular production area. However, for every contract the main supervisor is named case-specific and the nomination does not require a certain title. Although, in general the main supervisor is someone who has knowledge and an overview of the production area the service concerns. The operative supervisors can be for example shift supervisors or other production technicians working in the area in question usually in the field of daily operational tasks.

The main supervisor of a service is responsible for the overall monitoring of the contract. The duties begin from sorting out the need for outsourcing and planning of the service specifications. When a new service area is decided to outsource, the specifications can be time-consuming. However, if the previous contract is chosen to be renewed, the specifications are only adjusted which does not demand for such time. As stated, the specifications of a contract have a great influence on the overall functioning and cost-effectiveness of the service. In Raahe, the contract specifications are not considered as a point of weakness, since it has been adjusted in the course of time. Additionally, the present contents and specified work assignments detailed in the contracts have been found properly practical and workable. Hence, the most significant reasons for challenges are not found to be in the existing service specifications.

From the main supervisor's perspective, the most laborious tasks are related to the post-contract period. The main supervisor is responsible for the overall functioning of the service. He or she ensures, that the service is meeting the specifications compiled. This consists of keeping track of the related economic figures and actual amount of tons and hours compared to the budgeted ones performed by the supplier. The main supervisor is also liable of the handling of deviations and feedback together with the purchaser.

Some of the current main supervisors are responsible for several different services. In these cases, the follow-up of every contract is not necessarily adequate. The supervisor is obligated to participate in all of the periodic evaluating meetings, which require case-specific concentration and time. Further, most of the main supervisors have numerous other tasks besides monitoring of the quality of these services and the performance measurement of the supplier might suffer. Additionally, some of the services seem to have several named main supervisors. Since the amount of different service contracts is

high and each requires a main supervisor, the contracts demand somewhat plenty of resources. Due to the fact that the services have multiple interfaces with others, the main supervisors are also responsible for making the decisions about the performer of the work executed in the middle ground. As said earlier, these are often blurred situations which increase the work load of involved personnel further.

The operative supervisors are responsible for monitoring of the daily tasks performed by the service provider. The supervision is depended on the nature of the service. In hour-based contracts, more monitoring is required since the supplier is working by hours and the quality of the work is measured by the actions. Whereas with the ton-based services a certain amount of tons is expected to be handled or transported and the actual supplier monitoring is not as essential. The operative supervisors also make the orders required, for example reserving of a certain machine that is needed in a given time. When the tasks are completed, these internal customers enter the completed tasks to the information systems of the company. Although, the numbers of the supplier's work performance aren't always entered by internal customers and this part of the process seems to vary case-specifically.

At present the operational supervision of production services is quite scattered. Usually the names of the people in charge can be found from the contract of the particular service. However, in numerous cases the contract does not include the names of operational supervisors. Alternatively, the named personnel in the contract are no longer members of the buying company staff. Moreover, the named personnel might have shifted tasks inside the company or the naming in the contract is not accurate.

The names of the people responsible for operative monitoring are also troublesome to find when observing the names of order creators. In the company's information systems, there seems to be multiple different names inside the same service as creators of service orders. Additionally, the names found are oftentimes not similar compared to the names appearing in the contracts. Another way of sorting out the personnel in question is to examine the names behind the cost centers of different orders. However, orders have a number of different cost centers depending on the tasks and positions of each service agreement. Moreover, a certain position or a task of a service can include multiple cost centers, which even more complicates the inspection. In some cases, the name directed to the cost center is the main supervisor of the contract. To conclude, the names of the people responsible for the daily operational supervision of supplier's actions are difficult to track and disorderly announced.

Since the names of the operative supervision personnel are unclear, the contract supervision and monitoring might suffer. The responsibilities of each staff member are unclear and this has a direct influence on the quality supervision. Additionally, it seems that at presently most of these employees monitor a certain service and the service provider alongside with their own duties. This means that the actual supplier monitoring

might be endangered when the staff are primarily focusing on their own tasks. Furthermore, a certain service seems to have quite significant amount of named supervisors, even though the service locates in a single production area. In these cases, the possible deviations and feedback are possibly hampered, since the information flow between all of the operative monitors, main supervisor and the service provider is more demanding. However, the contracts that concern multiple production areas, this kind of divided monitoring responsibilities is justifiable and compulsory.

5.2.3 Supplier

The selected service provider is involved from the tender process to the ending of the contract period. As said, the competitive bidding is often arranged way beforehand of the actual contract starting date. This way the supplier has the time to properly plan the execution of the required service and make the relevant investments. Naturally, the most critical part of the process from the supplier's perspective is the actual providing of the service. This includes the participation to the development and monitoring of fulfillment of the service with the customer company, giving and receiving feedback, informing of deviations and in some services reporting the work performance numbers to the buying firm's internal customer and purchaser. However, the most significant resources the supplier offers are the staff, machinery and equipment.

In all of the ton-based services, the supplier's staff is responsible for conducting the given work. In part of the hour-based services the buying company rents both machines and operating personnel. The only service providers personnel excluding services are the rental contracts which only consist of machines and equipment. Although the labor costs for the service provider does not represent the majority of the total expense of the service, they can still be considered fairly great. In general, if no deviations occur and the amount of work is at usual expected level the expenditure caused by staff is not that significant. Nonetheless, the services frequently include extra work or some tasks that are unexpectedly required to be performed for example outside normal working days. Thus, the total costs of labor might be increased somewhat greatly. Obviously, when the costs to the supplier are increased, the price of the service provided to the customer company equally rises.

Again, this has a lot to do with the specifications. Ultimately, the objective of service specifications is to define the work adequately thoroughly and minimize the costs. Given these points, all of the additional and exceptional work should be ruled out. However, this kind of excluding of extra work is considered troubled or in most cases unfeasible, since there are often numerous factors influencing the operative environment that cannot be prepared or expected. Some examples of effecting actors are market situation, production amounts or maintenance operations. To conclude, in terms of service specifications it seems that at present time the majority of the contracts are well defined. This is contingently resulted from the fact that the current services and specifications are

developed in the course of time. However, some slight changes and adaptations to predominant specifications can be formed in the beginning of every contract period or in the periodic palavers.

Even though the specifications are currently carefully drafted, there are some issues hampering the planning of them. This has to do with the current services. Since many services have interfaces with others, the specifications are considered substantially tougher to form. For example, some subsequent work assignments are at the moment allocated to different services and contracts. The internal customer is forced to design the specifications by taking other services into account. As a result, amount of the mentioned extra work assignments are even more troubled to decrease. This occurs as a result of the fact that the only influencing factors aren't any longer in the hands of the buying company since external service providers and their actions in the nearby service have an impact to the production area and processes.

Although some close services might be provided by the same supplier, commonly this is not the case. When there are different contractors working in the same field in closeness to another, the flexibility of the production services in that particular area might be decreased. For example, a service might have some hectic moments with urgent needs for additional workers. Simultaneously, the neighboring service potentially has some slack time, having unused work resources. Because of the current situation, the kind of flexibility that workers from the other service could be capitalized on these situations is out of the question. At the same time, in the cases where services are provided by the same contractor synergies are more feasible to consider. In fact, it is believed that suppliers do this kind of resource optimization by using the same employees in both contracts. Surely, these are only temporary situations and the service providers might be changed after the contract period in question. However, the reasons for keeping two such similar services separate that could be handled in synergy with each other are decreased and considered questionable.

The most influencing factors to the total costs of the service are the machinery and equipment utilized. The costs of machine investments can be considered notably greater than any other work performed, for example the labor costs caused to the supplier. Hence, from the buying company's perspective, the machines used by the supplier have the most substantial effect to the pricing of the service. For this reason, the importance of carefully drafted specifications is again emphasized. The specifications must be planned in a way that all of the pointless or unnecessary machine usage is minimized. Although, this depends on the nature of the service. Usually with hour-based contracts, the machine lists are offered by the supplier, which include the hourly pricings. In these cases, the buying company can determine the size or capacity of the required machine for each task separately. However, in ton-based services the buying company usually classifies what kind of work is required and which is the amount of tons expected to be

handled or transported. This leaves the supplier the freedom to decide which machines are used to perform the required tasks.

Identically with exploiting the service provider's staff, the machinery and equipment used in the contracts can have some similarities with each other. Most of the handling and transporting services factory-wide utilize machines of the same type. However, if the services are contracted with different service providers, the shortage of a certain machine resource cannot be replaced with a similar machine from another location. At present, in some of the services that are provided by the same contractor it seems that the same machines are utilized in both services depending on the current demand. Certainly, this kind of optimization is reasonable and it can be for the benefit of both the supplier and the buying company. However, the machine usage synergies could have an even greater impact on the flexibility of the service provided.

At present, it seems that the utilization rate of different machinery in the contracts isn't at the highest possible level. Truly, this may not be the situation in all of the services, however, according to some of the buying company employees it has already been recognized. This is not only influencing the flexibility. Moreover, the effect on the costs of the service can be significant when the invested machines aren't used in appropriate amounts and the utilization degree is remained low. To conclude, this does harm to both parties of the agreement.

5.3 Case Luleå

One of the five Nordic production factories of SSAB Europe is the steel factory of Luleå in northern Sweden. Currently, the steel production base offers employment to approximately 1200 people. In comparison to Raahe, the beginning of the production process is fairly similar; it includes coking plant, blast furnaces and steel mill. Hence, the services required in harbor functions, iron production, steel mill and recycling include some similarities. However, at the point where the slabs are produced the steel is sent to another Swedish production plant for further refining, which in Raahe is self-made. This chapter describes the current situation and outsourcing strategy of production services in Luleå, outlining also the main challenges and upsides. Additionally, the key attributes related to the procurement of these services are compared to Raahe.

The main reason for taking the situation in Luleå into account is the timing of the research. After the fusion of SSAB and Ruukki, similar functions and activities are naturally compared with each other for finding the best practices and possible synergies. In addition, the factory of Luleå includes fairly similar features, which makes it a decent object for comparison with Raahe factory. Lastly, some challenges have been already recognized in Luleå, which also speaks for the brief analyzing of the current state.

5.3.1 Features of production service procurement

In general, the strategy of outsourcing of production services in the factory of Luleå has some differing characteristics. Although some of the major services for example in iron production and recycling are outsourced, a fair amount of the work is performed internally. In Luleå, a significant amount of machinery and equipment are owned by self and tens of company employees are working in the field of internal transport and handling. As a result, the contract base is significantly lower. However, this isn't only due the lesser share of outsourcing. In Luleå, the amount of contracts made for the similar type of services as in Raahe is rather low. Hence, the scopes of the contracted services are broader and the service providers have greater areas to cover. Consequently, the amount of challenging interfaces between service contracts is fairly lower. As a result, the possible difficulties caused by challenging middle-ground area between services are not considered as a notable downside in Luleå. However, some other emerged disadvantages in the current state have been acknowledged.

The amount of contractors providing production services in Luleå is low. It seems, that the quantity of different contractors has been greater in the past, however, the present situation has been prevailed for a while now. For example, one specific supplier is responsible for the major part of internal transport and the generality of the recycling process services. In fact, the same supplier has been providing the same or corresponding services for several decades now. Additionally, the shipping and terminal services operated in the harbor including for example the unloading of alloys and other materials from ships and placing these in the near harbor storage are provided by a single contractor. The same service provider is also responsible for loading of the carriers, which transport the material to production feeding. Generally speaking, it seems that these two suppliers provide nearly all of the production services in Luleå factory. To conclude, the supplier base is fairly small-sized. Although this kind of situation might enhance the focus on partnership, it has various drawbacks.

First off, the competitive situation can be considered relatively poor. In fact, this applies for both internal and external competition. With internal competition it is referred to the rivalry between the service providers working in the same site. Instead, external competition concerns the competing for the upcoming agreement periods, involving all of the potential external suppliers. In terms of internal competition, the current suppliers really have nothing to compete against. All of the required excessive work and other appeared minor tasks are usually agreed with the contemporary contractors. In addition, the situation doesn't exactly encourage suppliers to develop the service when the corresponding actions of rival suppliers are lacking in the area. In like manner, competition for the next contract periods might be endangered. Since the same contractor has been working in the same field for a long time, the know-how of the service and operational environment is well mastered. The supplier also has the required investments already made when

tendering for the next agreement. For these reasons, the preceding supplier is exceedingly able to compete.

Secondly, the current contractors have somewhat dominance on the provided services and the buying company might be overly depended on the suppliers. This is also related to the competitive situation, however, there is more into it. Above all, the supplier might commit to optimization of own actions, since it has a broad service to cover. As mentioned earlier, by this is meant that the supplier enhances its own actions neglecting the buying company's processes. In Luleå, the suppliers have in some cases maximized the movements of materials which benefit them, not taking into account flows and customer sequence. Furthermore, the contracts encourage the supplier to handle greater batches, which can cause major problems with processing.

However, there are some advantages in the current supplier base also. The certain suppliers have developed themselves over time and they can be considered as competent service providers. The partnership with the buying company is highly evolved and communication and information management between the parties is effortless and familiar. According to the Luleå factory employees, the present suppliers are regarded as reliable and highly capable, even though there are some disadvantages occurred. In addition, the situation where one service provider is responsible for a broad service, the flexibility is increased. The internal customers in Luleå stated, that in the cases where demand for certain machinery or work appears, the quality of being flexible is considered truly important. At present, the suppliers are offering this kind of adjustable services and for this part the internal customers seem to be satisfied. By the same token, the experienced suppliers cause fairly few deviations and problems that need to be evaluated.

The distribution of spend of the services is fairly constant. Besides the few large ton-based agreements, this results from certain factors one being the insourcing activities. The need for machinery rental agreements is lower, since the owned machinery can be utilized. In addition, the required machines are often supplied from the main suppliers case-specifically. The amount of low-spend contracts is therefore lower, and the attractiveness of the contracts is not endangered. Also, broader services might have positive impacts on unit prices of the contracts. Be that as it may, this situation has its flip sides. Having own machinery leads to maintenance obligations and planning of the utilization rates. In addition, external workforce is oftentimes required to operate the owned machinery, which needs to be managed also. The current contracts have quite long contract periods and validities. According to employees, this is one of the reasons why the daily development of the services is unsatisfactory. The current agreement specifications are regarded as somewhat poor, since they enable the supplier to optimize its actions without developing the mutual benefits.

Due to the low amount of contracts and suppliers, the supervision and monitoring required needs fewer resources. The contracts can be managed with lesser main supervisors and the operative monitoring might be handled more centralized. This way, the supplier is responsible for monitoring its subcontractors. Hence, the supervision of the contract is, in a way, outsourced to the main supplier. Additionally, this applies for the procurement also. The stress on the purchasing department is decreased, when contracts are in fewer broad wholeness. However, this demands much from the contract specifications. Since the contractors are working in such large areas, the monitoring becomes difficult. In fact, the tons and hours about the work performance reported by the service provider, are often hard to evaluate in terms of truthfulness. The buying company usually just needs to accept the values reported, whether it has the certainty of the correctness. It was also stated that the company employees have observed some useless movements performed by the contractors.

To conclude, the procurement of production services in the factory of Luleå is fairly extreme example of purchasing with a small-sized supplier base. The contract portfolio is rather narrow and services are managed with broad contracts. This way of managing production services have its benefits and challenges. The pros and cons are gathered in the Table 7.

Table 7: Main benefits and challenges of production service contracts in Luleå factory

Pros	Cons
Less interfaces between contracts	Poor competitive situation
Deep partnership with suppliers	Dependence on supplier
Flexibility and capability of service providers	Inadequate contract specifications
The utilization of own machinery and equipment more feasible to adjust to company processes	Maintenance and other costs caused by own machinery and equipment
Less resources required for contract management	Supplier's optimization of own actions neglecting the buying company's processes
	Troubled contract supervision & monitoring

5.3.2 Comparison Raahe V/S Luleå

The current state of the purchasing of production services in the factory of Raahe and Luleå has quite few similarities. In fact, for the most part the purchasing strategies and the rate of outsourcing are managed differently. In both of the factories, the present models of purchasing these services is not necessarily fully deliberately aimed for,

moreover, the situations have evolved over time and ended up in the current states. However, in these factories, the strategies of purchasing production services can be considered as two fairly differing examples, from which a baseline comparison can easily be established. The key attributes of the present situation in Raahe and Luleå are compared in Table 8.

Table 8: Comparison of current states in Raahe and Luleå factories

	Raahe	Luleå
Outsourcing strategy	Activities outsourced, some own equipment	Significant part of activities insourced & owned machinery and equipment
Supplier base	Medium-sized	Small-sized
Contract base	Large amount of contracts	Small amount of contracts
Service interfaces	Plenty, challenges emerged	Very few, not seen as threat
Competitive situation	Desirable	Challenging
Contract management	Requires resources from internal customers and procurement	Less resources needed, centralized management due fewer contracts
Specifications	Functioning	Partly unsatisfactory
Service quality	Desirable for the most part	Challenges emerged

In Raahe, the majority of the services are outsourced. There are some company employees, who for example operate the machines related to some contracts. Otherwise, the services are provided by external suppliers. However, in Luleå the rate of outsourcing is fairly lower and the buying company partly utilizes own resources, staff and machines, to perform the required tasks. In terms of supplier base, the factories have dissimilarities also. In Luleå the services are acquired from few suppliers, which are responsible for broad few contracts. On the contrary, in Raahe the amount of suppliers is higher and the contract base is even larger. As a result, the amount of interfaces between different contracts is significantly lower in Luleå than in Raahe.

Partly due to some of the mentioned factors, the differences in the case factories are increased further. Since the supplier and contract base are remarkably differently sized, the competitive situation can be regarded fairly unlike. Likewise, the amount of signed contracts is somewhat directly connected to the amount and nature of contract monitoring. In Raahe, the supervision and management of contracts requires more resources, whereas in Luleå, the supplier monitoring is more centralized and contracts demand less managing. In terms of service contract specifications, some similarities and divergences can be observed. The specifications require fairly differing drafting since the structure of the services deviates. In Luleå the problems occurred might be partly caused by inad-

equate contracts specifications. Whereas in Raahe, the specifications are considered mainly satisfactory and the challenges emerged are possibly resulted due other factors.

5.4 Conclusion of the current state and possible areas of development

There are a number of different aspects influencing the current state of production service procurement. These factors are related to the scope of the services, the supplier and contract base, contract validities, spend distribution and revenue logics of the service contracts. Additionally, the roles of different departments of the case company, the internal customer, purchasing and the supplier have an impact on the present situation. The allocation and management of related resources are considered highly important. Although as seen in this chapter, the managing of the mentioned factors isn't simple or self-explanatory. In fact, different characteristics often have certain benefits and on the contrary, specific challenges. Hence, in the current state in Raahe, both advantages and disadvantages have emerged.

One of the most significant influencing features is the scopes of the agreements. Since there are a number of different service contracts in different factory areas, the amount of interfaces between services are increased. The interfaces can cause certain situations in the middle-ground when the responsibilities are unclear. Hence, the interfaces complicate the drafting of contract specifications. At worst, some of the same services provided might be charged multiple times. The scopes of contracts should also be adjusted according to customer company's processes. Currently, in some of the services the suppliers actions don't necessarily promote the buying company's production process. On the contrary, as seen in the case of Luleå, having extremely wide scopes in agreements might also lead to some challenges. These have to do with the optimization of own action from the supplier, which have caused difficulties for the buying company.

The scopes are directly related to the service specifications. With properly drafted specifications, the service might be functional regardless of the scope of the contract. However, in Raahe the level of specifications are considered quite reasonable and the contract contents have been, in many cases, adjusted and updated numerous times in the past. Hence, the cost-effectiveness and quality of the services is somewhat more up to the proper scopes and areas of different contracts.

The supplier base also raises some challenges and advantages. Due there are currently a number of different service providers the flexibility of the services might be endangered. Since the services are divided to small-sized areas which are often performed by different contractors, the adapting to exceptional situations is found difficult. Additionally, deviation handling and monitoring of the service provider are challenged in the interface area where separate contractors are working. Furthermore, some stated that the same reasons have negative effect on the development of the service. Due to the fact

that service areas are narrow and the contractor might easily be replaced after the contract period, some of the suppliers aren't such willing to improve the service. Although, having a number of suppliers working in the same factory might increase the internal competition. Appearing extra work can fluently be tendered between the existing service providers. In addition, the competitive situation in between contract periods can be considered functional since there are a number of existing contractors able to provide proposal.

In addition to the interfaces, the amount of minor contracts leads to multiple other challenges. First off, the contract management requires somewhat wasted resources from the purchasing department and the internal customers of the buying company. Moreover, small-scale contracts aren't considered as the most attractive contracts for the suppliers to offer. The size of the contracts is also directly connected to the pricing. When the value and the expected revenue from the contract are low, the investments required from the supplier raises the prices. In the low-volume contracts the agreement period is likewise often short, which makes the supplier to charge the buying company for the uncertainty and risks regarding the continuance of the service. The invested machinery might be left unused, which could be crucial for the service providers. The other extreme of the spend in the services are the few large ones. In these cases, the existing supplier might be excessively potential alternative, when selecting the provider for the next period. This is due to the fact that the required investments are already made and the supplier has the experience from a long-scale contract period.

The current situation causes stress to the purchasing department. The quantity of different contracts causes increased work load, since the procurement department is somehow participated in every step of the contract process. This requires the management of all the potential, ongoing and ending agreements. Presently, the structure of the contract portfolio, consisting of numerous differently valued and sized agreements demands a lot of resources and the procurement department is not necessarily enough capable of dealing with existing supplier relationships and contracts. Furthermore, the majority of the contract periods are ending within few years, which means a significant amount of work for the purchaser simultaneously. As said, the preparations for next agreement periods need to be planned way beforehand, which further indicates that the time for development is pressing.

The contracts require resources from the contract supervision and from the suppliers. At the moment, every contract demands a main supervisor. Additionally, a contract might have multiple operative monitors, who are performing their service supervision tasks alongside their own duties. The operative monitoring is quite scattered, which might have led to weaker handling of deviations and service quality. In terms of the machines used by the suppliers, the rates of utilization are not the highest possible ones, which affect the costs. Same type of machines are used in different services around the factory, however, since owned by different suppliers they can't be used broadly. This affects the

flexibility of the service. Also the workforce of the supplier can't be exploited flexibly in other service areas, unless it is provided by same supplier currently. The development possibilities are outlined in Figure 23.

The current state with similar services in the factory of Luleå can be considered as fairly opposite to the one in Raahe. In Luleå the services are partly performed in-house and there appears owned machinery and equipment. The amount of suppliers and contracts is remarkably lower, which reduces the quantity of service interfaces and effects the competitive situation. The service quality has somewhat suffered in Luleå, partly due to the specifications and the optimization of own action by the suppliers. The suppliers are additionally fairly dominating and the supervision and monitoring of them are regarded as troubled. Similarly with Raahe, the situation in Luleå has its advantages and challenges.

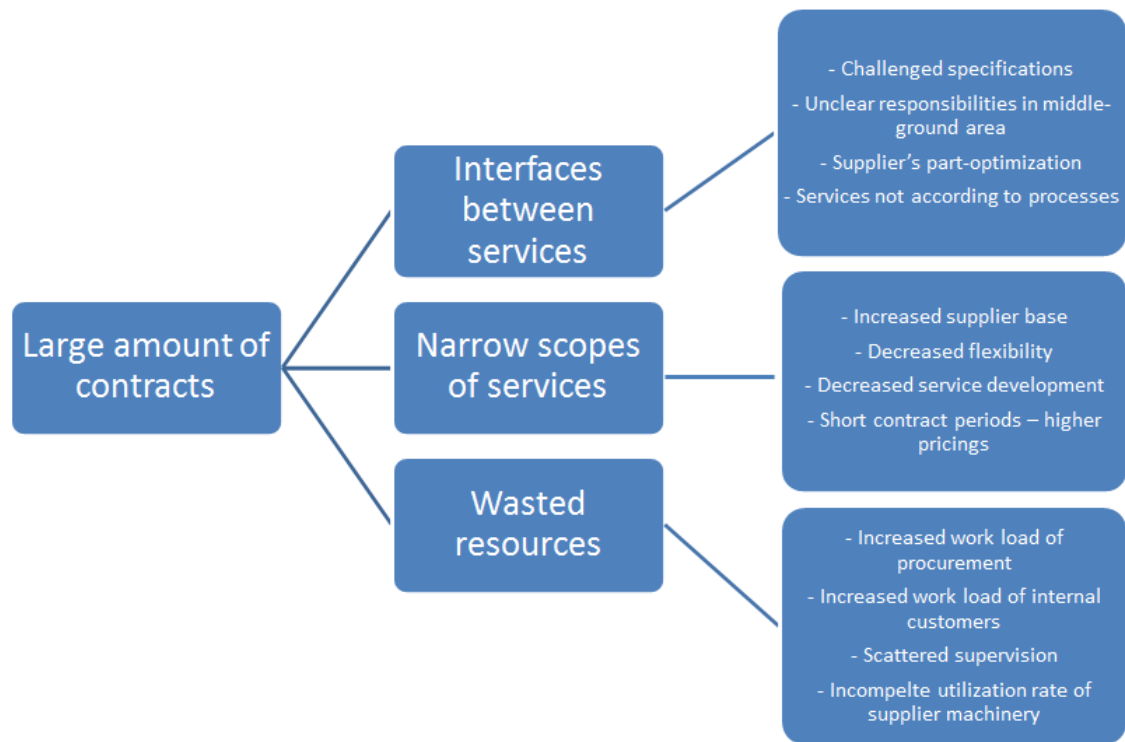


Figure 23: Development possibilities in the current state in Raahe

6. RESULTS

This chapter describes the completion of the resource analysis and the results accomplished based on the data gathered from the information systems and through interviews. First off, the features and characteristics of the resource analysis are described and the reasons for conducting such breakdown. The resource analysis is first conducted with operative supervisors. Second, similar analysis is performed with the machinery utilized in the services. As a result, the two dimensions are combined and the results are illustrated. The chapter also includes the further studying of the resulted combinations, focusing on the suitability of the results in practice. The suitability of the combinations in practice is mainly based on the interviews of company personnel. The composed results are analyzed through the potential opportunities challenges.

6.1 Resource analysis

In the previous chapter, the current situation and its features were analyzed in more detail and the possible areas of development were clarified. The main challenges in the present state are somewhat related the scopes of the agreements, to the supplier base and most importantly to the quantity of the contracts. In fact, the lastly mentioned has a great impact on both the scopes and the selected suppliers. Under those circumstances, the possible solutions for the current state might be connected to the amount of the production service contracts. Moreover, many of the emerged challenges in current state might be solved or prevented by reducing the amount of agreements. Based on the analysis and the interviews of employees in the procurement department a resource analysis was conducted to sort out the possibilities of decreasing the size of contract base.

As mentioned in Chapter 5, the greatest single influence to the size of the spend value has the machines the supplier utilizes. The similar machinery is used in different services and the utilization rates are not presently at the highest possible level. This causes decreased flexibility and adds wasted costs. For these reasons, the machinery usage of different service contracts was analyzed. Similarly, from the buying company's perspective, various operative supervisors monitoring supplier's activities are responsible for multiple service contracts. The contract supervision is fairly scattered and it also could benefit from merging of services. To solve the possible synergies of the contract supervision, the current responsibilities of service supervisors were analyzed. The third step of the resource analysis consists of combining the first two steps.

The agreements signed in the field of production services consist of few sections. These include among others the signing parties, general description of the service and general

terms. Usually as attachments the service levels, prices and the detailed specifications are outlined. The specifications are described through service positions. These are the detailed work assignments which are required to perform the service. Services often consist of multiple work assignments, which might be further divided to sub-positions. First off, every service contract and the specifications were gathered from company's contract archive. Second, the contents of the agreement specifications were collected. The basis of the resource analysis was to sort out the supervisor or supervisors responsible for a certain service position. Similarly, the machinery utilized in every service and each work assignment was clarified to perform the analysis.

6.1.1 Operative supervisors

The disorderly announced operative supervisors of each contract and positions were scattered in the company's information systems. To clarify the actual personnel responsible for the monitoring of different positions of the services, the data was gathered in multiple ways. As said in the Current state analysis - chapter, the information concerning the names was somewhat outdated or inaccurate. Hence, the names listed in the contracts, the names responsible for related cost centers and the information in the ARTTU-order maker – section were collected. Furthermore, estimations of names of each operative supervisor in each contract position were questioned from the main supervisors of each service agreement. Although the information gathered had some fluctuation and the data was missing in some parts, the estimation of each actual position-specific supervisor was succeeded to conduct.

Once the operative resources from the buying company responsible for each position were listed the analysis was carried out. The lists were sorted out according to the appearing names. As a result, a list of the contract positions targeted for each operative supervisor was generated. From the list it was readily seen, which of the services and service work assignments include certain supervisors. In the case of some supervisors, the names were only appeared in a single contract or only in some positions of a single contract. Since the purpose was to examine the possible combinations and synergies through supervisor's names, these cases weren't necessary to take into account in the results. The analysis was conducted concerning all of the contracts, however, some exceptions occurred. In terms of some of the hour- or monthly –based charging machinery rental services, the actual operative monitor from the buying company's perspective is not named. This is due the fact that the machines are utilized by customer company staff and there appears no need for monitoring. The general practice is that the one using the machine is responsible for the monitoring.

In the results of the supervisor analysis, there seemed to be numerous operative staff that was only participating in one service or even one position. In fact, over half of the appearing names were connected to only one service. Since the spread of different supervisors was recognized from before it was not considered surprising. This further in-

licated that monitoring of the services is somewhat diffused. The results showed that similar supervision resources were used mostly in the different services in iron production area and recycling. Generally, many of the names appearing in more than once service were inside a particular production area. This is partly due the fact that usually the work assignments of employees in case company are located in certain production areas. Although couple of names were connected to services that are related to transportation contracts, which are linked to numerous locations. To summarize, the resource utilization of operative monitoring personnel of the buying company had the most similarities in iron production, recycling and few other positions elsewhere.

6.1.2 Machinery

The service provider uses certain machinery to execute the required activities. Examples of the machines utilized are wheel loaders, excavators, earth movers or trucks. There are also numerous other machines operated and the size or the capacities of the machinery vary. To categorize the different sort of machines, a classification was formed. This classification includes all of the appearing machinery and three or four different classes for the size of the machines. The classes for the majority of the machines were small-sized, medium-sized and large-sized, which were defined individually. In some cases, the categories were formed based on capacity. Since the list of the devices used in the services isn't usually named in the contract and the supplier has the freedom to use the most convenient machinery to perform the activity, the information was gathered from the service providers. Usually, the information was presented by supplier's transport or production managers.

The machinery were classified for certain reasons. First off, the supplier has some commercial secrets concerning its business activities. Therefore, at first it wasn't self-evident that the required information would be handed out by the contractor staff. With a generalization and dividing the machines to class sizes, it was more feasible for the service provider to present the information. In addition, the exact models of the utilized machinery weren't necessary from the research point of view. The needed information to perform the analysis was at an adequate level through the machine classifications.

The gathered list of the machinery utilized was organized for further examination. The majority of the work assignments included more than one machine and there appeared to be some machinery which weren't in the prepared machine list. However, this didn't harm the process and the classification became more precise. In fact, it indicated that the suppliers were more than willing to address the employed devices. Similarly with the operative supervisor names, the machinery were listed and then sorted out according to each contract position. This way the certain sized machines were directed to specific service working assignments. The list seemed to include some machinery that was only utilized inside one particular service. These were usually some special machinery that is rarely exploited. One limiting factor in the machine resource analysis was the fact that

the positions were examined according to appearing of at least a specific machine type and class. For instance, if one work position in a service includes only one machine, and another utilizes numerous machines including the same one, these positions are considered using similar machinery.

The resource analysis in terms of machinery was conducted in two ways. At first, it was examined how the services utilize certain type of machines. This was a larger scale experiment, which showed that almost all of the machine types had wide usage in different services. As a result, it was concluded that the analysis could be based on the more accurate, machinery type and size class including analysis. Once the machinery was sorted by machine types and the classes of each type, more precise results were achieved. Quite similarly with the results of the supervisor analysis, it seemed that similar machinery was used especially in the services of recycling and iron production. In addition, some contracts in steel plant and harbor had connecting factors. Differing from the supervisor analysis, the results of utilized machinery in the hour-based rental services were also taken into account. The appearance of resources in these contracts seemed to have significant similarities between services.

6.1.3 Combined analysis

The lists resulted from the supervisor and the machinery analyses were gathered for further examination. The breakthrough is described in Figure 24. These were compared with each other and searched for similarities in terms of the two resources. The analysis was conducted in two ways, for ensuring the correctness of the results. At first, the supervisor names were targeted to each service positions that were using the same machinery resources. Hence, the similarities were connected and the outcome consisted of possible combinations by machine classes including supervisors. Conversely, the similar examination was performed using the contract work assignments using similar supervisors and then connected to the machinery classes. Lastly, the results of both of these ways were compared with each other. It was noted, that the results were identical, which confirmed the rightfulness.

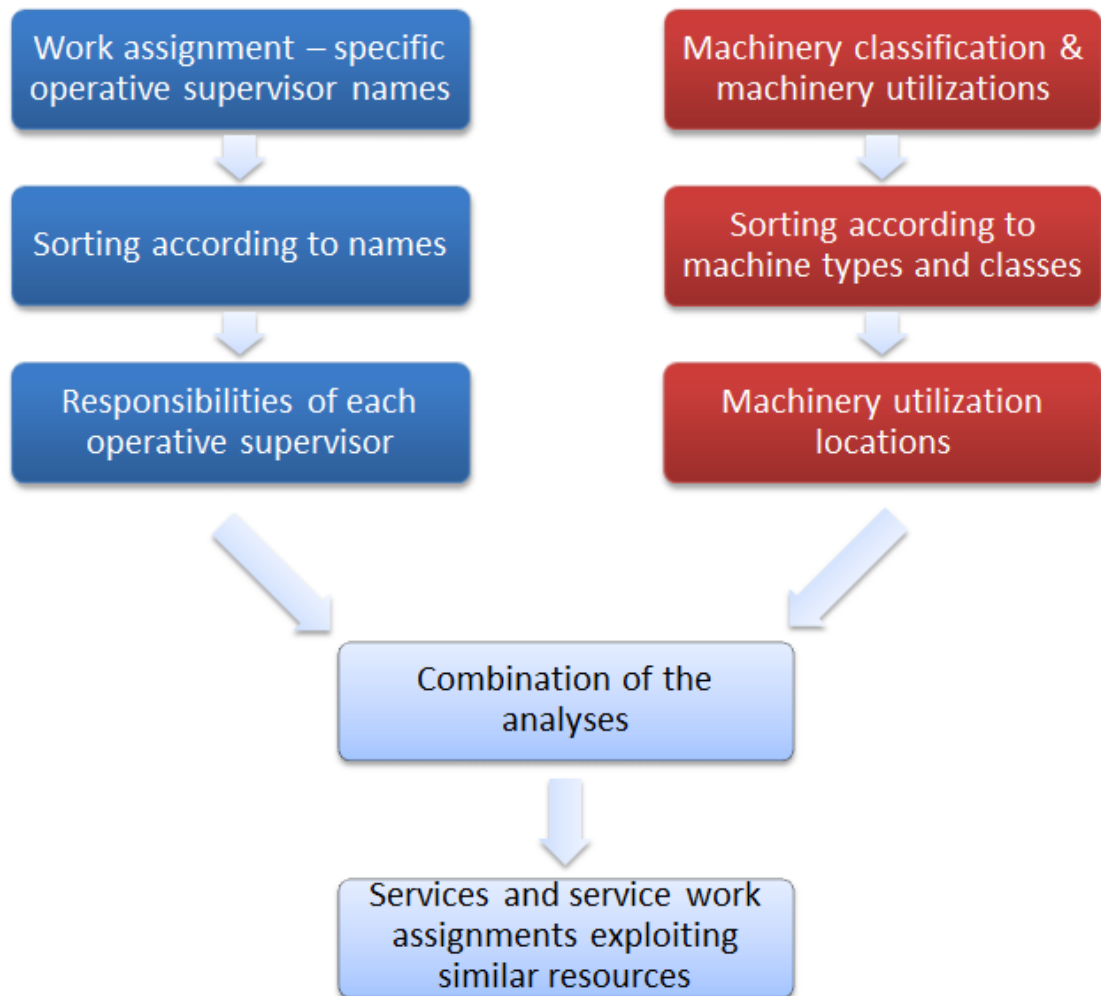


Figure 24: Breakthrough of the resource analysis

The data showed that all of the resulted combinations were located in either iron production area or recycling. However, since the machinery synergies were considered as more noteworthy some of the results based on the machine analysis alone were taken into further account also. Thereafter, the produced preliminary combinations were reviewed with the procurement personnel. The idea was to examine whether the resulted combinations based on data would be prospective or workable in practice. At first, the few combinations associated with recycling process were researched. Even though there were found more than one possibly functioning combinations in practice, the features of the ongoing contracts were stated to be overly demanding and in this case challenging. These were contracts that were still valid for several years, some as much as over ten years. Besides, these comprised some agreements that were agreed upon just recently or signed and the starting dates already determined. Not to mention, the agreements included significant investments, which were recently conducted. Due to these factors, it was concluded the agreements in question were not advisable to combine, at the least, not at this point.

Whereas, the resulted combinations affiliated with iron production had prospective features. Notably, one combination consisting of three contracts was promising. The validity periods of these particular contracts seemed to be in the near future, nevertheless, having sufficiently time for preparations for the next periods. As a matter of fact, the ending dates between the services were near with each other. Provisionally, the related purchasing personnel stated that the combination had no particular barriers, however, more research was required. In terms of machine resource utilizations, two other possible connections were found. The other consisted of services located in the steel plant and in the harbor. The third one concerned few hour-based contracts located in numerous locations. These combinations were considered potential in practice also, however, more detailed focus was needed. Apart from these three, one prospective combination was found between one ongoing contract in the iron production area and one future contract which is already signed. This was not examined further in this study due to some uncertain influencing features, however, it was still considered potential.

To conclude, grounded on the data-based resources analysis possible connections and synergies were found in the service contracts. These combinations were furtherly discussed with the procurement staff and the preliminary evaluation of the practical functionalities was conducted. However, at this point it was noted that all of the results needed further studying. Hence, these results were then refined by interviewing the staff related to the contracts in question. The interviews mainly concerned the main supervisors of these contracts. Nevertheless, some of the operative supervisors were also questioned regarding the combinations. In the next part, features of the contracts are described in more detail. Moreover, the focus is turned into the actual workableness of the resulted combinations in practice.

6.2 New contracts and feature analyses

In the following section the furtherly studied contracts are represented including the general descriptions of the services and the current similarities in terms of resources. Merging the services have their advantages and on the contrary disadvantages. Consequently the studying of the combinations was conducted concentrating on the possible opportunities and challenges each merging has.

6.2.1 Handling and transportation of raw-materials, additives and other process recycling materials

The combination consists of three contracts (outlined in Table 9). The first one includes the unloading, transportation and feeding of materials related to manufacturing of iron. The unloading comprises of shifting raw-materials, such as pellet, limestone, coke and others from the arriving barges at the harbor. From there on, the materials in question are transported to the feeders or to raw-material site directly or through intermediate

storage. The unloading of barges also includes other related work, for example post-unload cleaning. Additionally, the sold materials to external customers from the iron production require occasional work assignments, such as transportation related to shipping. The contract is hour-based and it consists of three positions. However, the invoicing is conducted by machinery and the work assignments require certain machines. The main utilized machinery concerns multiple large wheel loaders and several different earthmovers from two different size classes. The current contract period has been valid for two years starting from April 2013. Although, the contract included an option of one year, which was confirmed recently. As a result, the current agreement period is valid until April 2016.

The second service concerns the activities performed in the iron production area. The contract is separated to five work assignments; material screening and feeding to blast furnaces, screening of limestone and feeding to lime burning kilns, screening and feeding of coke to conveyor, handling and feeding of raw-material in briquetting plant and screening and warehousing of pellet material. Some of these are further divided into sub-positions. The majority of the handled materials are briquettes, pellets or steel scum. However, numerous other materials, such as lime and coke are screened and fed in the service. All of the screening is invoiced by tons according to the contract. The grounds of payment are the weigh-ins conducted with different conveyor system scales. The machinery utilized in this contract are large-sized wheel loaders and medium-sized earth movers. Furthermore, the first three positions include multiple separate screening stations. The ongoing contract period is six years, starting from the beginning of 2012, lasting to the end of 2017.

The third contract consists of transportation, screening and chipping of additives and other process recycling material. The service activities are performed in various different locations, including blast furnace, lime burning kilns, steel plant and coke plant. Work assignments are divided according to location and most of them concerns transporting, chipping, cleaning or dismantling related activities. The revenue logic is varying. In the transporting assignments the supplier is paid by moved tons whereas in other activities invoicing is conducted by the times the assignment in question is performed. In the contract, a specific fixed pricing is determined for all positions. The machinery exploited in the contract is quite extensive and diverse. Wheel loaders, earth movers, special machines such as pressure tank vehicles and excavators are used depending on the nature of the activity. In addition, some positions require telescopic handlers or screening stations. At present, the agreement period is approximately half way through, starting from the end of 2012. Hence, the contract is valid until 2017 November.

All of the mentioned service contracts utilize somewhat similar machinery resources. The first two contracts exploit alike large-sized wheel loaders in all of the work assignments. Additionally, medium-sized earth movers are used in all positions in the second service and in some positions in the first service. As said, the third service includes a

broader machinery list, however, earth movers and wheel loaders of different sizes are utilized in multiple positions, including activities for example in coke plant, steel plant and blast furnaces. Furthermore, screening plant is part of the equipment on all three services. In terms of operative supervision resources, contracts have a fair amount of similarities also. The first two services have identical supervisors in all work assignments. The same personnel are monitoring the activities in some positions in third contract, mainly in the blast furnace area. Moreover, there are only few supervisors in the third contract that aren't connected to the first two services, who are responsible for the positions at steel plant, coke plant and some other locations. As can be seen, for the most part, the first two services utilize similar resources while the third has a broader and more specific machinery and supervisor requirements.

A number of possible advantages in merging the mentioned services can be found. First off, currently the services are provided by two different contractors. The other one is supplying the unloading and the handling of recycling material contracts and the other one has the secondly mentioned screening and feeding service in iron production. In fact, all of the three services might be contracted with three different suppliers in the next agreement period. In other words, the synergies of machinery resource usage or supplier's personnel are presently unfeasible. Of course, the supplier having two of the contracts might benefit from that now but this might not be the case in the future. If all three services would be provided by same contractor, the flexibility of the services would increase. Currently, in the second contract the supplier seems to have incomplete utilization rates with some of the machines. For example in this case, the machines could be utilized in the other services. Additionally, the operative monitoring conducted by the buying company would be more fluent since the supervision would be more centralized. Hence, the supervision of the suppliers work and the handling of deviations and other service related work could become more effective and explicit.

Other appearing benefits are the decrease in the amount of interfaces, the work load of procurement and the convenience of main supervision. An example of a challenging interface between the first two contracts is related to material flow. Currently the other supplier transports steel scum to intermediate storage, from where the other contractor shifts it to further handling. Since the services aren't optimized according to company process, the steel scum freezes especially in winter time before it is picked up for screening. The screening is tremendously challenging if such cool down occurs. In fact, the screening might be totally unfeasible if the scum is in storage for too long. To emphasize, such merging of services would simplify the situation. Additionally, the contracts require work from the procurement and especially the service purchaser. In the case of merging, the future tendering and administrative work would be lesser. Additionally, the first two services are handled by the same main supervisor, which could be in the future centralized and dealt together. The third service could also be in hands of

the same quality manager, which is now responsible for the other two. Major benefits could also be achieved due to greater volume, which could decrease the unit prices.

At the same time, attaching the services has some possible threats. Regarding the first contract, operations related to the barges carrying raw-materials have currently some uncertain features. The usage of the barges is somewhat doubtful at the moment, which affects the total volume of material. It is considered as a threat that the continuation of barge shipping would not take place and that would have an influence on the unit prices of the contract wholeness. Also, the screening stations on the second contract are currently owned by the supplier, which is considered as a significant investment. Coupled with other required investments, the wholeness would demand for remarkable investing from the supplier. Although this is not necessarily a downside, some considered that it might hamper the competitive situation in the future. By the same token, some argued that the supplier might gain an excessively great position and that the costs might hence be increased and quality might be reduced. The competition might also suffer since the extra work appearing in middle ground wouldn't be possible to tender out with different contractors.

The contract including handling of recycling material requires experience and has been provided by the same contractor for a long time. As a result, some of the work assignments demand a tremendous amount of learning from the possible new contractor. Additionally, the positions in question are somewhat different than others and the supplier selected would have to have wide-ranging knowhow and equipment. The machinery required for these activities is fairly differing when compared to the ones in the first two contracts. Also, activities in the third contract have been performed by multiple contractors in the past and the present situation already has faced some merging of assignments. In fact, this has caused difficulties regarding tendering. In the last competitive bidding, only some qualified quotations appeared, since others probably found the contract requirements overly demanding and risky. Again, the received proposals weren't complete and the supplier selection was not plain and simple. Hence, connecting this already wide-ranging resources requiring contract with the others might hamper the competitive situation furthermore. Some also highlighted the dependence on the selected supplier. In case of contractor's financial difficulties or other challenges such as bankruptcy has a direct influence to the buying company's processes. Therefore, the supplier offering the services to all of the activities needs to be selected carefully. All of the mentioned opportunities and challenges are described in Table 9.

Table 9: Resulted opportunities and challenges from the interviews of the merging of the services in iron production

Contracts	Opportunities	Challenges
Unloading and transportation of iron production materials including harbor feedings	<ul style="list-style-type: none"> • Synergies of machinery • Similar supervision • Similar main supervisors • Increased flexibility if provided by one supplier • Decreased interfaces • Decrease of procurement work load • Greater volume, decreased unit prices 	<ul style="list-style-type: none"> • Uncertainty of barge shipping continuation • Combined required investments remarkable • Dependence on the supplier • Decrease in internal competition • Third contract requires special machinery and expertise • Tendering regarding the third contract
Storing, feeding and screening of iron production materials		
Transportation, screening and chipping of additives and other process recycling materials		

6.2.2 Transportation and handling of semi-products and end-products

The wholeness of the services in question concludes two contracts. The first agreement concerns the transportation of products and other process related transportation activities performed with platforms. The majority of the positions consist of product transportation between various locations. Another part of the work assignments is situated in the harbor, which basically involves the moving of products and platforms at that location. Few service positions are also related to recycling materials, which are transported to recycling terminal from different sites. Most of the service positions are priced by the transported or handled tons, however, some activities have monthly pricings. The required transportation is performed mainly with large-sized terminal tractors in all of the positions. The ongoing agreement period is valid until the beginning of 2017 lasting five years.

The other service comprehends transportation and handling of slabs and other slab materials. The specifications include six main work assignments. First two positions concern the outside warehouse handling and heat treatment of slabs. Both of these activities are performed with large-sized terminal tractors and telescopic handlers. The outside warehouse assignments also require excavator. The third position is related to unloading of slabs from train carriage. In general, this is executed with excavator and telescopic handler. However, slabs arrive less frequently by train and the machinery utilized is not such relevant. The handling of head pieces and scrap slabs is performed with special truck and similar large-sized terminal tractor. Rest of the assignments including the transports of short-sized, purchased and sold slabs are completed with terminal tractor,

telescopic handlers and an excavator. The slab handling contract has a long-scale eight year agreement period, which is valid until March 2017.

Regarding the machinery utilizations of these services, resemblance can be found. The terminal tractors required in both of the contracts have identical features. Although, the second contract includes some other machinery such as telescopic handlers and excavators and some other minor differences occur between the services. However, the majority of the tasks are handled with the terminal tractors in either of the services. In terms of the buying company's personnel there are fewer similarities. The contract supervision is handled by various supervisors and most of the activities are performed in different locations. Hence, the greatest resource similarities concern the machinery. Currently, the services are provided by the same contractor. This has already enabled the cross usage of the machinery. It turns out, that the supplier in fact is possibly utilizing the same machinery in both of the contracts. This mainly involves the exploiting of terminal tractors. The capacity of the tractor in product transportation is occasionally insufficient and this can be compensated with one from the slab handling service. This kind of shortage might rise, when the painting line at pretreatment functions causes spikes for transportation needs. Combining the services would ensure that sufficient and planned synergies and flexibility could be achieved on in the future.

The merging has numerous other advantages. As well as with the other service merging, enhanced main supervision and the decreased work load of procurement could be achieved. Moreover, the services are considered quite similar by nature and the specifications are quite functioning. Thus, it was argued that combining the services would not cause that many difficulties in terms of contract specifying. In fact, the specifications can be adjusted and updated simultaneously. Certainly, some of the biggest advantages come from the decreased costs due the greater volume. The attractiveness of the wider and more valuable wholeness can also increase the competition and hence produce decreased costs. Some stated that this kind of combination would increase the know-how of the supplier in the particular area. This way, the supplier providing both of these services would have greater potential to develop is actions. Lastly, in the slab handling contract the levelling of average ton prices has caused some difficulties. If such combining would be implemented, it was argued that this would have a positive effect on the subject in question.

Instead, there appears to be some factors that aren't influencing the merging positively. First off, the utilized platforms in the transportation services are utterly dissimilar. In the slab handling, the supplier owns the majority of the platforms, excluding few heat-protected ones. The heat-protected platforms are required in the high-temperature transportations, however, currently these have demanded widely maintenance. In fact, this has been considered as an object of future development. Conversely, in the product transport contract the platforms are owned by case company. Although, this difference is not necessarily an obstacle for the merging, it illustrates the somewhat differing na-

ture of the two services. Since the platforms differ, divergent equipment is required for the handling of them, such as lifting and shifting. In terms of the machinery usage currently, some stated that the machines already have high utilization rates in both services and the synergies would be fairly minor. Additionally, supervision resources would not decrease even if the combining would take place since the same monitoring would still be needed in various locations.

Otherwise, the appeared downsides regard similar factors than the first coupling. The dependence on the supplier, decreased competition and the high amount of investments required are considered as challenges. The amount of investments depends on various matters, one being the outsourcing rate transportation platforms. If the rest of the platforms are decided to invest by the case company, the capital costs of the supplier are decreased and the costs of the wholeness need to be lower. Also, only the other one of the contracts requires and currently utilizes weather protection equipment for the transportation. These are used to protect the transported items in the cases when raining occurs. Lastly, it was mentioned that in the current situation these services can be acquired from different suppliers which would not be possible in case of combining. This was considered as a downside since the supplier already providing the majority of production services, including these two, was regarded as a potential favorite in possible the upcoming bidding competition for the wholeness. Currently the services can be purchased separately, which might prevent the increasing share of contracts the supplier in question has. The opportunities and challenges are concluded in Table 10.

Table 10: Resulted opportunities and challenges from the interviews of the merging of the services related to transportation and handling of different stage products

Contracts	Opportunities	Challenges
Internal product transportation	<ul style="list-style-type: none"> • Synergies of machinery • Increased flexibility if provided by same supplier • Centralized main supervision 	<ul style="list-style-type: none"> • Differing operative supervisors • Differing platforms used • Dependence on the supplier
Transportation and handling of slabs and slab materials	<ul style="list-style-type: none"> • Decrease in work load of procurement • Feasible specifications • Market attractiveness of more valuable wholeness • Increased service development 	<ul style="list-style-type: none"> • Combined required investments remarkable • Decrease in internal competition

6.2.3 Truck agreements and other prospects

The combination, which was a result from the machinery resource analysis alone, concern three truck rental services. As said, these types of machinery rental services doesn't

have equal operative supervisors or other people mainly responsible for overseeing the service such as in the ton-based services. Hence the personnel interviewed in terms of this combination were mainly in the procurement department. Although such thorough consideration and research was not able to be committed due the amount of interviewees, fairly clear understanding of the contracts was managed to form. Additionally, another prospective combination was found in the analysis, consisting of one ongoing service and one upcoming already signed contract. However, these were not studied or aren't discussed in more detail in this study. This is only mentioned as a possible future combination.

The first one includes the trucks utilized in brick storage, brick laying and blast furnace. The contract comprises of five small-sized trucks; three trucks in brick storage, one four wheel drive truck in the brick laying and truck in the blast furnace. All of these are hourly priced having an estimated usage of approximately 1000-1400 hours per truck. The agreement has a five year contract period, expiring in the end of 2016. The second contract involves four fairly similar-sized trucks in different positions. These are located in the central storage, repair shop, cut-to-length line of strip products and pretreatment. As with the first service, the charging is made by hour-based prices. The prices are depended on the actual usage in hours per year. Hence, the more the trucks are utilized the more the hourly prices decrease. This contract has slightly lower estimated hours per truck, however, these are only approximations. The agreement period is three years ending in the turn of the year 2016-2017. The third service, unloading and shifting of arriving materials and items, includes two trucks located in the central storage. The other is equally sized than the trucks in the first two contracts. Instead, the second one has a greater lifting capacity and it requires a driver from the service provider. The pricings are based on a fixed half-monthly charged costs and the contract also includes a pricing for the extra work. The service is contracted for five years, from the beginning of mid-2013 to mid-2018.

All of the contracts concern similar machinery and are also partly located in same sites. The trucks in the services were all classified as small-sized, however, the other truck in the third contract appears to be in the top end of the scaling. Although, since the machinery is utilized mostly by the buying company and charged by hours, corresponding synergies of the usage can't be benefited from. Hence, the differing sizes of lifting capacity do not necessarily hamper the combining of the contracts. Furthermore, the truck agreements are all located in somewhat same whereabouts which simplifies the handling of them as a one service contract. In fact, some similar personnel of the case company could therefore be in touch with the wholeness for example in the repair shop. In addition, currently these three contracts have a quite minor spend value, which also speaks for the combining of them. The procurement work load would be significantly lesser since the new contract would be more feasible to manage. Also, the wholeness could be more attractive in the markets. Hence the competitive bidding might result

better hour-prices for the trucks and for the extra work. The flexibility regarding the utilization might also be enhanced if all of the trucks would be provided by same supplier.

On the contrary, some challenges appear also. Part of the services in question has already faced merging with other services. Hence the separate contracts consist of significant amount of trucks and this makes them more demanding to control and manage. For example the first and the second service including trucks in multiple locations have to be handled carefully by the procurement. Additionally, some challenges in terms of the truck specifications have already arisen. Evidently, the trucks offered by the suppliers have not always answered the drafted definitions. It was stated that this kind of difficulties might be increased even further in case of such merging of contracts. However, the specifications need to be drafted accurately anyway for the next contract period and especially if the services are concluded to combine. It was also stated that the first two contracts have somewhat similar requirements with each other compared to the third one. Therefore it was argued that the features would be more equal and the specifications might be more feasible to draft in case of only combining the first two services in question.

There also appears to be other influencing factors. The trucks are presently in differing condition. Arguably, some of the trucks are older and are utilized for a long time already. However, part of the machinery appears to be in great shape. The condition of the trucks has an influence on the future contracts. It was argued that if the trucks are in great shape the contracts can be easily continued from here on, as separate contracts or as wholeness. Although, in case of the trucks that are in a poor state, some adjustments need to be made. In the future agreement the specifications have to be made carefully also because of the possible longer-scaled agreement period. The planned wholeness requires investments from the supplier, which might force the procurement to increase the length of the validity of future contract. The appeared benefits and challenges are illustrated in Table 11.

Table 11: Resulted opportunities and challenges from the interviews of the merging of the truck services in various locations

Contracts	Opportunities	Challenges
Trucks in brick storage, brick laying and blast furnace	<ul style="list-style-type: none"> • Synergies of machinery • Similar locations • Increased flexibility if provided by one supplier • Decrease of procurement work load • Greater volume, decreased hour prices 	<ul style="list-style-type: none"> • Management of numerous trucks demanding • Troubled specifications • Third contract including one differing truck
Trucks in central storage, repair shop, cut-to-length line of strip products and pretreatment		
Trucks in material services		

The one prospective wholeness consists of two contracts. The ongoing contract concerns the unloading, transportation and feedings of coal related to coke plant. The other one, including transportation and feeding of coal in pulverized coal injection plant is signed and the validity starts this year. The agreements have somewhat similar machinery resources, since the handled and transported material is the same. In addition, the contract validities are ending quite simultaneously. It was also argued, that these two services would be feasible to combine, in terms of the case company process and flexibility. Moreover, some personnel in procurement and internal customers claimed that the particular combining would have a clear potential.

7. DISCUSSION

In this chapter the connections between the findings made in the empirical studying are compared to the ones from the theoretical part. This is conducted by focusing on the appearing similarities and distinctions. Then, the implications are discussed and established by taking into account these findings. The recommendations for new contracts are discussed in terms of contents, scheduling and other essential features. Furthermore, the chapter outlines the predicted impacts on the current state including the achieved advantages regarding potential savings and other benefits.

7.1 Resemblance of the literature review and empirical findings

It was noted, that the current state characteristics of production service procurement in Raahe and the results from the empirical studying had a number of similarities with the contents of the literature review. The factors related to the process of buying services, supplier base management, service quality management and contract management were all somewhat connected between the theory and practice. In terms of the responsibilities and roles related to the process, differences were also recognized. For example, as stated in Subchapter 3.3.1. the internal customer might often bypass the procurement function especially in critical services. This was highlighted in numerous studies. However, in the case company such disregarding was not identified. In the case company, the responsibilities of the internal customers and procurement in terms of the buying process are considered fairly clear.

The challenges in the current state (outlined in Figure 23) are widely recognized. Since there are a number of different contracts, numerous disadvantages have appeared. First, services create interfaces with others, which hamper the specifying of the services. Even though the current specifications are considered to be fairly efficient, the scopes of the services hinder the planning and drafting of them. Due to this fact, challenges such as supplier optimizing its own actions, difficulty of supplier and service monitoring and troubled spotting and handling of deviations occur. All of these facts are directly connected to the quality of the service. Furthermore, the quality problems increase the services costs. In Chapter 2, it was noted that the specification phase is often the most critical part of the service purchasing process. Furthermore, the influence of the specifications on quality and the overall succeeding of the service were mentioned in the literature.

Second, the narrow scopes of service cause some challenges. The lack of flexibility and development are both directly in touch with the long-term costs of the service. The small-scale contracts often demand for shorter agreement periods. As a result, the suppliers have a more significant risk in terms of investments. Hence, the supplier has to charge the buying company for this uncertainty, which increases the costs of the services.

Third, the large contract-base causes tremendous work load for procurement and the internal customers. The buying company can't properly focus on the relationships with the suppliers and the information sharing between internal customers, purchaser and the supplier is challenged. Although the relationships are not considered as a main challenge currently, proper focusing on managing these is considered highly important. In the long run, the lack of proper focus on supplier relationships and to prospective and ongoing contracts might increase costs.

In the literature, similar challenges were noted. In Subchapter 3.1 it was stated, that in case of outsourcing a certain activity, the buying company should ensure that the service supports the company's goals, objectives, strategy and vision. In Subchapter 3.2 as a part of the common seven wastes it is mentioned the lack of quality and ineffectiveness of the linkage of the service to customer company's process. Moreover, large supplier base is connected to poor flexibility and poor quality. Additionally, having numerous suppliers is proven to increase costs to the buying company. In case of a large supplier base it is argued that the focus on the partnership suffers. By the same token, the lack of proper investing to the ongoing relationships with the service providers has an impact on the flexibility and quality and hence, to costs. Lastly, failing to success with outsourcing is associated to the knowledge sharing of the partnership parties.

An almost utterly differing example of another situation with the procurement of similar services was found in the factory of Luleå. In Luleå, the outsourcing strategy was quite distinctive, the supplier and contract base were smaller sized and the features of competitive situation and service quality were outgoing. Although in the current state of Raahe numerous challenges have been identified and the situation in Luleå is quite the opposite, it is not considered anywhere near trouble-free. In fact, the challenges appeared in Luleå can be considered quite critical and in Raahe the overall status is regarded as more functioning and satisfactory. Certainly, in Luleå there are fewer interfaces between contracts, relationships with the suppliers are regarded as deeper and broader services might be more flexible. However, the appearing disadvantages are even more cogent. The few present suppliers have a dominating position and the competitive situation is considered poor. The owned machinery and equipment causes maintenance costs and the utilization of them requires planning. Supplier's services are overly broad and they aren't supporting the buying company's process, which enables the optimization of service providers own actions. Since, the supervision and monitoring of the service are

troubled. All of the appearing downsides cause significant costs both short-term and in the long-run.

When applying the main suggestions in the theoretical part, several recommendations can be identified. First of all, there are few factors that lead to successful outsourcing. The deeper relationship, selecting the right vendors, ensuring adequate contract monitoring and fitting the purchased service according to company's process are emphasized. Especially in case of remarkable services the focus on fewer agreements and supplier relationship management are recommended. Numerous authors have mentioned the reduction of supplier base. This can also be applied to contract base. Concentration on the fewer ongoing agreements bring about reduced costs, better quality, availability and capacity. Companies are stated to struggle with too many low-importance contracts, which demand for wasted resources. The theory suggests balancing these resources in order to achieve better cost-effectiveness. Lastly, the significance of knowledge sharing has a remarkable effect on the outsourcing success.

Although the implications made based on the theory speak for the combining of services and dividing the services to fewer suppliers, the situation in Luleå demonstrates the other end of the spectrum. As a result, it can be said that the situation in Luleå or in Raahe is not currently fully advisable or eligible, both including some challenges. The implications formed in this study thus recommend purchasing the services with including features from both example factories. Therefore, it is suggested that the solution would be somewhere in between these two situations. In fact, similar implications, such as the need for fewer contracts were made based only on the current state in Raahe, however, seemingly the theory and the example from Luleå support this conclusion. Although, since a quite cautionary example of minor vendor and minor contract base was seen in Luleå, the adjustments to the current situation need to be planned well carefully. Or at least, the development has to happen by ensuring that the kind of challenges appeared in Luleå can be avoided.

One of the most significant factors is the competitive situation. Even though the reducing of contracts has its benefits, the competitive bidding has to be functioning in the future. First off, this might be avoided by not reducing the supplier base in excess. In Luleå it was seen, that in case of only few suppliers the dominance of service contractors is increased. This enables a number of undesired consequences. Furthermore, the competitive situation has to be functional with the subcontractors also. These second or third tier suppliers have an almost equally important role, since their actions directly influence the buying company. Secondly, concentration on the drafting of detailed and thorough specifications is highlighted. Although these are currently quite satisfactory in Raahe, new wholeness's enable proper renewing and adjusting of present ones. The service areas can't either expand to excessively broad, so that the buying company has the timely and accurate information regarding the performed activities. If only the sup-

plier is aware of the performed activities and reports them to the customer, the situation can no longer be considered as advisable.

Since the need for reducing contracts was noted, not necessarily suppliers, the current agreements were studied further. This was conducted by analyzing the synergies of the services in terms of resource utilization. If such synergies could be found, the flexibility and quality of the services might be increased by merging them. Additionally, the service and supplier monitoring might be enhanced or at least more centralized. As a result, the cost-effectiveness of the services would increase while resources would be better balanced. In the Result – chapter, the services utilizing similar resources were found and the possibilities of actual merging were noted to include both challenges and opportunities.

7.2 Recommendations for procurement

Based on the deductions made from the literature review, the current states in Raahe and Luleå and the findings in the Results – chapter, recommendations for the developing of the procurement of production services in Raahe were conducted. This is performed by focusing on the gathered advantages and challenges from the three resulted service combinations in Chapter 6. Furthermore, the new contracts are discussed and described in terms of contents and scheduling.

7.2.1 Iron production services

For the most part, the opportunities identified (described in Table 9) were abundantly clear. Especially, the two services directly related to iron production utilized almost identical machinery and supervision resources. Hence, the benefits of merging might complete the utilization rates of the machinery and supervision could be more centralized. As said, the most significant costs are caused by the used machinery and hence the merging would enable decrease in pricing. For example, if the combining would reduce the amount of required machinery even by one unit, that would affect the costs remarkably. Furthermore, the two mentioned agreements include a challenging interface, which causes difficulties to the buying company's process. Evidently, removing this interface would increase the flexibility and promote the planning of services according to customer's production process. The synergies would also concern the service provider's staff, which could be utilized across the services. All of the factors in question would hence enhance the quality, which directly influence the costs of the service. Other identified opportunities concern all of the three agreements, including the decreased work load of procurement, improved competitive situation and decreased unit prices due to greater volume. To conclude, the benefits of merging are considered remarkable, particularly in terms of the first two contracts.

Overall, the challenges recognized (described also in Table 9) aren't considered as cogent as the possible benefits. First, the uncertainty of the barge usage in the future is considered as an influencing factor, however it doesn't prevent the possible merging. The mentioned effect on the unit prices is quite minimal or non-existent, since that can be taken into account in the competitive bidding and in the specifications. Moreover, by the time the contract merging would take place, the situation with the barges is most likely settled. Hence, the decisions can be made based on the situation of that time. Second, the mentioned overly increased investments due the screening stations are considered as a challenge. However, the combined investments of the services aren't considered overly high still and the buying company might also invest the screening stations by self, or at least to consider the option. The amount of screening stations was presently estimated as being overly great, which also speaks for making the investment. Hence, the competitive situation might be more desirable in the future.

The most significant downsides are related to the third contract. As said, in terms of resource utilizations the handling of recycled material requires a broad list, including special equipment that isn't exploited in the other two services at all. Especially the activities related to chipping are regarded as differing from the other duties. Chipping requires specific equipment, which reduces the amount of competent suppliers available. Actually, the required machinery is quite exceptional and it has caused difficulties in the previous tendering. Although the service in question is tendered separately in the past and the proposals have still considered fairly poor, the merging of this service with the others is found quite unfeasible. In fact, the contract could possibly in the future be divided into separate services so that a functional competitive bidding can be ensured.

As a result, it is recommended that the services related to storing, feeding, screening, transporting and unloading the iron production materials should be combined to one wholeness. The possible benefits in terms of these two services are considered greater than the possible challenges. However, due to the stated features the service of transportation, screening and chipping of additives and other process recycling materials is not recommended to merge with the others. A major part of the challenges listed in Figure 25 can be avoided by only focusing on the combination of the first two services. Otherwise the residual factors do not promote the keeping the services separate sufficiently since they will be taken into account in the future planning.

The storing, feeding and screening agreement is valid until the end of 2017, whereas the unloading and transportation service expires in March-April 2016. However, the latter is already been continued with an extra year before, and it is considered reasonable to resume the period with another year after the current period. In fact, when the combining of these services was discussed, it was suggested that after the current period, the latter agreement could be continued so that the expiring dates would match. To conclude, the recommended starting of the new contract would hence be in the turn of the years 2017-2018. The agreement period will be a minimum of five years, possibly more, since the

other of these contracts already as a separate service had five year validity. Also the required investments will be increased. Although, the predicted validity is most probably no more than ten years.

Since the investments required are considered fairly large regardless of the decisions made in terms of the screening stations, the agreement should be signed approximately year before the actual starting of the service. For this reason, the planning and drafting of specifications should already take place no later than the turn of the years 2015 and 2016. Hence, adequate time is left for the actual competitive bidding and supplier selection. The merge is described in Figure 25.



Figure 25: Contents, effective date and validity of contract 1

7.2.2 Transportation and handling of products and slab materials

The identified opportunities of the combination (listed in Table 10) were relatively explicit. Both services utilize terminal tractors, which might be used across. Although the utilization rates were estimated as quite high currently, the synergies can be beneficial. Additionally, the exploiting might be quite efficient since the services are presently provided by the same contractor. In case of keeping the services separate, these synergies would be unfeasible when the services were handled by two different suppliers. Moreover, often suppliers only own a certain type of machinery and investments increase when the demanded machinery list is extensive. The combined machinery list in this case remains controllable and it is not considered as threat of increasing capital costs, which would increase the pricing. The increased amount of know-how might increase the development of the service, which in the long run could benefit both parties. Therefore, quality might be improved which again reduces costs.

Instead the synergies found in the operative supervision are quite minimal since different monitoring personnel are required in different locations. Although the platforms are differing, it would not hinder the merging of the services. In touch with the combining process, the decisions about the heat-protected platforms and the other related equipment can be made. One of the mentioned challenges was related to the possible increas-

ing share of production services of one particular supplier. However, in case of combining the large attractive wholeness could fascinate other suppliers to make proposals. In fact, the current situation would not be harmed if an outside supplier would end up providing the service in question. This would increase the internal competition and reduce the emerging share of few significant suppliers.

Thus, it is recommended that the services in question would be combined to a larger wholeness. The specifying of the future service might be more difficult, since some personnel retirements are expected to happen in the next year. The staff in question has a tremendous amount of knowledge in terms of these services, which might complicate the future planning. Although it is considered possible, that the specifications and other planning might be conducted in time, so that the know-how of these personnel might be exploited. The contents of the service are predicted to remain somewhat same as presently, since the specifications are seen functional. The main supervisor might be directed to the person currently responsible for the slab handling contract, although this requires help from the personnel responsible for the product transportation in the harbor.

The validities of the contracts happen to expire in somewhat same dates, slab handling service ending few months later. Therefore, it is suggested that the internal product transportation agreement could be adjusted by three months so that the combined contract validity would take place in the beginning of April 2017. Because of the required investments, the signing of the agreement should not take place any later than roughly one year before the referred date. Hence, the actions concerning the wholeness specifications and tendering should be started relatively soon. The agreement period is recommended to be valid for at least seven years, since the slab handling contract validity has been eight years separate. In fact, an eight to ten year period would give the supplier relief in terms of investment risks, which also might decrease the costs for the buying company. The combination is described in Figure 26.

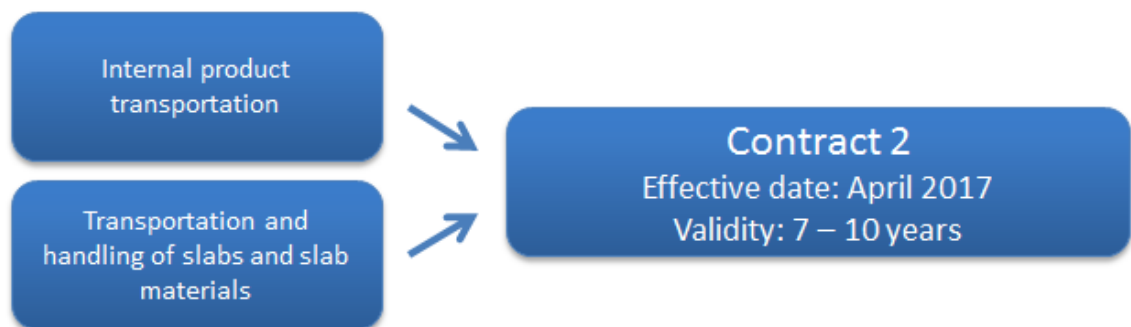


Figure 26: Contents, effective date and validity of contract 2

7.2.3 Truck machinery services

The appearing opportunities were stated in Table 11. The biggest savings might be achieved due to the decreased costs caused by attractiveness of larger wholeness with greater volume and long-lasting agreement period. Surely, the administrative work in the future would be reduced and the flexibility might be increased.

When comparing to the other combinations, the expected synergies in terms of machinery utilizations are considered the most modest. Even though similar trucks are used especially excluding the material services, the particular trucks are tied in the pointed activities. Although, including only certain sized trucks, the combination of the three contracts might tempt multiple contractors to the competitive bidding. The wholeness includes multiple similar and only one larger capacity trucks. It is concluded that the one differing truck would not be an obstacle to the merging of the services. However, since the specifications have been somewhat troubled in the past, the proper planning of them is required. The wholeness also requires more from the interested groups in the buying company, since it concerns a number of trucks in various locations.

As a result, it is implicated that all of the three services including truck machinery in different whereabouts would be beneficial to combine to a one larger wholeness. However, including the third contract is more demanding, since according to the results, it differs from to other two slightly and includes some challenges. This might also be somewhat depended on the current condition of the truck machinery, which was not studied further in this Thesis. However, the shape of the machines was not considered as an obstacle for the merging, regardless of the conclusions made about that later on. Since the first two services include the same type and size of machines and the activities are more similar, the combining of these two was regarded as explicit. Instead, including the third contract was more doubtful, however it was considered rational to conclude to the new contract.

The current contract validities are in line with the recommendations and the time of the merging consists of two options. The first two agreements are both ending in the turn of the year 2016. Hence, the merging could take place at the time in question. On the contrary, the third contract consisting of the trucks in material service expires later, in mid-2018. Therefore, the material service trucks would be added to the wholeness in the future, possibly after the next periods, if the ending dates are adjusted accordingly. The other alternative is to continue the other contracts with a year and a half extension, so that all of the ending dates would match in 2018. These alternatives need to be weighed in the procurement and with other people of interest. Although the specifications require planning and the supplier has to have adequate time to make the investments, the signing does not necessarily has to happen a year beforehand. This is simply because the value of the investments is remarkably lower when compared to the other two service mergers. Also, since validities of the current agreement periods are all four to five years

the suggested length for the merged contract period is five to six years. To conclude, the preparations for the next contract period are not as demanding or time-consuming and the timing depends on the time of the combining. The contents of the third contract combination are described in Figure 27.

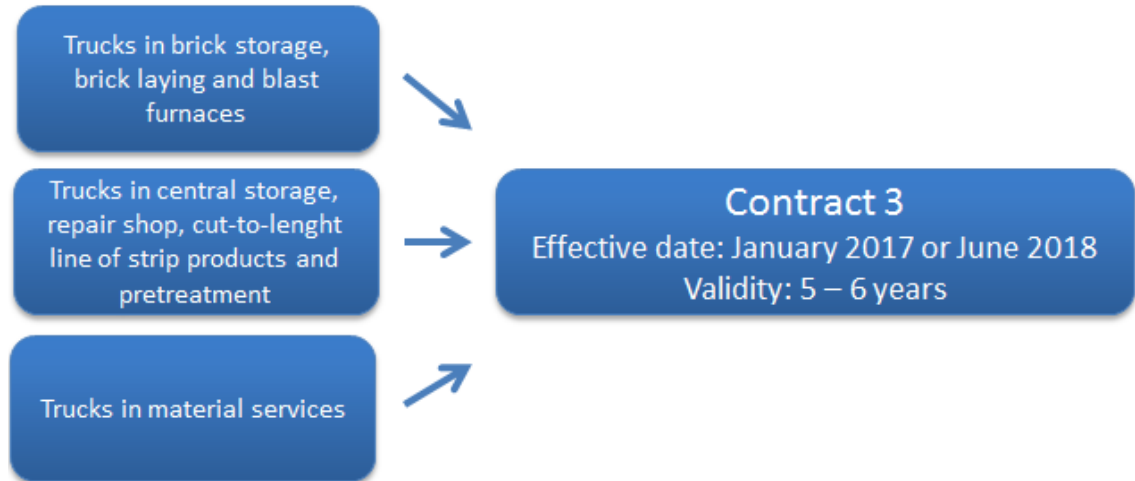


Figure 27: Contents, effective date and validity of contract 3

7.3 Predictions for future state

With the results found in this study, the challenges identified in the current state can be reduced. If the three mergers are concluded to implement, the amount of interfaces will be reduced. Additionally, the spend distribution of services will be more evenly balanced. To illustrate this, the future state of the spend distribution is compared to the current state (Figure 19) in Figure 28. As it can be seen, the amount of contracts is fewer and the low-importance contracts are reduced. The merging of the mentioned (at the end of Subchapter 6.2.3) prospective combination of the already signed and ongoing contracts related to coal transportation unloading and feeding, is also included in this figure. This is due the fact that it was seen such promising and it might be combined in the near future. Thus, the figure illustrates the situation in which production services would be managed with five fewer contracts. However, this is just a prediction of how the situation might appear in few years from now.

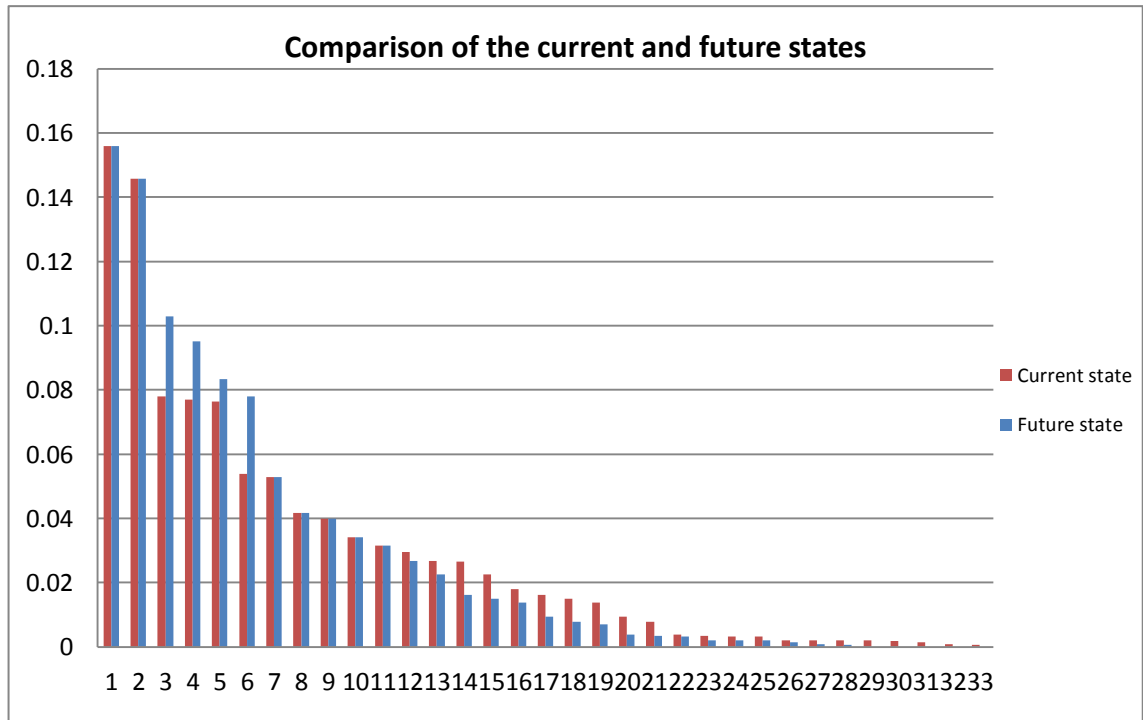


Figure 28: The distribution of the spend between services in current and future states

The combined spend value of the three mergers accurately discussed in this thesis represent approximately sixth of the total spend of production services. If the prospective combination is added to this value, the share is even greater. However, it is estimated that the three merging discussed could decrease the total costs caused by production services quite remarkably. More accurately, the mentioned share of sixth of the total spend could be decreased by as much as a few percentages. Although, these are just roughly estimated values and the real costs will be actualized not before than several years from now. In fact, the preliminary costs will be seen after the competitive biddings, when service providers have proposed their pricings. The actual savings can be calculated after the agreements are signed the when the suppliers have performed the activities in question for a while. The future spend values might be compared to the previous ones, including the changes and adjustments made in terms of service contents.

The achieving of the potential savings is depended on the service provider selection process. It is unnecessary to highlight the importance of specifications and the arranging of competitive biddings. In the selection process, the “hard” and non-cost criteria mentioned in the theoretical review of this study, should be taken into account. Although the prices and quality assumed can be considered the most remarkable factors, other “soft” criteria are important also. Additionally, the decisions made about the service providers need to be considered strategically. In order to maintain and develop the competitive situation, these factors need to be noted in the selection process.

Furthermore, there are numerous other factors influencing the future state. For example, the actualized savings and the implementation of the suggested subjects are highly de-

pended on the market situation. The amount of produced tons is depended on customer demand situation. In other words, production services are directly connected to the production, which means that changes in production tons straightly affects the performed activities. Since, it is a matter of market conditions in the future, how the production services should be purchased and performed. In addition, the markets have effect on the general pricing levels, which impact the future spends. Therefore, even if the services mergers in question are found to be more cost effective and the suppliers decrease overall charges, the changes in the pricings might not be equally significant if general price levels are greater. Even though it is hard to predict the situation further, it is assumed that the suggested implementations occur in such near future, that the market situation would not have that much of an effect on them.

8. CONCLUSIONS

The objective of this thesis was to develop the procurement of production services in the steel factory of Raahe. This was conducted by studying the possible optimization possibilities, which could lead to more cost effective service contracts. This was performed by finding solutions to the research questions. The questions consisted of one primary and few secondary questions. The purpose was to find the answer to the primary research question through solving the secondary supportive problems. In the theoretical section of the thesis, the aim was to develop an understanding of the previous research made in the field in question. In the first part, the definitions, trends and the process related to service procurement was described, which provided the answer to the first supportive research question. In the second part, the literature regarding external resource management, including supplier base management, service quality management and contract management, the purpose was to provide the answer to the second supportive question.

The empirical section consisted of few chapters. In the Current state analysis – chapter the main characteristics of the present procurement of production services in Raahe was described. In addition, the chapter concluded the main pros and cons of the situation with similar services in another production factory of the case company, Luleå. The purpose of this chapter was to outline the basic features and identify possible areas of development in Raahe. The chapter also included a comparison between the two factories, illustrating the main differentials. The objective of this chapter was to give the answer to the third and fourth secondary research questions.

Numerous challenges and areas of development were noted. Currently, the amount of service contracts in Raahe is quite substantial, which lead to some challenges. First off, the contracts have numerous interfaces with others, which hamper the specifications. The services aren't necessarily planned according to the case company's production process and the responsibilities of suppliers are unclear in the middle-ground area. Since the service scopes are narrow, the service development is challenged. Additionally, contract periods are considered fairly short, which might lead to higher pricings and lower flexibility. Also, the operative monitoring of services were seen somewhat scattered and the utilization rates of supplier's machinery were regarded as incomplete. In the present situation the majority of the contracts were valid no more than few years, which indicated that it was convenient time for acting. On the contrary, in Luleå there were significantly fewer contracts and suppliers. Although this led to certain advantages, even more challenges were identified.

In the Results – part, the solution to the final supportive research question was offered. This was performed by presenting the breakthrough of the resource analysis and outlining the main findings. These findings were furtherly described in terms of appearing advantages and disadvantages. Lastly, the results were discussed in more detail and the final suggestions for procurement were conducted. These were implicated by taking into account the solutions for the supportive questions. Hence, the Discussion – chapter provided the answer to the main research question. Additionally, the significance of the suggestions and predications of the future were discussed briefly.

Since it was noted that the possible solution to the identified challenges might be found by reducing the amount of contracts, the services were studied in terms of resources. Since the machinery utilized in the services have the most significant impact on the costs and the operative supervision were seen as having possible synergies, a resource analysis regarding these factors was conducted. This was performed by first classifying the types and sizes of machinery exploited in the services. Then, similarities between services in terms of machinery were searched. Similarly, the names of the operative supervisors were listed and the contracts were explored regarding similar supervisors. Combining these analyses showed that numerous contracts included similar resource utilizations. The results were furtherly studied in terms of the possible opportunities and challenges in case of merging. The main findings consisted of three contract combinations. By taking into account the findings from the literature review, current states both in Raahe and in Luleå and the identified opportunities and challenges regarding these mergers, the final suggestions for procurement were made.

The first combination consisted of two services. Combined, these include the activities of unloading, transporting, storing, feeding and screening of iron production materials in the iron production and harbor area. The merging is suggested to be implemented in the turn of the years 2017-2018. The second combination consists of internal product transportation and the handling and transportation of slabs and slab materials. The beginning of the new contract period is recommended to take place in April 2017. The third suggested wholeness contains three truck services. These are located in brick laying and storage, blast furnace, central storage, repair shop, cut-to-length line of strip products, pretreatment and material services. These are concluded to merge in mid-2018 or possibly gradually according to the agreement periods. In case of all the mentioned combinations, the argued opportunities were seen greater than the possible threats.

All of the resulted combinations are expected to enhance the cost effectiveness of the services. This originates from the fact that the machinery and suppliers staff can be exploited more flexible. Additionally, the case company can plan its own monitoring resources better and the work load of procurement is decreased. The flexibility and hence quality is increased and the combinations are more attractive in the markets, which might also lead to decreased unit prices, due to greater volumes. The contract periods are longer-lasting, which might decrease the capital costs. In general, the amount of

production services contracts is reduced, which means less interfaces and reduced deviations and more evenly distributed spend values between contracts. Altogether, by combining the suggested services, fairly significant savings might be resulted. In fact, even as much as a few percentages of the spend in question might be reduced.

8.1 Critical evaluation

According to Hirsijärvi (2007), the main subjects related to critical evaluation of a research are reliability and validity. Both of the concepts are used to measure reliability, although there seems to be appearing controversy related to the accurate definition of these terms. Validity is used to describe the ability of the research approach to measure the factors what was originally meant to be measured (Tuomi & Sarajärvi 2002, p. 136). Instead, the term reliability means the repeatability of the study. This defines how well the similar findings could be repeated and how the data gathering methods produce consistent results. (Saunders 2012)

First off, as described in Chapter 5, the collected data regarding the operative supervisors of each service and separate working assignments was somewhat scattered. Since the appearing names had some fluctuations depending on the source of information, the implications on the operative supervisors were conducted by evaluating the most realistic alternatives. In other words, the named personnel in agreements, names found behind cost centers or in order creators and the information received from the main supervisors weren't identical between each other. This might enable the slight subjectivity of the results. However, the conclusions concerning the most realistic options were discussed with procurement personnel and the common opinion was that the most reliable information was the one from main supervisors. Moreover, every name was considered case-specifically and the all of the names were eventually valued as truthful. Therefore, the objectivity of the results can be considered reliable.

In general, the reliability is often found troubled in qualitative case studies. (Yin 2003) This might originate from the fact that qualitative research often concludes interviewing, which might be regarded as somewhat subjective. As in this Thesis, significant part of the results were somewhat based on case company and service provider interviews and their opinions. However, the results formed were in every case based on multiple interviews, which reduces the possibility of subjectivity. Additionally, the results were reviewed with procurement personnel, which also speaks for objectivity.

The information related to the machinery utilized in the working assignments of services was interviewed with suppliers. Since the services in question represent a significant commercial relevance to the contractors, the situation might give the supplier a chance to give incorrect or distorted information. However, the possibility of this was pursued to exclude from the results. First, the supplier would not necessarily benefit from giving fault information, since they can't be certain of from perspective the study

is maid. Second, the machinery is present in the site and defined in some contracts and the faultiness of the results might have been notified during the research. Third, the contractors were informed beforehand, that this kind of research would be conducted and that some interviews might take place. The basic idea of the study was hence already known. Hence, giving faulty information concerning the subjects in question would be unexpected. In case the suppliers were willing to stay competitive, any reasons for not cooperating were not recognized. Lastly, the results were again reviewed with procurement and the purchaser responsible for production services. Due to these factors, the objectivity is assumed qualified.

The research is also evaluated in terms of generalizability. Commonly, the basic contents of the study could be repeated. In fact, similar study could be conducted in another factory of the case company, although with certain limitations. For example in Oxelosund, Sweden, which is a fairly similar factory than Raahe, differing information systems are utilized. Also, as in Luleå, the outsourcing rate is assumed to be quite differing and the services discussed are responsibilities of multiple different purchasers. Hence, the exact similar kind of research would be unfeasible or more troubled to conduct. When considering another procurement category, for example maintenance, some other limitations appear. First, the study only applies to services. Furthermore, the services should have somewhat similar spend values and similar machinery utilizations. This is simply because the machinery in production services are in the most critical role and represent the majority of the costs. In some consultancy or other similar business services, repeating is difficult. Hence, if the services regard similar features, for example some logistic functions or material handling, the possibility to conduct such study increases.

Numerous other factors affect the generalizability of the study. Since the focus is on steel industry, the discussed services include handling and transportation of significant ton amounts of material. The exact similar machinery is exploited in for example mining and construction industry also. In other fields, the machinery might differ and the working environments require unlike equipment. One of the influencing factors is the layout and size of the factory. For example, the amount of required transportation is highly depended on these. However, in general the synergies of resources could be studied regardless of the operational environment with certain modifications.

8.2 Suggestions for further research

During the research various topics were identified which could be furtherly studied. First off, the cost-effectiveness of the services might also be developed without implementing structural changes. For example, the flow of different materials and products might be examined and described, which could clarify the amount of transportations and material movements. The flow could also be tracked with GPS (Global Positioning System) – location or corresponding technology. Hence, supplier's wasted movements

could be eliminated and interface areas of different contracts would be more transparent. Additionally, the supplier supervision and monitoring would be less required. It could be furtherly studied whether the mobile tracking could be connected directly to case company information systems. Could the activities performed therefore be monitored straight from the ERP information systems?

It could also be studied, whether the ordering process of rental machinery could be managed more efficiently. Could it be performed with the help of information technology systems? For example, if the required machinery could be reserved in an IT application, it would be more feasible to handle the utilization of service machinery. Could this increase the transparency of machinery? Would it possibly reduce the costs? In addition, if the material flows could be illustrated, the services might be better adapted according to case company's production processes.

Third, the perspective of the suppliers might be studied further. In this thesis, the suppliers were only interviewed in terms of machinery utilizations. However, further questions on opinions about the current state were not discussed. Hence, if the viewpoints of contractors could be studied more accurately, possible ideas for development would possibly be gained. In addition, the similar interviewing could be conducted with the service providers in Luleå factory. This might give a broader point of view of the current state in Luleå also. As a result, the standings of contractors could be compared in both of the situations, Raahe and Luleå. The interviewing might also be conducted after competitive bidding situations, also with the supplier's not selected. If required information could be gathered, future solutions might be more feasible to develop.

The utilization rates of the machinery and the synergy possibilities with supervisors could be studied further. Since the utilization rates were only estimations, the most accurate insight of the situation was not formed. The utilization could be studied further by observing the situation and conducting amplified interviews. Although, this would require resources and the possible benefits might yet be unsatisfactory. With the knowledge of more accurate utilization rates, could the cost-effectiveness of services really be increased further?

Due to the merging of SSAB and former Ruukki, the similar kind of researching could be furtherly conducted in other sites. Hence, synergies in Sweden and in Finland might be found. For example, in this thesis only the basic features of the situation in Luleå was discovered. If the procurement of similar services there or in other sites is wanted to develop, relatively similar research could be conducted. The situations might hence be compared with each other in more detail and the best possible model for the purchasing of production services could possibly be formed further.

To track the actual savings resulted from this research, an appropriate key performance indicators could be established. As a result, the succeeding of the research results could

be followed. Since the implementation of the service contract merging is expected to take place in few years from now, the indicators should be aimed to measure the most relevant metrics after some time, such as after five years. The indicators could be related to for example the spend of the services. However, the indicator should be planned in a way that the development and changes of the actual service contents could be taken into account. Hence, the succeeding might be tracked with relative spend values annually. The enhancement in the internal functions, such as decreased procurement and operative supervision work load are more troubled to evaluate. Although, functional metrics for measuring the subjects in question might also be developed.

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APPENDIX A: TABLE OF THE INTERVIEWS CONDUCTED

Title	Topic of interview
Procurement personnel (managers, purchasers)	<ul style="list-style-type: none"> - Study conducting - Data gathering - Development possibilities - Features of service contracts
Production and quality managers (steel production, recycling, iron production)	<ul style="list-style-type: none"> - Own role in production services - Current state information - Data gathering - Development possibilities - Content of services
Production technicians, supervisors, development engineer	<ul style="list-style-type: none"> - Own role in production services - Current state information - Data gathering - Development possibilities
Service providers in Raahe	<ul style="list-style-type: none"> - Machinery utilizations in services
Head manager of internal transports, and purchaser in Luleå	<ul style="list-style-type: none"> - Own role in production services - Main features of production services procurement - Advantages and challenges related

APPENDIX B: RAAHE PRODUCTION FLOW

