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# Managing the Supply Base through Supply Base Reduction and Supplier Development

A case study in the maritime industry

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***Title: Managing the Supply Base through Supply Base Reduction and Supplier Development – A case study in the Maritime Industry.***

***Problem description:***

The objective of the master thesis is to provide a framework for a supply base reduction process in the maritime industry and how to further develop the suppliers considered as the most strategically important.

The master thesis will consist of the following parts:

1. Literature review of supply base management, supplier relationships, supply base reduction and supplier development.
2. Case study of a company in the maritime industry regarding the measures taken to reduce and develop the supply base, with special attention to how these measures can be used to develop a framework for a supply base reduction process.
3. Analysis and discussion of the case study in light of the literature presented, as well as implications for the case company.
4. Conclusion and implications for further research.



## Preface

This master thesis has been conducted at the Norwegian University of Science and Technology, spring semester 2015. The study is a part of our master degree in Project Management at the department of Industrial Economics and Technology Management. The thesis is undertaken as a part of the research project “SoundChain” in cooperation with the research organization SINTEF.

The purpose of the thesis is to explore how a company can manage processes related to supply base reduction and supplier development. Practical insights into Kongsberg Maritime Subsea in Horten and a group of their suppliers are used in order to make the results applicable for managers. Both buyers and suppliers point of view are represented in connection with supplier development, this in order to provide a holistic perspective.

Kongsberg Maritime Subsea Horten has been an important collaboration partner during this research process. We would like to thank Lean Manager Daryl John Powell, for organizing our visits to Horten as well as the interviews used in this research. The employees in the sourcing department in Kongsberg Maritime Subsea Horten have also been important contributors for this thesis.

We would also like to thank our academic supervisors, Ann-Charlott Pedersen and Elsebeth Holmen, for giving us regular feedback and suggestions for improvement on our work throughout the research process.

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*Trondheim, 11th June 2015.*



## Sammendrag

Kunnskap innen styring av leverandørbaser er både relevant og et kritisk område for mange firmaer, dette fordi store deler av verdiskapningen ofte skjer hos firmaets leverandører. For å holde seg konkurransedyktig i et marked preget av sterk internasjonal konkurranse burde potensialet til leverandørene bli bedre utnyttet. Leverandørbasereduksjon og leverandørutvikling tilrettelegger for dette, som igjen fører til forbedring av den totale ytelsen i forsyningskjeden.

Denne masteroppgaven tar i bruk resultater fra Kongsberg Maritime Subsea sin avdeling i Horten, hvor data ble samlet inn i en periode hvor bedriften har økt sin fokus rettet mot sine leverandører. Deres nye fokus har resultert i implementering av initiativer knyttet til leverandørbasereduksjon og leverandørutvikling. Hovedformålet i denne studien har vært å undersøke hvordan et firma kan styre prosesser relatert til leverandørbasereduksjon og leverandørutvikling. For å kunne gi et helhetlig perspektiv knyttet til leverandørutvikling, har perspektivene både til kjøper og leverandør blitt representert i studiet.

Kongsberg Maritime Subsea i Horten og fire av selskapets norske leverandører ble brukt som utgangspunkt for datainnsamling til oppgaven. Den empiriske undersøkelsen tok form gjennom kvalitative undersøkelser preget av en utforskende fremgangsmåte. De empiriske resultatene viste at de ansatte hadde ulike meninger når det gjaldt å redusere selskapets leverandørbase. Prosessen blir på den ene siden sett på som et strategisk trekk for å redusere kostnader og muliggjøre tettere forhold til leverandørene. Prosessen blir også vurdert av noen til å være potensielt skadende for organisasjonen, hvor bekymringen er at verdifulle leverandører kan ende opp med å bli fjernet fra selskapets leverandørbase. Studiet fremhever viktigheten med å skape en felles forståelse av prosessens hensikt. Resultatene fra studiet foreslår at en prosedyre for å avslutte leverandørforhold og en plan med konkrete mål bør bli utarbeidet i forkant av prosessens implementering.

Leverandørutvikling er initiert i selskapet med den hensikt å forbedre den generelle ytelsen av både seg selv og deres leverandører, og basert på dette kunne redusere kostnader. Både kjøper og leverandører vektlegger viktigheten av samarbeid, tillit og kommunikasjon for å lykkes med leverandørutvikling. Resultatene fra studien indikerer at leverandørene ønsker mer samarbeid i form av mer informasjonsdeling og tidligere involvering, der prognoser blir

fremhevet som den mest sentrale faktoren. Dette blir sett på som en nødvendighet for å kunne nå målet som er satt for leverandørutviklingsprogrammet; forbedre prosesser for å kunne tilby billigere produkter. Sentrale problemer er kommunikasjon, som et resultat av begrensede ressurser og kapasitet i kjøpers organisasjon. Studien vektlegger også viktigheten av å vise engasjement og forpliktelse til leverandørutviklingsprosessen. Dette er en viktig motivasjonsfaktor for leverandørens deltagelse, og det er viktig for at fordelene av å drive leverandørutvikling kan utnyttes fullt ut, både for kjøper og leverandør.

I litteraturen har det blitt fremhevet hvilke fordeler reduksjon av leverandørbasen kan gi og at mange firmaer velger å benytte seg av prosessen for å bli mer konkurransedyktig. Litteraturen som omhandler selve prosessen er likevel begrenset. Dette studiet kan bidra med å gi en økt forståelse for hvilke faktorer som blir vektlagt i en leverandørbasereduksjon i form av drivere, tilnærming til prosessen og suksessfaktorer. Litteraturen som omhandler leverandørutvikling er omfattende, men fokuset er hovedsakelig representert fra kjøpers perspektiv. Dette studiet har til hensikt å gi et helhetlig perspektiv på leverandørutvikling, ved å både presentere synet til kjøper og leverandør.



## Summary

Knowledge within the area of supply base management is highly relevant and a critical issue for many firms, as value creation to a large extent often happens with the suppliers. In order to stay competitive in a market characterized by fierce global competition, the potential of suppliers should be fully exploited. Supply base reduction and supplier development are an important part of this field of study, and facilitates better utilization of suppliers in order to improve the overall performance in the supply chain.

The thesis uses findings from Kongsberg Maritime Subsea in Horten during a period where the company has increased their focus towards their suppliers and supply base management, and the company has utilized the implementation of supply base reduction and supplier development. The main purpose of this study is to investigate how a company can manage processes related to supply base reduction and supplier development. In order to give a holistic perspective of supplier development, both buyers and suppliers perspective are represented in the research.

Using Kongsberg Maritime Subsea in Horten and four of the company's Norwegian suppliers as unit of analysis, a qualitative and exploratory investigation was conducted. The empirical results show that there are differing opinions about performing a supply base reduction among employees. The process is viewed as a strategic move in order to reduce cost and enable closer relationships with suppliers, or as a process that can potentially hurt the organization. The concern is that valuable suppliers might be taken out of the company's supply base. The study highlights the importance of having a common purpose and understanding of the process. Reaching consensus and having an objective perspective on suppliers is considered as crucial in order for a successful process. The findings also suggest that a procedure on termination of relationships with suppliers and a plan with specific goals should be made prior to implementation of process.

Supplier development is initiated with the purpose to improve the overall performance of both the buying company and its suppliers, and from this be able to reduce cost. Both buyer and suppliers point out the importance of cooperation, trust and communication in order to succeed with supplier development. Even though, the findings suggest that suppliers require more cooperation from buying company in terms of more information sharing and earlier

involvement, where forecasting is highlighted as the most important factor. This is perceived by the suppliers as necessary in order to reach the company's overall goal of the supplier development efforts; improve processes in order to reduce cost. Key issues are communication as a result of limited resources and capacity in buyer's organization. The research also emphasizes the importance of buyer to show commitment to the process and attention to suppliers. This serves as an important motivation for suppliers, and is important in order to fully utilize the benefits supplier development can give.

Despite the importance of supply base reduction emphasized in literature, the literature concerning supply base reduction processes has been recognized as scarce. This research can contribute to this area by giving an increased understanding of what factors are emphasized in a supply base reduction in terms of drivers, approach to the process and success factors. The supplier development literature is extensive, but the focus is primarily from the buyers' perspective of supplier development. This research intends to contribute in terms of presenting both buyers and suppliers perspective regarding supplier development efforts initiated by the buying firm, this in order to provide a holistic perspective of supplier development.

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# 1. Introduction

Supply chain management has become a discipline of increased importance and interest over the last few years, where central parts of this field of study is related to purchasing and supply management. According to Mol (2003) recent years have shown purchasing's increasing relevance, mostly due to the increasing occurrence of outsourcing in a firm's strategy. The focus of the purchasing function has become vital through increasing global competition (Van Weele, 2010), and it is important to understand the central role suppliers play. The underlying strategies for how supply base processes are managed, has become an important source for competitive advantage.

Supply base management includes decisions on how to organize the supply base, the number of suppliers in the supply base as well as what suppliers should be engaged in supplier development activities: *"Supply management must translate the firm's corporate strategy into an appropriate supply strategy which is then manifested in the supply base activities of the firm"* (Cousins et al., 2008 p. 14). As a result of increased dependency and collaboration with suppliers, decisions regarding supply base management play a crucial role in reaching a company's overall objectives. Supply base reduction and supplier development simplifies the overall management of suppliers and enhance the overall performance of both buyer and supplier, and are considered important tools in supply base management.

## 1.1 Background for thesis

The Norwegian industry has traditionally had a competitive advantage within knowledge-intensive industries, where technological advanced and customized products have been produced. Especially within the maritime industries Norway emerged as world leading. The challenges facing the industry today are high production cost, together with strong competition from low-cost countries that has approached the performance level offered in Norway. As a result of this it is necessary for Norwegian companies to apply smarter solutions that will lead to reduced cost and shorter time-to-market in order to stay competitive. Increased cooperation with suppliers and supplier management is important to reach these objectives. Kongsberg Maritime Subsea in Horten has utilized supply base reduction and supplier development in order to face these challenges.

This master thesis is undertaken as a part of the research project *"Sound Chain: Effective value chains for competitive production of underwater acoustic sensor systems"* where Kongsberg Maritime Subsea, Hadeland produkter, SINTEF and NTNU are partners. The contribution from this thesis will include how the case company, Kongsberg Maritime Subsea, uses supply base reduction and supplier development as strategies to improve their supply base management processes.

## 1.2 Research question

Originally, the objective of the thesis was to provide a framework for a supply base reduction process based on empirical findings from the case study, and further describe how supplier development could be applied. When starting the research process it became clear that the case company's main focus were on supplier development, and that limited information could be given on the exact process of supply base reduction. Based on this it became natural to change the content of the research questions, this in order to better match the organization's priority areas.

The objective of this study is to provide empirical evidence on what factors a buying firm in a supply base reduction emphasizes, and how both buyer and supplier perceive supplier development efforts. In order to answer the defined research question, both the perspectives of the buyer and supplier is represented with regards to supplier development. The research question for this assignment is:

*"How can a company manage processes related to supply base reduction and supplier development?"*

The research question can further be divided into the following sub-questions:

- (1) How are the drivers and attitudes expressed for supply base reduction and supplier development?
- (2) How is the supply base reduction and supplier development process approached?
- (3) How is the supplier development efforts perceived by the buying firm and the suppliers?
- (4) How can supply base reduction and supplier development be initiated in order for a successful process?

The discussion of sub-question one is used to identify why the company has decided to implement supply base reduction and what attitudes can be identified among the employees in the case company related to the process. This question will also be answered by discussing the motivation of the case company to go through with supplier development. In addition, it will be identified the drivers for supplier development from the supplier's point. The discussion of sub-question two is used to find out what approaches the case company has used related to their implementation of supply base reduction and supplier development.

The discussion of sub-question three is used to highlight both the opinions of buyer and supplier with regards to the supplier development efforts initiated by the buying firm. The main focus will be to emphasize suppliers' perceptions. The discussion of sub-question four intends to present what factors the case company emphasizes in order for successful implementation of supply base reduction and supplier development. In addition it will be identified what factors the suppliers view as important in order to succeed with supplier development.

### **1.3 Structure of thesis**

Chapter 2 presents the literature on supply base management, where the main focus is on supply base reduction and supplier development. Based on the reviewed literature, a theoretical framework is developed. Chapter 3 presents the research method applied for the research.

Chapter 4 presents the empirical results of the research; first, a description of the case company and the suppliers will be given. Further, the empirical results of the investigation are presented. The findings are discussed in relation to theory in chapter 5, where the theoretical framework is used systematically throughout the analysis. Chapter 6 includes conclusion for each research question, as well as implications for managers and further research.



## **2. Literature**

This chapter will describe the literature related to supply base management, where supply base reduction and supplier development will be the main parts presented. First, a more general presentation of literature regarding supply base management will be given in order to create a basis for the literature about supply base reduction and supplier development. The literature regarding supply base reduction will describe the purpose of the process, how the process can be approached and structured, and factors considered important for successful implementation.

The supplier development literature will describe the different ways to categorize supplier development, what activities such efforts can contain and how the process can be structured. Further, the literature will present what factors are emphasized in order to succeed with supplier development and how lean principals can be applied to the supplier development work. In order to present a comprehensive view on supplier development, literature about suppliers' perspective on supplier development will also be presented. Based on the literature review, a theoretical framework will be developed at the end of this chapter.

### **2.1 Supply base management**

This section will give an overview of different elements related to supply base management with regards to its content and general trends within business relationships. More specifically, the chapter will describe the challenges due to complexity in a supply base, sourcing decisions, supplier tiers and performance measurement. The purpose with this section is to present literature that make up the basis for understanding how to initiate supply base reduction and supplier development, as well as highlight the importance of supply base management to enhance company performance.

Supply base management has become an important strategic tool and central part of reaching competitive advantage (Krause et al., 1998), and has been referred to in literature as a key aspect of supplier management (Roseira et al., 2010). Choi and Krause (2006) define supply base as the part of the supply network that a buying company actively manages through contracts and the procurement of goods and services. Further, a supply base represents a variety of supplier characteristics, where the diversity is needed to complement the needs of a

company. This both highlights the importance of suppliers represented in the supply base, as well as the challenges of the diversity that need to be managed.

Ogden (2006) highlights the strategic importance supply base management represent, as suppliers to a high extent reflect a company's performance. Priority areas for purchasing professionals should be on tools used in the process of creating and managing a supply base. Both supply base reduction and supplier development facilitates improved supply base management processes. He also state that supply base management is considered by some scholars to be: "*one of the most strategic areas of responsibility in the purchasing and supply function in organizations*" (Ogden, 2006 p. 29). For many companies, an important part of the value creation happens with the supplier, hence should be high prioritized.

According to Tan et al. (1998) the development within business strategy and the way businesses tend to operate is to focus on their core competencies, outsource non-critical activities and to downsize the supply base. This also implies a bigger dependency towards suppliers for the buying firm; utilizing the expertise of suppliers to create added value for their business. As a result of increased global competition, companies specialize in specific areas and need external parties to complement certain areas within their business. Stump and Sriram (1997) also present two recognized trends; focusing less on arms-length relationships and a more focus on supplier base reductions. Supply base management processes must focus on creating relationships with suppliers characterized by closeness and cooperation in order to reap the benefits suppliers can give.

Spekman (1988) also highlights the importance of supplier relationships and their role in achieving competitive advantage for the buying firm. Suppliers are involved in processes related to product design in a much earlier stage, where sharing of information is an important factor to achieve effective cooperation processes. He also argues that it is only possible to maintain strong ties with a limited group of suppliers. This aligns with the view of Gadde and Snehota (2000) on supplier relationships, arguing that close relationships have resource-intensive characteristics and can only be initiated with a limited set of suppliers. In order to manage the supply base in a better way, many firms have ended their relationship with redundant suppliers and focused their volume of business on the suppliers they trust and consider highly competent. Suppliers are also presented in literature to be a virtual extension

of a firm, rather than considering them as totally separated from the buying firm (Tan et al., 1998).

Van Weele (2010) states that supply base management takes part in every commodity strategy and considers questions as: the number of suppliers that should be represented in each commodity and the criteria that is required and should be met by the best suppliers. A commodity strategy gives guidelines on matters such as using standardization thus giving reduced product variety, the number of suppliers in the supply base and the type of relationships one should have with each supplier.

Relationships that are developed happen with a selection of firms, where the suppliers are specialized in varied competencies, contributing in different ways of the value creation process (Ritter et al., 2004). The variation of skills and competencies represented in a supply base are necessary to complement knowledge or resources the buying firm do not possess, but at the same time this result in challenges for the buying firm in exploiting and getting the most out of each relationship. The supply base may be complex and sometimes hard to understand due to the variety of supplier characteristics represented. To utilize the potential of each supplier, the different elements constituting its complexity must be further explored.

### **2.1.1 Supply base complexity**

As firms have generally become very dependent on suppliers and source globally to keep the overall cost down, there are several things that lead to complexity. Relationships are developed between the buying company and its suppliers and further between the suppliers, resulting in a network of business relationships. These relationships are important to consider in the process of understanding the totality of a supply base. Some central concepts need to be defined in order to understand and manage the complexity represented in a supply base.

Choi and Krause (2006) argue that the supply base management literature needs more accepted terms and definitions to better describe and distinguish supply base from similar concepts. They propose a set of definitions of key terms in the supply base management literature.

<b>Complexity</b>	<i>"The degree of varied elements and their interaction within a system"</i>
<b>Supply network</b>	<i>"All inter-connected companies that exist upstream to any one company in the value system"</i>
<b>Supply base</b>	<i>"A portion of the supply network that is actively managed by the focal company through contracts and purchasing of parts, materials and services"</i>
<b>Supply base complexity</b>	<i>"The degree of differentiation of the focal firm's suppliers, their overall number, and the degree to which they interrelate ".</i>

Table 1: Key terms supply base management (Choi and Krause, 2006 p. 638)

Choi and Krause (2006) present three dimensions of supply base complexity: The number of suppliers in the supply base, the degree of differentiation among these suppliers and the level of inter-relationships among the suppliers. The way complexity is defined indicates that the characteristics of the individual supplier, the business relationships existing within the supply base and the relationships between the buying company and the individual supplier should be understood and explored further. The different relationships existing in a supply base can be considered an aspect of complexity in itself.

The number of suppliers in the supply base plays a central part on the effort a firm puts into managing its supply base, and it is also highlighted the trend of companies to reduce its supply base in order to make it more manageable. A regular consideration in companies is whether to go for single- or multiple sourcing. Generally the level of coordination increases with the number of suppliers, and it is easier to develop closer relations with fewer suppliers resulting in higher responsiveness and cost reduction due to a more efficient cooperation pattern (Choi and Krause, 2006).

The degree of differentiation is referred to how suppliers differentiate from each other with regards to organizational culture, size, location, technology etc. High differentiations among the suppliers result in more required resources. More resources are also required on an organizational level to face the inter-related suppliers. Business relationships are what makes extended company boundaries possible, and are vital for enhanced company performance

(Choi and Krause, 2006). Based on these definitions they developed a term including the overall definition of supply base complexity: *"The degree of differentiation of the focal firm's suppliers, their overall number, and the degree to which they relate"* (Choi and Krause, 2006 p. 643).

As Choi and Krause (2006) present the concept of supply base as a complex phenomenon, they point out four key areas that should be in focus considering the management of a supply base.

<b>Transaction cost</b>	Costs related to the buyer-supplier interface; these costs involve aspects connected to developing and maintaining an exchange relationship.
<b>Supply risk</b>	The risk connected to the procurement of goods and services.
<b>Supplier responsiveness</b>	The ability of the supplier to respond quickly to inquiries, and perform on-time deliveries.
<b>Supplier innovation</b>	The ability of suppliers to be creative.

Table 2: Key factors supply management (Choi and Krause, 2006 p. 643)

Supply base complexity may impact these four factors. Having many suppliers will result in high transaction cost, and it is challenging to maintain a large number of suppliers. They state that many companies across different industries have reduced their supply base mainly to reduce transaction costs. From this they imply that companies focus on reducing the number of suppliers rather than making the differentiation among suppliers smaller when reducing transaction costs. Supply base complexity has a negative consequence on the responsiveness of suppliers. Close relationships and open communication will contribute to more responsive processes from the supplier (Choi and Krause, 2006).

Innovation is an important part of supplier competencies and a company's competitive advantage. Choi and Krause (2006) argue that complexity may enhance innovation activities as a variety of people with different backgrounds, in terms of culture and technical competences, can lead to more creative development. They point out that it may not always be desirable to reduce complexity, as diversity can be considered the main source of

creativity. They emphasize the need to have an optimal size of the supply base with regards to the level of complexity. The optimal supply base size cannot be generalized, and are sensitive towards changes in the environment. In general, it is important for a company to consider these factors; transaction cost, supply risk, supplier responsiveness and supplier innovation when deciding on what suppliers should be a part of the supply base.

Based on the contribution regarding supply base complexity provided by Brandon-Jones et al. (2014), they refer to supply base complexity as the complexity existing upstream in the supply chain. The complexity stems from the large number of suppliers that all represent different characteristics. They are different in terms of technical competence, size, the lead-time they can offer and their geographical placement. More specifically, their research look at four factors representing complexity, which further results in supply disruptions such as late deliveries and not being able to fulfill demand. These four factors of complexity are scale complexity, differentiation complexity, delivery complexity and geographic dispersion complexity. High level of differentiation makes communication challenging and can have a negative impact of the overall performance. Some similarities can be seen in connection with Choi and Krause (2006), where both studies emphasize that complexity affects the supplier's ability to be responsive and have on-time deliveries. The two studies differ in focus, since Choi and Krause looks at factors that is affected by complexity, while Brandon-Jones et al. (2014) looks at factors representing complexity.

Complexity creates opportunities such as extended market possibilities and a varied product offering, but at the same time complexity is generally associated with negative terms, such as increased risk and negative effect on performance. This indicates the need for simplifying in order to manage the effects complexity tends to create. Based on the presented literature it is indicated that the supply base should balance its level of complexity and initiate relationships with suppliers they can develop a close business relationship with. Factors that have been emphasized and are important to consider is the number of suppliers in the supply base, their organizational culture, size, location and technology. The complexity represented in the supply base must match the available resources and capacity in the individual company to face the challenges that might appear. Further, other elements affecting supply base management will be presented, where the focus will be on different elements of sourcing decisions.

## **2.1.2 Sourcing**

A crucial part of supply base management and company strategy is to choose the right suppliers to be a part of the supply base. Some of the questions being addressed when sourcing strategies are developed are whether the supply base should be reduced or expanded, the location of the suppliers, whether single or multiple sourcing is required and what type of relationship to have with the suppliers (Van Weele, 2010). This section will present sourcing strategies; its content and how decisions regarding sourcing affects supply base management.

### **2.1.2.1 Global or local sourcing**

Selection of suppliers has become a strategic matter due to the added value they provide and the increased fierce global competition that exists in today's markets (Van Weele, 2010). As a result of this, companies are seeking competitive advantage through a global supply base with sourcing strategies as a central concept within their overall business strategy. Considering the supply base as a complex phenomenon can also stem from factors directly connected to a global supply base, where the differentiations with regards to organizational culture, size, location and technology can be big (Choi and Krause, 2006). An important decision for any company then becomes whether to go for local or global sourcing. Van Weele (2010) emphasizes the need for considering total cost of ownership in decisions regarding local or global sourcing.

In order to compete in the market, the performance of suppliers is critical. Some indicate that a global supply base is required to be able to compete among the best (Handfield and Nichols Jr, 2004). It has become common across different industries, and the industrialized part of the world need to look towards countries with lower production cost to keep the level of cost on a satisfying and competitive level. Some consider the key source to competitive advantage to lie in the ability to move production and source globally (Gelderman and Semeijn, 2006). Global sourcing is most often associated with bulk products or standardized products, where the supply market consist of many providers located around the world, operating with different prices for the same commodities (Van Weele, 2010). Based on this, global sourcing options may not always be desirable.

Van Weele (2010) points out that global sourcing has both its advantages and disadvantages. The positive factors are connected to lower unit cost, a broader range of suppliers to select from, which again stimulates competition among suppliers and getting access to new markets.

The challenges is related to more complex and complicated distribution and logistics processes, higher handling cost due to custom fees, problems stemming from cultural differences and higher uncertainty when it comes to the quality of the product and how precise the deliveries are. In a global context it is critical to find the right balance between global and local supplier opportunities (Gelderman and Semeijn, 2006).

Global sourcing is an important area within purchasing strategy, and has been of central importance for some time, mostly due to the high cost levels represented in the industrialized part of the world. Even so, there are more recent literature stating that many companies are "back-sourcing" their production (Fratocchi et al., 2014, Lanza and Moser, 2014). According to Lanza and Moser (2014) the most common reasons why companies decide to move back their outsourced production is due to quality problems, delivery time, increased cost related to personnel and transport and the unavailability of skilled personnel. The management task becomes challenging and complex, as it requires a high level of coordination efforts. Communication problems are also considered a challenge when parts of the production are moved to another place.

Handfield and Nichols Jr (2004) highlight key issues that have an impact on how the supply base is managed by a buying firm. They promote the need for "human factor" in the way the supply base should be managed, where positive relationships are established. They argue that a positive buyer-supplier relationship is characterized by trust and the practice of effective communication. Managing a global supply base make personal relationships difficult to create and maintain. However, it is desirable to create such personal and close relationships in order to fully understand each other's needs and create the trust needed. Handfield and Nichols Jr (2004) point out communication as a critical success factor in order to manage a global supply base, and are considered a great challenge due to difference in culture, language, business practices etc. For organizations to be able to manage the varied set of relationships in a global context, the personnel involved with suppliers need good skills and experience in sourcing and supply chain management to handle the varied set of business cultures.

By using local sourcing opportunities, many of the challenges mentioned above can be reduced and even avoided. According to (Van Weele, 2010) factors that are in favor of local sourcing are in situations when high-tech products are involved. For such products, high flexibility is required in connection with product specifications and delivery precision. The



relationship between the buyer and supplier in this context requires more personal communication in order to be able to create the wanted product. As mentioned above, the trend is “back-sourcing” in order to ensure the right quality. It is also easier to establish trust when face-to-face communication is present in the relationship. In situations where complex and technical tasks must be solved, local sourcing is the most suitable option.

Location together with the number of suppliers, affects supply base management decisions. Sometimes a company finds it necessary to have more than one supplier delivering a specific product in order to reduce supply risk. Decisions concerning such questions relates to multiple or single sourcing strategies.

#### **2.1.2.2. Multiple or single sourcing**

When structuring and designing the supply base it is important to decide how many suppliers are needed to deliver the same supplies or services. According to Cousins et al. (2008) the decision regarding the choice of structure must be seen in accordance with the needs of a company; type of relationship needed in terms of level of involvement and dependency considered appropriate and the market structure of the wanted supplies.

Single sourcing is often used in connection with relationships represented with high dependency. According to Kraljic (1983) this type of arrangements are often connected to the strategic products or bottleneck products, since these often require a closer cooperation between the buying firm and the supplier. Even if single sourcing indicates a high supply risk, there are advantages such as increased level of integration in terms of information exchange and shared understanding (Cousins et al., 2008). Multiple sourcing is generally used in situations where continuity and securing supply is required. Seen in connection with the matrix provided by Kraljic (1983), this type of arrangement is mostly used for routine products, where a competitive supply base will push the cost level down.

#### **2.1.2.3 Portfolio models**

A portfolio model can be explained as the managing of an array of supplier relationships. The relationships are not only managed individually, but as a set. A portfolio of supplier relationships is developed, resulting in an optimized supply base (Wagner and Johnson, 2004). Portfolio models are applied in many different areas, such as strategic management and marketing, and were originally used in financial investment as a way of reducing risk.

Portfolio models have been modified many times, and they are still widely used in literature. Companies are often highly dependent on certain relationships that can have major impact on economic parameters such as turnover, profitability and viability. In circumstances where key strategic relationships need to be identified, portfolio models can be very helpful. Both the strategic and tactical level of relationship management is explored through relationship portfolio analysis (Zolkiewski and Turnbull, 2002).

It has been observed that purchasing portfolio models have three common steps:

1) Product and classification; 2) Analysis of the supplier relationships required and; 3) Action plan to match requirements (Sarkar and Mohapatra, 2006). The questions considered are; to what extent new relationships need to be developed, which of the existing relationships should be developed further, which of the existing relationships should be maintained and should any of the existing relationships be terminated. This becomes relevant both for supply base reduction and supplier development, as an analysis must be made to know which relationships are the most valuable.

Even if portfolio models are widely used, many authors have criticized these models for their limitations in considering environmental factors and simplifying the reality companies are operating in. The models also lack an integrated view by not taking into account the supplier interdependencies (Roseira et al., 2010). The general criticism of portfolio models presented by Zolkiewski and Turnbull (2002) are also stated to be oversimplification; judgment is based on too few factors, the scales that are suggested for axes can be considered imprecise as values are based on "high" or "low" measures and both simple and important factors may be overlooked.

Despite the criticism towards portfolio models, they are widely used by many companies as a framework for developing supply strategies (Cousins et al., 2008). The portfolio model provided by Kraljic (1983) will be described further as a framework relevant for classifying and categorizing suppliers.

#### 2.1.2.3.1 Kraljic purchasing portfolio

When addressing the questions concerning sourcing, conducting a purchasing portfolio analysis can be considered a first step in this process. Kraljic's purchasing portfolio present four strategies, which leads to a classification of the purchased items (Van Weele, 2010).

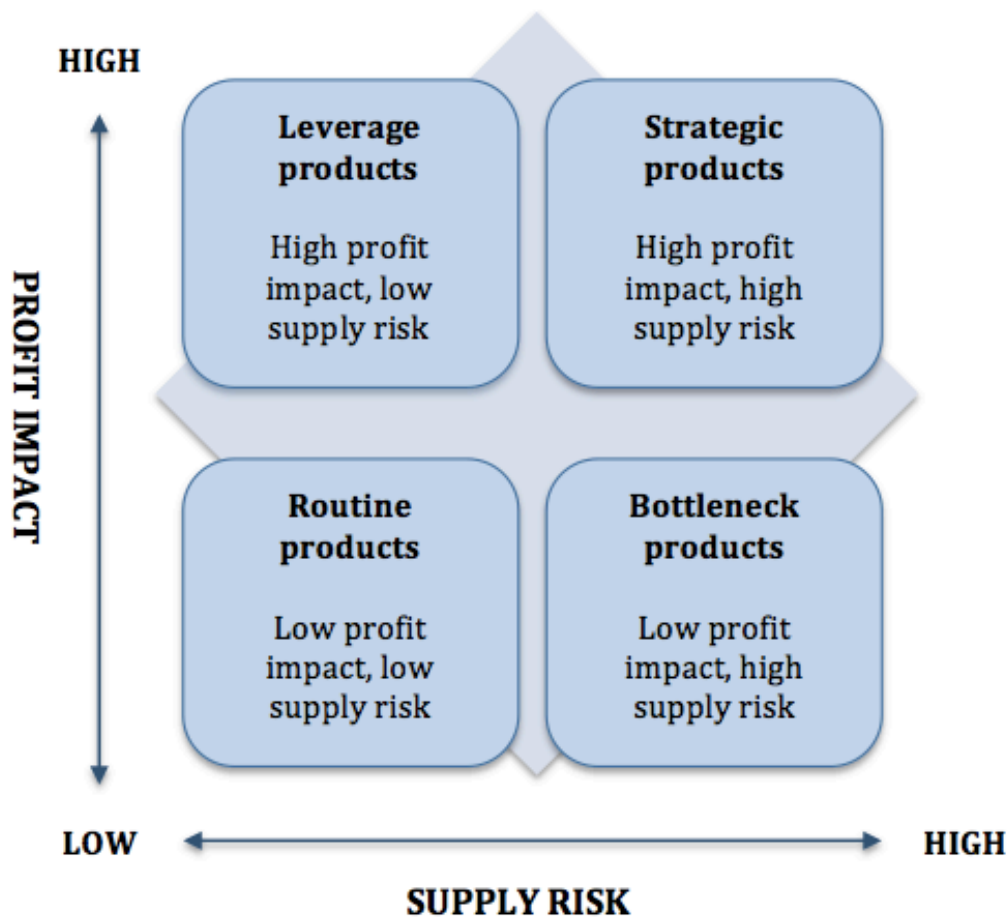
According to Kraljic (1983), to ensure the long-term availability of critical goods at competitive cost, the risk and complexity of global sourcing must be understood. *"Instead of simply monitoring current developments, the management must learn to make things happen to its own advantage"* (Kraljic, 1983 p. 110) This marks the change of perspective; from considering purchasing as an operating function, to one of a strategic sort. The portfolio matrix provided by Kraljic (1983) can be considered as a way to categorize and perceive suppliers based on their product offering and the market structure related to their products. Each category represent different focus in terms of measures such as cost and quality (Van Weele, 2010).

As mentioned earlier, companies are focusing on core competencies and outsource non-critical activities. This makes sourcing strategy highly relevant, as it helps company's develop strategies for different types of suppliers. The matrix developed by Kraljic (1983) has been modified by several authors, and has been an important contribution in supply strategy (Cousins et al., 2008). The matrix gives a categorization of suppliers based on the supplier's product offerings. According to Kraljic (1983) the materials are classified in terms of profit impact and supply risk. Profit impact may be assessed in terms of the volume purchased, percentage of total purchased cost, or impact on product quality or business growth. Supply risk is defined in terms of availability, number of suppliers, competitive demand, make-or-buy opportunities, storage risk, and substitution possibilities.

In his study, Kraljic (1983) emphasizes the importance of action plans, decisions and monitoring rules for each item, in order for the buyer to implement new sourcing strategies, and also monitor purchasing activities regularly. He also stresses the importance of greater integration, cross-functional relations and more top-management involvement.

To create effective relations and exploit the company's full bargaining power, the purchasing function must reflect the overall corporate set-up, and whether it should be centralized or decentralized. This will depend on several different factors such as volume and concentration of purchased materials and components as well as the structure and complexity of the

corporation. The matrix provided by Kraljic (1983) categorize the products delivered by suppliers in four categorizes: Leverage products, strategic products, routine products and bottleneck products.



**Figure 1: Kraljic Matrix (Kraljic, 1983)**

By dividing the supply base into four main categorizes, different levels of involvement is generally connected to each approach. The nature of the relationships is dependent on the strategic importance of the supplier and its product offering. Strategic products are often related to close and collaborative relationships, as these products usually involve custom-made solutions and take a central part in the buying company's final products/solutions. There are generally few suppliers available connected to this product category. The same situation is for the bottleneck products, but these have a lower profit impact for the buying company. Market availability is connected to leverage products and routine products. The leverage products have a bigger impact on profit than routine products have. The routine products are

often seen in connection with Vendor Management Inventory solutions (VMI), where the main objective is to secure supply through low cost (Van Weele, 2010). The supply strategy for each category is explained in table 3.

<b>Leverage products</b>	<b>Routine products</b>	<b>Strategic products</b>	<b>Bottleneck products</b>
<b><u>Characteristics:</u></b> Buyer dominated segment due to alternative sources of supply available. Main focus on unit cost because of volume usage.	<b><u>Characteristics:</u></b> High availability on the market e.g. competitive supply market - Often standardized items.	<b><u>Characteristics:</u></b> The supplier represent a unique product offering that is important for the buying company. (1) Products are custom designed and/or have unique specification; (2) Changing source of supply is difficult or costly.	<b><u>Characteristics:</u></b> (1) Few or none suppliers to choose between, monopolistic market situation; (2) Unique specification
<b><u>Strategy:</u></b> Competitive bidding	<b><u>Strategy:</u></b> Category management - main objective is to reduce administrative cost due to the simplicity and availability of the products.	<b><u>Strategy:</u></b> Performance based partnerships.	<b><u>Strategy:</u></b> Secure continuity of supply.

Table 3: Kraljic matrix characteristics and strategy (Kraljic, 1983, Van Weele, 2010)

Based on the provided matrix a classification of suppliers has been presented. Another useful structuring initiative is to understand the totality of the suppliers existing in its network, and divide the supplier network into different levels in terms of supplier tiers.

### 2.1.3 Supplier tiers

When considering the supply base of a company both the supplier-buyer interface and supplier-to-supplier relationships must be in focus. When organizing the supply base there are opportunities in simplifying the information-flow between the buying firm and its suppliers through delegating responsibility to first-tier suppliers (Cousins et al., 2008). The way the supply base is organized has impact on how it is managed. There is no best way to organize a firm's supply base, and the way it is structured must be seen in accordance with what business

an organization is operating in. Companies operating in highly innovative environments with rapid changes may have to modify its supply base more often than firms operating in more stable markets (Choi and Krause, 2006).

As implied earlier, the size of the supply base is an important factor in how well the company is able to manage the supply base. As a result, supply base reduction has become a well-known tool to reduce the size of the supply base to a manageable size. Even so, according to Cousins (1999) there is evidence suggesting that some companies actually do not reduce their supply base, even if they claim so. Many of these companies have organized their supply base in a way where control is delegated to "first-tier" suppliers. Choi and Krause (2006) state that there is a common misperception of the term first-tier suppliers, and that many consider all the suppliers in a supply base as first-tier suppliers. Many different authors discuss supplier tiers as a concept, and Cousins (1999) indicates that the concept is not clearly defined.

Lamming (1993) gives a definition of first-tier suppliers and second-tier suppliers:

<b>First-tier supplier</b>	<i>.."are those that integrate systems for direct supply to the assembler, or have a significant technical influence on the assembler while supplying indirectly".</i>
<b>Second-tier supplier</b>	<i>.."are those that supply components to the first-tier firms for integration into systems, or provide some support service".</i>

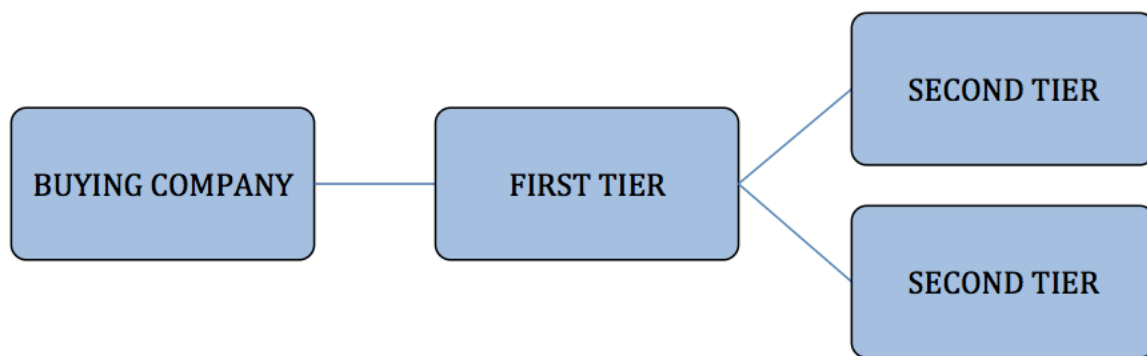
Table 4: Supplier tier definition (Lamming, 1993, p.188).

From these definitions the buying-firm has direct contact with its first-tier suppliers, while first-tier suppliers are managing second-tier suppliers. This means that the buying firm delegates responsibility to its first-tier supplier to deliver products or sub-assemblies, where both the first-tier and second-tier supplier has contributed to the final product delivered to the buying firm. The coordination required to assemble different parts from a variety of suppliers are in this case the responsibility of the first-tier supplier.

Definitions on supply base and supplier networks were given in section 2.1.1. Based on these definitions a supply base are those suppliers that are actively managed by the buying firm, while a supply network represent all inter-connected relationships between the suppliers of

the buying company. The buying company is often incapable of having a full overview of the entire supplier network, as it may include several tiers of suppliers (Choi and Krause, 2006).

Choi and Krause (2006) emphasize that the function of the buying company is to coordinate and control activities of the supply base, and it might also encourage new relations to develop between the suppliers within the supply base.



**Figure 2: Supplier tiers (Cousins et al., 2008)**

Organizing the supply base in tiers, segmenting the areas of responsibility, results in a simpler communication-system for the buying firm since fewer suppliers need to be managed. Parts of the management process are delegated to first-tier supplier, enabling the management process to be more efficient for both the buying firm and the suppliers. At the same time, organizing the in tiers require coordination. As firms get more specialized and focus on core-competencies, the organization of supplier tiers is an important concept that simplifies coordination. This increases responsiveness, improves quality and reduces the risk for the supplier participants (Cousins et al., 2008).

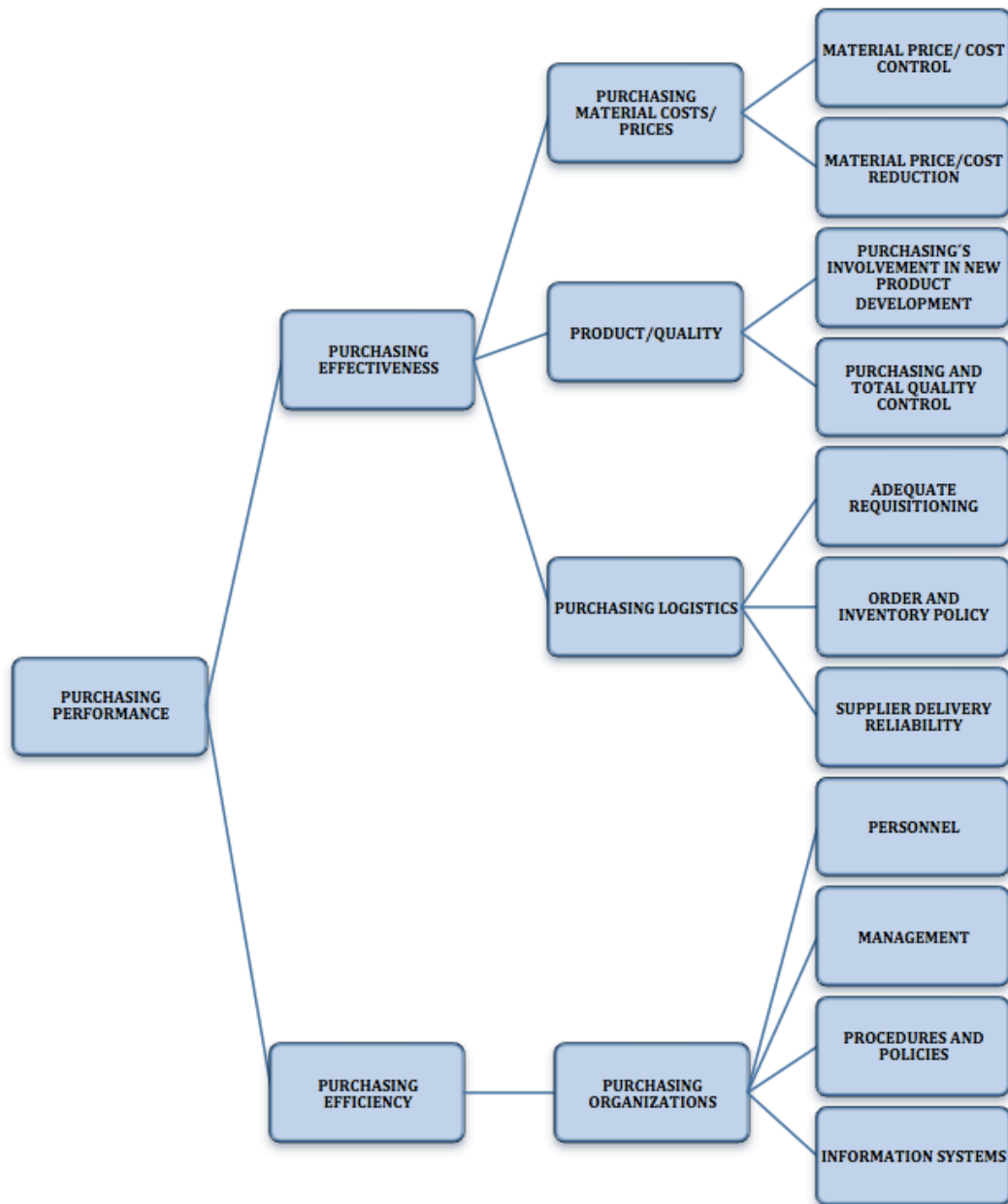
To ensure suppliers deliver the right quality, and to enable suppliers to improve their performance, a performance measurement system is crucial. This creates the basis for comparison with past and future performance, as well as comparing suppliers with each other.

#### **2.1.4 Performance measurement**

Measurement of supplier performance is considered a critical element in the success of supply management. The overall objective of using performance measurement system is to have a systematic way of evaluating supplier performance and to compare suppliers with each other in order to enhance purchasing performance. Performance measurement has an important role in monitoring performance, improve motivation and communication, as well as finding the root cause of a problem(Chan, 2003).

As performance measurement is a continuous process, performance will be documented and can be used as a baseline for comparing suppliers with each other. Different type of information can be used to formulate appropriate performance measures, and the most effective is a combination of financial and non-financial information (Cousins et al., 2008). Based on figure 3, some of the key areas of purchasing performance are presented. Van Weele (2010) gives a definition of purchasing performance to include measures related to both effectiveness and efficiency, where effectiveness is related to creating relationships with best in class suppliers. This in turn creates the basis for good supply chain performance, and the purchasing function need to facilitate and provide good processes, systems and competencies.

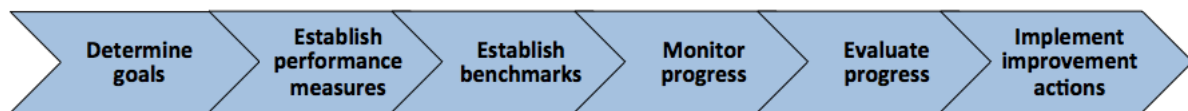




**Figure 3: Performance measurement (Van Weele, 2010)**

The model shows the relationship between the different dimensions representing purchasing performance in a company. As purchasing effectiveness involves the performance of suppliers, the model gives an indication about what the measures should cover. The three main elements that affect the purchasing effectiveness are measures connected to material cost, the quality of the product the supplier delivers and the logistics connected to the purchased goods.

A variety of performance measures are presented in literature and applied among companies, and these must be seen in connection with company and market characteristics. It may be hard to generalize a performance measurement system, as different companies find different factors important. Cousins et al. (2008) provide a model for steps to be taken in order to develop a performance measurement system.



**Figure 4: Performance measurement process (Cousins et al., 2008)**

The model shows the main elements in creating a performance measurement system. There must be an alignment between the company's strategy and performance measurement, this in order to ensure that critical areas for improvement are in focus. The established performance measures should follow the SMART-test in order to be comparable and to be able to establish benchmarks. SMART include: specific, measureable, actionable, relevant and timely. Many companies face challenges related to developing the right performance measures (Cousins et al., 2008).

Measurement of performance involves different performance ratios. According to Chan (2003) there is no systematic grouping of the different performance measures presented in the existing literature. He has defined performance measurement criteria into seven categories: cost, quality, resource utilization, flexibility, visibility, trust and innovativeness. The measures are separated into qualitative and quantitative measures. These criteria can be seen in relation to figure 3 because most of these measures have a direct effect on purchasing effectiveness and purchasing efficiency. More specifically; cost, quality, flexibility and innovativeness influences purchasing effectiveness. Trust is more related to aspects concerning the purchasing organization, which again impacts purchasing efficiency.

### **2.1.5 Supply base management - summary**

Chapter 2.1 provided a basis for understanding what supply base management comprises, and how this matters for company performance. As a result of closer relationships with fewer suppliers, many companies have increased their dependence towards suppliers. An issue that may stem from this is connected to missed/late deliveries and inferior quality level. Approaches used to address problems such as these are to reverse their downsizing emphasis; this may involve taking back outsourced products and services. Alternative ways of handling such problems is to search for new suppliers or put an effort in developing the existing suppliers in the supply base (Tan et al., 1998). This highlights the importance of supply base reduction and supplier development as useful approaches within supply base management.

The option of choosing among a range of suppliers is not always present, and the availability of certain goods and services may be limited. This reflects how a supply base can be considered as complex, consisting of a variety of relationships, where all need to be understood and handled differently. Decisions regarding supply base management might include how many suppliers to have in the supply base, whether to use global or local sourcing options and how many suppliers should deliver the same supplies. The challenge lies in creating a supply base that can help a company reach its overall goals, and at the same time match the company's resources and capacity in order to manage it in best possible way. Supply base management has been presented as the overall subject for the assignment, and the literature will now go deeper into two approaches that can enhance supply base management performance; supply base reduction and supplier development.

## **2.2 Supply base reduction**

This section will look in depth at the supply base reduction process, focusing on the purpose of reducing the supply base, the process as well as the success factors. Supply base reduction as a strategy is a result of increased supplier integration. Supply base reduction can be defined as: *"The process of and activities associated with reducing the number of suppliers that an organization utilizes"* (Ogden, 2006 p. 29). This indicates a strategy where a company wants to work closer with fewer suppliers.

Many big companies perform supply base reduction as a part of their supply strategy, where the overall objectives is to reduce costs, improve quality, responsiveness, flexibility and other

important performance measures (Cousins et al., 2008). As indicated earlier, supply base reduction was defined as a tool in supply management, as it resulted in a more manageable supply base. According to Ogden (2006) there are two main benefits that can be reached through efforts of supply base reduction: Reduced cost and increased service from suppliers. Based on a case study, he also identified additional benefits such as more transparent relationships where the supplier gives access to new technology, increased availability of goods, better quality, more optimal inventory levels and the opportunity of using vendor managed inventory solutions.

Goffin et al. (1997) also states that the main effect of reducing the supply base is that this allows for the buyer to spend more time to develop closer relationships with the remaining suppliers. When managed in a correct way, this should lead to competitive advantage through reduced cost, higher quality and innovation. As indicated earlier the size of the supply base is an important factor in how well the company is able to manage the supply base. A small number of suppliers are considered a prerequisite for developing strong relationships between the buyer and suppliers. In many companies the supply base tends to consist of many registered suppliers of which only a few have recurring sales year after year. To improve the supply chain and facilitate effective partnerships the number of suppliers in the supply must be reduced to a manageable level (Sarkar and Mohapatra, 2006).

It is also important to distinguish between supply base reductions and supply base rationalization. The terms have been used about the same thing (Cousins, 1999), but there is a difference between the two. Firstly, when performing a supply base reduction the supply base is already perceived as too big, and the supply base is reduced to a predetermined size by retaining the top performers. Supply base rationalization on the other hand, is about determining the optimum size of the supply base, and then identify the suppliers the supply base should consist of whether the amount should be decreased or increased (Sarkar and Mohapatra, 2006). Supply base reduction is often considered a prerequisite in purchasing strategy, and is often connected to the delivery term just-in-time, supplier development efforts, and partnerships (Ogden, 2006). Overall, there are many advantages of performing a supply base reduction, but it is important to also be aware of the possible challenges and negative effects such a process can result in

Some argue that a company should not implement a supply base reduction (Porter, 1997). Porter (1997) summarizes his arguments in four points: (1) due to the fact that this may lead to less competition among the suppliers in the supply base; (2) the system needs to be formalized so that the suppliers can be evaluated on equal terms; (3) it is time consuming to break the cultural barriers among corporate functions and divisions and to build consensus (4) and it is time consuming to design standards in order to keep the supply base on a determined level.

This implies that there are different views on how much effort should be put into the supply base reduction process compared to how big the gain is. The success of a supply base reduction is dependent on different factors that should be considered before performing a supply base reduction process. Examples on such factors will be elaborated on in the following section.

### 2.2.1 Approaches for supply base reduction

This section will describe different approaches on how to perform a supply base reduction process. According to Ogden and Carter (2008) there are three approaches on how to perform a supply base reduction process: systematic elimination, standardization and tiering. These are described in the following table.

<b>Systematic elimination</b>	This approach is focusing on distinguishing suppliers based on the criterion chosen to evaluate suppliers.
<b>Standardization</b>	The method is about redesigning processes to facilitate increased usage of the same components.
<b>Tiering</b>	A company handles fewer suppliers because suppliers are given the responsibility to manage sub-suppliers.

Table 5: Approaches to supply base reduction (Ogden and Carter, 2008)

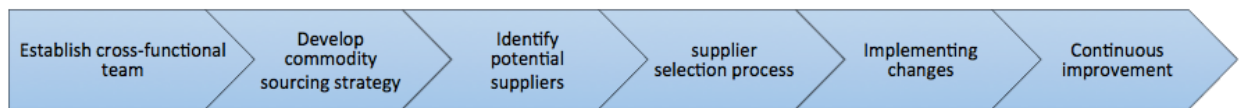
Systematic elimination is a method where the total number of suppliers is reduced. This involves elimination based on evaluation criteria of suppliers that are clearly defined. A supplier database applies these criteria with the purpose to distinguish suppliers from each other, which further makes it possible to identify what suppliers should stay in the supply base and which suppliers should be exited. Taking a systematic approach involves evaluating suppliers based on standardized procedures. Based on research, most companies tend to use this approach (Ogden and Carter, 2008).

The standardization approach focuses on how the design of products can facilitate the use of fewer suppliers. This means that instead of having two different components with the same function, efforts are put into making one component fulfilling the function (Ogden and Carter, 2008). Tiering as a concept was presented in the section 2.1.3 and as implied earlier, this is not a direct approach in reducing the supply base but rather an attempt of simplifying the management of first-tier suppliers. There is a lack of literature covering this specific area within supply base reduction (Ogden and Carter, 2008). However there is a few models describing the process of the supplier reduction, which will be used to describe how such a process can be executed.

### **2.2.2 Supply base reduction process**

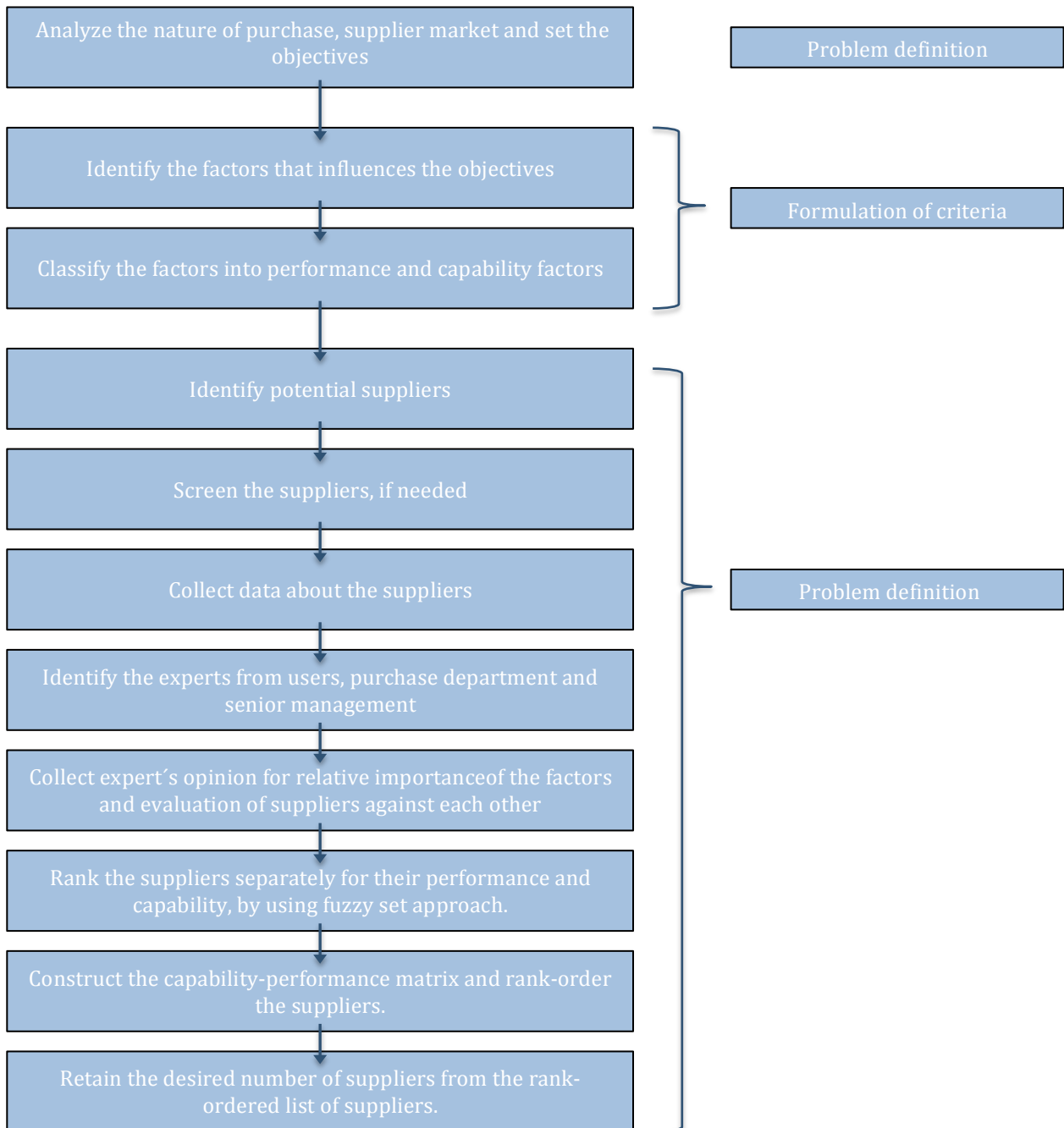
Ogden and Carter (2008) present a six-step model on how to perform the actual supply base reduction. The model was developed on the basis of an in-depth analysis of several case studies performing a supply base reduction. The companies had different approaches as showed in table 5, in how they conducted the supply base reduction process, but still there were many similarities in the processes they used which were observed.

The first step of their model is to establish a cross-functional team in order to include relevant stakeholders during the implementation of the reduction. This allows the team to gather valuable information from different functions within the organization. The second step is to develop a commodity sourcing strategy, reflecting the companies' corporate goals and the use of spend analysis is identified. Step number three identifies the potential suppliers, which are based on the defined criteria. The fourth step consists of determining which of these suppliers that meets the company's requirements, and which to remove from the supplier base. The fifth and final step is the actual implementation of the changes. Some suppliers are eliminated and other is selected. Ogden and Carter (2008) define this as the most critical and time-consuming step. This is because of the risk of disrupting the operations in the company if the transfer of responsibilities from old to new suppliers does not go well. The last step also involves benchmarking and measurement of the impact on purchasing prices as a result of the supply base reduction.



**Figure 5: Supply base reduction process 1 (Ogden and Carter, 2008)**

Sarkar and Mohapatra (2006) present a second model for the process of supply base reduction.



**Figure 6: Supply base reduction process 2 (Sarkar and Mohapatra, 2006)**

The methodology is based on the framework proposed by De Boer et al. (2001) on supplier selection. The process starts with the definition of the problem; an analysis of the nature of the purchase is performed to identify what kind of relationship that is desired. The next phase is the formulation of criteria. Sarkar and Mohapatra (2006) argue that the supplier characteristics should be grouped into long-term and short-term factors. The last step is the qualification, which consists of several different steps. As opposed to the other model, this model includes an own step for identifying potential new suppliers, which are not in the existing supply base. Data is collected about the different suppliers. Experts' opinion-based methods are used to rank the suppliers, and a fuzzy set approach is used. As one of the last steps in the qualification phase, the suppliers are ranked in a capability-performance matrix. As the final step, the remaining suppliers are retained from the rank-order list.

Both of the models presented highlights the importance of gathering data about the suppliers, and the best way to do that is to establish a group representing different perspectives of the suppliers. Both of the models also emphasize defining criteria for the suppliers in order to make decision about which suppliers should be kept, and which should be removed from the company's supply base.

### **2.2.2.1 Termination of relationships**

A part of the supply base reduction process is to terminate relationships with suppliers. *"For the effective management of business relationships, managers should not only know how to establish a relationship, but also how to end one"* (Halinen and Tähtinen, 2002, p.163)

When terminating a relationship it is beneficial for all parties to make the termination go as smooth as possible. *"For the management of a disengage company, it is necessary to understand what type of strategy can be applied in dissolution, so that any negative consequences affecting both partners and the network can be avoided."* (Alajoutsijärvi et al., 2000, p.1271) They present a framework describing different communication strategies used to terminate buyer-seller relationships.



		OTHER-ORIENTED	SELF-ORIENTED
INDIRECT	Disguised exit	Pseudo-de-escalation	Cost escalation
	Silent exit	Fading away	Signaling Withdrawal
DIRECT	Communicated exit	Negotiated farewell	<i>Fait accompli</i>
	Revocable exit	Mutual state-of-the relationship talk.	Attributional conflict Diverging state-of-the relationship talk
	Voice	Changing the relationship	Changing the partner.

**Figure 7: Strategies for relationship termination (Alajoutsijarvi et al., 2000)**

The choice of strategy is depending on the nature of the relationship that should be terminated. The model differs between direct and indirect strategies with a choice of self or – other-orientation. Indirect strategies are used when the exit are not preferred to be done explicitly. A disguised exit is when hints are presented to the other party about the wish for exiting the relationship, or when the cost of the relationship is increased to the point where the other party itself starts to dissolve the relationship, like tighter delivery schedules or extra services. A silent exit strategy is used when the ending of the relationship is an implicit understanding for both parties, through changed behavior such as vanishing investment initiatives and orders. The indirect strategies are considered a more gentle way for one party to say that they want out (Alajoutsijärvi et al., 2000).

On the other hand are the direct termination strategies, which are used when the initiator does not wish to leave the other party in doubt. *Fait accompli* is strongly self-oriented, and this involves stating explicitly that the relationship is over, leaving no opportunities for negotiation. Negotiated farewell is a less hostile way of ending the relationship, where both parties see the termination as inevitable or even beneficial. In revocable exit is the disengager explains the wish to end the relationship but they open for discussion regarding the reasons,

hence there are still possibilities for the relationship to remain if actions are taken to repair it. Diverging state-of-the relationship talk means that the views of the supplier and buyer are so distant that one of them has to change their view completely for the relationship to continue. Voice, involves going directly to the top management of the partner expressing their dissatisfaction (Alajoutsijärvi et al., 2000) .

More than one strategy can be used at the same time, and at different levels in the company. The strategies represent pure types, but in reality there will be hybrids or mixed forms. An indirect strategy will give both partners a bit of time to adjust, while a direct process is more rapid. However, in an indirect dissolution process the partner might not realize the dissolution process in action and feel uncertain about the future of the relationship. This can result in the partner feeling betrayed, when realizing that the relationship in fact has ended. In some cases it is important for the disengager to be able to re-activate the relationship should the circumstances change, and also to remain a good reputation in the network. Therefore a self oriented strategy may seem very attractive in the short-run since this requires less resources from the disengager, but may be regrettable in the future (Alajoutsijärvi et al., 2000) .

To try and avoid potential negative consequences of the termination of the relationship, the disengaging partner should understand the different strategies, and be aware of the different options. Defining procedures for termination of relationships can be considered important when implementing a supply base reduction. Further, the factors affecting the process being well executed will be presented.

### **2.2.3 Success factors in supply base reduction**

Ogden (2006) has identified a set of critical success factors when performing a supply base reduction process. His research has involved supply base reduction activities across 10 different organizations where several different industries were represented. Based on the research by Ogden (2006) the six most important success factors identified are presented. The study considering a large range of companies hence it is assumed that the external validity of the study is high.

<b>Success factor</b>	<b>Comment</b>
<b>Good information systems</b>	As one of the main challenges in supply base reduction is connected to a lack of historical data, information systems operate is an important source of providing such information. Creates the foundation for performance measurement Facilitates thorough spend analysis across the organization.
<b>Cross-functional teams</b>	There is a general resistance to change; in order to overcome possible resistance from stakeholders they need to be engaged in the supply base reduction process. A cross-functional team will increase the probability of participation from stakeholders.
<b>Selecting the right supplier/suppliers</b>	As a buying company gets more dependent on its suppliers after a reduction process of the supply base, it is vital that the remaining suppliers have the capacity and capability to deliver larger volumes of supplies within the same timeframe as before.
<b>Communication</b>	Good communication with stakeholders is critical, especially in the implementation phase. The purpose and the benefits of performing a supply base reduction process should be clearly communicated throughout the organization. Communication ensures commitment.
<b>Win-win relationships</b>	Some of the motivation for performing a supply base reduction is to establish relationships where both parties can utilize each other's competencies.
<b>Key management support</b>	Decision makers with influence capability must be involved early in the process to increase a successful outcome.

Table 6: Supply base reduction success factors (Ogden, 2006)

It is important to be aware of the factors resulting in a successful supply base reduction process. There are different approaches identified on how to do a supply base reduction, and the process can be structured in different ways. As emphasized in section 2.2, a supply base reduction facilitates closer relationships being formed between a buyer and its suppliers. A central part of the process is to gather data about the different suppliers in order to create suitable criterion, which will create the basis for choosing the best suppliers for the supply base. In order to have a thorough evaluation of suppliers, a cross-functional team with different functions represented should be established. As supply base reduction can be considered a change process, and different stakeholders should be included in the decision making process to make the right decisions for the company. Termination of supplier

relationships becomes a part of the supply base reduction process, and knowledge about this can be valuable. After performing a supply base reduction the need to develop some of the remaining suppliers might be considered. Further, the literature about supplier development will be presented.

## 2.3 Supplier development

This section will present the literature regarding supplier development; what supplier development can involve, its purpose, how lean philosophy can be applied in supplier development as well as success factors for the process. Both the buyer's and supplier's point of view with regards to supplier development will be presented in order to give a holistic perspective, and because supplier development is dependent on both buyer's and supplier's participation and commitment.

Krause and Ellram (1997, p. 34) define supplier development as: *“any activity undertaken by a buying firm to improve either supplier performance, supplier capabilities, or both, and to meet the buying firm's short and/or long-term needs.”* Another definition provided on the term is that is a long-term cooperative effort by a company with the intention to improve its supplier's technical capabilities, delivery of quality and costs to enable continuous improvement (Hahn et al., 1990).

More involvement from buying companies in supplier's activities is a result of reliance on few competent suppliers. Supplier development can be described as a supplier management practice, initiated with strategic suppliers (Nagati and Rebolledo, 2013). In order to stay competitive the buying firm increasingly relies on their suppliers to deliver products that are technologically advanced, in a timely and cost effective manner (Krause and Ellram, 1997). When the buying firm experiences shortcomings on any of these aspects, there are different options on how to solve the problem; (1) invest time and resources to increase the performance and/or capabilities of their current supplier, (2) manufacture the items themselves, (3) find an alternative supplier or (4) choose a combination of the first three options (Krause and Ellram, 1997). The first option involves supplier development, and in order to enhance supplier performance different practices within supplier development can be applied. These will be described further in the following section.

### **2.3.1 Perspectives in supplier development**

There are several different perspectives to how to engage in supplier development. What might be the right approach for supplier development in one company may not be the best fit in a different company with a different supply market. The buying firm must evaluate the supplier that is selected for development and find the most appropriate approach to suit the relationship they have with the suppliers. Different supply markets requires different supplier approaches (CIPS, 2015).

Value management is an important part of the supplier development. When performing a value analysis it allows the buying firm to identify the potential of reducing the cost of a product, reducing time to market, improving environmental performance or quality. Without specifying this further most supplier development initiatives involves one or more of the goals mentioned above. For the buying company the main interest is for the development to result in improvements in the total added value from the supplier, or else the effort the supplier put in the development will be redundant.

#### **2.3.1.1.Reactive/strategic approach**

In 1996 Global Procurement and Supply Chain Benchmarking Initiative initiated a study on the supplier development best practices. The study suggested that the different approaches could be divided into two categories; supplier-specific improvement projects or efforts to improve the capabilities of the entire supply base. Further more the focus can be either on product-level or process-level. From this findings, two main approaches was mapped out; the strategic supplier development and the reactive supplier development. When focusing on strategic supplier development the goal is to improve the long-term capabilities of the supplier, while when focusing on the reactive supplier development the buying firm adopt an ad hoc response to eliminate specific supplier deficiencies. Typically a company employing a reactive approach will go forward with the development as a reaction to some major crisis or defaults of the supplier (Handfield and Bechtel, 2002). As strategic processes identify critical commodities and suppliers requiring development, and the intent is to create a world-class supply base, this provides a sustainable competitive advantage (Wagner and Johnson, 2004). The reactive process, on the other hand, is motivated by poor performance of the suppliers, detected by performance evaluation systems. The trend is that reactive firms are less systematic in their evaluation of suppliers, and suppliers with the need of development only become visible after a problem occurs (Krause et al., 1998, p.40).

### **2.3.1.2 Indirect/direct**

A different categorization of supplier development strategies is internalized (direct or transaction specific) or externalized (indirect or infrastructure factors) supplier development activities (Wagner, 2006, Wagner and Krause, 2009, Krause et al., 2001). Externalized supplier development strategies are based on the firm making use of the external market to initiate supplier performance improvements. Wagner (2006) defines indirect supplier development as *“the buying firm commits no or only limited resources to a specific supplier. There is no active involvement of the buying firm in the supplier’s operations, and know-how transferred from the buying firm does not occur.”* Some of the activities that constitute an external supplier development strategy are competitive pressure, supplier assessment and supplier incentives 2000. These will be further explained in the following sections. The buying firm uses these activities to encourage the supplier to improve their performance without having to be actively involved in the development itself.

Direct supplier development strategies on the other hand, involve the activities conducted under direct involvement of the buying firm; a direct involvement of the buying firms resources in the supplier. Direct supplier development may involve activities such as provision of equipment or capital, on-site consultation, training and education of supplier’s personnel, the buying firm temporarily dedicating personnel to the supplier and inviting supplier’s personnel. By conducting these activities the buying firm internalizes the cost of improving the suppliers (Krause and Ellram, 1997).

Both direct and indirect supplier development are likely to have a direct effect on the performance of the supplier and the buying firms competitive advantage. Although direct and indirect supplier development are two very different approaches and can be classified as mutually exclusive, the buying firm can also combine the two (Krause and Ellram, 1997).

### **2.3.1.3 Process/result oriented**

Supplier development programs often tend to be result oriented, focusing on solving specific problems of the supplier, which often result in improvement of the supplier’s quality and cost. The development focuses on improving the suppliers technical systems such as layout of equipment, work processes, work methods and quality assurance. The advantages of a result oriented supplier development program is fast implementation of the process, quick identification of problems and quick solutions which will give the buying firms the

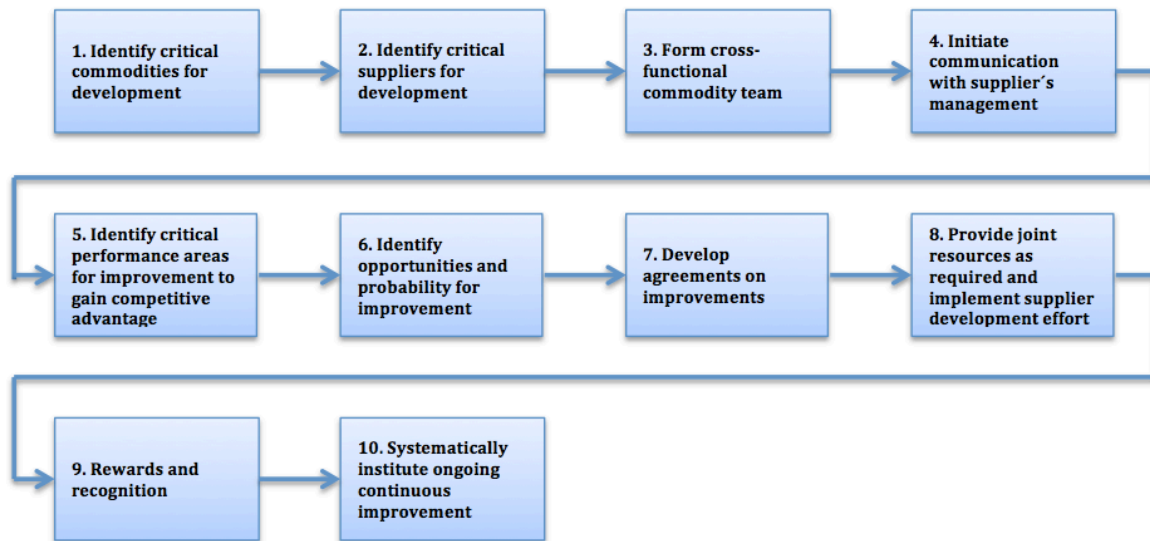
experience to solve successive problems of suppliers. On the other hand, there are disadvantages such as less commitment from the supplier and less improvement in the supplier's capability to solve their own problems. There are three key characteristics of result oriented supplier development; (1) a standardized and buyer-drive process, (2) primarily technical changes, (3) short duration and limited follow up (Hartley and Jones, 1997)

Process-oriented supplier development aims to increase the suppliers' capability for improvement and to help them sustain and continue the change process. This is described as a supplier development initiative complementing result oriented supplier development. Four steps design to effectively achieve this are identify in the study of Hartley and Jones (1997); (1) Assess the suppliers readiness for change, (2) Build commitment trough collaboration, (3), Implement system wide changes and (4) transition out of the suppliers organization. A major commitment of time and resources are required when initiating in process-oriented supplier development. And this should only be considered on strategically important suppliers where the buyer is expecting long-term relationships. Also it may take long time before measurable result appears, and this it is important for both the buyer and the supplier to remember (Hartley and Jones, 1997).

The decisions regarding which supplier development practices to apply depend on factors such as the objectives defined for supplier development and the characteristics of the companies involved. In order to apply supplier development in a structured manner, some processes will be presented for supplier development.

### **2.3.2 Supplier development process**

Krause and Ellram (1997) suggest a strategic supplier development process consisting of ten steps. The model was developed based of a survey with open-ended questions, and validated trough a statistical analysis of quantitative data.



**Figure 5: Supplier development process 1 (Krause and Ellram, 1997)**

(1) When approaching supplier development strategically the firm assess the relative importance of each commodity, and this assessment results in a portfolio of commodities considered important for the market segment assessed, while the reactive approach completely skips this step. (2) From this portfolio, analyzing the supplier performance data identifies the critical suppliers. Reactive process companies only identify the critical suppliers after poor performance.

(3) The next step is to form a cross-functional development team to run the development. Strategically driven firms tends to utilize cross-functional teams in a different manner than reactive firms; strategic firms having a permanent team while reactive firms form an ad hoc team which was then dissolved after the issue was resolved. However this has not been proved to have significantly different results. When the cross-functional team is set, (4) the top-management of the supplier is contacted and a meeting is set. In the strategic approach, research emphasizes the importance of not demanding improved performance but to agree to work jointly to improve the performance of the supplier for mutual benefit.

(5) The key difference between strategic and reactive supplier development strategies is to identify the objectives and the critical performance areas for improvement. According to Krause and Ellram (1997) companies pursuing a strategic development of suppliers are significantly more likely to have:

- Established criteria about when to enter into a supplier development effort;



- Developed improvement benchmarks for the firm's supply base; and
- Developed supplier-focused total cost management programs to assist in identifying eliminating non-value-added cost.

(6) Further on the opportunities and probabilities of improvement are identified.

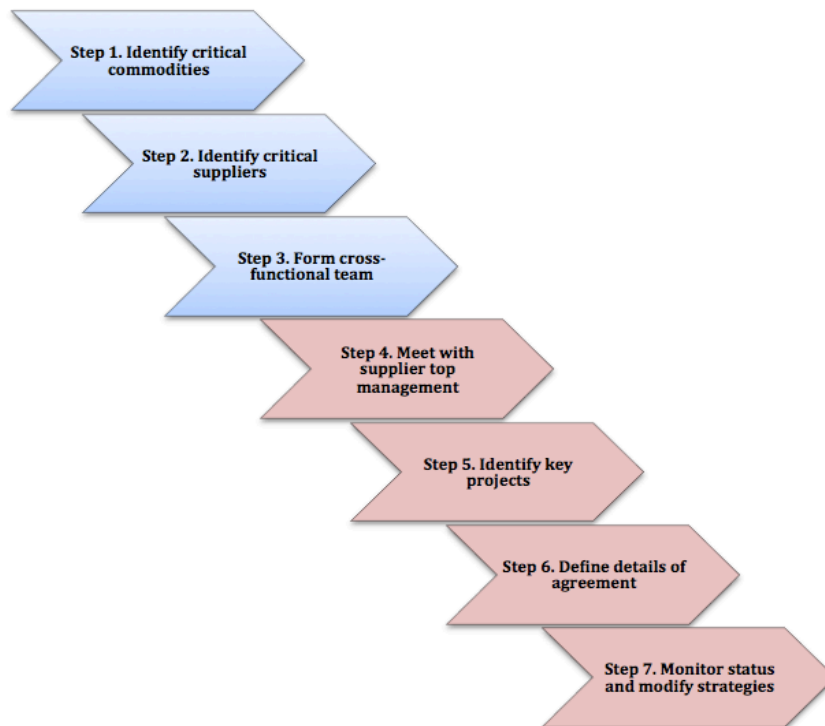
(7) An agreement on improvements and performance metrics are developed, where the most critical part is time-phased milestones. (8) The next step is to deploy resources and implement development effort. Both companies are required to commit financial, capital and personnel resources for the development to be successful (Handfield et al., 1999). The research shows that strategic companies emphasize the importance of mutual improvements, not only improvements from the supplier. The supplier is also more likely to achieve these goals if there is tangible evidence that the buying firm will support their effort with matching resources. Some of the strategic firms formed a liaison to help prevent a situation where the parties fail to follow through with the commitment. The results of the study suggest that more resources were deployed in strategic firms than reactive firms, and that strategic firms also received a higher level of deployed resources than reactive firms (Krause et al., 1998).

(9) After the development effort is set in motion both reactive and strategic firms are equally likely to use rewards and recognition as incentives for further development. The continued progress must be monitored over time.

The survey indicates that supplier development is first used as a reactive tool, to correct the suppliers' poor performance. However when the supplier's performance is improved the buying firm continues to develop the supplier in a strategic manner to create competitive advantage. When evaluating a supply-base, and removing the redundant suppliers, the poor-performing suppliers are more likely to be removed. However this evaluation will give an indication to which poor-performing suppliers that are kept in the supply base, and are in need of supplier development.

All the remaining suppliers should be further developed in order to enhance the long-term competitive advantage of the buying firm. In this case the development of the suppliers will be done in a strategic manner, not as a result of the suppliers poor performance.

Handfield et al. (1999) also suggests a process map for supplier development. The 7-step generic process map was developed after scanning supplier-development strategies in over 60 organizations. As can be seen in the model, the model is very similar to the first model presented.



**Figure 6: Supplier development process 2 (Handfield et al., 1999)**

The first four steps are the same in both models, but they differ on the later steps. Step 5 in the model of Handfield et al. (1999) model involves identifying key projects for supplier development. In the model of Krause and Ellram (1997) model this step is divided into two different steps; 5 and 6, where the first one is to identify critical performance areas followed by identifying opportunities and probability for improvement. The following step is similar in both models. The model of Krause and Ellram (1997) has some steps that are not included in the other model. These are the last three steps, step 8 – step 10. This model does not include monitoring of status and modifying strategies like the other model, but focus on facilitating continuous improvement, something that can be considered as focusing on the same things.

### **2.3.3 Supplier development practices**

According to the literature reviewed in previous section, different categorizations and types of supplier development approaches are briefly described. The different supplier development practices are summed up in ascending order of the involvement of the suppliers as shown in the table below.

<b>Supplier development activities</b>	<b>Indicators</b>	
<b>Competitive pressure</b> Assessing alternative suppliers when buying a product to create pressure on the current supplier.	→ Bidding → Short term contracts	Hahn et al (1990); Krause (1997); Krause et al (2000)
<b>Limited number of suppliers</b>	→ Limited number of suppliers per purchased item.	Krause (1997); Krause (1999); Krause et al. (2000)
<b>Supplier Assessment</b> Evaluating the performance of the supplier to set goals and measure improvement.	→ Performance expectations → Measuring time/cost/quality	Hahn et al (1990); Krause (1997); Krause and Ellram (1997b); Krause et al (1998) Krause et al (2000)
<b>Site Visit</b>	→ Inspection of the site	Hartley and Choi (1996); Krause (1997); Krause and Ellram (1997a); Krause et al (1998) Krause et al (2000)
<b>Communication and feedback</b>	→ Feedback of evaluation → Frequency of communication → Methods used for feedback & communication.	Krause (1997); Krause and Ellram (1997b); Hartley & Jones (1997) Krause et al (1998) Wagner & Krause (2009)
<b>Demand of supplier certification</b>	→ Certification by buyer → Certification by standard (ISO 14	Krause (1997); Krause (1999); Wagner (2010)
<b>Knowledge transfer</b>	→ Seminars, forum → On-site consultations → Supplier invited to buyer	Krause (1999), Wagner & Krause (2009), Wagner(2010)
<b>Supplier Incentives</b> Reward for supplier performance improvement	→ Long-term contracts → Increased future business → Recognition	Hartley and Choi (1996); Krause (1997); Krause and Ellram (1997a); Krause et al (1998) Krause et al (2000)
<b>Intensive information sharing</b>	→ Exchange of product and process information. → EDI → ESI – Early supplier involvement in new product development.	Krause (1999); Wagner & Krause (2010)
<b>Training and education</b>	→ Organized training by buying firm → Relocating personnel temporarily.	Krause & Ellram (1997); Krause (1997) Krause et.al (1999) Krause et al (2000); Modi & makbert (2007)
<b>Exchange of personnel</b>	→ On-site verifier → Collocation of staff	Keause (1997); Li et al (2007) Modi & makbert (2007)
<b>Direct investment</b>	→ Purchase of machines → Improving machines → Specialized training	Krause (1997); Krause et al (1998); Krause et al (2000); Wagner (2006)

Table 7: Supplier development activities

The literature on this subject regarding what are the best practices to supplier development is limited. Some argue that result-oriented supplier development can only get the buying company so far, and that process-oriented supplier development is necessary in order to bring out the full potential of the supplier. However, this is costly for the buying firm and to make such an investment the buying firm needs to see that this will pay off in the long run.

In their study (Krause et al., 1999) two models. Their study suggests that regarding the models form, supplier assessment and supplier incentives are important enablers, but the impact of these on the performance improvement is only indirectly. However the direct involvement activities, such as training of personnel by the buying firm etc. has a direct and critical impact in achieving significant performance improvement. Competitive pressure did not seem to have much impact on the supplier development itself (Krause et al., 1999). They also suggest that the degree of involvement of the buying firm has a great impact on the outcome of the supplier development.

As presented, supplier development includes different practices and a company must adjust their supplier development goals towards their own company and available resources. In order to succeed with supplier development, some factors must be further explored.

#### **2.3.4 Critical success factors in supplier development**

This section will look into the pitfalls and success factors in supplier development efforts. Developing suppliers lead to many benefits, both for the buying company and the supplier, but at the same time it is a resource intensive initiative in terms of time and money. It needs to be considered carefully what opportunities and advantages lies in the work of developing a specific supplier, or what challenges need to be faced. *“Supplier development requires both firms to commit financial, capital, and personnel resources to the work; to share timely and sensitive information; and to create an effective means of measuring performance”* (Handfield et.al p. 38, 2006). This indicates how both parties need to commit to the process on different levels, thus reflecting the challenges that need to be faced.

According to Handfield et.al (2006) the supplier development should be considered a long-term business strategy, which is viewed as the foundation for an integrated supply chain. Based on the results of their research it was indicated that even though many firms could

identify which suppliers within their supply base required development, not many firms had successfully conducted the supplier development work. In connection with this, they focused on the reasons for these results and what pitfalls might occur in supplier development efforts. They proposed a supplier development process containing seven steps as presented in section 2.3.2. As highlighted in their figure, most pitfalls identified occurred in the last four steps, where communication with suppliers became a more distinct part of the process. The pitfalls identified from the research were divided into three categories; supplier-specific, buyer specified and buyer-supplier interface pitfalls.

The supplier specific pitfalls are connected to lack of supplier commitment and insufficient supplier resources. To enable commitment to the process from the suppliers it should clearly be communicated what the gains are for the supplier. Also, the supplier development efforts should be adjusted towards the available resources in the supplier organization. With regards to the buyer-specified pitfalls it is emphasized the importance of having few suppliers to focus on and that cost of ownership should be determined in order to evaluate the total cost of doing business with a supplier. In addition, the research highlights the importance of defining small and realistic goals and that commitment to the process from managers should be a prioritized. The pitfalls related to the buyer-supplier interface category are connected to lack of trust and poor alignment of organizational cultures. Communication is the key to create trust in the buyer-supplier relationship, and is considered as a crucial part for a successful supplier development process (Handfield et al. 2006).

Krause and Ellram (1997) performed a research identifying eight critical elements of supplier development as presented in table 9.

<b>Critical element of supplier development</b>	<b>Purpose</b>
Effective two two-way, multifunctional communication	Communication is considered crucial as it enables the supplier to understand what is required in terms of design, engineering, quality etc. – It enhances the performance of the supplier.
Top management involvement	The top management have the knowledge of a firm's strategy, and therefore make decisions about whether or not to initiate supplier development programs.
Cross-functional teams	In order to deal with the range of problems that supplier development might address, a cross-functional team possess the expertise required to solve different problems that might occur.
Focus on other measures than price alone	It is important to have a long-term perspective in terms of the all-in-cost connected to a purchased product.
Long-term perspective	Both the buyer and supplier need to invest resources in terms of time and money in a supplier development initiative, and the pay-offs from doing this may not occur immediately, but first after a longer time period.
Be a big customer of the supplier by constituting a large part of their total sales.	The willingness of the suppliers to take part in the supplier development efforts may be affected by how large the customer is in terms of percentage of total annual sales. Buying firms need some leverage to make suppliers cooperate and see the advantages of the supplier development effort.
Supplier evaluation	Supplier evaluation in itself is not supplier development, but serves as a helpful mechanism when identifying where supplier development activities should be concentrated.
Supplier recognition	Supplier recognition may serve at least two purposes: <ul style="list-style-type: none"> <li>(1) As a motivating tool for suppliers to improve their performance</li> <li>(2) Stimulate competition among suppliers, and provide incentives for those with outstanding achievements.</li> </ul>

Table 8: Critical elements of supplier development (Krause and Ellram, 1997)

All of these factors are important to consider when initiating a supplier development program, but the results of the data analysis indicated that the most critical factors in supplier development are effective communication, involvement of top management and collaborative attitude (Krause and Ellram, 1997). Some similarities can be identified between the two

described studies such as the importance of top-management to commit to the process, the focus on elements regarding cooperation and that a long-term perspective should be applied for the process. In addition, both studies express that the all-in cost of doing business with a supplier should be assessed. The studies differ when it comes to factors specifically aimed at the supplier.

Both buyer and supplier need to be involved in supplier development, and the literature presented have focused primarily on the buying firm and how suppliers should be managed. The supplier's point of view on supplier development will be further explored, this in order to provide a more complete perspective of supplier development.

### **2.3.5 Supplier's perspective in supplier development initiatives**

This section will present the supplier's perspective on supplier development initiatives. The purpose is to understand what is required from buyer and supplier to succeed with supplier development. Company performance is highly dependent on and connected to supplier performance. A shortcoming is that the buyer's perspective is mostly represented in research on supplier development (Stjernström and Bengtsson, 2004). However, both the buyer and supplier are relevant for the success of supplier development initiatives. If the supplier's motivations and concerns related to supplier development were fully understood by the buyer, it would enable better planning and implementation of the initiatives (Nagati and Rebolledo, 2013).

Another argument given for increasing the focus on the supplier's perspective is that such an approach provides new insight into cooperation between customer and supplier (Stjernström and Bengtsson, 2004). Well performing suppliers with special competencies might easily gain the power to choose their customers on their own. Therefore it is crucial to extend the scope of existing research and also consider the supplier's perspective (Klioutch and Leker, 2011).

#### **2.3.5.1 The role of trust and cooperation**

Buyer-supplier relationships are often associated with cooperation. Based on the research provided by Nagati and Rebolledo (2013) they explored the conditions favouring supplier's participation in supplier development activities; the motivation for their participation and the impact supplier development activities have on supplier's operational performance. The study put emphasis on and investigated the role of trust, and found that trust must be present in the

relationship in order for suppliers to be willing to take part in supplier development initiatives. Reed and Walsh (2002) confirmed in their study that supplier development strengthened the buyer-supplier relationship and contributed in building mutual trust. This creates the basis for better communication that enables more sharing of strategic information and more effective innovation processes.

According to Langfield - Smith and Greenwood (1998), due to lack of trust between Toyota and their suppliers, their supplier development program could not be implemented without difficulties for the supplier. Trust facilitates sharing of information and more open attitude towards their customers, also affecting the willingness of the supplier to allocate resources to the relationship (Nagati and Rebolledo, 2013).

The empirical findings made by Stjernström and Bengtsson (2004) indicate that a buyer-supplier relationship would benefit from increased level of trust. The study reveals that collaboration is not fully developed between the buyer and supplier, which create barriers for mutual learning. Further, the suppliers in the research highlighted several reasons for this; lack of commitment to supplier involvement from managers in the buying firm and the customer's focus on the short-term cost reductions rather than on long-term improvement. Their results revealed that both suppliers and customers want to cooperate more, but the suppliers and customers do not share a common perspective regarding what is required for effective cooperation.

The following challenges are summarized as part of their analysis made from the supplier's perspective: Price reduction demand from the buyer; Vagueness of customer's expectations resulting in lack of trust; The buyer and supplier do not share the same level of dependence towards each other, hence do not create a good basis for good co-operation; The opportunities of suppliers to collaborate with the customer's competitors are restricted (Stjernström and Bengtsson, 2004)

#### **2.3.5.2. Different perceptions of supplier development**

When supplier development is initiated by a buying firm, there might be different perceptions of the efforts made by customer and supplier. Krause et al. (1999) examine examining potential barriers to success, and they determine whether supplier size, sales percentage, or relationship length were related to the perceived quality of the relationship. The suppliers



represented with low sales were less positive than the larger suppliers when it came to the benefits they reached in terms of enhanced quality, profitability and growth through the supplier development program initiated by the customer. The small suppliers had more difficulties than the larger suppliers when it came to communication; barriers such as getting required information and recognition by the purchasers of the customer's. The low-percentage group expressed that buyers of the customer could make more of an effort to work with them. The study also considered the length of the buyer-supplier relationship, where the suppliers having a short relationship struggled more to get information.

Langfield - Smith and Greenwood (1998) investigated how Toyota initiated a new supplier strategy to improve the relationships with suppliers. The new supplier strategy included a range of activities, such as a supplier development program and supplier assessment. The supplier development program intended to introduce three elements to suppliers: Management by policy deployment, implementation of Toyota Production Systems and change the workplace culture at the supplier.

The case study focused on mainly two of Toyota's suppliers, and both of them got many benefits from participating in the supplier development program, but they also experienced some difficulties. As a result of the supplier development program, the suppliers made extensive changes, and some employee resistance was experienced and became a problem, as one of the suppliers did not have the personal skills to influence other employees to change. The suppliers considered it critical to get high scores in their assessment in order to get long-term contracts and to maintain a good relationship with Toyota, but they regarded the penalties of low scores as harsh. The suppliers also expressed that some measures were too subjective, and sometimes even inaccurate, and that the circumstances to some suppliers was not considered. It was also expressed that Toyota's supplier strategy had too much focus on the outcomes for Toyota. A reason for this might be bad communication processes between Toyota and the company's suppliers. Even if Toyota initiated many activities to improve their relationship with suppliers, the suppliers did not have sufficient trust.

Reed and Walsh (2002) performed a case study where the suppliers expressed their opinion about their customer's supplier development program. Something that was emphasized as a positive trait was that the customer was willing to accept criticism from their suppliers. The suppliers also felt the supplier development program had resulted in the customer

understanding their capabilities in a better way. Liker and Choi (2004) also emphasized how Toyota's and Honda's philosophy involve understanding how their supplier works and how this contribute in a positive way when initiating supplier development efforts. Most of Toyota's and Honda's suppliers perceive Toyota and Honda as both their best and toughest customers. The suppliers feel high standards and expectations are expected, but at the same time feel it is manageable to reach these objectives when the customer provide its assistance. The customer wants to maximize profits, but not on expense of their suppliers.

### **2.3.5.3 Incentives and drivers for supplier development from supplier's perspective**

The role of incentives has a central part in supplier development as it represents motivation for supplier's participation in the initiatives. According to (Nagati and Rebolledo, 2013) the results of their research confirm that supplier development activities lead to improvement in supplier's performance, something that can be considered a motivation in itself to participate in supplier development initiatives. They also stated that supplier development activities could be considered a source of competitive advantage for the supplier, at least for the suppliers facing complex competitive environments.

A research provided by Klioutch and Leker (2011) intends to look at factors in a customer relationship that affects the supplier's willingness to participate in the customer's NPD, and explore the value creation by the supplier. They differ between direct and indirect functions of customer relationship, where direct functions show an immediate effect on the supplier firm. Direct functions include profit, volume and safeguard functions. Indirect functions have an impact on long-term benefits and might include getting access to new technology or expertise from the relationship that is established with a customer. These benefits may result in enhanced value of the supplier's offerings to their customer and can contribute to gaining access to new customers and markets. The study confirms that long-term benefits and network opportunities, which are provided by indirect functions, are highly important for strategically oriented suppliers.

This section has showed that supplier's motivation and concerns are not always fully understood by the buyer, hence should be prioritized. Cooperation has been emphasized as crucial for the success of supplier development. Further, lean supplier development will be

presented in order to describe methods that facilitate cooperation and increased visibility of performance.

### **2.3.6 Lean supplier development**

This section will look into the philosophy of lean and how it can be applied in supplier development. Some of the principals and methods used in lean will be presented in order to give a basis for what lean supplier development include. Applying lean manufacturing philosophy can be considered one of the most important concepts in the contribution of facing fierce competition in the global market. Smarter and more effective ways of operation is required, not just within the individual company but throughout the entire supply chain (Harris, 2011). Lean production is both a philosophy and a set of tools and techniques, where the objective is to find and eliminate sources of waste in manufacturing operations (Powell, Strandhagen, Tommelein, Ballard and Rossi, 2014).

The principals used internally in a lean organization reflect the way these organizations perform their supplier development efforts (Harris, 2011). Lean production can be defined as: *“management that focuses the organization on continuously identifying and removing sources of waste so that processes are continuously improved”* (Nicholas, 2011, p.3). The principal of continuous improvement is the core of lean philosophy, and can be measured in terms of producing things better, faster and cheaper (Nicholas, 2011). This also supports the objectives of supplier development, where the models presented of the supplier development process focused on modifying strategies and continuously improvement.

The lean purchasing philosophy intends to find one supplier that the company can establish a long-term relationship with. Closer relationships with suppliers facilitate more coordinated processes, minimizing the amounts of waste produced, enabling delivery from suppliers being on time, in the right amount and quality. As lean manufacturing focuses on creating more effective processes, economical benefits can also be reached due to reduced operational cost and increased capacity (Harris et al., 2011). This also aligns with the objectives for supply base reduction and supplier development as presented in earlier sections; reaping benefits by focusing on fewer suppliers and establishing closer relationships with these suppliers.

### 2.3.4.1. Lean principals and methods

According to (Harris et al., 2010) a lean supply chain is built around solid core operations. This means that solid internal material movement leads to the knowledge required for supplier development, where the internal processes and procedures reflect the requirements for suppliers. To ensure a successful lean process, both the supplier and customer must be committed to the process of continuous improvement (Nicholas, 2011). Some of the most central tools and principals used in lean are presented in table 9.

Lean tools and principal	Functionality
<b>5s</b>	<b>The five principals help create a less complex working environment:</b> <ul style="list-style-type: none"><li>• (1) Make proper arrangements - sort</li><li>• (2) Orderliness –create an own space for everything</li><li>• (3) Cleanliness</li><li>• (4) Neatness – create procedures</li><li>• (5) Self-discipline</li></ul>
<b>Seven sources of waste</b>	<ul style="list-style-type: none"><li>• Identify inefficiencies in the supplier's processes</li><li>• Reduce the occurrence of waste within processes by focusing on producing no defects, save time by shortening transportation distance, produce in accordance with market needs to minimize inventory levels and overproduction, reduce time spent on waiting and motion.</li></ul>
<b>Value stream mapping</b>	<ul style="list-style-type: none"><li>• The value stream mapping methodology visualizes the value stream consisting of all activities leading up to a finished product</li><li>• A good way to analyse and identify areas where the supplier can improve</li><li>• It works as a good way to communicate the status of progress to the buying company.</li></ul>

Table 9: Lean tools and principals (Nicholas, 2011)

The presented lean tools and principals emphasize visibility of results and processes in order to identify improvement areas. In order to monitor progress, measurement is crucial.

#### **2.3.4.2 Examples of lean supplier development**

Lean has emerged from the methods and practices used in Toyota Production Systems, and insight into what they do to develop suppliers will be presented. Sharing of knowledge, both characterized as tacit and explicit is considered the key in Toyota's approach towards supplier development. They focus both on knowledge sharing with, and among suppliers (Dyer and Nobeoka, 2002). The table presents the different supplier development initiatives used by Toyota.

Process	Purpose of process
Supplier-Association	<ul style="list-style-type: none"> <li>• Exchange of information between member companies and Toyota</li> <li>• Provide the same training among member companies</li> <li>• Socializing events</li> </ul>
On-site Consulting	<ul style="list-style-type: none"> <li>• Availability of assistance by offering a group of internal consultants with knowledge within operations that can assist in problem-solving both at Toyota and at Toyota's suppliers</li> <li>• Tasks: assist in productivity improvements, inventory reductions and quality improvements.</li> </ul>
Supplier learning teams	<ul style="list-style-type: none"> <li>• Suppliers can assist each other with productivity and quality improvements</li> <li>• The intention is that suppliers can help each other in the process of improving productivity in areas of common interest</li> </ul>
Problem solving teams	<ul style="list-style-type: none"> <li>• A team is put together in order to solve emergent problems within the network of Toyota suppliers</li> <li>• Identifies the cause of the problem</li> </ul>
Employee Transfers	<ul style="list-style-type: none"> <li>• Toyota offers both permanent and temporary solutions where personnel from Toyota's own organization is transferred to supplier's facilities.</li> <li>• This is considered an important mechanism for transferring knowledge to suppliers</li> </ul>
Performance feedback; Process Monitoring	<ul style="list-style-type: none"> <li>• Toyota is regularly measuring performance of suppliers with the intention to identify improvement areas and suggest what can be done to improve.</li> <li>• Encourages and motivates suppliers to improve</li> </ul>

Table 10: Supplier development at Toyota (Dyer and Nobeoka, 2002)

The company Honda have a similar way of conducting supplier development. The company consider their supplier development efforts as a way to teach their philosophy, where their vision is to have mutual responsibility and obligation between supplier and customer. At the centre of their supplier development work is a program referred to as BP – “Best Process, Best Performance, Best Practice”. To take part in this program, a BP team is established, where representatives from different functions from both the Honda organization and their supplier are included. The concept for the supplier development program is to work in the

supplier's plant for weeks or months on narrowly targeted improvement projects. Having a narrow focus permits quick results. The purpose of their supplier development program is to learn from "actual part, actual place, and actual situation" (Helper and MacDuffie, 2002).

The way these companies carry out their supplier development represents high involvement in terms of allocating a lot of resources and time to improve their suppliers. Some of the supplier development practices mentioned in section 2.3.3 can be identified; intensive information sharing together with regular communication and feedback are the main element in the way supplier development is performed, and represent a highly resource intensive way of performing supplier development activities. The required resources need to be in place before approaching supplier development in such a way, and might not be the suitable solution for any industry or company.

The lean philosophy is mostly associated with and has emerged from environments represented as high volume production. In the context of products characterized as highly-customized, engineer-to-order products, the situation differs in terms of bigger variation in both products and processes. This also reflects the challenges in applying such methods in companies operating in more volatile markets, where flexibility is required and offered to customers. The concept of modularization has been identified as an important element to succeed with applying lean in Engineer-to-order manufacturing companies (Powell et al., 2014). To enable companies to adopt towards more standardized designs, and at the same time manage to offer flexibility to customers, it may become more important to work with suppliers to establish solutions that satisfies these requirements.

Lean supplier development represents high involvement from both buyer and supplier, where the intention is to become better by solving problems together and look at each other as partners. Most of the literature of supplier development presented is characterized by lean philosophy, as the focus is on continuous improvement and visualizing results. In order to succeed with supplier development internal focus of buyer should reflect the requirements made for suppliers.

## **2.4 Presentation of theoretical framework**

This section will present the theoretical framework developed, where the presented theory is used as a basis. The purpose of the theoretical framework is to reflect the most central parts of supply base reduction and supplier development in order to make it applicable for analyzing company practice related to the two processes.

Different factors have been emphasized as essential for both supply base reduction and supplier development, and have been presented as central methods in the way a company manages its supply base. Priority areas for purchasing professionals should be on tools used in the process of creating and managing a supply base (Ogden, 2006). Several factors are mentioned with regards to supply base management and its importance for a company's corporate strategy, as it is considered an important strategic tool and central part of reaching competitive advantage (Krause et al., 1998). Supply base management is today influenced by increased focus on supply base reductions and relationships characterized with closeness and cooperation (Stump and Sriram, 1997);(Choi and Krause, 2006).

A supply base reduction facilitates closer relationships being formed with suppliers (Ogden and Carter, 2008), and if managed correctly it can result in benefits leading to competitive advantage (Goffin et al., 1997). Close relationships can only be maintained with a limited set of suppliers (Spekman, 1988, Gadde and Snehota, 2000, Handfield et al., 2006), and emphasize the importance of supply base reductions in company strategy. The overall objective of the process is to reduce costs, improve quality, responsiveness, flexibility and other important performance measures (Ogden, 2006, Stump and Sriram, 1997, Cousins et al., 2008).

A supply base reduction can be applied based on three different approaches: systematic elimination, standardization and tiering (Ogden and Carter, 2008). The process of a supply base reduction is characterized with the establishment of a cross-functional teams, development of sourcing strategies, identifying potential suppliers for termination and applying defined criteria for suppliers (Ogden and Carter, 2008, Sarkar and Mohapatra, 2006). Some success factors are identified related to the process (Ogden, 2006). It is characterized as a continuous process, where the supply base should be adjusted in accordance with external changes as market conditions (Ogden and Carter, 2008). A supply base reduction may serve



as a prerequisite for supplier development (Ogden, 2006) and the framework reflects supplier development as a possible step after performing a supply base reduction.

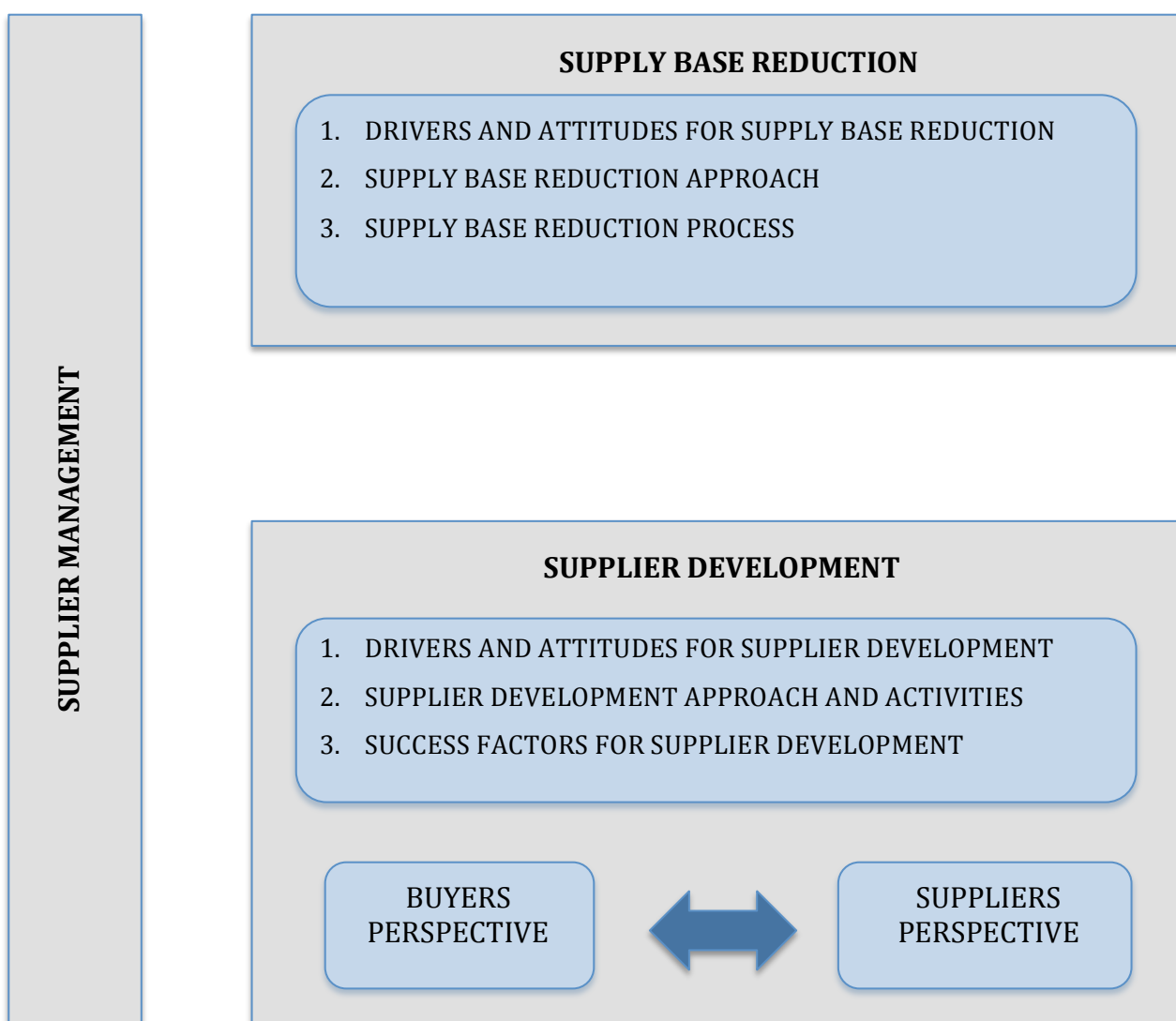
Supplier development can be described as a supplier management practice, initiated with strategic suppliers (Nagati and Rebolledo, 2013), and it is a long-term cooperative effort by a company with the intention to improve its supplier's technical capabilities, delivery of quality and costs to enable continuous improvement (Hahn et al., 1990).

Supplier development can be performed through different approaches; strategic or reactive approach (Handfield and Bechtel, 2002), Indirect or direct approach (Wagner, 2006, Krause et al., 1999); and process or result oriented approach (Hartley et al., 1997). Supplier development also include a varied set of activities and practices: competitive pressure (Hahn et al., 1990, Krause and Ellram, 1997, Helper and MacDuffie, 2002, Krause et al., 1998), supplier assessment (Hahn et al., 1990, Krause and Ellram, 1997, Krause et al., 1998), site visits (Choi and Hartley, 1996, Krause and Ellram, 1997, Krause et al., 1998, Krause et al., 2001), communication and feedback (Choi and Hartley, 1996, Krause and Ellram, 1997, Krause et al., 1998, Krause et al., 2001, Hartley and Jones, 1997, Wagner and Krause, 2009) knowledge transfer (Wagner and Krause, 2009, Krause et al., 1999), supplier incentives (Choi and Hartley, 1996, Krause and Ellram, 1997, Krause et al., 1998, Krause et al., 2001, Hartley and Jones, 1997, Wagner and Krause, 2009) (Hartley and Choi, 1996; Krause, 1997; Krause and Ellram, 1997a; Krause et al., 1998; Krause et al. 2000), intensive information training (Choi and Hartley, 1996, Krause and Ellram, 1997, Krause et al., 1998, Krause et al., 2001, Hartley and Jones, 1997, Wagner and Krause, 2009) and training and education (Wagner and Krause, 2009, Krause et al., 1999).

The supplier development process is characterized by identifying critical commodities and suppliers, monitor status and modify strategies (Handfield et al., 1999). The process chosen for supplier development reflects the approaches applied. The identified success factors (Krause and Ellram, 1997) are an important aspect in forming the process and to ensure good performance. The framework reflect both buyer's and supplier's perspective on supplier development, as research on the given area is mostly presented from the buyers point of view (Stjernström and Bengtsson, 2004). The supplier's motivations and concerns related to supplier development should be understood by the buyer in order to enable better planning and implementation of the supplier development initiatives (Nagati and Rebolledo, 2013).

Different perceptions of supplier development may be revealed by the buyer and supplier (Stjernström and Bengtsson, 2004, Forker and Stannack, 2000, Forker et al., 1999, Langfield - Smith and Greenwood, 1998).

Figure 10 presents the theoretical framework developed for this assignment. The background for the framework is represented through the presented theory, and will serve as an analysis tool to discuss the empirical data reflecting the research questions of this thesis. The framework is relevant both for a company's own employees and the company's suppliers, as it reflects both buyer's and supplier's perspective on supplier development.



**Figure 10: Theoretical framework**

The framework presents two separate processes; supply base reduction and supplier development. The first part of the framework related to supply base reduction represents the buying firm and its practice towards supply base reduction. The framework intends to identify (1) What factors has lead to the decision of implementing the process; (2) What approach is taken to conduct the process; (3) What factors affect the success of supply base reduction.

The framework presents supply base reduction as a prior step before implementing supplier development as it facilitates closer relationships being established. The second part of the framework is related to supplier development, and includes both buyer's and supplier's perception. This part intends to identify the (1) What supplier development practices are applied by the buying company; (2) What drivers can be identified for both buyer and supplier? (3); What factors affect the success of supplier development; (4) How are the applied supplier development efforts perceive by both buyer and supplier.

The results of implementing supplier development do not necessarily give immediate results and a long-term perspective should be applied (Krause and Ellram, 1997). The process of reducing the supply base may also be a time-consuming process, depending on the size of the supply base and the goal set for its reduction. Therefore, the usefulness of the framework depends to some extent on what stages of the processes a company is in. Continuous improvement is important for both the process of supplier development and supply base reduction (Krause and Ellram, 1997, Ogden and Carter, 2008). The framework is open in the sense that intends to consider all relevant elements found in the empirical evidence and is structured in order to provide a systematic analysis.

### **3. Methodology**

This chapter In order to address the research questions identified for the thesis, an appropriate scientific design must be in place. In the following chapter the methodological decisions made in the thesis are made visible to the reader. First reflections regarding the research design are given. Further on the aspect of data collection is described, and last the quality and the reliability of the study is depicted.

The empirical investigations of this study are based on visits at Kongsberg Maritime Subsea during February - April 2015, visits to KMS's suppliers in the same time period, as well as meeting with a KMS employee in Trondheim. There has also been regular communication with the company by email. Both researches have been present during most parts of the occasions.

#### **3.1 Research methods**

Research design is described by Yin (2009) as a logical plan for how to conduct the study, which often starts with a set of questions and ends with answers to these questions. This plan should involve what data to collect and how, as well as how to analyze the result.

The purpose of the thesis was to investigate how a company could manage their supply base through supply base reduction and supplier development, and to identify potential challenges connected to these activities. The main intension was to develop a framework for the supply base reduction process, and to give guidelines for how to engage in supplier development. However, during the preliminary meetings with KMS, it was discovered that the situation in the company was different than first envisioned. On this basis, it was decided to focus more on the supplier development activities, due to the fact that with the activities going on in the company at the time, this focus would benefit KMS to a greater extent. More specific, the goal is to analyze the different initiatives performed by the case company to increase competitiveness, and gain insight to what factors that are important in order to succeed with these activities.

##### **3.1.1 Approach**

The purpose of the study is to examine the phenomenon of supply base reduction and supplier development, as a way to manage the supply base. As indicated in the literature review, the field about supply base reduction has only been explored to some extent. The supplier

development literature is much wider, but limited to the extent that supplier's perspective is seldom represented. The research questions reflect this with open-ended formulations where the aim is to look for new connections that have been studied to a limited extent in existing literature. This suggests that an exploratory approach would be best suited for the thesis, as the purpose of such an approach is to generate insights about a situation and where no set procedure is defined for collecting data. This is often adopted when the outcome is uncertain at the beginning of the study. As for this research, new perspectives related to the research questions were discovered as the process progressed.

Based on this, open-ended designs and a qualitative approach for data-collection and analysis are the best-suited techniques. According to Bryman (2012) and Stake (2005) a case study is the best approach when investigating a phenomenon qualitatively in one company.

### **3.1.2 Case study**

According to Yin (2009) a case study is characterized by research question being formulated with "how" or "why", and is preferred when examining contemporary events when relevant behaviors cannot be manipulated. The case study method allows investigators to retain the holistic and meaningful characteristics of real-life events, such as organizational and managerial processes. Some of the strength of a case study is the ability of dealing with a variety of documents, such as documents, interviews and observations. The main argument against using case study in research is that it provides limited basis for generalization.

In this study it was found interesting to investigate KMS, due to their increased focus on suppliers and because of their ongoing projects related supply base reduction and supplier development. Especially their ongoing projects on supplier development on some of their Norwegian suppliers gave a unique opportunity to gain insight both from the buyer's side, as well as the supplier's side. Doing a case study enabled to explore different attitudes represented among the informants on the relevant subjects. To the knowledge of the researchers no similar research has previously been conducted in the Norwegian maritime industry.

### 3.2 Data collection

A qualitative approach is chosen for collecting data. According to Bryman (2012) a qualitative study deals with words rather than numbers, it is open-ended and is characterized by a contextual understanding. The characteristics of a qualitative study correspond to the type of study to be carried out.

Quantitative	Qualitative
Numbers	Words
Point of view of researcher	Point of view of participants
Researcher distant	Researcher close
Theory testing	Theory emergent
Static	Process
Structured	Unstructured
Generalization	Contextual understanding
Hard, reliable data	Rich, deep data
Macro	Micro
Behaviour	Meaning
Artificial	Natural setting

**Figure 7: Quantitative VS qualitative research (Bryman, 2012)**

Open-ended interviews are used as the main source of evidence, as this will give best insight to the current situation. Interviews are appropriate for an exploratory study, due to the fact that they ensure that the questioning adhere to the given subjects, but allows for the questions to evolve during the interview in response to the interviewee's response. In addition to this, general information about the company was collected in public web sites and classified information retrieved directly from employees at KMS such as manuals, excel-sheets etc.

#### 3.2.1 Interviews

In total a number of ten interviews were conducted during the data collection. Both researchers were present at nine of these interviews; the last one was performed by only one of the researchers due to practicalities. One of the researchers was performing the interview

while the other was taking notes and did follow-up questions. Eight of the interviews were recorded and shortly thereafter were transcribed. Two of the interviews were not recorded, this because of some reluctance by the informant. Under these interviews, careful notes were taken to avoid missing important points. On average, an interview lasted for approximately one hour, sometimes a bit longer.

All ten interviews were carried out as semi-structured interviews, and an interview guide was developed for each of these. According to Bryman (2012) the most crucial part of a semi-structured interview is that the questioning allows the interviewers to capture the ways in which the interviewees view the situation and that there is flexibility in the conduct of the interviews. When developing the interview guide the focus was therefore on asking short and open, but at the same time specific questions, to enable the research participants to answer as they liked and elaborate on what they believe are necessary to give an answer. Follow-up and clarifying questions were asked along the way. The advantage of this type of interviews is the opportunity to delve into the topics of interest and to get the most relevant information from the informants. This may, however, have the effect that can be quite difficult to compare data across the interviews when informants give very different answers to similar questions (Bryman, 2012).

The first interview guide that was developed for the employees in KMS for the first visit primarily focused on understanding the situation in the organization and why supply base reduction and supplier development was initiated. The second interview guide developed for KMS tried to go deeper into the subjects presented in interview guide one. One interview guide was developed and used during the interviews with the four suppliers. The questions made for the interview guide intended to reflect the content of the framework presented in section 2.4. In addition to this it was regarded as relevant to ask some company-specific questions to get insight in organizational dynamics and culture. The interview guides are presented in appendix.

### **3.2.1.1 KMS**

Interviews were carried out with three informants within the organization of KMS, all working in the sourcing department. When selecting these informants the snow-ball technique was used, where informants point to one or several new informants who can give additional information on the subject (Bryman, 2012). Through initial conversations with the Lean

manager, he recommended three informants, who in turn recommended interviewing their strategic suppliers. The disadvantage of using this technique is that important informants might be left out. The company can consciously avoid suggesting informants for various reasons such as personal issues, the wish to hide critical information etc. However, the informants are those who know the business best and thus know which informants that might be interesting. All the informants had central roles when it came to the projects related to supply base reduction and supplier development. Two in-depth interviews were carried out with each of the three employees at KMS.

### **3.2.1.2 Suppliers**

Among KMS's six strategic suppliers participating in their supplier development project, only five was asked to do an interview. The last one was left out due to long travel distance. Four out of the five companies asked for an interview, were happy to participate and one in-depth interview was conducted with each of the companies. The informant from each company was either CEO or at manager level.

### **3.2.2 Additional information**

In addition to the interviews, there has been communication with the informants by e-mail. Follow-up questions have been asked, and clarifications have been made. The informants have also shared different documents that have been discussed during the interviews. These are documents such as presentations of organizational structure, excel-sheets used for supplier evaluation, supplier quality manuals, and templates.

### **3.2.2 Analyzing data.**

The transcribed interviews together with the information obtained from the case company have been used for evaluating the empirical basis and interpreting the findings. As mentioned earlier, follow-up questions have been asked directly to the informant if statements were perceived as unclear.

The overall structure for presenting the empirical results follows the framework presented in chapter 2. This is in order to draw some overall inferences from the empirical findings. An important principle throughout the study has been to anonymize the respondents, and therefore the results are grouped into topics rather than for each respondent.



The analysis was conducted by a systematical application of the framework presented in chapter 2.4.

### **3.3 Quality of the research**

The quality of the research will be discussed in the following sections. First the issues related to validity are examined, before reliability and conformability are reflected upon.

#### **3.3.1 Validity**

Validity concerns the integrity of the conclusions conducted from the research (Bryman, 2012). Typical forms of measures regarding integrity are internal, external and construct validity (Yin, 2009) Internal validity is not relevant to this study, as this is not a explanatory study (Yin, 2009), hence this is not discussed.

Construct validity is concerned with the issue of finding operational measures for the concepts that are studied. A recommended strategy is the use of multiple sources of evidence (Yin, 2009). Given that most of the evidence was conducted through interviews, this criterion is not regarded as fulfilled. However, the interviews carried out were numerous and with several respondents, representing both the buying organization and its suppliers. In addition to interviews, documents provided by the case company have been used in the research. Based on both buyer's perspective and supplier's perspective is represented in the research, it should enhance the credibility of the conclusions. Another recommended strategy by Yin (2009) is to establish a chain of evidence where there is a logical link between initial research questions and the conclusions. Great efforts has been put in to following this strategy by using theory as a basis for the interview guides along with explicit citations to theory when analyzing the empirical results.

External validity concerns the ability to generalize the results of the study (Yin, 2009). Beyond the single case firm in general, it is difficult to generalize the findings from single cases. The results of this study are better suited to create a foundation for further research. The research may give some indication of how the studied phenomenon may be in other similar companies operating in the same industry, but each company will probably have their peculiarities that affect the phenomenon. A study of several case firms will therefore be necessary to transferability.

### **3.3.2 Reliability**

Yin (2009) describes reliability as the criterion for securing the same results when an empirical study is repeated. The key principle to ensure that the study is replicable is to document all the steps in the process.

Nine of the ten interviews were recorded in order to get all the details from the interview and enhance reliability. This gives the potential for other researchers to analyze the data collected. The interviews were carried out by two researchers and were also transcribed in order to enhance reliability. However, the research has some limitations on this area. Most of the questions asked in the semi-structured interviews were open-ended. It is rare that the respondents will give the exact same answer to the question twice, and this is considered a weakness. Also, the follow-up questions are a result of the answers given by the respondents, and these might be hard to ask if the respondent doesn't give the exact same answer.

### **3.3.3 Conformability**

Bryman (2012) describes conformability as the issue of ensuring that the researcher can be shown to have acted in good faith; that he or she has not overtly allowed personal values or theoretical inclinations manifestly to sway the conduct of the research and the findings deriving from it.

Firstly, the fact that there have been two researchers doing the case study reduces the risk of influence from personal values. There were questions in the interviews that may have been posted in a manner that could have led the respondent to answer in a certain way. However, the aim was to ask open-ended questions in order to give the respondent the opportunity to reflect freely on the matter.

## 4. Empirical Results

This chapter will present the empirical results for this research. First, a presentation of the case company followed by a general description of the suppliers participating in the research will be given. Further, the findings from the interviews will be presented. The last part of this chapter will present a part of the case company's supplier quality manual in terms of categorization of suppliers.

### 4.1 Case company: Kongsberg Maritime Subsea Horten

The Kongsberg Group was established in 1814, and the company has gone from being a small Norwegian ammunition producer to become an international technology corporation. The corporation serves four global markets, where the maritime segment is the biggest in terms of workforce and operating revenues. The maritime segment represented 46% of the operating revenues in 2013 (KM annual report 2013).

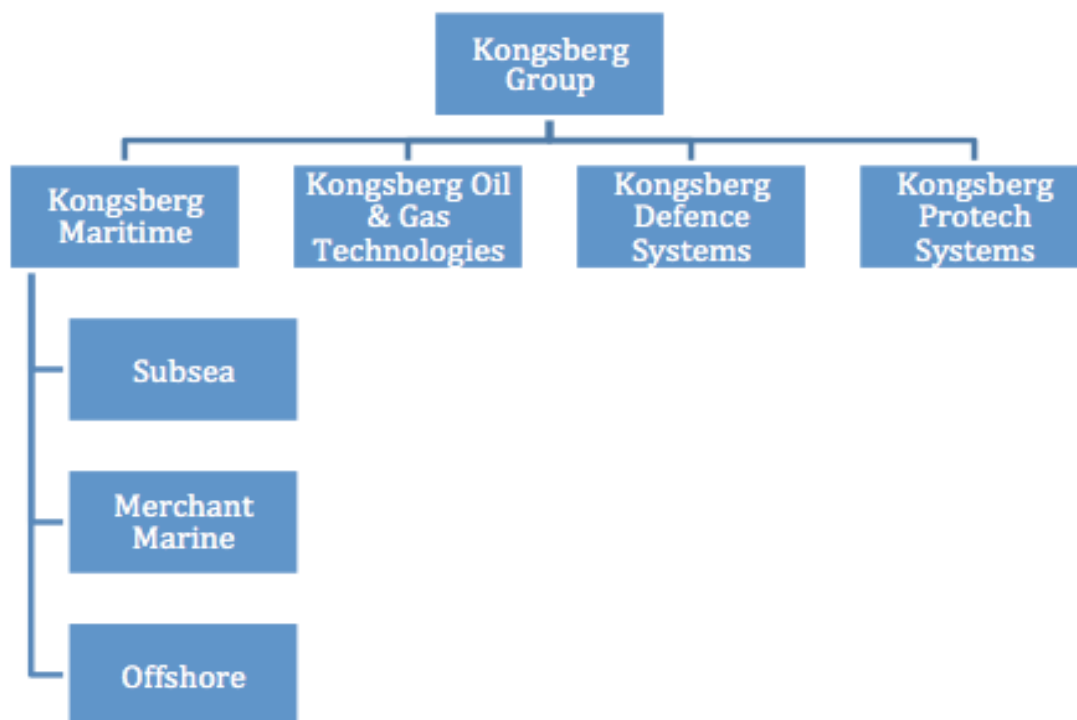


Figure 12: Kongsberg Group (KM homepage)

The maritime part of the corporation is further divided into three business areas, where the scope of this thesis focuses on the subsea division in Horten. The deliveries from this division are high-tech systems for under water navigation and seabed survey. The company's vision is embedded in the statement: "World Class – through people, technology and dedication" (KM Supplier Quality Manual). Their overall strategy and strength is innovation and a customer-focused organization where flexibility through customized solutions is offered. The market where the company is operating is variable and unpredictable, and in order to stay competitive the opportunities lie in the ability to adapt towards rapid changes in the market.

The division in Horten has been through some changes in terms of organizational structure and responsibility areas. How the organization is currently structured is showed in figure 13. The interviews performed in the KM subsea organization were with employees working in the department of strategic sourcing.

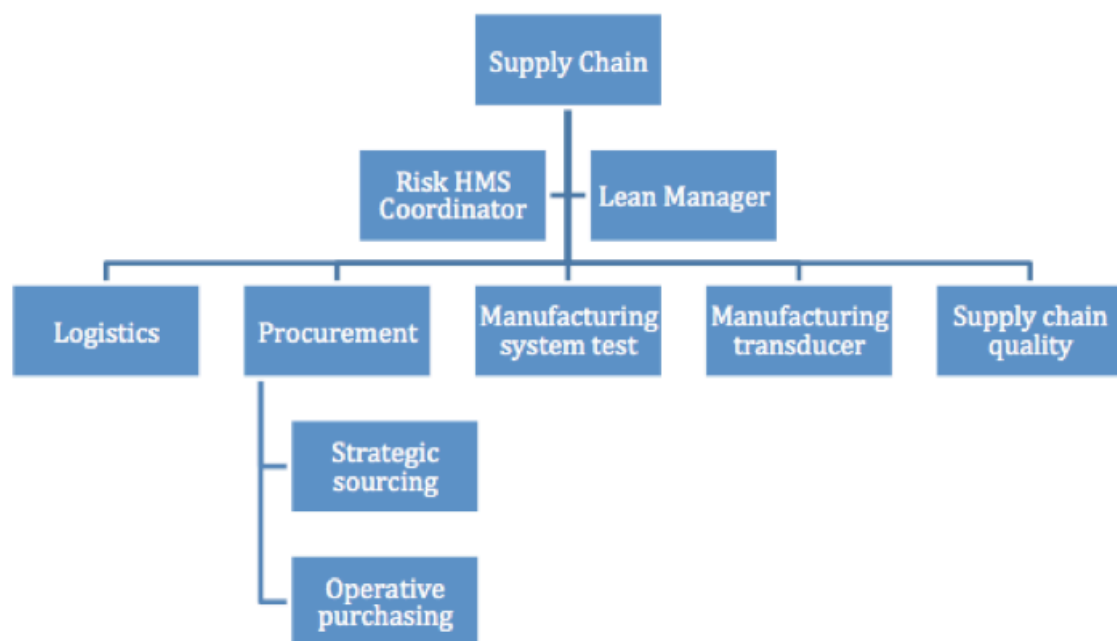


Figure 13: Supply chain organizational structure KMS (KMS presentation).

Based on the need to stay competitive in a market with fierce competition, the company focuses on some strategic initiatives both internally in the organization and externally with their suppliers. The company is currently working on lean implementation at different levels in the organization. The purpose is to improve internal processes and procedures to increase the company's competitiveness in the market.

#### **4.1.1 Suppliers of KM**

The suppliers interviewed for this research are placed geographically close to KM and to each other. For all the suppliers KM is represented as one the biggest and most important customers, and all the suppliers deliver products characterized as technological advanced and are represented in the category of mechanical/electromechanical equipment. The suppliers contribute on different areas such as prototype construction, testing and delivery of complete products.

### **4.2 Initiatives regarding supply base reduction and supplier development**

The initiatives presented in the following section will give a basic understanding of the background for the research questions developed for this thesis, and how supply base reduction and supplier development are a part of the described projects. The described initiatives will create a basis for understanding the empirical material from the interviews. The objectives of the described initiatives will be to enhance the supply base management processes of the company.

#### **4.2.1 DELTAONE**

Delta One is a program that applies to the entire Kongsberg group with the objective to improve competitiveness through sustainable outstanding performance. This will be reached by developing smarter and more efficient ways to work. The project strengthens the company's improvement work and is considered a mechanism in sharing internal and external best practices. As a result of this initiative the aim is to affect the way people work, how suppliers are used, as well as responsibility areas within the organization. The project focuses on three elements: cross division bundling, supplier development management as well as standardization and re-design. The project started in 2013 and implementations of the different elements have an expected completion by the end of 2016. Both the parts of Delta One related to bundling and supplier development is relevant for this research.

### **4.2.2 Supplier Quality Manual**

The supplier quality manual developed by Kongsberg Maritime is a document with the purpose of communicating supplier requirements and methods to follow to enable improvement. The document has been sent out to Kongsberg Maritimes top-50 suppliers. The manual is characterized by the use of lean principles in terms of preventive actions and process control. In order to support the company's vision, to be "World Class" in the areas where the company operates, Kongsberg Maritime intends to improve quality within their supply chain by reducing variation and waste. The main content of the manual includes supplier monitoring, expectations, requirements, supplier deviations and supplier classification. Supplier classification will be further described in section 4.4.1 (Supplier Quality Manual KM).

### **4.2.3 Network for supplier innovation**

The challenge in the Norwegian industry is high production costs and the hard competition that need to be faced from global markets. Based on Kongsberg Maritime's wish to strengthen its relationships with its Norwegian suppliers, cooperation between KM, Norwegian Centres of Expertise Systems Engineering and Innovasjon Norge has been initiated. This resulted in the supplier development project "Network for supplier innovation". Six of Kongsberg Maritime's strategic suppliers are participating in this supplier development project with the purpose to enhance the overall performance of both Kongsberg and the suppliers. Kongsberg Maritime are highly dependent on their suppliers since mostly all commodity production happens with them. An important factor for the choice of suppliers participating in the supplier development program lies in the historically developed, unique competence of the firms. The core technological competence in the local firms in Horten is built up through long-term cooperation in innovation projects, and some of the companies participating in the project are a part of a regional cluster.

As mentioned earlier, Kongsberg Maritime is working with an internal lean implementation. The supplier development program will focus on implementation of the supplier quality manual and implementation of lean. The manual will serve as a basis to develop performance measurement system and to facilitate continuous improvement. There is also potential for the project to lead to more innovation and enable faster processes related to product development as a result of increased cooperation with suppliers.

The supplier development program involves participation on three sessions, where the program will provide supplier training in lean. This involves training in lean methodology tools such as value stream mapping. The supplier development program will also focus on giving each supplier advice on what measures can be taken within the supplier's facility to make manufacturing processes more efficient.

## **4.3 Results from the interviews**

This section will present the results from the interviews with KMS and with their suppliers. The interviews performed with KMS employees are divided into two main themes, which are supply base reduction and supplier development, reflecting the content of the research question. The interviews with KMS's suppliers are related to the project "network for supplier innovation", focusing on their perception and opinion of the supplier development initiatives they are participating in.

### **4.3.1 Supply base reduction in KM**

The following sub-section will provide the empirical evidence regarding the supply base reduction process within KM.

#### **4.3.1.1 Drivers and attitudes in KMS towards supply base reduction**

Regarding the supply base reduction process there is different opinions among the employees whether the process is a strategic move to strengthen the organization. It is the question of cost which has initiated the supply base reduction in KM, where the aim is to lower the administration cost and at the same time build stronger strategic relationships with the remaining suppliers. The process of reducing the supply base will happen across the different divisions in KM, where the possibility of gathering the volume with fewer suppliers will be assessed.

One of the employees claim that it is not a goal in itself to reduce the number of suppliers in the supply base, and that the result of a supply base reduction could make the organization weaker rather than stronger. The act of ending relationships with suppliers because they are small and only delivers a few products is questioned and should not be the basis for ending a relationship with a supplier. At the same time the employee states that a side effect from increasing the volume with some suppliers in order to get better conditions, can be that a

supplier can be removed from the supply base. Some suppliers representing low volume often produce unique products that create great value for the customers of KM, and the employee argues for keeping such suppliers in the supply base.

Others emphasize the importance of achieving better conditions and prices related to purchasing; enhance the volume with some suppliers, and as a result of this get reduced prices. Informant 3 emphasizes that a supply base reduction enables closer cooperation with the suppliers the company considers it purposeful to focus on. It was highlighted by informant 1 that a supply base reduction process facilitates long-term relationships with suppliers chosen, enables better logistics solutions and results in less work with follow-up and monitoring of suppliers.

One of the interviewees had a clear opinion of the purpose; how to go through with the supply base reduction process, as well as how many suppliers should be removed from the supply base in each commodity group. The others expressed that no specific number were defined for how many suppliers should be removed from the company's supply base. In addition, different answers were given related to the number of suppliers in the supply base. Each employee gave different answers when asked about the number of suppliers in their supply base. The strategic supply base was defined as the top 50 suppliers of KM, where the supplier quality manual intends to contribute to enhanced supplier performance.

#### **4.3.1.2 The supply base reduction process**

The strategy for the supply base reduction is embedded in the Delta one project, and was initiated in 2013 with an estimated timeframe of another year (2016). The process of supply base reduction was expressed as time-consuming, mostly because KM constitute a group of merged companies that are now working towards the same structure, leading to separate supply bases are being perceived as one. When the interviewed employees were asked how long the process of reducing the supply base would take, informant 1 stated: *"The job of turning 50 suppliers within the timeframe of under a year is not possible. It will at least take one and a half years". "The more suppliers that wish to be in this process and lift themselves together with us, the faster the process will progress"*.

The purpose of the project is to coordinate purchases across business groups and geographies. Workgroups across the locations representing Kongsberg Maritime has been created, enabling



communication between the purchasers on each location in KM. A plan for which suppliers can be responsible for the delivery of the entire volume is made, and is evolving as the project progresses. All suppliers with delivery under 100 000 NOK per year should be assessed, and the volume represented by these suppliers should try to be put on other suppliers.

All the interviewed employees emphasized the importance of establishing a cross-functional team, and some meant that this is crucial in a supply base reduction process. The characteristics of the suppliers staying in the supply base are according to informant 3: *"Able to show that they can deliver stable, in the right quality and be able to give reduced prices"*. Informant 2 considers the most important factors to be the supplier's ability to deliver the right price and quality, and in addition to this global presence. Informant 1 emphasizes the willingness of the supplier to cooperate, price trend and time-to market. Communication is emphasized as very important as this creates the basis for understanding what measures should be taken. The employees emphasized that in some situations KM is dependent on a supplier based on the supplier's unique competence and are necessary to keep in the supply base.

Potential suppliers being phased out of the supply base is characterized by a low spend, the commodities are represented as non-critical with big availability on the market, the quality is not according to satisfying levels and the supplier shows limited willingness to develop. It was also mentioned that the suppliers represented in this category represent a low value for KM, and in some situations many deviations in terms of quality or delivery precision.

When asked about how they categorize suppliers, they all referred to the supplier quality manual developed by KM. The suppliers are divided into four categories: strategic, preferred, core and basic. When the employees were asked if a plan on how to execute the supply base reduction process had been made, the following answers were given. Informant 1 stated that: *"The only thing we are focusing on are suppliers represented in the strategic and preferred category"*. The others referred to the Delta One project and that a plan for supply base reduction process was a part of this project.

#### **4.3.1.3 Success factors and challenges during the process**

The employees highlighted some factors with regards to a successful supply base reduction process. The main challenges lies in doing a supply base reduction across the different locations in KM. Reaching consensus and cooperation, both across the different locations in

KM and internally in the departments was stated as most important by one of the employees. This is a challenge due to the variety of needs represented in different locations of KM. Being able to consider suppliers from an objective perspective was considered a big challenge, hence an important factor to choose the suppliers best suited for the supply base. People working with the same suppliers over a longer time period have developed special bonds difficult to break and perceive from a new perspective. The ability to identify which products are bought from several suppliers, was also considered important when deciding what suppliers should potentially be faced out of the supply base.

Different tools have been used in the process of reducing the supply base. Some of these are historical data obtained from ERP-system, audits made of suppliers and experience from employees working within the organization for a long time. This gives a basis for evaluating previous performance of suppliers.

Reduction of a supply base also involves ending relationships. When the interviewed employees were asked if a procedure was put in place when terminating a supplier relationships, they all answered that no specific procedure was established and that this was a challenging subject that had been discussed a lot lately. Informant 3 stated that there should be a procedure for this, and that the challenge is to end a relationship in a professional manner. He argues for ending the relationship with a supplier in a good way as it may happen the supplier will be needed again on a later occasion. Informant 2 also expressed that a relationship with a supplier should be ended in an orderly manner, where the supplier is given an explanation of why the relationship is terminated. The informant generally thinks that this is an improvement area for the company and that a procedure should be made. Informant 1 presented two solutions to this question that has been discussed among KM's employees: (1) To let the relationship fade out through a soft transaction; (2) To give a notice that the relationship will be ended. Informant 1 prefers the first option, while many others in KM prefers the last option.

#### **4.3.2 Supplier development in KMS**

The empirical evidence involving supplier development in KMS includes supplier development represented in the Delta One project, the lean supplier development program "Network for supplier innovation" and the company's supplier quality manual.

#### **4.3.2.1 Drivers for supplier development in KMS**

It was a common opinion regarding the importance of supplier development among all the interviewed employees. The need of reducing cost and enhance quality in order to stay competitive in the market is the main driver for the company's focus on supplier development. The answers given in the interview is divided into drivers related to cost and quality, and to the aspects related to the cooperation with suppliers.

Informant 2 expressed the desire to share more information with suppliers in order to get more efficient processes, and sees the value in cooperating more with suppliers. Together with the supplier KM can improve and solve problems, and believes that the suppliers have a lot to contribute with. The informant points out that the way of working has changed to the more positive, both for themselves and for their suppliers.

It is mentioned that there are some products where only one supplier can offer a specific product offering, where KM have no other choice than making the relationship work with the supplier. Informant 3 emphasizes that it has been a change in how the company is working with their suppliers, as it will be more focus on those suppliers the company decides to work with, and it will be more dedicated work towards these suppliers.

It is stated that 80% of the suppliers taking part in supplier development are Norwegian. The reason for this is embedded in historical factors and the development of unique competence of firms located in the area around Horten. The relationships developed between KM and the company's local suppliers go far back in time, and the decision of developing these suppliers has a connection with the historical aspect of the relationship. It was confirmed that developing Norwegian suppliers is important to keep the core technologies of the company geographically close.

The project related to the supplier quality manual was initiated with the purpose of getting better at handling and controlling the suppliers. The supplier quality manual developed by KM represents many of the drivers and focus areas of their supplier development initiatives. The company want to focus on fewer suppliers in order to work more purposefully with them. In connection with this one of the informants where asked if KM let first-tier suppliers be responsible for a bigger part of the supplier network. The informant expressed that this is a solution the company should implement. It is confirmed that many of the suppliers in KM's

network are providing each other with supplies/services, but due to limited capacity KM has not a overview of their entire network.

#### **4.3.2.2 Content of the supplier development initiative in KMS**

The supplier development activities in KMS are represented in both the project Delta One and “Network for supplier innovation”, and the company’s supplier quality manual. The supplier development work represented in Delta One is a longitudinal process involving regular assessments of suppliers. "Network for supplier innovation" is a project including supplier training in lean over a given time period, constituting three sessions and follow-up by a consultant. The manual provides a basis for the improvement work with suppliers, and there is a plan further for how to follow up the requirements communicated in this manual. This involves among other things regular assessments of supplier performance. Measurement of supplier performance is built on the 11 steps presented in the supplier quality manual.

In general, the supplier development work in KM is still in an early stage, and the employees in KM mostly spoke about the plans further to establish a procedure for regular assessments of suppliers and follow-up. Not much could be said about the results of their supplier development activities as this take time, but they experience it as positive and necessary measure. Some of the evaluation measurements are still under development, and there is still work to be done in order for a complete supplier development program to be established.

The assessment of suppliers is done step-wise: (1) Self-assessment of suppliers; (2) Remote audit (telephone); (3) Supplier visits where the gaps between the results of self-assessment and the assessment made by KMS is identified; (4) Development of action plans for suppliers where a time limit to improve is given; (5) Re-assessment. The idea is that the action plans developed are adjusted towards the different suppliers. Today there is no one responsible for this work in KM, hence, it is not prioritized. Informant 1 thinks that someone needs to be responsible for this ownership.

KMS have regular supplier meetings, and suppliers are categorized in a,b,c and d, depending on how often they need to be followed up. The a-category represents the suppliers getting followed up the most, where monthly meetings are held. The categorization is defined based on volume and type of product, and complex products that the company buys in large amounts is being followed up more closely than other products.

#### **4.3.2.3 Supplier development success factors in KMS**

The challenge within KM and their work related to suppliers is the lack of resources required to actively develop suppliers. The employees feel that they are on the right way with their work internally, but more resources are required in order to follow up suppliers in the way they want. In order for a successful supplier development process all interviewed employees agreed that this is crucial in order to actively be able to develop suppliers and make improvements in a long-term perspective. The process requires patience to see results of improvement. In order to succeed with supplier development informant 3 points out long-term plans, involving top-management and the establishment of a cross-functional team that can evaluate supplier performance with the intention to benefit different parts of the organisation.

Informant 1 argues for a flexible solution when it comes to contracts with suppliers and that the supply base should be assessed and adjusted on a regular basis, but the timeframe given should still give the suppliers time to develop: *"I think a three year perspective is a good solution, then a new assessment is done after three years. Developments in the market go fast. This timeframe gives the supplier the opportunity to develop"*. Informant 1 further emphasize the importance of communicating to suppliers in which direction the company is headed, and feels that it is difficult to challenge suppliers actively in order for them to work with the problems that occurs. It is also pointed out that it is important to make the suppliers understand what KM wants to work with according to the manual developed.

#### **4.3.3 The supplier's perspective on supplier development**

This section involves the supplier's perspective on KM's supplier development initiatives. The results of the interviews with four of KM's suppliers participating in their supplier development program are presented.

##### **4.3.3.1 The relationship with KM**

All the suppliers interviewed regard KM as one of their most important costumers, and most of them described KM as their largest costumer. This makes the relationship between KM and the suppliers very valuable, at least to the supplier. All the suppliers express gratitude for being chosen as a strategic partner and for the opportunity to participate in the supplier development program.

The relationship between KM and the suppliers has evolved differently. One supplier describes a well functioning relationship that has lasted for decades, with ties that has grown closer over the last couple of years. Two of the suppliers emphasize the importance of KM as a customer but have different opinions on how they are treated. One of them describes a relationship that is close and fruitful, but mentions issues with the order placement of KM. Both suppliers express the feeling of pushing for orders, and that the time-horizon is too short, something that results in a situation where it is unrealistic to deliver within the wanted timeframe: *"We have a relationship with them where we nag that they should order earlier."*

One of the suppliers states that they do not feel the relationship going forward, and that the pushing for orders has caused some tension between the two companies. Another supplier describes a relationship that has evolved over the last few years, and the supplier is now closer involved as a strategic supplier and experience a gradual increase in requests.

#### **4.3.3.2 Cooperation**

The suppliers expressed different opinions regarding their cooperation with KM. The overall impression is that every supplier perceives their relationship with KM as an important relation and that they are willing to work hard to establish the wanted cooperation.

One of the suppliers describes the cooperation with KM as good and states that the company has always been an important customer. Further, it is emphasized that the level of cooperation have evolved the last years, and the relationship is more characterized by trust and openness. The supplier perceives KM as more professional than before and that big changes have occurred the last year. Increased involvement in the early stages of product development is one of the changes pointed out by the supplier, and is considered as important in order to create good solutions.

Another supplier considers the relationship with KM as satisfying, but points out some improvement areas in order for better cooperation. It is emphasized that more sharing of information, predictability and forecasting is required. The flow of information needs improvement as the supplier struggles with communication with KM's purchasing department. At the same time the supplier points out that KM is focusing on improving communication and want to involve suppliers more in order to enable more efficient processes. A statement by supplier two highlights their confidence in KM and that the

company are on the right way towards improving cooperation: *"KM considers their suppliers as a tool to succeed in the market in a new way than they did before"*.

One of the suppliers considers KM as an important customer and wants a good and functioning cooperation, though the need for improvement regarding cooperation is clearly expressed. Too little sharing of information together with short time-horizon on purchasing orders has resulted in a relationship characterized by tension. The supplier's perspective on the cooperation is that a lot of feedback is given and is perceived of KM as nagging, something that is not good for the overall cooperation. The supplier is searching for more communication in order for KM to understand the full picture of their situation, and to better understand what solutions are good and what is not. The supplier wants to deliver in accordance with KM's wishes, but finds it impossible due to the short time horizon given on orders.

Major support towards KM is expressed by one of the suppliers, and the supplier describes the cooperation as a relationship that has evolved, where closer ties and trust have been established. The supplier considers itself as a strategic supplier, where it has been experienced a gradual increase in requests from KM. It is pointed out that the way they communicate with each other has changed to the more positive, and the supplier is satisfied with having an own person to communicate with within the purchasing function of KM. Even though, the supplier feels that some areas can be improved. Based on the supplier's perspective the improvement lies in providing more predictability through long-term contracts and being involved earlier in the process, as this would enable investments in smarter solutions, resulting in reduced prices. The overall level of communication and presence of KM is described as very good; KM visits the supplier and the supplier visits their customer on a regular basis.

Many of the suppliers are aware of the changes made internally in the KMS organization. Some of the suppliers feel this change affects themselves in a negative way in terms of bad communication with KM's purchasers, and even feel the communication is worse now than it has ever been before. Since KM is a big customer of all suppliers, some express that the problems with KM affect their every day life. One of the suppliers point out that the supplier development project opens up for improving their dialogue with KM, something considered as necessary for improving their cooperation. All the suppliers want to be a good a big supplier of KM, and some express the need to improve the current status of the relationship

and their cooperation.

#### 4.3.3.3 "Network for supplier innovation" and lean implementation

Among the interviewed suppliers there was a positive attitude towards the project "Network for supplier innovation". They all expressed how happy they were to be considered as a strategic supplier by KM, and grateful for the ability to participate in the program. Only one of the suppliers had been involved in supplier development initiatives of this sort before.

One of the suppliers emphasizes the importance of considering the whole supply chain in order to succeed in the Norwegian industry. This is supported by another supplier, stating that the Norwegian industry does not have a choice, and smarter and more effective processes are required. This underlines the importance of the project, and why KM has decided to initiate these activities.

The different suppliers have various starting points for lean implementation. Some had a lot of experience with lean, while others were new to the field. One of the suppliers explained that they had never worked with lean in such a deliberate way before, and the initiative and the timing as such were perfect. Together with the consultants they decided to focus on implementing lean in two of their activities to begin with, and when this is well embedded they can implement lean in the rest of the organization. They emphasise the importance of being patient, and to remember that there will not be an immediate effect.

Another supplier had worked with lean for several years as a request from other customers. They were also part owners of LEAN-lab, which is a training program for LEAN. They knew the consultants provided by Sintef Raufoss manufacturing, and had worked with them on several occasions earlier on. *"The consultants probably wished that we were to arrange a proper kick-off and a little more fanfare. But this I defend smoothly. Everyone here has a previous experience with LEAN and we can start well into the lean processes."* The supplier divided the employees into groups, which were responsible for making their own actions/improvements, in order to create a sense of ownership among the employees.

One of the suppliers had not worked with lean development specifically, but the lean way of working has been their core values from the beginning according to the interviewee. Their focus going forward would be with systematization. *"We must invest time to gain time, but we*



*must be sure that we do not spend much time on something that does not yield a profit" .*

There was one of the suppliers that had worked with lean since January 2008. They claim to have the system and the potential, but need the focus, something they feel is provided by the consultant in the supplier development project.

When the suppliers were asked about if the project inspired to work with continuous improvement and what was the most useful things from the project the answers were positive. Several interviewees stated that sharing experiences with the other suppliers in the program was very rewarding: *"It has been positive to meet other suppliers and discuss common issues"; "I think that it has been useful to meet the other suppliers participating in the project"; "Many of the suppliers have the same feedback concerning forecasting, long term perspective and to get better at their needs".* Another important contribution that is expressed is: *"The project contributes to increased focus. We notice the big competition, and this gives a sharpened focus".*

Overall, all the suppliers receive the supplier development project in a positive way. Even though, one supplier questions the role and presence of KM during the supplier development project. It is also expressed that KM have transferred the whole issue to a third party and feel that this is not a good way to initiate supplier development efforts. Since the project focuses on lean and improvement work, it is stated that the focus should be on engaging people and showing attention for the supplier's work.

#### **4.3.3.4 Incentives**

The interviewed suppliers were asked about the incentives used by KM and what could be done by KM in order to motivate the suppliers to improve on the areas they require.

One of the suppliers point out it has been a long relationship, but the bonds are tighter now than ever: *"KM show trust to us as supplier, and we are taking over parts of their core technology".* The supplier means that KM uses them in a better way than before in terms of exploiting their potential by using them on the things they are good at. The need for more predictability is highlighted when it comes to motivational factors: *"We wish to get forecasts. KM have promised this, but they have a job to do".* The supplier is searching for more long-term and strategic thinking from KM.

Another supplier states that predictability is the most important thing KM can offer them.

This is fulfilled through a signed long-term contract between the supplier and KM. In order to enhance the predictability offered the suppliers want more insight into KM's inventory system and be more involved in product development. *"The involvement today is almost equal to zero"*. New business possibilities open up as other customers approve the supplier as capable when being a supplier of KM, and the supplier considers this as an important element for their business.

One of the suppliers express that incentives to a low extent have been used in their relationship. No changes have been made even if the supplier has been searching for this. Long-term contracts, forecasts and more involvement would fulfil some of this gap for the supplier. The need for more face-to face contact is expressed: *"visits from customer is an important motivation in order for us to become better"*. The supplier want to be involved earlier in order for them to work together and reduce the cost, and means KM spend too much time on selecting suppliers.

Another supplier has some long-term contracts, but calls for more in order to invest in smarter solutions and reduce the cost. Some areas are covered by long-term forecasts (12 months), where the supplier buys raw materials and KM commits to cover these cost. According to the supplier this is a good solution, but there is a big potential of improvement.

#### **4.3.3.5 Requirements and expectations**

Regarding the Supplier Quality Manual the opinions vary. One of the interviewed suppliers points out that the work is more deliberate now that there are some requirements from KM and that it is more visible where the company is lacking. This is supported by another supplier, stating that: *"The supplier quality manual have made us aware of in which direction we are working towards"*.

Another supplier already had the same requirements from other costumers and there was nothing new to them in the supplier quality manual. However they were made aware of some things that they should be better at, among others reporting on quality discrepancies. The supplier were involved in the early phases of the configuration of the supplier quality manual, but they are not even sure if they have received the final version, hence they are not able to give any feedback to its content.

#### 4.3.3.6 Success factors for supplier development

The interviewed suppliers were asked about what they perceived to be the most important success factors for supplier development. The answers they gave to this question were quite similar. They all emphasized the importance of predictability and better prognosis. It seems like this is something they all consider as the foundation for a successful supplier development initiative. Without more predictability they are unable to make investments in terms of allocating resources to specific projects; *"We must invest time to gain time, but we must be sure that we do not spend much time on something that does not yield a profit."*

In addition to this the supplier also describes factors such as trust, openness, better information flow, and internal "clean-up" process at KM in order to succeed in supplier development. This is supported by another supplier, which highlights predictability, more information and attitude-change as the most important success factors.

*"It is important that the attitude towards a subcontractor changes. It's probably left some functions in Kongsberg where a subcontractor is seen only as a subcontractor."*

One of the suppliers describes cooperation as the key to a successful supplier development. *"It's important to view the other part as a partner, instead of as a supplier of toilet rolls"*. In addition they also highlight prognosis to improve the processes between customer and supplier. It is also emphasized that presence and show interest to the supplier is important: *"Engage people and show attention so we have this commitment - this is the key"*. Another supplier points out the importance of seeing the "whole picture", not until then is it possible to create a good environment for development. The customer needs to view the supplier as equally important. They also put emphasis to the importance of the suppliers still having the same margins so that it is still interesting for the supplier to develop.

#### 4.3.3.7 Improvement areas for KM

All the interviewed suppliers mention many of the same problems. All suppliers are aware of the internal changes made within KM's organization, and that the company have some difficulties in terms of resources and capacity. Two of the suppliers expressed the difficulties in communicating with KM's purchasing department, thus making processes less efficient. All suppliers are searching for more forecasts and sharing of information to enable better planning processes, and is considered a main improvement area by all of the interviewed suppliers.

One of the suppliers want the monthly meetings with KM to be more detailed and include more status on orders and deviations: *"I miss quarterly meetings with overall measurements. I am searching for more long-term and strategic thinking"*. Another supplier defines the main improvement area in KM as better information flow in order to improve the responsiveness: *"The problem is not here with us. KM is not fast enough in their own system"*.

Due to lack of forecasts and too short horizon on purchasing orders, more communication and forecasts is searched for by some of the suppliers. High inventory levels with the supplier makes it impossible for to reduce cost and deliver in accordance with the demands from KM: *"Longer horizon on purchasing orders and better forecasts would enable better production and more reasonable purchases"*. Another improvement area is regarding earlier involvement, something all suppliers feel would be beneficial.

## 4.4 Empirical evidence from documents

This section will present some of the additional information provided by the case company.

### 4.4.1 Supplier classification in supplier quality manual

An important part of the company's supplier quality manual is the definition of the supplier categories. The supplier quality manual operates with four supplier categories: strategic company partner, preferred supplier, core supplier and basic supplier. As shown in figure, the suppliers not meeting the demands as a basic supplier may be considered phased out of the supply base as it represents too low performance on measures KM consider important.



Figure 14: Supplier classification (KM supplier quality manual).

The company wants their top 50 suppliers represented in the supply base to belong to the categories preferred and strategic. The qualifying demands for each category are presented in figure 15. The classification of suppliers serve as an indicator for what suppliers the company should focus most on, and at the same time gives the supplier an indication of where they stand in terms of meeting KM's requirements.

## Supplier classification



Supplier specifications	Basic Supplier	Core Supplier	Preferred Supplier	Strategic company partner
1. KM strategic product technology or unique or protected manufacturing processes				
2. Global perspective and capacity (Focus on end user/customer, International player, regulators and stakeholders).				
3. Commitment to the KM values (Determined, Reliable, Collaborative, Innovative)				
4. Contribution to increased IP (KM-Intellectual property)				
5. Contribution to excellence (best practise, unique, world class).				
6. Successful completion of R&D projects (Within scope, time and overall cost)				
7. Successful fulfillment of additional KM quality requirements. (Change control, CAPA, SPC, KPI's monitoring, Lean implementation).				
8. Proactive approach to fulfill KM «needs & wants» (R&D, Quality, Purchase, Logistics and overall cost)				
9. Quality & Delivery (ISO 9001. Fulfillment of standard baseline. Continual improvements. Yearly positive trends.				
10. Successful over time (Fulfillment of delivery precision and capacity, flexibility requirements)				
11. CSR, Code of Ethics - Kongsberg directive				

Figure 15: supplier specifications (KM Supplier quality Manual).

In order for a supplier to become a preferred or strategic supplier, the qualifying demands focus on the supplier's ability to strengthen KM's product offering towards their customers. The company is searching for the best suppliers to be a part of the top two categories. The basic and core category represent commodities with typically higher market availability, where the focus is more on general terms such as cost, delivery precision and quality.

## 5. Analysis

In this chapter the results presented in chapter 4 will be discussed in light of theory. The theoretical framework developed in section 2.4 will be used systematically, to reflect the content of the research questions. To sum up, the key findings in the analysis will be highlighted.

### 5.1 Supply base management in KM

The overall element represented in the theoretical framework is the company's supply base management. Both KM and the suppliers express the change in focus when it comes to how suppliers are perceived and managed. The suppliers take a more central part of the company's focus, and this is reflected through their initiated projects regarding supply base reduction and supplier development. KM look upon their suppliers as a strategic tool to succeed in market to a larger extent than before. The company's supplier quality manual serves as a statement of their new supplier focus and what expectations they have for their suppliers. In order to be a supplier of KM some qualifying demands need to be fulfilled, and is an important part of KM's strategy of reaching a "World Class" supply base. The supply base reduction facilitates stronger focus on the remaining suppliers, while their supplier development initiative will take suppliers to a higher level in terms of contribution to KM's technology and product offering.

The company's view towards suppliers has changed, but in order for implementing this new mind-set, some challenges regarding cooperation and communication need to be faced as this creates the foundation for good supply base management. As presented in the empirical findings, the procurement department in KMS was restructured over the last two years in order to improve internal processes and gain better control. The aim of the restructuring was for each supplier to have only one contact person in KMS, and to gather all the orders from one supplier. However, some of the interviewed suppliers experiences more difficulties now than ever with the communication, and explain that it is sometimes hard to get in contact with the right people. At the same time it was highlighted by another supplier that the way they communicate with the company has changed to the more positive, and that they are very satisfied by having one specific person to communicate with within the purchasing department of KM.

With regards to the literature review, Handfield and Nichols Jr (2004) point out the importance of a positive relationship, characterized by trust and effective communication. Even if many of the suppliers describes their relationship with KMS as rewarding, it seems like KMS have the potential when it comes to the communication with their suppliers. Some of the suppliers feel that more face-to-face communication would be desirable, and that the main issue related to communication is late responses of simple questions such as status of orders and inventory, processes the suppliers want to happen more automatically. Some of the suppliers are looking for easier ways to get in touch with the company, hence should be a focus area for KM in their way of managing their supply base.

### **5.1.1 Categorization of suppliers**

The supply base of KM can be perceived and divided in accordance with the four supplier categories presented in section 4.4.1. The classification can serve as an important management tool to distinguish suppliers from each other. The supplier quality manual serves as a communicator of KM's expectations to suppliers, and this also includes the qualifying demands defined for each supplier category; basic, core, preferred and strategic. Each category represents different level of commitment to KM in terms of innovativeness and value added to the final product delivered to KM's customers. In order for a supplier to reach the strategic company partner category many requirements need to be met, and the supplier should contribute to KM's strategic company technology and in helping the company reach its strategic objectives. Only the suppliers with outstanding performance and unique competence are able to meet these demands. Some may consider the demands representing the strategic and preferred category as hard to reach. At the same time, it can be considered necessary for a company as KM to have such demands for their suppliers as the company's brand represents highly advanced and reliable solutions. The consequences can be big if suppliers deliver products that for instance have errors.

The way suppliers are categorized can be seen in accordance with the matrix provided by Kraljic (1983), where the matrix classifies materials from suppliers in terms of profit impact and supply risk. KM operates in innovate industry where they in some situations are dependent on suppliers due to low market availability of specific products. Such products represent high supply risk and usually high profit impact, such as the products characterized as strategic by Kraljic (1983). The supply strategy for such products in KM aligns with the suggested supply strategy by Kraljic (1983), which is to establish a close partnership



relationship with the supplier.

As indicated in the empirical results, the company's focus area in relation to supply management is to focus on the top 50 suppliers. The goal is to get these suppliers to be represented in the strategic and preferred category, and in order to do that the company intends to develop closer bonds with these suppliers. This goal may be hard to reach initially, and a long-term perspective to reach such objectives should be applied. The empirical results indicated limited capacity internally in the organization of KM, and the capacity should be increased in order to allocate enough time and resources to reach the objectives. Even if the categories basic and core are not in the company's focus area, the suppliers delivering these products must also be considered as necessary to complement the needs of the company.

## **5.2 Supply base reduction in KM**

The first part of the theoretical framework presents the supply base reduction process. The research provided on this area is from the buying company's perspective, as the buying firm carries out the activities.

### **5.2.1 Drivers and attitudes for supply base reduction**

As presented in chapter 4 the overall impression is that the main driver for the supply base reduction initiative is to reduce cost. According to Choi and Krause (2006) having many suppliers in the supply base will result in high transaction cost, and it is stated that many companies across different industries have decided to reduce their supply base mainly to reduce such cost. In addition, a supply base reduction will enable closer relationships with the suppliers remaining, and the alignment of the supply base of each of the different divisions of Kongsberg Maritime to a joint supply base, and this will also be an important gain. Apart from this there are different opinions regarding the supply base reduction among the interviewees in KMS. They give inconsistent answers to the questions asked during the interviews and there seem to be some confusion concerning how the process should be structured and how many suppliers to be removed.

Two opposite attitudes were identified. On one hand the supply base reduction was viewed as a necessary strategic move, in order to reduce the administrative cost and to create better conditions with the remaining suppliers. This is supported by Goffin et al. (1997) and Ogden



(2006) which argues that supply base reduction enhances competitive advantage through improved quality, reduced cost and increased innovation. The informant also has a clear perception on how many suppliers to remove in each commodity group. On the other hand the supply base reduction was seen as potentially damaging; if suppliers are removed only for the sake of reducing the number, valuable suppliers might be lost and the supply base weakened. The informant is of the opinion that the supply base reduction is not a goal in itself, but a side effect from the bundling-project in KM. The competitive advantage of KM lies in their knowledge and technological advanced solutions that is customized in accordance with customer requirements. In order to create unique products, suppliers with specialized competence are required in the supply base even if they represent a low purchasing-volume. The reasons for the different opinions may stem from the varied backgrounds and the period of employment in the organization.

According to KMS 1 they aim to work only with suppliers categorized as preferred and strategic, which can be considered as ambitious. KMS are dependent on suppliers delivering simple and standardized items as well, in order to be able to offer a complete product for their costumers. The question is whether the suppliers of these products see the value of meeting the demands required to be categorized as strategic or preferred.

### **5.2.2 Supply base reduction approach in KM**

KM is focusing on supply base reduction through a bundling approach where the possibilities of gathering the volume with fewer suppliers are assessed. This approach is identified to be a systematic elimination as presented by Ogden and Carter (2008) distinguishing suppliers based on different criterion chosen to evaluate the suppliers. The cost criterion are applied in a spend-analysis, where all suppliers representing a purchasing value under 100 000 NOK per year should be assessed and considered to be phased out of the supply base. The spend analysis seems to be the most important factor considered in the supply base reduction process. Other factors affecting the choice of suppliers are market availability, quality performance and willingness of the supplier to cooperate with the company. Also, the four categories of suppliers presented in the company's supplier quality manual is relevant; if the demands for the basic category is not met, the supplier can be considered phased out of the company's supply base.

Informant 1 explained that they would like to let the first-tier supplier be responsible for a bigger part of the supplier network, however the resources to get a complete overview of the supplier network are not in place. As stated by Cousins et al. (2008) this approach would in a long-term perspective, reduce the workload of managing the supply base, while at the same time having access to the same supplies. During a visit with one of KMS's strategic suppliers, it was revealed that they have a common source delivering standardized items. This indicates that there might be possibilities of organizing some of the suppliers in tiers. KMS can compare what suppliers they have in common with their strategic suppliers, and based on this transfer the responsibility of sourcing the product.

### **5.2.3 The supply base reduction process in KM**

As mentioned earlier the interviewed informants were unclear about how the process should be structured, even though one of them claimed that there were specific objectives for each commodity group. All three interviewees agreed that a cross-functional team was a crucial element of the supply base reduction, as the team have different views on the suppliers being evaluated. A cross-functional team is also emphasized by Ogden (2006) as it may increase the probability of stakeholder's participation. This is important since a supply base reduction process can be considered a change process, and Ogden (2006) highlights that there is a general resistance to change. However, it is unclear if the team put together is cross-functional. The groups established have been created across the different locations in KM with the same functions representing each location. This is done in order to get a complete overview of each other's suppliers.

The challenge in this part of the process is to perceive the supply base as one across the different locations as these have different needs. Standardizing procedures and systems across the different locations in KM will give economical benefits in a long-term perspective. Even if the process is expressed as extensive and time consuming when doing it across the different locations, it can also be considered necessary for KM to create common systems and procedures to reach economical benefits and make processes more effective. The given timeframe for the supply base reduction is stated to be until the completion of the group-wide program Delta One. It is also stated that a plan is made for which suppliers can be responsible for the delivery of the entire volume of certain products, and that this plan is evolving as the project progresses. Based on this it is unclear whether a plan with defined goals has been made prior to the project. As implied by the empirical evidence, the overall objective

regarding the company's supply base management is to focus on those suppliers represented as strategic and preferred.

Some similarities can be identified between the process of KM and the process defined by Ogden and Carter (2008). KM emphasized the importance of a cross-functional team, but it is unclear whether this has been established in connection with the supply base reduction process. The second step of the process by Ogden and Carter (2008) is the development of a commodity strategy, and this has been developed by KM and is embedded in the milestones defined for the Delta One project. Step three in the theoretical model is to identify potential suppliers, and this is done by KM in the established teams across the different locations of KM. A final step in the theoretical model is continuous improvement, as the supply base must be assessed and adjusted on regular basis. This is also important for KM to keep in mind.

#### **5.2.3.1 Termination of supplier relationships**

Ending relationships with suppliers is a part of a supply base reduction process. The interviewees expressed different opinions on what is the best practice for ending relationships with suppliers. It is argued for a direct termination of the relationship (Alajoutsijärvi et al., 2000) where the supplier is informed about the termination in an orderly manner. Mainly because they might be dependent on using this supplier again in a later period of time, and a professional connection should be maintained. Theory describes the direct approach as the suitable if the partner should not be left in doubt.

On the contrary some prefers a silent exit, where the supplier is not made aware of the termination and KMS withdraws from the relationship without explicitly stating that they are ending the relationship (Alajoutsijärvi et al., 2000). The informant argues that this is more efficient, because this way does not open for the supplier to try and improve. Theory supports both views to some extent. The silent termination is categorized as an indirect strategy to terminate a relationship, and if performed in an "other-oriented" way, this may give both parties time to adjust. However it might leave the supplier with confusion to whether the relationship is actually terminated or not, and if the supplier has not read the signs that KMS is about to terminate they might end up feeling betrayed.

The divergent answers imply that there is no defined process regarding termination of relationship. Literature puts strong emphasis on the importance of dissolution of relationships,

and to get a procedure in place should be a priority for KMS. The procedure should involve a careful consideration of which strategy to use for different suppliers. No matter indirect or direct strategy, the termination should be other-oriented in order to maintain a good reputation among the suppliers in case of future business.

#### **5.2.4 Success factors for supply base reduction**

The employees of KMS revealed some important factors in connection with a successful supply base reduction process. Since the process is carried out across the different locations of KM, reaching consensus, both across the different locations as well as internally in the departments, was considered one of the most important things in order to succeed in the process, hence a big challenge to face. This aligns with Porter (1997) which is implying that a supply base reduction is challenging, as it is time consuming to break the cultural barriers among corporate functions and divisions, and that it is difficult to build consensus.

Having an objective perspective on a supplier was also stated by one of the employees as crucial in order to get the best possible supply base. For many, a supply base reduction is a change process, and Ogden (2006) emphasize that the purpose of the supply base reduction should be clearly communicated throughout the organization in order to get the commitment required for a successful process. Based on the empirical evidence there is not a common understanding of the purpose of the process. If many of the employees within KMS are of the opinion that a supply base reduction could have negative consequences for the organization, the process can end up not being well executed. Since KMS operates in highly innovative environments with rapid changes, their supply base may need to be modified continuously (Choi and Krause, 2006), hence it is important for KMS to implement the mind-set of viewing the supplier with an objective perspective and adjust the supply base in accordance with factors such as changing market conditions.

Another factor influencing the supply base reduction process is the ability to get a full overview of the supply base and to identify which products are bought from several suppliers. This was pointed out by one of the informants as important, and was also stated to be time consuming mostly because the supply base of KM has many different suppliers represented from different locations and divisions. The Delta One project facilitates an overview of the supply base, where employees from different divisions in KMS are gathered together to

identify common suppliers. As indicated, the process is time consuming, and KMS employees seem to have limited time and resources allocated to this purpose. However, a supply base reduction process may be considered necessary in order for the company to gain better control over the supply base. According to Brandon-Jones et al. (2014), supply base complexity stems from the large number of suppliers that all represent different characteristics. It is rewarding to reduce this complexity by phasing out suppliers of the supply base the company do not need.

Some tools were used in KM to create a basis for evaluating supplier performance. These were historical data obtained from ERP-system, supplier audits and employee experience. One of the main challenges in a supply base reduction process is according to Ogden (2006) lack of historical data. All of the three factors mentioned contribute on this area, and serve as an important mechanism to avoid important suppliers being phased out of the company's supply base.

### **5.3 Supplier development**

The company's new focus on utilizing suppliers has resulted in different initiatives regarding supplier development. Different supplier development practices can be applied, and the approach chosen for supplier development must be seen in relation to the individual company. For KM it has been important to focus on supplier development on Norwegian suppliers, as these suppliers are important contributors to the final product KM can offer their customers.

#### **5.3.1 Supplier development activities and practices**

Different supplier development practices are applied by KMS, both confirmed by themselves and their suppliers. The table presents the different supplier development practices used by KMS. The table will serve as a basis for discussion of the following part.

<b>Supplier development activities/practices</b>	<b>KONGSBERG MARITIME SUBSEA</b>	<b>SUPPLIERS</b>
<b>Competitive pressure</b> Assessing alternative suppliers when buying a product to create pressure on the current supplier.	One of the informants states that they always solicit tenders from several suppliers, including at least two low cost countries.	Some of the suppliers experienced loss of contract in situations where they were not able to offer a low enough price
<b>Limited number of suppliers</b>	The bundling project Delta One aims to limit the number of suppliers for each purchased item.	-
<b>Supplier Assessment</b> Evaluating the performance of the supplier to set goals and measure improvement.	Step-wise assessment like described in the empirical evidence.	Different opinions about the degree of accuracy and continuity of these assessments
<b>Site Visit</b>	As a part of the supplier assessment, a site visit is done on regular basis	Some of the suppliers agreed on this, others did not know when their next visit was scheduled.
<b>Communication and feedback</b>	Scheme of supplier evaluation is reviewed during the supplier meeting.  Frequency: monthly, quarterly and yearly depending on a-b-c-d-categorization.  Method used are supplier meeting, face-to-face communication or phone-sessions	Lack of performance from KMS on this area.
<b>Demand of supplier certification</b>	The demands for certification is given in the Supplier Quality manual	-
<b>Knowledge transfer</b>	- On-site consultations - Supplier invited to buyers - Possibility of creating a forum in the future	One of the suppliers state that they are often invited to KMS while other suppliers perceives KMS as "closed off". Knowledge transfer has improved after the supplier development initiative,
<b>Supplier Incentives</b> Reward for supplier performance improvement	Long-term contracts Recognition	Most of the suppliers mention Long-term contracts and recognition
<b>Intensive information sharing</b>	Transferring parts of their core-technology to supplier.	Suppliers request early involvement in new product development.
<b>Training and education</b>	Through network for supplier innovation.	Through network for supplier innovation.
<b>Exchange of personnel</b>	-	-
<b>Direct investment</b>	-	-

Table 11: Supplier development practices in KM

### **5.3.1.1 Direct/Indirect approach**

Both direct and indirect approach of supplier development can be identified in KMS's supplier development efforts. The supplier training and education in lean provided by KMS to suppliers through the supplier development program "Network for supplier innovation" can be considered a direct approach to supplier development, as this is defined by (Wagner and Krause, 2009) as a direct involvement of the buying firms resources in the supplier.

The indirect category of supplier development include competitive pressure, supplier assessment and supplier incentives (Krause et al., 2000). All of these elements can be identified in KMS's supplier development efforts as indicated in table 12. Competitive pressure is used by KMS to assess alternative suppliers when buying a product to create pressure on the current suppliers, and this is also stated by the suppliers. KMS's supplier assessment is still in an early stage and they intend to do regular assessments on top-50 suppliers. It is positive that top-management has identified the need for supplier development, however it is important to have a realistic view on the resources needed to conduct these assessments.

### **5.3.1.2 Reactive/strategic**

A strategic approach is identified in the way KMS is performing their supplier development. KMS have clearly stated that their main focus is on their top-50 suppliers, where regularly assessments are made and where the supplier quality manual serves an important role in communicating the company's requirements for suppliers. The purpose of the manual is to enable supplier's support to the company's vision: "World class - through people, technology and dedication". As defined by Hanfield (2002) the objective of a strategic approach is to improve the long-term capabilities of the supplier and to create a world-class supply base that represents a sustainable competitive advantage.

KMS primarily have a strategic approach to supplier development as the company intends to develop those suppliers they consider as valuable based on their good performance or unique product offering. A reactive approach represent a reaction towards poor performance of suppliers (Handfield and Bechtel, 2002). In some situations the company may find it necessary to take a reactive approach since some suppliers may be the only source of a specific product. When the goal of KMS is taken into consideration, the strategic approach seems to be the most suitable for the company. Only when addressing supplier development

strategically are KM able to create a world-class supply base that can match the company's overall objectives.

### **5.3.1.3 Process/result oriented**

Both a result oriented and process oriented approach can be identified in KM's supplier development efforts. The supplier development project "Network for supplier innovation" focuses on lean implementation in the supplier's facilities and implementation of KM's supplier quality manual. The overall objective of the project is to create more effective processes and enhance the quality in the supplier's organization, and based on this reduce cost. The process oriented approach is characterized by increasing the supplier's capabilities for continuously improvement and involves the implementation of system-wide changes (Hartley and Jones, 1997). Implementing lean can be considered a change process, depending on what previous experience the supplier has with lean. Regarding the suppliers participating in this research, varied level of experience with lean could be identified. This project can be characterized as more process oriented since lean implementation can mean system-wide changes for the suppliers participating in the project. Even if the project itself has a short duration, lean is a long-term process that facilitates continuous improvement. One of the suppliers confirmed that they worked with a new production hall as a result of KM's wish of lean implementation with suppliers, and plan to do many changes in their facility in order to reduce cost, improve quality and offer shorter time to market.

The regular assessments of suppliers focuses on specific measures related to cost and quality, as defined in the company's supplier quality manual. If a supplier do not met the requirements defined by KM, actions will be taken to improve the specific measures the suppliers fail to meet. Examples of this is meeting with the supplier to agree on an improvement program, follow up audit results and evaluating supplier action plans. The assessment of suppliers is a more longitudinal process that may require more follow up work in order to get the suppliers on the level they want. Supplier assessments can be characterized as process oriented as it is a long-tem process that facilitates continuous improvement of performance. At the same time the assessments focus on solving specific problems of the supplier, which is the characteristics of a result oriented approach (Hartley and Jones, 1997). Based on this both a process and result oriented approach can be identified for the company's supplier assessment activity.



### **5.3.2 Drivers and attitudes for supplier development**

KM's supply base management are now primarily focusing on developing the Norwegian suppliers in the base and keeping the company's intellectual property geographically close, and this can also be seen in connection with the new trend within business strategy. The high cost levels represented in the industrialized part of the world made global sourcing an important part of purchasing strategy in order to be competitive on price. However, the trend now is that many companies are "back-sourcing" their production (Fratocchi et al., 2014, Lanza and Moser, 2014). The most common reasons for this change is due to quality problems, delivery time and increased cost in terms of personnel and transport (Lanza and Moser, 2014). KM have a supply base where many of the suppliers are specialized in technical advanced products, and high level of competence and quality is needed to deliver in accordance with KM's objectives. When the company is exploiting the potential of Norwegian suppliers, many benefits can be reached both for themselves and their suppliers. Situations where high-tech products are involved, local sourcing is a favorable option (Van Weele, 2010). It is easier to communicate and create the trust needed with suppliers, something considered important to have the flexibility required for such products. This can be considered the underlying driver for the supplier development initiatives focusing on the Norwegian part of the company's supply base.

The empirical evidence implies that the main driver for KMS is the reduction of cost. In order to achieve this KMS need to create a better relationship with their suppliers. Like mentioned earlier, KMS have had a drastic change in their attitude towards their suppliers and this indicates that they see the importance of considering the whole supply chain in order to increase their competitive advantage. This is also acknowledged by three of the interviewed suppliers, which has experienced a major difference in how they are treated by KM. One of the employees in KM emphasized the value of cooperating more with suppliers in order to become better together and to learn from suppliers.

The goal of KM to become a leaner organization also need to include their suppliers, and smarter and more effective ways of operation is required throughout the entire supply chain, and not just within the individual company (Harris et al., 2010). Implementing lean principals, for both KM and their suppliers can make them reach many benefits, and is considered one of the most important concepts to apply in order to stay competitive in the global market (Harris

et al., 2010). This also reflects the overall goal of the supplier development project.

KMS is a very important customer for all the suppliers in the research. Hence, the main driver for them is to keep KMS as a customer and maintain their long-term relationship. The empirical evidence shows a positive attitude towards the supplier development initiative among the suppliers, and they point out that it is necessary for the Norwegian industry to apply smarter solutions in order to survive in the global market.

It is confirmed by Nagati and Rebolledo (2013) that supplier development activities results in improved supplier performance and can be considered a source of competitive advantage, at least for the suppliers facing complex competitive environments, which is situation for KM's suppliers. This represents an important driver for the participation of KMS's suppliers in the company's supplier development efforts, and it may lead to suppliers standing stronger towards other customers. Some of the suppliers are searching for earlier involvement and improved cooperation with KM. Therefore some of the suppliers view the project as an opportunity to improve the existing relationship. Since lean is characterized by joint problem solving, information sharing and partnership relationship (Nicholas, 2011) it facilitates improved cooperation.

### **5.3.3 Incentives**

Based on the empirical evidence KMS uses incentives on most of the suppliers participating in this research. These incentives are long-term contracts and recognition through increased trust by taking over parts of KMS's core technology. Most of the suppliers felt that long-term contracts and predictability was one of the most important things KM could offer them. One of the suppliers stated that new business possibilities opened up as other customers approved them as a capable supplier when being a supplier of KM.

According to Klioutch and Leker (2011) their research suggest that innovative suppliers view indirect functions, representing long-term benefits and network opportunities, as important prerequisites to get involved in their customer's new product development compared to non-innovative suppliers. This might include getting access to new technology or expertise from the relationship that is established with the customer. This implies that KM should keep in mind the importance of incentives in order for the suppliers to participate in projects that require high technological competence, and incentives are described as important enablers for

performance improvements (Krause et al., 2000). However in this case KMS's bargaining power is superior to the supplier and there might be the possibility of KMS considering the need for incentives as limited. This is because KMS is a big company compared to their suppliers, and also represents the most important customer of each of the suppliers. Even so, the probability of the supplier development to succeed increases when incentives are applied to the process, as they serve as a motivating tool for suppliers to improve and to stimulate competition among suppliers (Krause and Ellram, 1997).

#### **5.3.4 Success factors for supplier development**

Both KM and their suppliers have mentioned several factors that are important to succeed with supplier development. These are listed under the categories: resources, presence, timeframe, predictability and cooperation.

##### **5.3.4.1 Resources**

The empirical evidence shows that all the suppliers are questioning whether KMS has the required resources to actively develop suppliers. They point out limited capacity in the work force as possible reasons for this. This is confirmed by KMS which admits that their workload is too high compared to the number of employees. This leads to poor communication and limited planning both for themselves and their suppliers. Effective two-way communication is considered an important success factor to succeed in supplier development (Krause and Ellram, 1997). This implies that KMS should focus on improving their availability towards their suppliers, and consider increasing their staff to cope with these challenges. Handfield et al. (1999) suggests that the suppliers are more likely to achieve their goals for supplier development if there is evidence that the buying company is putting the same amount of resources into the project. This is something KMS should consider when proceeding with the supplier development initiative. The suppliers might feel unfairly treated when they have to nag just to get answers to simple questions, while at the same time putting down a lot of resources in meeting the demands of KM.

##### **5.3.4.2 Presence**

KMS is the project owner of the supplier development project "Network for supplier innovation", but a third party is hired to provide the supplier training and give on-site consultation for KMS's suppliers. It is solely positive that resources are allocated for supplier training. However, some of the suppliers have questioned the presence of KMS during the supplier development gatherings. Outsourcing the task may lead to KMS not reaping as much

benefits as they could have if performing the task themselves, at least when central roles within KMS's organization is not present. The absence of KMS may be perceived by the suppliers as a disclaim of responsibility. Krause et al. (2000) suggest that the degree of involvement from the buying firm has a great impact on the outcome of the supplier development.

One of the suppliers stated that in order for them to fully commit to the supplier development project, KM should engage people and show attention for both the project and the suppliers. It was also stated by one of the informants in KMS that top-management involvement was important in order to succeed with supplier development as this showed commitment to the process. Based on this KMS should prioritize to attend to these gatherings in order to make the suppliers feel commitment to the project. Supplier development requires commitment on different levels, both from the buyer and supplier (Handfield et al., 2006), and this is important in order to succeed with supplier development.

#### **5.3.4.3 Timeframe**

Supplier development is something that does not show immediate results, rather something that will pay-off after some time, hence it is important to have a long-term perspective. KMS point out that long-term plans and establishment of cross-functional teams are important factors in supplier development. Both supplier and buyer invest a great amount of resources, and if the timeframe is too short this may seem as a waste of time and money. A suitable timeframe should be applied in order to see the results of the supplier development work. The empirical evidence implies that three year long contracts is a good solution, and the timeframe gives the suppliers the opportunity to develop. This is a good solution as it represents long-term perspective, and aligns with one of the success factors presented by Krause and Ellram (1997) and Handfield et al. (2006).

#### **5.3.4.4 Predictability**

Predictability, both in terms of long-term contracts, more sharing of information and forecasting, was stated to be the most important success factor by all the interviewed suppliers. In order for the suppliers to invest time on specific areas, they need to know whether there are possibilities for them to achieve benefits from their investments. More forecasting would make it possible to invest in smarter solutions, and would again reduce the

overall cost, both for themselves and KM. This reflects KM's goal and intention of implementing supplier development; to reduce cost in order to stay competitive in the market.

#### **5.3.4.5 Cooperation**

The overall impression is that the relationship with KM is regarded as an important relation for all the suppliers and that they are willing to work hard in order to have a good cooperation. Based on the empirical evidence trust, openness, more and better information flows are considered by the suppliers to be important success factors. In addition to this one of the suppliers pointed out cooperation in terms of a regular and good dialogue as the main factor to succeed in supplier development. A good and open communication is required for the suppliers to deliver in accordance with KM's demands, and for KM to communicate what they expect from their suppliers. The cooperation that is expressed by the suppliers represent differing opinions; as a good and well functioning cooperation where closer ties have evolved with time, and as a cooperation characterized by tension and lack of communication.

The characteristics of the cooperation can also reflect the extent of trust established between KM and the suppliers. There are different views among the suppliers when it comes to the visibility of trust in the relationship. One of the suppliers feel a great level of trust in their relationship, and they feel this is confirmed by KM by transferring parts of their core technology to them. Nagati and Rebolledo (2013) put emphasis on the importance of trust in order for the supplier to be willing to take part in supplier development initiatives and for the supplier to allocate resources to the relationship. This is important for KM in order to fully exploit the potential of their suppliers. To establish trust is crucial and can lead to many difficulties being avoided in the initiation of supplier development program (Langfield - Smith and Greenwood, 1998)

KMS have shown big improvement in the way they are working with suppliers. Some of the suppliers describe the situation as "completely turned" from KMS being enclosed and withholding information to being open and sharing towards the suppliers. However, there are some suppliers who have not experienced this change and perceive the cooperation with KM as very hard and affecting every-day life in a negative way in terms of a tense relationship. To succeed with supplier development under these circumstances are virtually impossible, considered from the supplier's point of view. In order to continue the relationship in a better

way, the issues creating the bad cooperation should be addressed and measures implemented. The negative perception from the supplier's perspective are primarily stemming from lack of communication and the synergy effects from this. This has resulted in problems such as high inventory levels due to bad planning and too short time horizon on orders from KM. More communication in order to understand the situation of the supplier would improve the status of the relationship, and it is confirmed by Liker and Choi (2004), stating that understanding how its supplier works has a positive effect when initiating supplier development efforts.

It is also indicated by Nagati and Rebolledo (2013) that if supplier's motivations and concerns connected to supplier development are fully understood by the buying firm, it would enable better planning and implementation of the initiatives. One of the suppliers view the supplier development project as an opportunity to improve their current dialogue with KM, and is positive towards the supplier development initiative. Reed and Walsh (2002) confirm that supplier development leads to a strengthened buyer-supplier relationship and contribute to building mutual trust. This is considered as the basis to improve communication, and the initiation of supplier development can be considered a necessary step in order to improve the cooperation with some of their suppliers.

### **5.3.5 Possible reasons for the different perceptions among suppliers**

KM's change in attitude clearly has influenced the way some of the suppliers view the cooperation and relationship, but some differing opinions among the suppliers have been revealed. They are all regarded as strategically important to KM as the company have decided to focus their resources on developing them, and all the suppliers consider KM as one of their most important customers. All the suppliers point out more information sharing and earlier involvement as important elements in establishing smarter solutions in order to reach the goals of KM to reduce cost, delivery time and enhance quality. The amount of communication between KM and the group of suppliers differ, also leading to various consequences being experienced for the suppliers. Based on this KM may have focused more on some suppliers due to the need for more follow up on complex products or because some people within the KMS organization has personal bonds with employees in the supplier's organization. Taken the lack of capacity within the departments of KMS into consideration, it seems like they are not able to allocate as much time and resources as they like on suppliers, resulting in some suppliers not feeling satisfied with the overall cooperation.

A variety of reasons can be given for the different perceptions among the suppliers. The suppliers participating in the research differ in terms of size and international presence, and may affect how KM view some of the suppliers as potentially future competition. Innovative companies as KM need to protect themselves from actors that can be considered as a potential threat, and need to consider carefully which suppliers can be allowed insight to their core technology. The industries the companies are operating within are sensitive and highly technological advanced products are characterized by short life cycle. For such products the competitive advantage to a large extent is dependent on time-to-market.

Some of the suppliers are also competitors, something that can make it challenging for KM to pursue the best way of treating them, considering that they all are viewed as strategically important. It is a good thing to have a competitive supply base in order to keep the performance level high, but it may lead to challenges for KM in situations where the company might have to choose which of their closest suppliers should be chosen for a specific task. The willingness of adjusting towards KM might differ, also affecting KM's decisions regarding who they want to work closest with and focus their communication at.

As a final reflection, the suppliers differ to some extent in size, and KM may feel it is easier to adjust smaller suppliers towards their needs. All of the relationships with the group of suppliers can be considered long-term, but the relationships vary to some extent in length. The length of the relationship may reflect the level of trust and cooperation established between KM and the suppliers. This aligns with the results of a research by Krause et al. (1999) where suppliers having a shorter relationship with the buyer struggled more to get the required information. If there is a varied level of trust between KM and the company's suppliers, this may also lead to different perceptions of the suppliers.

### **5.3.6 Key findings**

A small summary of the key findings is given in order to highlight the elements considered most important during the analysis. KM's supply base management has received increased focus the last years, as suppliers play a crucial role of the company's overall performance. The supplier quality manual developed by KM can in many ways represent the company's new direction; to become world class within their segment, the suppliers need requirements they can reach for to support KM's vision. In order for KM to better manage their supply

base, a re-structuring process within the organization was done to facilitate improved communication with suppliers. Seen from the supplier's perspective there are differing opinions whether the re-structuring lead to improved communication. Geographical closeness is indicated to be more important than before, and the company is focusing more on exploiting the potential of Norwegian suppliers, both to keep their intellectual property close and to ensure the right quality of products. The wish of the company to gain increased overview and control of their supply base resulted in different projects involving supply base reduction and supplier development. Both the process of supply base reduction and supplier development can be considered as extensive and resource intensive, but also necessary in order to reach the company's objectives.

The main drivers for the supply base reduction process is to reduce cost and to align the different locations constituting Kongsberg Maritime into one system and perceiving the separate supply bases as one. Different opinions among the employees were revealed regarding the purpose of the supply base reduction process; as a strategic move or as potentially hurting the organization. It is clear that there is not a common understanding of the purpose. There were also varied opinions whether specific goals were made prior to the process. The main challenges identified were to reach consensus, both across the different locations of KM, and internally in the departments. Strong ties being formed over time with suppliers makes it challenging for many of the employees to consider them from an objective view, but is considered necessary in order to have an optimal supply base. KM consider their suppliers as strategically important in order to succeed in the market, and want a closer relationship with their suppliers in order to improve the overall performance of themselves and their suppliers. As a result of this KM have initiated supplier development initiatives. The supplier development project "Network for supplier innovation", supplier audits and the company's supplier quality manual have been important elements in their supplier development work. Both KM and the suppliers view the supplier development project as a positive initiative, and consider it as important and necessary to strengthen the Norwegian industry.

Lack of resources and capacity have been confirmed by both KM and the suppliers to be one of the main obstacles in order to actively develop suppliers. It is questioned by some of the suppliers whether it is the right time for KM to initiate supplier development as their internal processes need to be improved in order to get the most out of the supplier development efforts



and their relationship with suppliers. KM's limited capacity internally affects the way suppliers perceive the relationship and cooperation, and problems for the suppliers stem from this cause. Some of the suppliers express the consequences of too little communication and sharing of information, especially forecasting, to affect the relationship in a negative way. As KM is an important customer, they express the hope of improving the current status of the relationship. The table below summarizes how the suppliers view different aspects related to supplier development and their relationship with KM.

Theme	Supplier 1	Supplier 2	Supplier 3	Supplier 4
<b>Cooperation and relationship</b>	Very satisfied. Build on trust and more openness has evolved.	Describes it as a good and long relation.	The cooperation has big potential for improvement. Characterized with tension.	Very satisfied. Build on trust and more openness has evolved.
<b>Size of KM as customer</b>	Important customer	KM is the biggest customer	KM is the biggest customer	KM is the biggest customer
<b>Previous experience with LEAN</b>	Quite new, some initiatives earlier but nothing planned in a structured manner as now.	Not directly, but have been working with improvement and efficiency before.	Yes. Started with lean in 2008. The system is in place, but need the focus.	Yes, very experienced.
<b>Most important contribution from KM's SD initiative</b>	(1) More focus on measurements and improvement (2) Meet other suppliers	Predictability through long-term contracts and the closeness to each other as partners	New ideas on improvement and meet other suppliers and discuss common issues.	Competitiveness and sharpened focus.
<b>Previous experience with supplier development</b>	Yes, with other big costumers. A lot like the way KM.	No.	No. Costumers have made strong demands but no one has initiated supplier development program.	Yes, but not in the same scale as with KM.
<b>Communication</b>	Satisfied, but could have been better.	Struggling with communication with their purchasing department.	The overall communication is not good. Struggling with communication with their purchasing department.	Have regular meetings and visits from customer. The communication can improve, would like to be involved at an earlier stage.
<b>Success factors in SD</b>	Trust, openness, sharing of information through forecasting, increased capacity in KM's organization.	Predictability and attitude; a supplier is not just a supplier.	Cooperation and view each other as partners.	Have a holistic perspective and create better flow between customer and supplier.
<b>Incentives</b>	Taking over parts of their core technology	Long-term contracts	Nothing	Long-term contracts
<b>Identified improvement from KM since SD has</b>	A lot more openness compared to	A change in attitude is on its way; KM wants to improve	Nothing, because of KM's limited capacity.	The supplier is more involved as a

been initiated?	previous..	their presence.		strategic supplier and have experienced increased requests from KM.
What can KM improve?	Earlier supplier involvement, prognosis, superior meetings every quarter, more strategic and long- term thinking.	More assistance from KM, better prognosis, better information flow, automatic status on inventory levels.	First priority is cooperation; Earlier supplier involvement, better prognosis, more openness and commitment.	Earlier supplier involvement and prognosis.

Table 12: Summary of supplier's perspective

## 6. Conclusion and implications

In this chapter a conclusion will be given to the research questions defined for the thesis. Further, implications for managers and suggestion for further research will be presented.

### 6.1 Conclusion

As presented in the introduction, the research questions were evaluated by using the empirical evidence from the case study. Further on these were discussed in relation with the relevant theory presented in chapter 2. The framework presented in chapter 2.4 was used systematically in chapter 5 in order to discuss the empirical findings reflecting the content of the research questions.

- *How can a company manage processes related to supply base reduction and supplier development*

The objective of this study was to provide empirical evidence on how a company manages its supply base by using supply base reduction and supplier development. The focus has been on what factors a buying firm performing a supply base reduction emphasizes, and how both buyer and supplier perceive supplier development efforts. In order to answer the defined research question, both the perspectives of the buyer and supplier is represented with regards to supplier development. To give thoroughly answer to this, four sub-questions have been explored.

At a general level KM have given increased focus to their supply base management, and view suppliers as central actors in order to succeed in the market. In order for the company to improve the way suppliers in KM are being managed, several measures have been taken. With regards to the company's supply base reduction process the company is in the process of aligning the supply bases of each location in KM to one supply base. In addition they have assessed the possibilities of gathering the volume of products with fewer suppliers and implemented new structure of organization to facilitate better information flow with suppliers.

The company's supplier development is still in its early stages, and KM have started with regular supplier audits on some of the suppliers in order to assess supplier performance and identify improvement areas. The supplier quality manual serves as an important communicator of KM's expectations, and creates the basis for supplier assessment. The supplier development project "Network for supplier innovation" aims to enhance the overall performance of suppliers, focusing on six of KM's strategic suppliers, through providing training in lean. The project also tries to match the organizations internal focus on lean implementation. The company's overall goal by initiating these initiatives is to create closer ties to its suppliers, and as a result of this reducing the cost together with their suppliers. The supply base management in KM is now trying to achieve increased control through simplification and better strategic alignment between themselves and their suppliers.

### **(1) How are the drivers and attitudes expressed for supply base reduction and supplier development?**

Regarding the supply base reduction initiative, the main driver was to reduce cost. In addition to this KM hope to reap benefits from getting a closer relationship with the remaining suppliers and to become more aligned across the different locations of KM as a result of the Delta One bundling project. Two opposite attitudes were identified in relation to the supply base reduction; viewed as a strategic move, or as potentially damaging for the organization. The implication is that in order for a supply base reduction to succeed the organization should have a common understanding of its purpose.

For KMS the same driver was identified for supplier development; closer ties with suppliers in order to enhance quality, reduce cost and facilitate for more innovation. The driver

identified for the suppliers were mainly to keep KMS as a customer and to maintain their long-term relationship, this because KMS is a very important customer for all of the suppliers. They all pointed out that they were very grateful to be chosen to be a part of the project. Both KMS and the suppliers expressed a positive attitude towards the supplier development project, and everyone expressed the importance of such initiative in order for the Norwegian industry to stay competitive in a global market.

## **(2) How is the supply base reduction and supplier development process approached?**

The approach identified for supply base reduction was systematic elimination. KMS view the possibility of organizing their supply base in tiers, but at the time they lack the resources to exploit this opportunity. There are major benefits in aligning the supply bases of the different locations in KM; they will gain more control by standardizing their systems and possible better prices when gathering the volume with fewer suppliers. However, they need to be careful and not terminate relationships with important suppliers, and they need to reach consensus on important decisions regarding which suppliers should be taken out of the supply base. Innovative companies as KM need to keep in mind that the supply base should be adjusted towards market changes.

The supplier development initiative has both a direct and indirect approach. KMS provides supplier training and education through the project "Network for supplier innovation", but it is recommended that KMS attend to this themselves even if they outsource the task. Presence and cooperation are key issues, and the company must ensure that the suppliers perceive them as committed to the initiative. Intensive information sharing has been used to some extent, but this is an area with major potential if KMS are able to create a close and trustful relationship with their core suppliers. There are also several indirect activities, such as supplier assessment, site visits, competitive pressure and incentives, and these need to be carried out in a structured manner. Predictability in terms of long-term contracts is mentioned as one of the most important things KMS can offer their suppliers, and it would be favorable for KMS to offer this if possible. This creates synergies in the form of the suppliers being able to invest in smarter production solutions, which again may lead to reduced cost and shorter time to market.

KMS's approach is defined as strategic, as they focus on improving all their big suppliers. However, it might be necessary for KMS to complement with a reactive approach if there are suppliers delivering unique products representing low market availability, which has a poor performance.

The empirical evidence implies that KMS is using both a result oriented and process-oriented approach. The supplier development project aligns with the characteristics of a process oriented approach as lean training and implementation may be considered an attempt to increase the supplier's capabilities for continuous improvement and to change parts of the supplier's internal system. The regular assessments of suppliers are characterized as both result and process oriented. The assessments are focusing on specific measures, and actions will be taken by KM in order to improve the measures the supplier fails to meet. This implies a result-oriented approach as it is characterized by solving specific problems of the supplier. At the same time regular supplier assessments aligns with a process-oriented approach, as it is a process with a long-term perspective and facilitates continuous improvement of performance. It seems like a suitable solution for KM to have a mix of the two approaches, since having a long-term perspective and at the same time focusing on specific measures in order to have control over supplier performance is important for them. Their focus going forward will be on the top 50 suppliers, which the company intends to have a long-term relationship with, and this should also be reflected in their supplier development efforts.

### **(3) How are the supplier development efforts initiated perceived by both the buying firm and their suppliers?**

There is an overall positive perception of the initiative among the interviewees. KMS consider their new focus on supplier development as an important and rewarding initiative, and they are of the opinion that the suppliers feel the same way. The issue that arises is whether it is the right time for KMS to initiate these activities. The suppliers express some concerns about the capacity at KMS, and whether there is enough resources allocated to this specific task. They also suggest that KMS have a lot to improve in their own organization before they are ready to fully dedicate themselves to the process of developing their suppliers. It is especially important that the suppliers feel that KMS is committed as this will probably enhance the suppliers desire to perform better, rather than create frustration. Most of the suppliers are

positive and experience that KMS have a bigger focus now than before on using the suppliers as a strategic tool to succeed in the market, and it was indicated that a change in attitude towards suppliers is on the way and perceive KM as more professional now than earlier. Even though, some suppliers do not feel that their cooperation with KM has improved after initiating supplier development. It may be a good solution for KM to increase their focus on cooperation and communication in order to reap the benefits supplier development can give.

#### **(4) How can supply base reduction and supplier development be initiated in order for a successful process?**

The success factors identified for supply base reduction are first and foremost to reach consensus and cooperate both across the different locations, as well as internally in the departments. Also the different functions involved in the process need to keep an objective view to the suppliers, which they might have close ties to. It is also recommended that KMS prioritize to get a clear and common understanding of the purpose of the supply base reduction in order to get the employees fully committed. KMS should also keep in mind that their supply base should be adjusted on a regular basis in order to stay competitive. A supply base reduction process can be time-consuming, and plans with defined goals should be made prior to the process in order to make it as effective as possible. As expressed by some of the employees in KMS a procedure for ending relationships with suppliers is needed, and should be clearly defined before initiating a supply base reduction process.

Both KMS and their suppliers point out that required resources and capacity is needed for a successful supplier development process. Hence, it is strongly recommended that KMS prioritize to increase their internal capacity in order to reach their goals for developing suppliers. Communication is crucial in order for KMS to communicate their expectations and for suppliers to be able to give feedback to KMS on the process. This is the area identified to have the greatest potential among the different success factors. Supplier development is a long-term process where the timeframe chosen must be realistic in order to see results of the improvement work. This is done by KMS by using a three-year perspective as this gives the suppliers enough time to develop.

Predictability, both in terms of long-term contracts and prognosis is pointed out as the most crucial success factor from the supplier's perspective. To be able to develop in the direction KMS want, which is to reduce the overall cost, the suppliers need to get the opportunity to plan smarter. This includes knowing what to deliver in a longer time horizon in order to produce products faster to a lowered cost. Both KMS and their suppliers express that cooperation, trust and openness is important prerequisites to reap the benefits from a buyer-supplier relationship. A bigger focus on the internal system and procedures of KM that ensures better communication with suppliers is important for KM in order to succeed with supplier development.

KM's new focus can be considered as strategic important in order to stay competitive in the market and reach the company's vision. Based on the analysis and conclusions given, it can be indicated that KM is on the right way in improving their relationships with suppliers and reaping the benefits from cooperating closer with them, but still the company have a way to go. The important thing going forward is to match goals with available resources, and further align the goals defined for their own organization with their suppliers.

## **6.2 Implications**

Based on the research performed, the results and conclusion will be used to highlight some implications for managers and further research.

### **6.2.1 Implications for managers**

Supply base management plays an important role for a company's overall strategy, and knowledge within this field can contribute to cost reduction and better utilization of the suppliers chosen to be a part of the company's supply base. A supply base reduction is often considered a natural step before implementing supplier development initiatives, depending on the size of the company and its supply base. When it comes to initiatives, such as supply base reduction and supplier development, each of them must be adapted towards the individual company; the processes must be defined in accordance with the company's overall goals and available resources before being implemented. The important task for managers will be to define specific and realistic goals for each initiative and clearly communicate the purpose of the processes throughout the organization in order to get employees fully committed. It is also important that managers ensure a cross-functional team is established, where different



functions from the organization is represented, this in order to facilitate an objective perspective on the suppliers being assessed.

With regards to supply base reduction, a clear goal on how many suppliers should be removed from each commodity group should be defined. Multiple sources of supplies should be identified to avoid having many suppliers delivering the same products or services, and this represents a big potential for cost savings both system and logistics wise. A supply base reduction can for many be perceived as a change process as terminating relationships with suppliers can affect employees to a large extent if close bonds between buyer and supplier are established, and some internal resistance towards the process may be experienced. Personal bonds may become a challenge in this process, and the cross-functional team will ensure that different opinions is considered and that a decision is made based on what is best for the organization as a whole.

Managers should make sure a procedure for termination of relationships with suppliers is made prior to the supply base reduction process in order to ensure this is done in a professional manner. It is important to maintain a good reputation in case the company might need the supplier again for future business. Managers should also utilize tools such as the company's ERP-system and experience from other employees. Historical data from the ERP-system makes it possible to do a spend-analysis across the organization and to identify suppliers with poor performance. Both the cross-functional team and experience from employees should be emphasized in order to avoid important suppliers being removed from the supply base. It should be kept in mind that supply base reduction can be considered a more comprehensive process when applied in innovative firms, as more criterion for suppliers might be necessary to define in order to make the right decisions.

Supplier development is a resource intensive initiative and areas for application should be considered closely. The buying firm should only include a limited number of suppliers at the same time, and it is beneficial to implement such an initiative with suppliers the company has established trust in the relationship with. The important role of managers in the buying company is to communicate both the company's expectations towards its suppliers and what the gains for the supplier are by taking part in the supplier development initiative. Goals should be made and supplier development practices chosen in accordance with available resources both in the buyer's and supplier's organization. The goals should also be adjusted

towards the individual supplier's needs to improve the suppliers on its most critical areas. In addition, managers should show their commitment to the process by giving the suppliers the attention needed to also give them the required commitment.

Managers should facilitate effective two-way communication between purchasing personnel in own organization and supplier's organization. This can be done by defining clear responsibility areas for each employee in the purchasing function and assign some suppliers each that the employees are responsible for. This will simplify information flow and it will possibly make it easier to establish the required trust needed between the buying company and the supplier. The manager can also evaluate the opportunity of creating a forum with the company's suppliers. This will serve as an arena for discussion, which can contribute to a common understanding of what is required in terms of improvement and further development, both for the buyer and its suppliers. Common issues among suppliers can be discussed, and based on this strengthen the cooperation they have with each other and their buying firm. A forum can be especially relevant for suppliers complementing each other's competencies; this can enhance the coordination efforts towards the buying company. The forum can illustrate how the company's supply chains can become more functional, by requiring more of each other, both as a buying company and supplier.

While working with supplier development it is advisable that the buying firm tries to understand how its suppliers work and understand the supplier's motivations and concerns related to the implemented supplier development program. The managers should facilitate information sharing between its own company and its supplier's organization. This will enable better planning and smart solutions being applied for purchasing, manufacturing and other functions relevant for reducing cost, lead-time and enhanced quality. Communication is the key for successful supplier development process, and managers must facilitate regular communication with suppliers. The process of supplier development requires patience, and the timeframe applied should give the supplier enough time to develop

The supplier's organization must also be committed to the supplier development process and understand what is expected of them from the buying company. The managers in supplier's organization must have a clear understanding of the buyer organization's goals, this in order to ensure strategic alignment. They should also try to influence the goals defined for supplier

development in such a way that the goals are adjusted towards the available resources in its own organization.

The manager's role in the supplier's organization will also be to facilitate communication between its own company and the buying company to ensure that the required cooperation and trust is established. In connection with this a team should be established that will be responsible for the supplier development activities in its own organization. The team should have regular communication with the buying company to communicate status.

In situations where system-wide changes in supplier's facility are a part of the supplier development program, some resistance might occur among the employees. An important task for managers will be to identify those who are able to commit to the process and those that show resistance. Based on this the group of employees being able to commit to the supplier development process will be most involved in the activities.

### **6.2.2 Implications for further studies**

This study focused on how a company can manage its supply base by using initiatives such as supply base reduction and supplier development. More specifically, the study intended to provide empirical evidence and identify several factors connected to the two processes; the drivers and attitudes, approaches and success factors. In addition, the study intended to identify how supplier development efforts are perceived, both from the buyers and suppliers perspective.

The work put forward contributes to the field of supply base management in several ways. First, the thesis provides a literature review of the supply base management literature, where the main focus was on supply base reduction and supplier development. In this process it was revealed that some areas within the literature are lacking theoretical research; (1) Literature regarding supply base reduction was primarily described in brief sense and as an important process to enable closer relationships with suppliers. Not many researches focused on the process of supply base reduction and its success factors; (2) The supplier's perspective on supplier development is rather limited as the buying perspective is primarily covered in existing research. This research has contributed to the field of supply base management, and the contribution complements some of the areas lacking theoretical research, and may help put focus on these topics for further studies.

Further research on supply base reduction should include how a supply base reduction can be structured, and whether the process should be influenced by industry characteristics. Different industries should be included in the research in order to highlight what areas that might differ between industries. In addition, how to terminate relationships with suppliers should be given more focus on in connection with supply base reduction and take part in the suggested supply base reduction process.

The empirical evidence provided by this study indicates the importance of representing both the buyer's and supplier's perspective in supplier development. This is valuable in order for buying companies to better understand the motivations and concerns of suppliers related to supplier development and to better utilize the potential of supplier development efforts. Further research on supplier development should focus more on the supplier's perspective in relation to the cooperation with buyer, and on the supplier's perception of taking part in different supplier development activities, such as supplier assessments, supplier training and on-site consultation. It can also be interesting to compare buyer's and supplier's view on supplier development in order to identify areas where both parties can improve and utilize their relationship in a better way.

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## **APPENDIX A: - Intervjuguide KMS Februar.**

1. Hvor mange leverandører er det i leverandørbasen per i dag?
2. Hva er årsaken til at KMH ser det som hensiktsmessig å redusere sin leverandørbase? Hva har inspirert bedriften til et slikt tiltak?
3. Gjør dere en kategorisering av leverandørene og/eller av varen? Hvordan gjøres eventuelt dette?
4. Hvordan måles prestasjonene til deres leverandørene per i dag, og hvordan måler/vurderer bedriften om relasjonen til leverandørene fungerer?
5. Hvor mange leverandører skal fjernes?
6. Hva kjennetegner de leverandørene som skal fjernes?
7. Hva kjennetegner de leverandørene bedriften ønsker å beholde i leverandørbasen? Hvilke kriterier ligger til grunn når disse skal velges?
8. Hvor lang tid er det forventet det vil ta å redusere leverandørbasen og få på plass en ny leverandørbasestruktur?
9. Har dere laget en plan for hvordan denne prosessen skal gjennomføres, og bruker dere noen konkrete verktøy i denne?
10. Hva vurderer dere som viktige kriterier for å lykkes med en reduksjon av leverandørbasen? Hvorfor er dette viktig?
11. Hva har vært mest utfordrende/vanskelig i løpet av prosessen, og hvorfor har dette vært vanskelig? Hvordan har disse utfordringene blitt håndtert?
12. Hvilke funksjoner i bedriften bør være involvert i denne prosessen, og hvorfor?
13. Reduksjon av leverandørbasen innebærer at noen relasjoner må avsluttes. Har bedriften laget prosedyrer for hvordan relasjoner skal avsluttes? Hva vil være de største utfordringene med å avslutte relasjoner?
14. Vil det bli endring i måten dere jobber med leverandørene på etter reduksjon av leverandørbasen? Vil det være behov for å utvikle noen av leverandørene slik at de bedre kan møte behovene til bedriften?

15. I prosessen med å velge ut leverandører må visse kriterier stilles. Vurderes da leverandørens villighet til å utvikle/tilpasse seg i forhold til bedriften?
16. Hvordan tenker dere å jobbe med de utvalgte leverandørene fremover, og hva må til for å få en velfungerende leverandørbase?

## **APPENDIX B - Intervjuguide KMS April.**

1. Formålet med forbedringsprosjektet ”Deltaone” er å finne smartere og mer effektive måter å jobbe på for å styrke Kongsberg Gruppens konkurranseevne. Hva mener du har vært bra med prosjektet, og hva kunne eventuelt blitt gjort bedre?
2. Hvilke faktorer påvirket behovet for et forbedringsprosjekt som Delta 1?
3. Omorganisering av innkjøpsfunksjonen i forbindelse med varegruppebasert innkjøp er en viktig endring i deres organisasjon. Hva har dette hatt å si for Kongsberg Maritime? Hvordan påvirker dette deres leverandører?  
(eks: samler PO-linjer, mindre kompleks informasjonsflyt, muliggjør tettere relasjoner?)
4. Hva ønsker dere å ha oppnådd etter ”Deltaone” prosjektet er fullført? Hvilke målsetninger er satt for prosjektet?
5. DeltaOne er et prosjekt som omfatter hele Kongsberg Gruppen, der de ulike lokasjonene har varierte behov når det kommer til innkjøp av produkter/tjenester fra leverandører. Hvordan oppleves det når leverandørbasen tilpasses Kongsberg gruppen som helhet? Hvilke utfordringer gir dette?
6. KM leverer skreddersydde systemer der bedriften må være fleksibel i forhold til kundens behov. Hvordan påvirker reduksjon av leverandørbasen og standardisering i forbindelse med design av deres systemer fleksibilitet og ”unikheten” dere kan tilby?
7. Hvordan har implementeringen av Lean påvirket måten dere forholder dere til og jobber med leverandørene på?
8. I bedriftens Supplier Quality Manual kommuniseres det hvilke forventninger og kriterier som stilles til leverandørene. Hva har implementeringen av Lean hatt å si for måten deres leverandører samhandler med deres organisasjon på? Hvilke responser har dere fått i forbindelse med implementeringen av lean og kravene som stilles i manualen?
9. Gjør dere tiltak for å utvikle leverandører som allerede er gode til å bli enda bedre, eller er det først når dere måler avvik at tiltak blir satt i gang?  
(Strategisk/reaktiv tilnærming – eventuelt en kombinasjon av disse?)
10. Dersom dere vil utvikle leverandører som allerede er gode; hvordan velger dere ut aktuelle leverandører, og hvordan utvikles de?
11. Dersom dere utvikler leverandører som følge av dårlige prestasjoner; hvilke faktorer er avgjørende for at dere anser det som nødvendig å utvikle leverandørene? Hvordan foregår utviklingen?

12. Hender det at dere velger ut spesifikke leverandører for utvikling, spesielt rettet mot ny produktutvikling der fokuset er å bedre innovative prosesser?
13. Når forventer dere å se resultater hos deres leverandører? (Tidlig fase/langtids) og hva slags resultater?
14. Hvilke insentiver brukes for at leverandørene skal ønske å utvikle seg?
15. Hvem har ansvaret for å følge opp leverandørutviklingen?
16. Hvordan er deres tilstedeværelse hos leverandørene dere vil utvikle?
17. Dere har kommet godt i gang med deres arbeid med å utvikle leverandører ved å ha utarbeidet Supplier Quality Manual. Hva er planen videre for å gjennomføre dette?
18. Hva mener du må til for å lykkes med leverandørutvikling og skape en felles forbedringskultur med leverandørene, både fra KM og leverandørenes side?
19. I prosjektet "Network for supplier innovation" fokuserer dere på å utvikle norske leverandører. Hvorfor er dette viktig for dere?
20. Hvordan kan de norske leverandørene brukes på en bedre måte? Hva må det jobbes med?
21. Hvor stor andel av leverandørene dere ønsker å utvikle er norske? Hvor mange er lokale?

## **APPENDIX C - Intervjuguide KMS leverandører April.**

1. Hvordan opplever dere samarbeidet med KM og vil du beskrive relasjonen mellom deres bedrift og Kongsberg Maritime?
2. Har dere jobbet med LEAN tidligere? Hvordan oppleves treningen og opplæringen i LEAN dere har fått ved å delta på samlingene i forbindelse med prosjektet "Network for supplier innovation"? Hvilke tre ting vil du fremheve i forbindelse med samlingene, og det dere har fått ut av prosjektet så langt?
3. Hvordan vil dere jobbe videre for å bruke det dere har lært i prosjektet?
4. Viktige elementer i forbedringsprogrammet dere deltar i er "design to cost" og "time to market". Hva gjøres/skal gjøres fra deres side for å fokusere på dette?
5. Har dere tidligere erfaring med leverandørutviklingsarbeid? Er dere i per d.d involvert i andre leverandørutviklingsprogrammer enn med KM?
6. Hvilke leverandørutviklingstiltak som er iverksatt av KM ser dere på som mest nyttig for dere? (Hvorfor?). Hvilke fordeler har et leverandørutviklingsprogram fra leverandørens side?
7. Er KM flinke til å kommunisere sine forventninger til dere?, og er feed-backen dere får fra KM nyttig?
8. I KM's Supplier Quality Manual stilles det forskjellige krav til leverandørene. Kan dere nevne de tre kravene som har hatt/gjort størst nytte hos dere? Har manualen ført til at dere har blitt mer bevisste på gode/dårlige sider hos dere selv?
9. Har insentivene fra KM endret seg etter at de begynte arbeidet med leverandørutvikling? Hvilke insentiver setter dere høyest? Hva kan eventuelt gjøre at det blir enda mer attraktivt for dere å utvikle dere videre?
10. Hvordan er tilstedeværelsen fra KM (tid de bruker ute hos leverandøren/oppfølging) nå i forhold til før de begynte med leverandørutvikling? Kunne dere tenke dere mer assistanse fra KM?
11. Hva mener du må til for å lykkes med leverandørutvikling og skape en felles forbedringskultur? Fra deres side? Fra KM's side?
12. Hvordan inspirerer dette prosjektet dere til å jobbe med kontinuerlig forbedring i deres bedrift?

## APPENDIX D

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Styrker leverandørene sammen  
Skrevet 15.12.14

– Skal vi utvikle vår posisjon i det globale markedet må vi ha leverandørene våre med oss. Sammen sørger vi for at kompetansen og viktige leverandørproppdrag forblir i Norge, sier Kjell Gjestad, Vice President, Supply Chain, Subsea Division i Kongsberg Maritime.



*Kongsberg Maritime ønsker å styrke samarbeidet med sine norske leverandører. – Vi blir ikke best uten å ha leverandørene med oss, sier Kjell Gjestad. F.v. Truls E. Moe, NCE Systems Engineering, Marion Emilsen Frydenlund, Innovasjon Norge, Kjell Gjestad, Vice President Supply Chain, Dr. Daryl Powell, Lean Manager Supply Chain og Jerry Ojala, General Manager Procurement i Subsea Division i Kongsberg Maritime. Foto: NCE SE/Eli Strindeberg*

Bedriften samarbeider med NCE Systems Engineering og Innovasjon Norge om å få på plass et kompetanseprogram som skal gjøre både dem selv og leverandørene mer konkurransedyktige.

– Vi blir stadig mer konkurranseutsatt i det globale markedet. Kravene til kostnadseffektivitet og kvalitet blir høyere. I Norge hvor produksjonskostnadene er høye, må vi finne smarte måter å jobbe på for å holde oss konkurransedyktige, sier Gjestad.

For Kongsberg Maritime, som stort sett har all vareproduksjon hos underleverandører, er det innkjøpsstrategiske svært viktig. De har som mål å videreutvikle sin leverandørbase for å styrke sin konkurransekraft. Derfor har de blant annet gjennomført et internt forarbeid for å forberede innføringen av et Corporate Lean Programme. Programmet skal både utvikle egen organisasjon og styrke samarbeidet med leverandørene. Dette er styrt som et felles prosjekt for Kongsberg Maritime, hvor Subsea-divisjonen kjører dette med noen pilotleverandører i 2014. Programmet vil ta for seg en implementering av selskapets Supplier Quality Manual og samtidig sette fokus på en ambisiøs Lean implementering.

### **Raskere innovasjon og produktutvikling**

Samarbeidsprosjektet er også i tråd med målsetningene til Innovasjon Norge. – Vi skal sørge for at små og mellomstore bedrifter styrker sin konkurransekraft, slik at innovasjonstakten i norsk industri kan øke og

blir mer robust. At et industrilokomotiv som Kongsberg Maritime ønsker et tettere samarbeid med strategiske leverandører og stiller krav til dem, styrker leverandørene på nye områder. Det ligger også et potensial i at dette samarbeidet fører til mer innovasjon. Leverandørene blir mer uavhengige, og står sterkere mot andre kunder og i nye markeder, sier Marion Emilsen Frydenlund, Senior Advisor i Innovasjon Norge.

Gjestad bekrefter at et tett samarbeid med leverandører kan bidra til at innovasjon og produktutvikling kan gå raskere. På den måten oppnås større nasjonal verdiskaping.

– Det er viktig for oss å beskytte vår kjerneteknologi og dette kan gjøres enklere med leverandører i Norge. Vi må samtidig sørge for at vi blir konkurransedyktige på kostpris, leveringspresisjon og kvalitet. Fokus på ”design to cost” og ”time to market” vil være viktige elementer i dette programmet. Norge er et kostnadskrevende land med tanke på produksjon, derfor bør vi være best i verden på Lean, sier han.

Tirsdag 16. desember holdes det et kick-off for prosjektet som har fått navnet ”Network for Supplier Innovation” og som har vist seg å ha stor interesse blant leverandørene.