

Can Scania Be Stronger Than Steel?

- A study of control and delegation of purchasing in a three-tier supply chain

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Abstract

Title:	Can Scania be stronger than steel?
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Project owners:	Patrik Leickt, Senior Sourcing Manager, Scania Frida Matsdotter Bauer, Commodity Manager, Scania
Research issue:	Research about delegating or controlling purchasing with 2 nd tier suppliers does not seem to be convergent; it discusses benefits and disadvantages of both purchasing tactics in various situations. There is no single tool today that we have found, that helps manufacturing companies decide when to control and when to delegate purchasing in the supply chain.
Purpose:	The purpose of this thesis is twofold. First, to create a framework that can act as a decision making tool for manufacturing companies regarding the question if they should delegate or control purchasing activities with the 2 nd tier suppliers. Second, to apply the framework on the part of Scania's purchasing division that handles forged parts.
Method:	A constructive approach has been used in this thesis and a multiple case study has been conducted where five manufacturing companies were interviewed.
Conclusions:	The decision making tool, named the 3Part CoD-tool, has been constructed for manufacturing companies to use when deciding whether to control or delegate purchasing with 2 nd tier suppliers. The tool was thereafter applied on a case at Scania, resulting in a recommendation for Scania to control purchasing, by using the Buy-Sell procurement model. One additional procurement model has been produced named COI.
Keywords:	Purchasing, control, delegation, principal-agent, power relationship, purchasing leverage, steel, forgings, Scania.

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1. Introduction

This chapter will start with a short background describing the concept of delegating and controlling purchasing. A discussion of the underlying theoretical issues is then presented in the problem discussion along with the Scania case and the specific issues that apply here. After this, the problem is narrowed down and the purpose of the thesis is described. To provide the reader with an overview, the chapter is concluded with a brief description of the disposition of the thesis.

1.1 Background

It is fairly common that agents in an organizational hierarchy are given authority to communicate and contract with agents at lower levels. For example, owners of a firm often hand over authority to managers who run production and everyday business; these in turn delegate certain responsibilities to line managers, and so on. A similar structure can also be observed within purchasing, where purchasers contract with a supplier, who in turn is given authority to arrange and organize purchasing of necessary inputs from their suppliers.¹ However, it is important to recognize that there are alternate ways of structuring the purchasing arrangement. One such alternative would be to centralize control over purchasing and contract directly with both the 1st and 2nd tier suppliers. Figure 1 presents a simple description of how the flow of goods and negotiations and contracting can change from a situation where a manufacturing company *delegates* control of purchasing to a situation where the manufacturing company *controls* purchasing, and contracts with both the 1st and 2nd tier supplier.

¹ Melumad, N. Mookherjee, D. Reichelstein, S. (1995)

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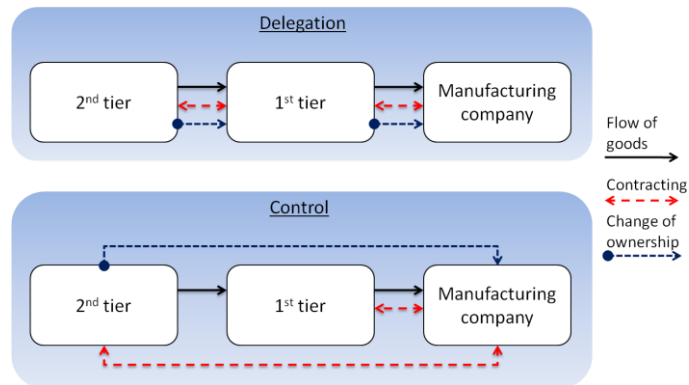


Figure 1: Flows of goods, changes of ownership, and contracting when delegating and controlling purchasing. Note that the picture only presents one example of how control of purchasing can be exercised.

Many manufacturers struggle with the decision of whether to contract with its 2nd tier suppliers of components or raw material or to delegate that responsibility to its direct (1st tier) suppliers.² One such company is Scania, a large manufacturer of trucks, buses and engines. Scania is in the process of deciding whether to control purchasing of steel used for forged parts, or to delegate that responsibility to the forges (the 1st tier suppliers). The decision on how to handle this is influenced by a number of complex factors and manufacturing companies in different industries all over the world deal with the matter in several different ways. Simply put, manufacturers can position themselves on a scale, where the one extreme is to completely delegate the responsibility of contracting with the 2nd tier suppliers to their 1st tier suppliers and the other extreme is to completely control the 2nd tier purchases. Most manufacturers will most likely be somewhere in between the two extremes. However, there are examples of manufacturers that lean heavily to one side or the other. One example of a manufacturer that is close to the first extreme mentioned, to completely delegate the responsibility of purchasing, is Cisco, who tends to delegate component purchasing to its contract manufacturers. An example on the other side of the scale is Sun Microsystems, who controls component purchasing and even purchases subcomponents itself. A company that can be said to be found closer to the middle of the scale is HP, who delegates responsibility of commodity purchasing while controlling purchasing of strategic components.³

Business strategy and policies together with cultural aspects also seem to affect the decision of delegation versus control, as Japanese automobile manufacturers delegate more responsibility to their 1st tier suppliers in comparison to American equivalents. However, from a history of contracting with 2nd tier suppliers and in

² Kayış, E. Erhun, F. Plambeck, E. (2007)

³ Ibid

accordance with the Japanese way, the trend for American automobile manufacturers now seems to be to delegate responsibility.⁴ Cox confirms that there seems to be consensus in the purchasing community that the most appropriate way for buyers to manage their relationships with suppliers is to use the Japanese way, making delegation of responsibility an important part.⁵ However, as Cox goes on to discuss and as we will see in the next section, the decision of whether to control purchasing or to delegate responsibility depends on many variables and is not an easy one to make.

1.2 Problem discussion

1.2.1 Delegate or control?

The decision on whether to control purchasing in both the 1st and 2nd tier of supply or to delegate the responsibility to the 1st tier suppliers is, as mentioned above, multifaceted. Research in the area does not seem to be convergent; it discusses benefits and disadvantages of both delegation and control in various situations.

Ellram and Billington discuss the risk of losing purchasing leverage when delegating the responsibility to contract with 2nd tier suppliers to the 1st tier suppliers. They argue that the 1st tier suppliers may pay a higher price for raw materials or components because of smaller volumes. This higher price is then forwarded to the buying company (which we have referred to as the manufacturing company earlier). Alternatively, the 1st tier suppliers may receive a lower price by consolidating volumes from a number of customers, but will keep the volume discount as part of their own profit.⁶ In addition to the risk of paying a higher price Amaral et al also stress the risks that the manufacturing company and the 1st tier supplier do not have the same priorities when it comes to making trade-offs concerning for example assurance of supply, responsiveness, quality and technical performance of the 2nd tier supplier.⁷

Melumad et al view the issue from an economics perspective, based on the principal-agent theory. Their standpoint implies that delegation can reduce the burden of communication requirements between the principal (in this case the purchaser of a manufacturing company) and the agent (in this case the 1st tier supplier), but at the same time delegation might give rise to incentive problems, causing the agent to pursue its own self-interests rather than that of the principal. Melumad et al discuss that because of this incentive problem, the manufacturing

⁴ see Marsh (1996) and McIvor, Humphreys and McAleer (1998) in Kayış, E. Erhun, F. Plambeck, E. (2007)

⁵ Cox, A. (2004)

⁶ Ellram L. & Billington, C. (2001)

⁷ Amaral, J. Billington, C. Tsay, A. (2006)

company can be subject to a loss of control and purchasing leverage. However, the concluding remarks of Melumad et al is that the performance and expected profit of controlling purchasing may be replicated using delegation of responsibility, so long as the principal monitors the contribution of the agent (the 1st tier supplier) and ensures that no subcontracts are executed before the prime contract.⁸

As presented above, research focusing on the problem to delegate or to control purchasing with the 2nd tier suppliers is highlighting different focus areas and presents conclusions that are not always aligned. This report can be seen as an attempt to add knowledge and bring clarity to which areas should be prioritized, in what way and under what circumstances. For example, what is more important in the decision: assurance of supply or to achieve lower prices by consolidating volumes? Is the priority between the two options the same in all situations? What impact does the nature of the relationship between the manufacturing company and the 1st tier supplier have on the decision? These are examples of considerations that may be important when deciding to control or delegate purchasing.

1.2.2 The Scania case

Scania is a large manufacturer of trucks, buses and engines. Scania is dealing with the described issues of potential loss in leverage power, as well as loss of control and insight in cost and price variation upstream in the supply chain in the area of purchasing forged parts. Here, the 1st tier suppliers are forges and the 2nd tier suppliers are steelworks. In Scania's products, several forged parts are used; around three percent of the total purchases that Scania makes are made up of forged elements. Generally, in the case of forged parts, the cost of steel stands for over 50 percent of the total cost, which makes it an important area to keep track of. Other than the base cost of steel, the price is determined by a scrap surcharge (usually set by independent organizations), an alloy surcharge (which is dependent on what kind of metals and how much of each metal the alloy consists of) and the value added by the forges.

Currently the forges that Scania works with conduct negotiations and buy steel from steelworks that have been preapproved by Scania in terms of quality. The forges that Scania has chosen to work with are small to medium sized companies, while the steelworks are generally big and few in numbers. The higher bargaining power with respect to prices therefore lies with the steelworks, which means that the forges try to raise their prices to Scania whenever the steelworks do the same towards the forges. Scania has little insight and control over the negotiations between the steelworks and the forges, which often results in them being a "price taker". In addition, as a result of the lack of insight in the negotiations between the forges and the steelworks, Scania often experiences that different forges present different base

⁸ Melumad, N. Mookherjee, D. Reichelstein, S. (1995)

price information. Scania expresses that this makes it harder to draw conclusions on which prices are reasonable and which are not, even though it provides a rich foundation for comparison between the forges.

Scania's Global Purchasing Department has developed an interest to investigate if it would be better for Scania to negotiate directly with the steelworks when it comes to steel used by the forges. In many cases, Scania would be able to purchase higher volumes from the steelworks than the forges, but is concerned about the consequences of such an endeavor. For example, Scania would risk decreasing its ability to "share" the increase in price with the forges, as is possible to some extent today. Also, controlling purchasing and contracting with both the 1st and 2nd tier suppliers would mean that it is necessary for Scania to build up a purchasing function that can handle both the extra workload as well as the complexity of the purchases which was formerly run by the 1st tier suppliers. Finally it is unclear how the 1st and 2nd tier suppliers may react and how they would respond to a change like this in the supply chain. The priorities and trade-offs between controlling purchasing and delegating the responsibility clearly need to be explored further.

1.3 Research issue

The research on the issue of delegation and control of purchasing, in combination with the concerns and issues that Scania expresses, creates a foundation for us to formulate the purpose of this thesis. We consider it important to investigate normative aspects of the issue, i.e. through previous research, as well as our own, help manufacturing companies determine a process for how they should decide when to control purchasing and when to delegate that responsibility to the 1st tier suppliers. It is also important to explore descriptive aspects such as what different ways of controlling and delegating purchasing that are employed by companies today, in order to establish what types of arrangement that have been successful and what seems to be the conditions for success. Through this thesis we want to be able to help manufacturing companies in general, and Scania in particular, to make the decision of whether to control or delegate purchasing.

1.4 Purpose

The reasoning in section 1.3 leads to our purpose, which is twofold:

1. Create a framework that can serve as a decision making tool for manufacturing companies regarding the question if they should delegate or control purchasing activities with the 2nd tier suppliers.
2. Apply the framework on the case of Scania and present a recommendation to Scania on whether or not to control purchasing, and contract with both the 1st and 2nd tier suppliers when purchasing forged parts, as well as an indication on how to do it.

1.5 Thesis outline

In this section, a brief overview of the structure of the thesis is provided in figure 2.

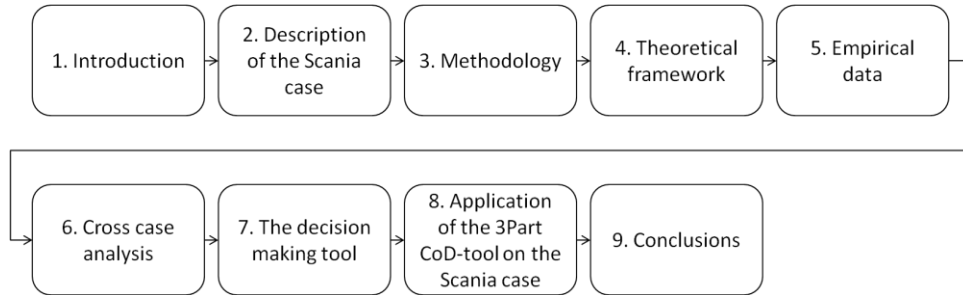


Figure 2: Overview of the structure of the thesis

After the introductory chapter (1), a description of the Scania case is provided in chapter 2, followed by a description of the methodology we have used (chapter 3), the theoretical framework of the thesis (4) and the collected empirical data (5). The data has been collected using a multiple case study approach, and is compared and analyzed in a cross case analysis in chapter 6. Based on the cross case analysis, a decision making tool, named the 3Part CoD-tool, has been created and is presented in chapter 7. The 3Part CoD-tool is then applied on the Scania case in chapter 8, and finally our conclusions are presented in chapter 9.

2. Description of the Scania case

In this section the reader will find a description of the Scania case starting with a short presentation of Scania as a company followed by a description of the players in the supply chain for forged parts. This information is presented with an aim to inform the reader of the present situation of the main case in the thesis.⁹

2.1 Player 0 – Scania

Scania is one of the world's leading manufacturers of heavy trucks and buses, as well as industrial and marine engines. Worldwide, the company has around 34 000 employees and is present in some 100 countries. Although Scania is a global company, production only takes place in Europe and to some extent in Latin America while the Research and Development function is concentrated in Södertälje, Sweden. The European and the Latin American businesses are for the most part separated in the sense that what is produced in Latin America is also sold there and vice versa.

Recovering from the crisis year of 2009, Scania reported an increase of total deliveries by 47 percent during 2010, reaching 63 712 deliveries (43 443). Net sales rose by 26 percent to 78 168 MSEK during the same period (62 074). Scania has a history of presenting positive results over a long period of time and it is considered as one of the most profitable organizations that manufacture trucks and buses.

The general purchasing strategy used by Scania is based on the principle of dual or multiple sourcing. Also, Scania strives to keep different types of suppliers; one type that has the capability to develop products together with Scania, and another type that strictly produces parts already specified by Scania. However, because Scania does most of its product development in-house, the need for suppliers with a product development capability is small. Thus, Scania tends to select small- to medium sized suppliers, who strictly produces already specified parts. Scania also wants to avoid being dependent on its suppliers, which it considers a bigger risk of becoming when using larger suppliers. Instead, Scania enjoys the benefits of being a prioritized customer at the small- to medium sized suppliers, where the aim is to have between 25 to 30 percent of the supplier's total business.

Another important factor Scania considers when selecting its suppliers is their delivery reliability, which is often more important than the price offered. In

⁹ The information has been gathered mainly from interviews with Per Åke Persson, Executive Supplier Quality Manager and Patrik Leickt, Senior Sourcing Manager Forgings, both employees at Scania Global Purchasing Power Train. Additional information has been collected from Scania's internal network, InLine, from presentations and reports.

connection to the delivery reliability issue Scania does not have an agenda of reducing its supplier base, because of the risk of failing deliveries. Other important factors that Scania also considers when selecting suppliers is price, quality and geographical location.

2.2 Player 1 – the 1st tier suppliers

Scania uses around 30 forges. However, there are many others on the supply market i.e. there are many others that potentially could supply Scania. Generally the competition in the business is high, but for some, large, forged parts (50 kilos and above) that Scania needs for its products the number of competent suppliers are lower and thus, the competition decreases. Most forges are specialized on a specific kind of forgings. Since Scania needs many different parts for its products, the company also needs to use many suppliers.

The forges vary in size. In many cases, several suppliers have been acquired or merged to create larger companies. Scania's share of the forges' total business varies but, as mentioned above, Scania has a guideline that it should be between 25 and 30 percent. About half of the forges that are being used by Scania are in this interval.

Geographically, most forges used by Scania are situated in Germany, where about half of the supplier base can be found. However, when it comes to volume, Sweden is also an important source.

The foremost driver of cost for the forges is the cost of steel, which makes the price of forged parts follow the base price of steel. The suppliers of forged parts use from around two or three steelworks up to ten or 15 as raw material providers to accommodate their demand of steel. The reason for this is that the different steelworks produce different kinds of sizes and shapes of steel, which can be provided by different type of steelworks. Additional elements, other than the base price of steel, that make up the final price of forged parts towards Scania are surcharges for scrap and different alloys, as well as the value adding work done by the forges on the parts. The surcharges for scrap and alloys are determined by independent organizations. There are different organizations in different countries, but their surcharges are more or less the same everywhere.

Scania has developed a supplier approval process where the different forges are approved as suppliers to Scania based on the quality of the products they produce and the way that they are handling their business with Scania.

2.3 Player 2 – the 2nd tier suppliers

For a forge to be allowed to deliver to Scania, they need to buy their steel from steelworks that have been approved by Scania. The approval process starts with the forge suggesting a new steelwork to Scania that it wants to purchase from. Scania then evaluates the plausibility of the new steelwork in terms of quality and starts an approval process if the steelwork seems satisfactory. In Europe, Scania has approved around 30 steelworks, which covers most of the market i.e. there are not an extensive number of steelworks on the market. Similar to the forges, many of the steelworks are specialized in different types of steel. However, many of the steelworks also have the capacity to produce a wide variety of different types of steel if needed. The steel that is used in forgings is mostly pole shaped in different variations.

Many of the different types of parts that Scania uses in its trucks and buses require different types of steel. Scania has classified its steel into three different categories, according to quality: the A, B and C classes. The default class is B, with A being used for a few specific parts that needs special endurance. The C class steel is rarely used.

Few, large players who often offer similar prices characterize the market for steelworks. The steelworks have a favorable position towards the forges, as the demand for steel on the market currently is high. The forges have a hard time acquiring steel and have to pay a high price for extra deliveries. If the forges seek out new steelworks they automatically get prioritized down, which sometimes means they cannot deliver in time to Scania.

Geographically, the bulk of the steelworks are located in Germany with the rest spread out across Europe. Approximately between 10 and 20 percent of the total produced steel is being used in forgings.

2.4 The supply chain situation

Figure 3 depicts the situation in the supply chain for forged parts today, in terms of flows of goods, changes of ownership, and contracting.

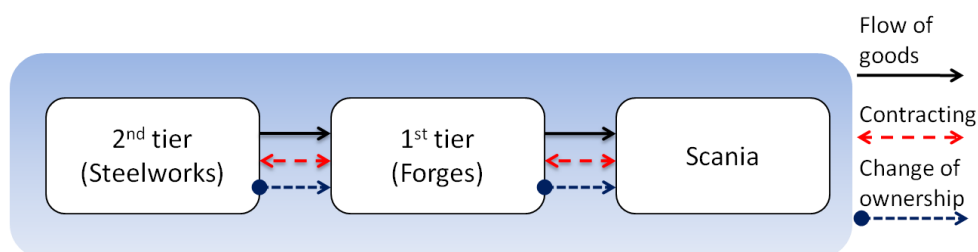


Figure 3: Flows of goods, changes of ownership, and contracting in the supply chain for forged parts at Scania today

As described in figure 3, Scania today delegates purchasing activities with the steelworks to the forges.

3. Methodology

In this chapter, the chosen methodology of the thesis, a constructive approach, will be described. First the chosen research approach will be elaborated upon and then the different models and techniques that are used will be described, with special focus on multiple case studies. The chapter will end with descriptions on how we have handled areas such as validity and reliability.

3.1 Research approach

It is necessary to clarify what kind of research approach researchers have in order to understand how they choose to handle issues that they meet in their research. In an early stage of our research, investigating the questions that are related to this thesis and the purpose, we identified what kind of research approach we would benefit from having. As we set out to solve a problem for Scania, it would preferably be an approach that focused on a real-world problem where qualitative information gathering would be central since we consider this problem to be complex and therefore needed to be investigated in a holistic way considering many parameters interacting, probably via some sort of case study. We also had a normative approach where we concluded that our result would be a framework of some sort based on the collected data. An approach that suits these requirements is the constructive research approach. The central elements of the constructive approach are displayed in figure 4.

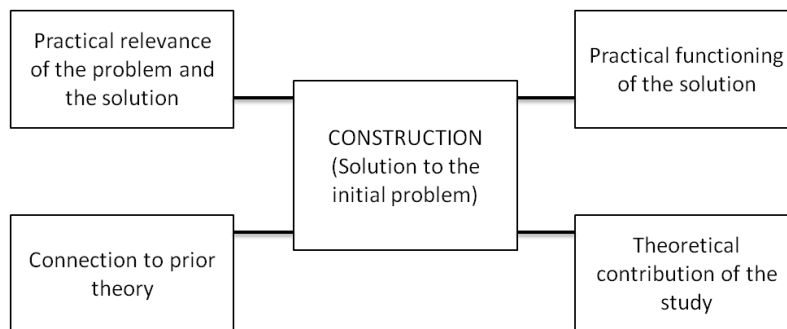


Figure 4: The central elements of the constructive approach¹⁰.

¹⁰ Lukka, K (2003) p. 85

3.1.1 The constructive research approach

The constructive research approach is developed towards the field of business administration but has a broad field of use and aims at producing innovative constructions. By constructions the approach intends all human artifacts that are invented and developed and not discovered. Examples of such constructions are models, diagrams, plans, organizational structures, commercial products and information system designs. According to Lukka¹¹, there are 6 requirements that need to be fulfilled when following a constructive research approach. The research should:

1. Focus on real-world problems that are relevant to be solved in practice.
2. Produce an innovative construction meant to solve the initial real-world problem.
3. Include an attempt for implementing the developed construction and thereby a test for its practical applicability.
4. Include a very close involvement and co-operation between the researcher and practitioners.
5. Should explicitly be linked to prior theoretical knowledge.
6. Should pay particular attention to reflecting the empirical findings back to theory.

We consider our research to fulfill these requirements sufficiently. The real-world problem in this thesis is the problem that Scania is facing together with the speculations and uncertainties that other companies have in the matter. The decision making tool, that has been constructed out of the collected data and earlier theoretical findings, constitutes the innovative construction. The tool has been tested on the Scania case and since we were present at Scania's global purchasing department during almost the whole time of the project period we secured a close co-operation between the researchers and the practitioners. Our theory and analysis chapters describe the linkage to theory and the reflections on empirical findings in relation to theory, which have been a main focus for us performing this research.

Lukka describes that the ideal result of a constructive research project is such that the real-world problem is solved by an implemented new construction, which has both great practical and theoretical contribution. Furthermore, he also points out that even if the project would fail at the practical level, e.g. by not realizing an implementation or other tests, it can still contribute to the academia with interesting theoretical findings.¹²

¹¹ Lukka, K. (2003) p. 83-85

¹² Ibid p. 85

3.1.2 Potential benefits and risks using the constructive research approach

The potential benefits and risks, which may arise when using the constructive research approach, are summarized in table 1.

Potential benefits	Potential risks
1. Emphasizes a two-way communication between theory and practice, researchers and practitioners.	1. Too delicate issues for the organizations investigated within the research to get published.
2. Validity through “what works is true”.	2. Lack of practical validity if not implemented/tested thoroughly.
3. A relevant, simple and easy to use solution.	3. Underestimate the importance of keeping continuous contact to the target organization.
4. Narrows the gap between practice and research.	4. For the researcher to both develop a problem-solving construction and to maintain a neutral and critical attitude expected of academic scholars.

Table 1: Potential benefits and risks with the constructive research approach¹³

Since we were present at Scania during the majority of the period and having daily communication with the project owners there, we believe that risks 1 and 3 in table 1 have been handled. Risk 2 in table 1 is a real risk which we consider to have handled by testing our framework and final solutions in a workshop consisting of Scania professionals both familiar with the key problem that this report focuses on and with the forging and steel industry. Finally in order to avert risk four in table 1 we have followed and relied on the guidance of our supervisors at Lund University, whom we have great faith in and consider being highly experienced academic scholars. We have also used a reference group, consisting of two other master students studying Technology Management at Lund University, which have examined our work and findings before finalizing this report.

During our research we have been able to take advantage of some of the benefits stated in table 1. The constructive approach has for us enabled better communication between practitioners and researchers due to the fact that it focuses on both practical and academic issues. This has also been helped by the focus to create a solution that is simple and that works in real life, not only in discussions, which can be a qualm for organizations when collaborating with academics. When reflecting on the chosen method we consider it to have helped us to work more closely with Scania and to better reach a result that is satisfactory for both the company and us as researchers.

¹³ Lukka, K. (2003) p. 91-92 & 96-99

3.2 Our process when using the constructive research approach

The typical research processes of a constructive research consist of seven steps.¹⁴ Which these processes are, their main characteristics and comments on how we plan to execute them are presented in this section.

3.2.1 Execution of step 1

Table 2 briefly describes the process of step 1, as well as the main characteristics of the step.

Process step 1	Main characteristics
Find a practically relevant problem, which also has potential for theoretical contribution	Pay attention to both practical and theoretical concerns

Table 2: Process and main characteristics of step 1 in the constructive approach

The issue that acts as a foundation for this report is described in chapter 1. Our formulated question takes into consideration both practical problems, which Scania and other organizations faces, and theoretical gaps. Therefore we conclude that we have a relevant problem, which also has potential for theoretical and practical contribution.

Our conclusions to how the issue was perceived by Scania came from a pre-study that we conducted when we started our research. In this study we interviewed Patrik Leickt, Senior Sourcing Manager that handles forged goods, and Per Åke Persson, Executive Quality Manager at Supplier Quality Power Train. We also attended various meetings for the commodity group *Forgings and Fasteners* and other groups such as Business Control & Analysis. We read internal documents on the internal network at Scania, InLine, to get ourselves oriented in how the business works. We elaborate more on our findings about Scania and its supply chain in chapter 2.

When investigating the research area we quickly realized that there has been limited research performed that handles this specific subject. Therefore we consider this thesis as a part of filling the gap in current research when it comes to how manufacturing companies should delegate or control purchasing with their 2nd tier suppliers.

3.2.2 Execution of step 2

Table 3 briefly describes the process of step 2, as well as the main characteristics of the step.

¹⁴ Lukka, K. (2003) p. 85-91

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Process step 2	Main characteristics
Examine the potential for long-term research co-operation with the target organization(s)	Both major parties should be committed to the project

Table 3: Process and main characteristics of step 2 in the constructive approach

Other than our six-month contract with Scania, our collaboration and co-operation has been secured in two ways. First, we have been working at Scania's purchasing department in Södertälje during the majority of the research period, which has made us a part of the commodity group for forgings. Second, we have delivered status reports every week to Scania for the first three months and presented our findings regularly according to pre-planned deliverables to the project owners at Scania.

3.2.3 Execution of step 3

Table 4 briefly describes the process of step 3, as well as the main characteristics of the step.

Process step 3	Main characteristics
Obtain deep understanding of the topic area both practically and theoretically.	Should reveal the problems and purposes of the research subject. Meant to conceptualize the problem area so that useful communication between the parties can take place. Investigate prior theory in the topic area.

Table 4: Process and main characteristics of step 3 in the constructive approach

During this process step we first explored theories that were relevant for our research. How we went about to find these theories is described in section 3.4. This exploration gave us a theoretical framework, which we used in the analysis. The foundation of the framework is a review of research on the particular issue of the thesis, i.e. how companies handle their 2nd tier suppliers, under what circumstances moving beyond the 1st tier supplier can be favorable and what factors determine the success or failure of such an action.

With the theoretical foundation at hand we gathered qualitative data by conducting a multiple case study. The method used during the multiple case study is described in section 3.3.1.

3.2.4 Execution of step 4

Table 5 briefly describes the process of step 4, as well as the main characteristics of the step.

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Process step 4	Main characteristics
Innovate a solution idea and develop a problem solving construction, which also has potential for theoretical contribution.	An innovative construction is designed. Creative and heuristic step. Profound co-operation teamwork between practitioners and researchers. May be a time consuming and iterative process.

Table 5: Process and main characteristics of step 4 in the constructive approach

In this step we analyzed data from our multiple case study in a cross case analysis, and innovated a construction. In the cross case analysis, we compared the cases to each other and to our theoretical framework and identified connections and patterns that are used as basis for our construction. The construction takes the form of a tool that consists of three parts and results in a recommendation for the manufacturing company that uses it. It serves as a guide on whether or not to control purchasing and suggests a preferred procurement model.

3.2.5 Execution of step 5

Table 6 briefly describes the process of step 5, as well as the main characteristics of the step.

Process step 5	Main characteristics
Implement the solution and test how it works.	One of the key characteristics of the constructive approach. The innovation has to be sold to the target organization.

Table 6: Process and main characteristics of step 5 in the constructive approach

In this step we studied the supply chain consisting of Scania, forges and steelworks in the same manner as we studied our case companies during our multiple case study. After gathering the information we applied our decision making tool to fulfill the purpose of this report.

What we have not done, which normally is a part of the constructive research approach, is to fully test our construction. This would mean a follow up on our conclusion whether or not Scania should include their 2nd tier suppliers in their purchasing processes with an action plan and also implementing the recommended decision. The reason that step 5 is excluded is that this would according to us be a far too big scope for a master thesis. We have tested both our decision making tool and the recommendations to Scania by conducting a workshop where purchasing professionals discussed and challenged our findings. This brought according to us validation to the result and helped us draw conclusions on the usability of the framework.

3.2.6 Execution of step 6

Table 7 briefly describes the process of step 6, as well as the main characteristics of the step.

Process step 6	Main characteristics
Ponder the scope of the applicability of the solution	Analyze the results of the constructive research process and its preconditions. Stepping back from the empirical work and ponder at the learning process. Conduct a theoretical analysis even if the test in process step 5 failed.

Table 7: Process and main characteristics of step 6 in the constructive approach

Conclusions and discussions related to issues that are conducted in step 6 are described in chapter 9, Final results and conclusions.

3.2.7 Execution of step 7

Table 8 briefly describes the process of step 7, as well as the main characteristics of the step.

Process step 7	Main characteristics
Identify and analyze the theoretical contribution	Reflect the findings back to prior theory both if the construction test was positive and negative. In both cases there is the possibility for theoretical contribution. Investigate what the more general findings are. Theory refinement is probably the most expected theoretical result of a constructive project.

Table 8: Process and main characteristics of step 7 in the constructive approach

Conclusions and discussions related to issues that are conducted in step 7 are described in chapter 9, Final results and conclusions.

3.3 Case studies

This section will describe our method when working with case studies, which is a part of step three in the constructive approach.

Single or multiple case studies can be used to describe a phenomenon, or predict outcomes based on past occurrences in similar cases¹⁵. According to Yin, case studies should be used when *“a “how” or “why” question is being asked about a*

¹⁵ Ellram, Lisa M. (1996)

*contemporary set of events, over which the investigator has little or no control*¹⁶. Both of these approaches indicate that a case study would be preferable in this thesis.

Case studies are rich empirical descriptions of a phenomenon and are often based on a variety of data sources, which supports the creation of accurate, interesting and testable theory. However, there are some challenges connected to conducting case study analyses. Eisenhardt and Graebner highlight some of these challenges; they are presented in table 9.¹⁷

1.	<i>The justification of theory building</i> i.e. why the research question is better addressed by theory-building rather than theory-testing research
2.	<i>Case selection</i> i.e. how the theory can generalize if the cases are not representative
3.	<i>Dealing with interview data</i> i.e. how we can be sure that the data is not biased
4.	<i>Presenting empirical evidence</i> i.e. conveying a rich "story"
5.	<i>Writing the emergent theory</i> i.e. justifying the formatting of the theory

Table 9: Challenges in conducting a case study¹⁸

All of these issues have been taken into consideration when conducting the research for this report. How is presented further on in this chapter.

3.3.1 Case study method

The multiple case study conducted in this thesis is based on the multiple case study method described by Yin¹⁹. The method is depicted in figure 5.

¹⁶ Yin, R.K. (2009) p. 13

¹⁷ Eisenhardt, K M. and Graebner, M E. (2007)

¹⁸ Eisenhardt, K M. and Graebner, M E. (2007)

¹⁹ Yin, R.K. (2009) p. 57

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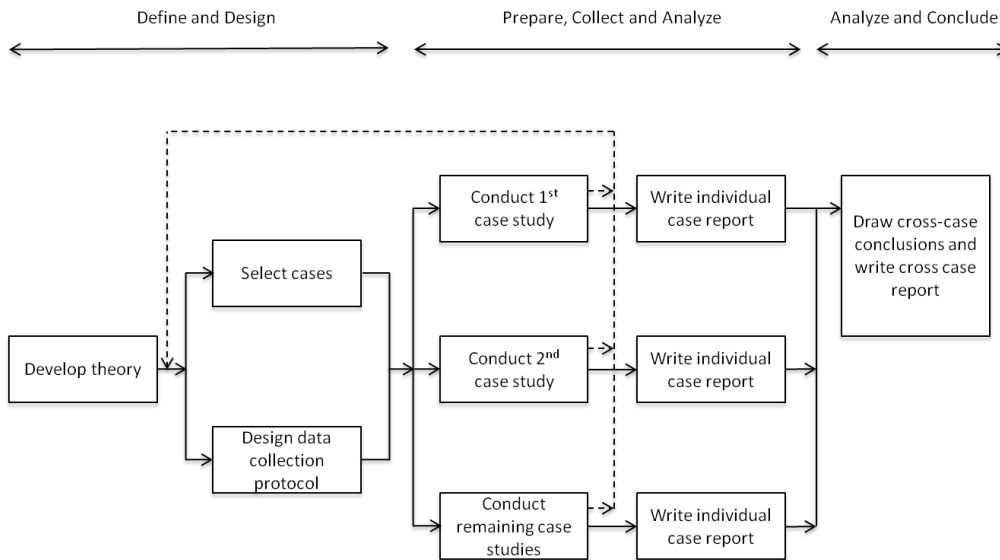


Figure 5: Case study method²⁰

The different parts in figure 5 will in this section be described according to how we have chosen to use them when conducting our multiple case study.

3.3.1.1 Design data collection protocol

Yin describes a certain case study protocol that states the purpose of the research, what kind of information that the researchers want to answer to meet the purpose and how to conduct the interviews. We have not written a case study protocol as an independent document. This information is instead spread out in the thesis. The main parts are found in chapters 1 and 3 (purpose and method together with complementary information), chapters 5 and 6 (case reports and cross case analysis), a case study questions and interview guide in appendix 1 (questions that were asked during conducted interviews) and case report guide in appendix 2 (how the case reports were structured when collecting the data).

3.3.1.2 Selecting cases

An essential question when using case study analysis is to determine how many cases are necessary to achieve the desired generalizability of the results. Using a single case is preferred when testing a well-formulated theory or when the case is unique and perhaps reveals a phenomenon that was previously unknown or inaccessible. Multiple case studies, on the other hand, allows for the development of a rich, theoretical framework and should be used to either predict similar results among replications, or to show contrasting results, but for predictable, explainable

²⁰ Inspired from Yin, R.K. (2009) p. 57

reasons.²¹ We have chosen to conduct a multiple case study since we believe it to be necessary in order to be able to create a framework with a strong sense of validity. Earlier research indicates that there are a lot of different variables to consider which would be hard to discover if only studying one case.

In this thesis, purposive sampling has been used to select appropriate cases. Purposive sampling involves making strategic decisions regarding with whom, where and how the research is done. There are several varieties of purposive sampling, depending on what the research is aiming to accomplish. One of these varieties is named *criterion case sampling*, which involves selecting cases who meet certain criteria.²² The criteria we have chosen to use when selecting cases is described in table 10 and has been inspired from the situation that Scania is in when purchasing forged parts.

Criteria	Description
CRIT-1	The case company should preferably be a manufacturing company
CRIT-2	The case company should preferably have experience in negotiating and/or contracting with its 2 nd tier suppliers in their purchasing processes
CRIT-3	The case company should preferably be near the final customer in the supply chain
CRIT-4	The case company should preferably be a larger company
CRIT-5	The case company should preferably be an international player
CRIT-6	The case company should preferably have a well-developed purchasing division
CRIT-7	The case company's 2 nd tier suppliers should preferably sell (1) steel, (2) metals or (3) raw material of some sort

Table 10: Preferred criteria used when selecting cases for the multiple case study.

The criteria can be compared to the unit of analysis that according to Yin should be decided in designing the case study²³. Our unit of analysis when conducting this multiple case study is:

- Different types of strategies for delegating and controlling purchasing processes with 2nd tier suppliers.

When conducting this study we have had limited resources. Our time frame has been limited to 20 weeks and the geographical working area has been concentrated to Stockholm and Lund, which is where we operate and where we have had best opportunities to connect with organizations. These limitations have affected our

²¹ Ellram, Lisa M. (1996)

²² Given, Lisa M. (2008) p. 697-698

²³ Yin, R.K. (2009) p. 29-33

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choices of case objects. Due to these limitations we have not considered our criteria as demands but as guidelines and as a framework to evaluate how attractive the potential case companies would be to our research. The choices were made out of those that matched our criteria the most.

Based on above-mentioned criteria, five organizations were selected to be included in the research. Two of the companies wished to remain anonymous. These companies have been given a fictional name, *GloboMan and Globotech*, and will only be described shortly. The following case companies have been included in our case study:

- *Alfa Laval* – a global company manufacturing products related to cooling, heating, flow and separation processes.
- *Cargotec* – an international corporate group that improves efficiency of cargo flows on land and at sea. Cargotec has affiliates that manufacture among other things cranes, forklifts and shuttle carriers.
- *GloboMan* – a global manufacturing company.
- *Globotech* – a global company in a high tech and dynamic industry.
- *Scania global purchasing, Cab Components, Chemicals* – a part of Scania’s purchasing department that purchases plastics and other chemicals.

How each selected case company fulfilled the mentioned criteria in table 10 is presented in table 11.

Company	Fulfilled criteria						
	CRIT-1	CRIT-2	CRIT-3	CRIT-4	CRIT-5	CRIT-6	CRIT-7 ²⁴
Alfa Laval	X	X	X	X	X	X	-
Cargotec	X	X	X	X	X	X	-
GloboMan	X	X	X	X	X	X	-
Globotech	X	X		X	X	X	-
Scania, chemicals	X	X	X	X	X	X	-

Table 11: How each case company fulfilled the preferred criteria.

3.3.1.3 Conduct case study

The cases were studied in a certain order, which enabled us to identify new areas of interest and develop our way of working continuously. What we notice as a result of this is that the first case study that was conducted, Globotech, has a slightly different focus than the rest of the studies.

²⁴ not presented here, see table 12 for detailed information

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When conducting our case studies the primary source of collected data has been interviews. Interviews are argued to be one of the most important sources of information when it comes to case studies²⁵. The interviews were prepared and interview guides were constructed (see appendix 1) in order for the interviewers to stay on the subject and on the right level of type of questions. The conversations were recorded and notes were taken during the meetings. After each interview the notes were summarized and the draft was sent to the interviewees for confirmation that the conclusions were in accordance with their opinions.

When possible we have also taken part of internal documents from the studied organizations. At Scania we had access to a number of different types of sources such as the internal intranet, InLine, and with that several internal documents and databases. Since we have been present at Scania's purchasing department we have been able to make observations continuously, which also has contributed to our understanding of the situation and the issues regarding this research.

The type of articles that we have discussed with the companies have been selected from a certain prioritization that was made to resemble the situation that Scania is in: *priority one* is steel articles, *priority two* is other metal products and *priority three* is articles where the 2nd tier suppliers sells raw material. The outcome from each case company regarding which type of person that we interviewed and what type of articles that were investigated is shown in table 12.

Case company:	Article priority group	Type of person interviewed
Alfa Laval	1	3 x Strategic Purchasing Managers
Cargotec	1, 3	1 x Vice President & Deputy at Global Sourcing and 1 x Global Category Director
GloboMan	1	2 x Supply Manager
Globotech	3	1 x Sourcing Commodity Manager
Scania, chemicals	3	1 x Sourcing Manager

Table 12: Article priority group and people interviewed for investigated case companies

The interviews conducted in this research have been guided conversations instead of structured queries, which are to prefer when conducting case studies.²⁶ This means that we have had a flow during our interviews rather than a rigid interrogation. In other words our interviews may also be described as semi-structured since we have had a list of specific themes and main questions that we wanted to address²⁷. However, we have not been stringent in what order the different subjects have been discussed and we have not been bound to only include the subjects that we on

²⁵ Yin, R.K. (2009) p. 106

²⁶ Yin, R.K. (2009) p. 106

²⁷ Bryman, A. Bell, E. (2005) p. 363

beforehand have decided to address. We believe this technique is preferable in order to get the information that we are interested in, affecting the interviewed persons as little as possible. It has also allowed us to be more receptive to changes and new findings when they appear. In doing so we prepared ourselves from the beginning on being adaptive and flexible, which are of importance when conducting case studies²⁸. The interview guides that we have followed are found in appendix 1.

3.4 Literature studies

When conducting literature studies within the frame for this thesis we have investigated several areas such as: power structures in supply chains, power in buyer supplier relationships, principal agent theory and delegation versus control in various settings. In order to find relevant literature we have had discussions with our supervisors at Lund University and contacted distinguished researchers that has conducted research in the area of delegation and control. One of our primary sources of information has been electronic databases such as LibHub – Lund University library database for books, articles and other printed sources and Google Scholar, which is a commercial search engine for articles. In these databases we have used key words such as: purchasing leverage, transaction cost analysis, delegation, control, procurement and purchasing.

Our way of working was iterative where interesting books and articles led us to new sources both via used references and by other work written by the authors. Google scholar proved very effective in the way that if we found an interesting article we could with this search engine in an easy way find articles that had referred to the original article and through that find related research.

3.5 Validity and reliability

Validity and reliability are both criteria for judging the quality of research design and can be seen as tests in which the research method has to defend itself for different types of criticism. Yin divides validity into construct validity, internal validity and external validity. Constructive validity questions whether subjective judgments have been used to collect data. Internal validity tests the researchers' ability to analyze the collected data in a convincing, airtight and credible way. External validity handles the issue if the case study is generalizable. The final test of reliability aims to minimize the errors and biases in a study and to check if another researcher, following in our footsteps and remaking our study, would arrive at the same conclusion.²⁹

²⁸ Yin, R.K. (2009) p. 70-71

²⁹ Yin, R.K. (2009) p. 40-45

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In table 13 we have summarized what kind of tactics we used to strengthen the thesis in relation to each test in validity and reliability, together with a short explanation.

Test	Tactic	Explanation
Construct validity	Have had key informants review draft case study reports	The persons that were interviewed have had the opportunity to review our conclusions from each interview, the case reports and the final report.
Internal validity	The use of replication logic	Represented in the way we designed our case study: our focus on the choices of case and the method in which we collected data that was made in a way easy to replicate.
	Multiple cases	The choice of studying many cases instead of one strengthens the generalizability.
External validity	Extensive research documentation which covers the headlines of a case study report ³⁰	With regards to the description of the purpose and background in chapter 1, the chosen method in chapter 3 together with theoretical framework in chapter 4, interview guides in appendix 1, case report guide in appendix 2 and data analysis in chapter 6 where descriptions of the different case subjects are summarized.
Reliability	Same as the above, extensive research documentation.	Same as the above, an extensive documentation strengthens the reliability.
	Supervision from established academics and opponents.	We have had supervision from Lund University by two established academics ³¹ . The supervision has resulted in meetings in person every two weeks with additional mail conversations and telephone meetings. Two master's students have also reviewed this thesis.

Table 13: Summary of the used tactics in this thesis to strengthen its validity and reliability

³⁰ Yin, R.K. (2009) p. 80-81

³¹ Andreas Norrman, Professor in Engineering logistics, especially supply chain structure and organization, at Lund University Faculty of Engineering, and Christer Kedström, associate professor at Lund School of Economics and Management, Lund University

4. Theoretical framework

This chapter reviews and summarizes relevant literature that has been used as a theoretical framework when writing this thesis. It has served as a foundation for the thesis and as a reference during our analysis of the collected empirical data. First we will present the structure of the chapter, which is based on the background and problem discussion in chapter 1. It will be followed by a description of stated and related theories. Finally we will present the summarized theoretical framework that has been used in this thesis.

4.1 Structure

Our theoretical framework takes its start in three initial focus areas that are stated as questions, all presented in table 14. The questions are chosen and set up with an aim to take into account what a manufacturing company should prioritize when investigating how to decide whether to delegate or control purchasing activities with its 2nd tier suppliers, an approach that we consider to be aligned with the purpose of this thesis. Each area has been built up from the identified concepts in chapter 1 and is presented with what type of theoretical fields of study that has been found relevant or fields that incorporate several of such theoretical areas (see table 14). The theoretical fields of study will be briefly introduced in each section but will have a strong focus on research that is specifically angled at issues handling delegation and control in a purchasing situation.

The first area aims to investigate *what* kind of issues a manufacturing company should consider when deciding whether to control or delegate it's purchasing activities to the 2nd tier suppliers, as well as *why* these are important. The second area aims at investigating *how* manufacturing companies can delegate or control their purchasing activities with their 2nd tier suppliers according to earlier research. Finally we aim to investigate *when* a certain type of model of delegation or control is to prefer.

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Initial focus areas	Concepts identified from chapter 1	Theoretical fields of study
What issues to consider & why they should be considered?	Principal and agent	Principal agent theory for delegation and control of contracting with 2nd tier suppliers
	Loss of control	
	Loss of insight	
	Communications issues	
	Incentive problems	
	Contracting	
	Risk sharing	
	Purchasing leverage	Power and relationships between buyers and suppliers in a 3 tier supply chain
	Volumes relations	
	Bargaining power	
Buyer-supplier relationships		
How to delegate or control?	Different ways of delegating and controlling purchasing	Defined models
When to delegate or control?		External cases
	Conditions for success	

Table 14: The road to what type of theoretical fields that we have chosen to study in this report

4.2 Principal-agent theory for delegation and control of purchasing

“Agency (principal-agent) theory addresses the “information asymmetry” and “the self-interest” by focusing on the “contract” and its incentive properties.”³²

The principal-agency theory handles models where a principal (person or company) requests an action to be performed by an agent (person or company). The agent is potentially difficult to monitor for the principal or in possession of information that the principal cannot obtain. They are both in a cooperative relationship but have potentially different objectives and attitudes toward risk.³³

Principal-agent theory addresses problems with risk sharing in the supply chain that might arise when companies prioritize their own interest instead of the collective best for that specific supply chain. Another problem is information asymmetry (“hidden”, “private” or not transparent information) commonly found in supply chains. These problems may create a behavior by companies to continuously try to reduce their own risk and in doing so obstructing the way to optimize the supply chain for all parties. A reason for such an opportunistic behavior might be the lack of an effective incentive structure for the supply chain. A tool for reaching such a state

³² Agrell and Norrman (2004) p. 18

³³ Ibid p. 18-20

is a contract.³⁴ The two main problems that are mentioned within the principal-agent theory that can occur in a principal-agent relationship are commonly separated to:

1. *Agency problems*: can occur when the two parties have different goals and when it is difficult or expensive for the principal to monitor and verify the agent's actions. This includes the earlier mentioned information asymmetry problem.
2. *Risk sharing problem*: can occur when the principal and agent have different attitudes toward risk, which may make them act differently in certain situations.³⁵

Furthermore, the agency problems (1) have a certain amount of sub-issues, which are of interest when it comes to principal-agent theory, they are:

- 1A. *Moral hazard or hidden action*: is related to when the principal is unable to monitor the agent's level of effort, which will have to be handled by contracting.
- 1B. *Adverse selection*: is when the principal has several agents that may perform his task but each with a certain level of ability, which the principal is unable to observe. This is one sort of hidden information.
- 1C. *Signaling or local information*: is when the agent has some private information that he would like to express to the principal by some observable action. An example can be a supplier providing high quality product or offering generous warranties. This is one sort of hidden information.³⁶

The agency and the risk sharing problems incorporate many different practical problems and therefore other types of sub-issues. The aim of the description in this section is to give the reader an insight in what type of issues that one might relate to principal-agent theory by explaining its basic concepts. This will be important in order to understand the discussions that follow. Further on in this chapter we will discuss such problems in a more direct relation to delegation and control of purchasing activities in a two-agent model.

4.2.1 Different types of research approaches

Two different types of research are mentioned connected to agency theory: positivist agency theory and normative principal agency research. The first focuses on solving the agency problems that occur when the principal and agent are likely to

³⁴ Ibid p. 17-18

³⁵ Eisenhardt, K (1989) in Agrell and Norrman (2004) p. 20

³⁶ Agrell and Norrman (2004) p. 20-21

have conflicting goals by describing the appropriate governance mechanism. The normative principal agency research differs both in focus, which is broader, and in performance, which is more abstract and mathematical.³⁷ We will in this thesis focus on conflicting goals between agents and principals and governance mechanisms in the way of controlling or delegating purchasing by the manufacturing company. What is not addressed here are mathematical calculations to support arguments even though the conclusions and discussions of authors conducting normative agency research will be presented. Therefore we consider the scope of this thesis to include part positivist and part normative agency research.

4.2.1.1 Revelation principle

From what seems to be the more normative approach to agency theory Mookherjee presents a central theoretical result in the area of centralized and decentralized systems of economic organization, which is the so called "Revelation Principle". This principle will later be used in discussions of certain issues in this chapter. The revelation principle relies on some specific assumptions in order to uphold its validity:

1. The absence of communication costs between agents and principal,
2. The absence of information processing costs for the principal,
3. The absence of collusion among agents and
4. The ability of the principal to commit upfront to a mechanism and not renegotiate it later.

With these assumptions the revelation principle establishes that central control cannot be dominated by any delegation arrangement. After defining this principle Mookherjee reveals two approaches for studying delegation, control and contractual hierarchies and developing theories within the area. The first is by staying within the framework of the revelation principle and the second is by defining precisely which type of assumption that no longer is valid.³⁸ The purpose of the revelation principle seems to be good: to have a structure when analyzing control and delegation situations and a way to separate different issues in doing so. It could be favorable when wanting to single out one factor and pursuing the cause and effect of that parameter e.g. communication costs by making assumptions 2-4 valid. However, it is hard to consider the first three assumptions realistic. This critique is strengthened by central parts of the agency theory, which states that supply chain relationships issues exists because of information costs, hidden actions and hidden information.

³⁷ Agrell and Norrman (2004) p. 21-22

³⁸ Mookherjee, D. (2006) p. 369-370

4.2.2 Agency and risk sharing problems and solutions

In this section we will present research for what type of agency and risk sharing problems and solutions research states to be relevant when deciding whether to control or delegate contracting with 2nd tier suppliers.

4.2.2.1 Conflicting agenda

When organizations interact there is a risk of differing agendas and what type of incentives that should be in force for the different actors to act according to a common agenda. This relates to agency problems such as moral hazard or hidden action mentioned in section 4.2. Whether the manufacturing company chooses delegation or control of purchasing activities with the 2nd tier suppliers will have an effect on the possibilities for a conflicting agenda to arise and to create issues.

Controlled contracting in a two agent-model, such as one with a manufacturing company and a two-tier supply chain, can according to Melumad et al prevent issues that may arise due to upcoming incentive problems when delegating. Depending on what type of incentives that is presented, delegating contracting may lead to the intermediate agent (the 1st tier supplier) pursuing its own self-interest and causing the principal (the manufacturing company) to lose control over the situation.³⁹ In order to avoid such a problem the principal must ensure three things when delegating:

- (a). that the contribution of the agent (the 1st tier supplier) is monitored,
- (b). that the sequence of contracts is designed properly. A proper sequence here means the following order; first principal and 1st tier, then 1st tier and 2nd tier,⁴⁰
- (c). first (c1) that the 1st tier supplier is risk neutral⁴¹, and second (c2) that there is an absence of limited liability constraints⁴².

If the principal does not monitor the agent (a), it might take advantage of the situation, resulting in a problem similar to the “double marginalization of rents”^{43,44}, common in vertical relationships. Regarding the contracting sequence (b), it is important that the 1st tier supplier does not enter into a contract with the 2nd tier supplier before accepting the primary contract with the principal. If this happens, the 1st tier supplier will have obtained additional private information, which

³⁹ Melumad, N. et al (1995) p. 655

⁴⁰ Ibid

⁴¹ Kayış, E. et al (2007)

⁴² Mookherjee, D. (2006) p. 374

⁴³ Melumad, N. et al (1995) p. 655

⁴⁴ The concept double marginalization of rents here refers to a situation where each tier adds a margin to their product due to agency problems, resulting in a sub optimization of the supply chain.

generally tends to increase the information rent gained by the 1st tier supplier. It is also important that the 1st tier supplier reports its costs before entering a contract with the 2nd tier supplier, so that the principal can align the 1st tier supplier's objective with its own.⁴⁵ The absence of limited liability constraints (c2) allows the principal to evade information rents originating from privacy of the prime contractor's (1st tier suppliers) knowledge of subcontract cost⁴⁶.

Mookherjee describes the risk of conflicting agenda when delegating as a situation where *“/.../ the “prime” supplier’s payments between himself and the subcontractor may differ from what the principal desires.”* He continues by comparing the vertical control problem when delegating with the “double marginalization of rents” similar to the discussion made by Melumad et al.⁴⁷ The risk of increasing costs due to hidden information seems to be an issue that is well-established. The same issues can according to Mookherjee explain other complications such as bureaucracy in large companies and control of costs:

“/.../ managerial risk aversion or limited capacity for principals to monitor local conditions or agent decisions can cause significant control losses from delegation, that grow with the size and complexity of the organization. This provides an explanation of organizational diseconomies of scale, i.e. why larger firms tend to be more “bureaucratic” and less able to control costs.”⁴⁸

Even with the above stated precautions (a-c), the risk of a changing agenda will be present over time and monitoring the agents and enforcing a certain sequence of contracting could be costly for the principal. It is also according to us a big limitation to have to assume that the 1st tier supplier is risk neutral. All together this unravels important issues for why controlling purchasing is to prefer to prevent moral hazard/hidden action or hidden information issues such as conflicting agendas.

When addressing the issue of different models for controlling or delegating contracting with the 2nd tier suppliers Amaral et al discuss agency problems as general issues that need to be taken into consideration. They point out five principles that are valid no matter what purchasing model organizations use when assessing risks and opportunities and two of these handle issues connected to information asymmetry. The two principles relevant to this area are:

1. *Addressing the motive* – provide appropriate incentives to motivate the 1st tier suppliers.

⁴⁵ Melumad, N. et al (1995) p.655

⁴⁶ Mookherjee, D. (2006) p. 374

⁴⁷ Mookherjee, D. (2006) p. 374

⁴⁸ Ibid p. 388

2. *Addressing the opportunity* – limit the opportunities for the 1st tier suppliers to exploit their means to violate the manufacturer's interests.⁴⁹

When *addressing the motive* a manufacturer should try to align the 1st tier supplier's agenda with its own. To begin with, it would be appropriate to design contract structures that minimize conflicts of interest, e.g. by not paying fixed fees to the 1st tier supplier for materials handling, but instead paying a percentage on top of materials costs. However, by using this approach, the 1st tier supplier might attempt to increase other charges. Another approach that can be used is to attach rewards to desirable behaviors, i.e. offer appropriate compensation to the 1st tier suppliers for bearing more risks. To develop mutual trust it is important that the manufacturer invests in the relationship, perhaps by using open-book accounting.⁵⁰

A manufacturer can redesign processes to *address the opportunities* of the 1st tier suppliers to violate the manufacturer's intentions. Information systems and monitoring procedure play an important role here. For example, a manufacturer can facilitate the management of suppliers by creating metrics that predict downstream performance, minimize information requirement and are easy to monitor as well as document actions and record transactions. Periodic audits from multiple systems to detect error or fraud can also be used.⁵¹

One issue that is not addressed is the quality of the relationship between the principal and the agents. It is interesting that the authors of the research that we have found related to this subject do not handle this area in a broader extent. Amaral et al briefly mention it in the principle of addressing the opportunities. The quality or type of relationship could have an effect on whether the agents would develop or act on a different agenda than the principal and therefore developing such a relationship would be one tool for the principal to prevent this type of issue. We will address relationships to a certain extent in section 4.3, when discussing power in the supply chain.

4.2.2.2 Changes in price, costs or product related attributes related to hidden information and hidden actions

One way of analyzing the situation of delegation and control is to define each step in the supply chain as a market in itself. Continuing with this argument one might see it as if the manufacturing company should start to control purchasing it would break the monopoly that the 1st tier suppliers would have in contracting with the 2nd tier suppliers if it was delegated by the principal.⁵² If the manufacturing company does

⁴⁹ Amaral et al (2006) p. 230

⁵⁰ Amaral et al (2006) p. 231-232

⁵¹ Ibid p. 232

⁵² Melumad, N. et al (1995) p. 661

not take part of that market there is a risk for both hidden information and hidden actions. Control of purchasing by the manufacturing company would therefore expose the purchasing from the 2nd tier suppliers to competition and increase the visibility of both actions but foremost information. A higher degree of competition would also lower prices and force the different actors to enhance internal and external business processes in order to increase their competitiveness. This argument speaks for an increase in control of contracting.

Controlling purchasing with the 2nd tier suppliers could result in a better control over quality, delivery performance and component cost.⁵³ This could be the case since an increase of control could open up new ways of information flows and in that way reduce the amount of hidden information. If issues regarding quality and performance were spread throughout the three tiers there would be a greater possibility to correct them and improve the results of the whole supply chain.

Kayış et al point out that by delegating purchasing the manufacturing company reduces the amount of expertise, tasks and overall workload that need to be dealt with by the purchasing division. This will lead to a reduction in employees and in managerial effort, which consequently will lower the total cost for the manufacturing company.⁵⁴ Further reasons to delegate described by Kayış et al are in situations when the revelation principle fails and where the *“delegation may result in strictly greater expected profit for the manufacturer”* which is part of consolidated results from other authors research.⁵⁵ Usually, these researchers have incorporated information processing costs, cost of complex contracts and collusion among suppliers. Since the revelation principle seems to be more of a way to simplify theoretical modeling than a realistic situation the conclusion from these arguments are here that delegation is to prefer in a live case when all the different types of costs are taken into account.

Melumad et al argues that the advantages of delegation are connected to communication and information issues. With delegation, the principal (manufacturing company) may be permitted a higher degree of flexibility because of the inability of agents (suppliers) to communicate all of their private information to the principal if it were to control the process. Reasons for the inability to communicate could be that a certain expertise is held by the agent and not the principal or due to certain costs related to communication and information processing.⁵⁶

⁵³ Amaral, Billington and Tsay (2005) in Kayış, E. et al (2007) p. 2

⁵⁴ Kayış, E. et al (2007) p. 2

⁵⁵ Ibid p. 3

⁵⁶ Melumad, N. et al (1995) p. 666

Mookherjee mentions the possible benefit that derives from decentralization (delegation) when each level may use local information instead of having to communicate. He points out that in order for there to be any benefits with delegation in this matter there should exist some constraints on what agents (suppliers) can report to the principal (manufacturing company) or alternatively limitations to the extent of information that the principal can handle.⁵⁷ Mookherjee concludes among other things: *“Perhaps the most important benefit of delegation is the distribution of information processing tasks.”*⁵⁸ Mookherjee also argues that *“/.../ the added control loss is always outweighed by the advantage of better informed production decisions, provided the principal can monitor production assignments or payments between the agents ex post.”*⁵⁹ In this way Mookherjee highlights both an important advantage for delegation and one for control. This might illustrate that there is no single best way to choose between delegation and control and gives an indication that a middle way or continuing analysis for specific article groups or suppliers might be the right way to go for manufacturing companies that are reflecting on if they should delegate or control their purchasing with their 2nd tier suppliers.

We also refer to section 4.2.2.1, *conflicting agenda*, where we present issues that also can influence the cost situation for the principal in different ways depending on if she is controlling or delegating the contracting with the 2nd tier suppliers. One good example is if the principal is delegating contracting she would have to monitor the actions of the agent, which could require resources that would be costly.

4.3 Power and relationships between buyers and suppliers in a 3 tier supply chain

The central part of this section is the description by Cox of power in dyadic buyer supplier relationships in the supply chain. Several connections have been made to relevant concepts to the purpose of this thesis since it focuses around different types of buyer supplier relationships in the supply chain. The theory can be used to map what kind of power-relationship organizations in a supply chain have toward each other and how organizations should manage these relationships to take advantage of the situation or to change it. The theory also strives to identify where in the supply chain value is being gathered, according to the different power situations and what type of circumstances that affects this. We consider this theory to shed light on many aspects that can be of use when conducting our analysis.

⁵⁷ Mookherjee, D. (2006) p 379

⁵⁸ Mookherjee, D. (2006) p. 387

⁵⁹ Mookherjee, D. (2006) p. 380

4.3.1 Buyer and Supplier Power

Most of the academia, together with practitioners and consultants, has under the last 10 years created a sort of consensus on the preferred way of acting and thinking when it comes to purchasing and supply chain management. Cox calls the consensus model *integrated supply chain management* (ISCM) and summarizes the approach into five steps, which are shown in table 15.⁶⁰

1.	Concentrate on core competencies
2.	Outsource all non-core competencies to suppliers
3.	Consolidate all supply inputs into categories of spend
4.	Concentrate resources on a limited number of preferred suppliers
5.	Improve supplier and supply chain performance through proactive supplier development activities.

Table 15: The five steps of integrated supply chain management⁶¹

If one sees ISCM as the general best practice when it comes to purchasing one does not according to Cox fully consider that all buyer and supplier (and extended supply chain) relationships operate in an environment of relative buyer and supplier power. Therefore buyers can be in a position where ISCM is not the preferred strategy and where extended supply chain relationships would not be the best way to improve efficiency or to enhance business-purchasing performance. According to Cox ISCM can only be fully implemented in one of two situations, or a combination of them, due to what kind of leverage the buyers can obtain;

*'The first is when the focal organization is in a position of structural dominance over its extended network of suppliers. The second is when there is an interdependence with the extended network of suppliers that results in power being shared willingly by both sides in these exchange relationships.'*⁶²

Instead of claiming that there is one model, such as the ISCM, that suite all situations, organizations and supply chains practitioners should according to Cox focus on achieving *Janus-faced dominance*. Janus-faced dominance means acquiring dominance both as a supplier and as a buyer in the supply chain, further explained in figure 6.⁶³

⁶⁰ Cox, A. (2001 A) p. 8-9

⁶¹ Cox, A. (2001 A) p. 9

⁶² Ibid

⁶³ Ibid p. 12

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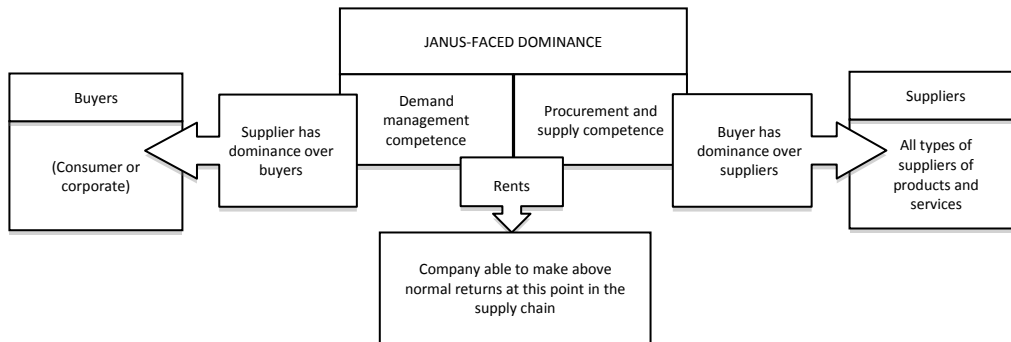


Figure 6: The janus-faced dominance in business⁶⁴

Other research besides Cox also addresses the concept of power in situations when delegation and control of contracting is discussed. Amaral et al argues that regardless of which procurement model a manufacturer chooses to use, it must consider the concept of power. Amaral et al suggest five general principles to help assess the risks and opportunities when deciding whether to control or delegate contracting. The first two of these are related to power:

- *Preserve power* – maintain and increase relative power in the supply chain.
- *Address the means* – limit the means for the 1st tier suppliers to take over this power.⁶⁵

According to Amaral et al a manufacturer must *preserve power* because its power in the supply chain is threatened by the trend to delegate responsibility not only for production and purchasing, but for product design and logistics as well. The threat is especially potent if the manufacturer is consolidating several of these functions to a single service provider. An additional threat is that the 1st tier suppliers have a motive to set up switching barriers for their customers by e.g. customize information systems and form deep relationships. To fend off the threats, a manufacturer can use tactics such as installing central oversight and coordination of purchasing, clarifying obligations and accountability up front and fostering competition among service providers. To leverage its purchasing power and accelerate negotiations, while still retaining long-term supplier relationships, e-procurement tools can be used. Multiple or dual sourcing are also helpful tools in the process, but it is important that the manufacturer formulates contracts where expectations and accountability are explicitly expressed.⁶⁶

⁶⁴ Cox, A. (2001 A) p. 12

⁶⁵ Amaral et al (2006) p. 230

⁶⁶ Ibid p. 230-231

A manufacturer can *address the means* of the 1st tier supplier to take over power by reallocating the decisions rights, e.g. by bringing some activities back in house. This will obstruct the 1st tier supplier's means to leak information to the manufacturer's competitors. However, with current information systems, the manufacturer has an advantage in that it can choose which activities to delegate, enabling it to tightly control the scope of responsibility and easily reallocate it. A manufacturer can also limit the means by distributing responsibilities among multiple providers. This increases costs for coordination, but makes it easier to detect errors or fraud. Amaral et al found in their study that many manufacturers are satisfied with the benefits they get from their chosen procurement model (more about procurement models in section 4.4.1), but far from all knew how to select the best one for their particular situation, and how to decide which activities to delegate and which to control. They use HP as an example of a company that has a well thought through strategy. HP uses the buy-sell model (see section 4.4.1) for their strategic commodities, i.e. the 20 percent of parts that represent about half of the companies production spending. For the next 50 percent of parts, HP uses audits to verify prices and rebates to mask pricing. The 1st tier suppliers, using the turnkey model (see section 4.4.1), purchase the remainder of parts.⁶⁷

The discussion made by Amaral et al tends to be more spread out than just handling the concept of power. Nevertheless it confirms the importance and relevance of power when discussing decisions regarding if to delegate or control purchasing.

4.3.2 The Power matrix

One way of understanding the relationship of power between buyers and suppliers is via the *Power Matrix*. It defines the power-relationship between a buyer and supplier according to certain power attributes. The matrix together with key power attributes is shown in figure 7. What is also shown is the signs that Cox uses to indicate which type of power relationship that certain organizations have; '<' and '>' stands for dominance in the pointed direction, '>' is dominance to the left and '<' is dominance to the right; '=' stands for interdependence; '0' stands for independence.⁶⁸

⁶⁷ Amaral et al (2006) p. 231

⁶⁸ Cox, A. (2001 A) p. 13

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Attributes to Buyer Power Relative to Supplier	High	<p>Buyer dominance (> or <)</p> <ul style="list-style-type: none"> • Few buyers/many suppliers • Buyer has high % share of total market for supplier • Supplier is highly dependent on buyer for revenue with few alternatives • Supplier's switching costs are high • Buyer's account is attractive to supplier • Supplier's offering is a standardized commodity • Buyer's search costs are low • Supplier has no information asymmetry over buyer 	<p>Interdependence (=)</p> <ul style="list-style-type: none"> • Few buyers/few suppliers • Buyer has relatively high % share of total market for supplier • Supplier is highly dependent on buyer for revenue with few alternatives • Supplier's switching costs are high • Buyer's switching costs are high • Buyer's account is attractive to supplier • Supplier's offering is relatively unique • Buyer's search costs are relatively high • Supplier has moderate information asymmetry advantage over buyer 	
	Low	<p>Independence (0)</p> <ul style="list-style-type: none"> • Many buyers/many suppliers • Buyer has relatively low % share of total market for supplier • Supplier has little dependence on buyer for revenue and has many alternatives • Supplier's switching costs are low • Buyer's switching costs are low • Buyer's account is not particularly attractive to supplier • Supplier's offering is a standardized commodity • Buyer's search costs are relatively low • Supplier has very limited information asymmetry advantages over buyer 	<p>Supplier dominance (< or >)</p> <ul style="list-style-type: none"> • Many buyers/few suppliers • Buyer has low % share of total market for supplier • Supplier has no dependence on buyer for revenue and has many alternatives • Supplier's switching costs are low • Buyer's switching costs are high • Buyer's account is not particularly attractive to supplier • Supplier's offering is relatively unique • Buyer's search costs are very high • Supplier has substantial information asymmetry advantages over buyer. 	
		Low	Attributes to Supplier Power Relative to Buyer	High

Figure 7: The power matrix, which presents the four different power relationships according to Cox⁶⁹

The matrix is used by first defining in which position the organization is in and thereafter how it can move the relationship to a more favorable position. The ideal position for buyers is to force all of their suppliers into the buyer dominant box and vice versa. Even if this is not possible buyers should strive to position themselves in a position that enables them as effective leverage of quality and cost as possible.⁷⁰

Several attributes presented in the power matrix are related to other research that we have found connected to the purpose of this thesis. Cox mentions information asymmetry as a power attribute and in so doing connects the power relationship theory to the principal-agent theory. We conclude that the information asymmetry is one of the concepts that seem to be consistent in research regarding delegate or control purchasing with the 2nd tier suppliers for a manufacturing organization. Continuing, it does not seem far-fetched to see connections with the power relationship theory that Cox describes with concepts such as bargaining power or purchasing leverage if comparing with the stated power attributes in figure 7 e.g.

⁶⁹ Inspired by Cox, A. (2001 A) p. 14

⁷⁰ Cox, A. (2001 A) p. 13-14

dependence on revenue and attractiveness. We discuss Ellram and Billington's take on purchasing leverage in the following section, 4.3.3, which handles several areas that are similar to the attributes presented in the power matrix, amongst others asset specificity (for example related to switching costs, attractiveness and standardization) and especially relative purchasing volume (for example related to percental share of total market, revenue dependence and importance of purchasing account).

4.3.3 Purchasing leverage

Ellram and Billington discuss how to outsource purchasing leverage in a successful way, which is similar to the concept of delegation or control of purchasing. They found that the foremost factor for retaining a strong purchasing leverage when controlling purchasing is that there needs to be a case of recurrent transactions with the same supplier; the manufacturing company must place significant business with one supplier, or there is no leverage to be gained. Another important factor is the specificity of assets involved, i.e. if the purchased product or material is unique, there is no evidence that implies that the manufacturing company could do a better job in contracting with the 2nd tier supplier than the 1st tier supplier.

The authors conclude that economies of scale affect the decision of whether to control the purchasing or not in a significant way. That is, if the 1st tier supplier serves several customers with similar needs, it may be able to consolidate its volumes and achieve a greater purchasing leverage and by that a lower purchasing price. In such a case it would be preferable to delegate purchasing to the 1st tier suppliers. However, there can also be situations where the manufacturing company has spread out its volumes of similar materials or parts on several suppliers in which case the manufacturing company could consolidate the volumes and by doing so achieve greater purchasing leverage and lower purchasing prices when controlling purchasing.⁷¹ Kayis et al also argues that a large manufacturer may be able to negotiate a lower price and get a better purchasing position by consolidating the purchasing quantity on behalf of all its contract manufacturers (1st tier suppliers)⁷².

The conclusions of the research from Ellram and Billington emphasize, as mentioned, the importance of economies of scale and summarizes their conclusions in this area in figure 8. The figure focuses on the relative leverage of customer firm (manufacturing company i.e. principal) versus contractor (1st tier supplier i.e. agent) and is mainly based on purchasing volumes. With that information it gives a recommendation of what type of action the principal/manufacturing company should take when deciding if to control or delegate contracting.

⁷¹ Ellram, L and Billington, C (2001)

⁷² Kayiş, E. et al (2007) p. 2

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High	Contract directly with raw material suppliers (2 nd tier)	Work with contractor (1 st tier), utilize your leverage so that you both benefit
Sufficient volume to command market leverage on materials/components	Assess transactions cost of contracting direct versus using subcontractor (1 st tier): act accordingly	
Low	Allow contractor (1 st tier) to manage	Utilize the contractor's leverage to the extent possible
	Low	High
	Buying organization (manufacturing company) leverage with supplier (2 nd tier), considering the contractor's (1 st tier) share of buying organization volume and volume of others	

Figure 8: Relative leverage of customer firm (manufacturing company) versus contractor (1st tier)^{73,74}

4.3.4 Power in supply chains

After presenting the concept of power in purchasing relationships as described by Cox together with purchasing leverage we now take it one step further when Cox describes the power and power relationships in the supply chain.

*'By a supply chain, one simply means the extended network of dyadic exchange relationships that must exist for the creation of any product or service that is supplied to a final customer'*⁷⁵

⁷³ Ellram, L and Billington, C (2001) p. 26

⁷⁴ By transaction costs Ellram and Billington means the costs related to the decision if an organization should perform a transaction or activity internally (vertically integrate), or in the market (horizontally integrate or outsource).

⁷⁵ Cox, A. Sanderson, J. Watson, G. (2001) p. 28

There are several ways of describing and categorizing supply chains in a descriptive way⁷⁶. Almost all of them fail to address the concept of power, which is argued by Cox to be one of the most important issues. The descriptions focus on the physical flow of products or services alone but then fail to see the more important flow, which is the relation between physical properties and value. The concept of value is commonly used in three ways:

1. *Value proposition*: refers to how much the customer appreciates the product or service in question.
2. *Value-adding process*: refers to transformation processes in organizations where less valued products transform to higher valued products.
3. *Value appropriation*: refers to the amount of money that any organization acquires when participating at a particular stage in the supply chain.

According to Cox it is the last type of value that is the most important because it refers to the value that is created towards the organization's shareholders and that is the only real purpose for business organizations to exist. Including all three types of value to descriptions of supply chains would make them more holistic and analytical rather than only descriptive. In order to approach a more analytical thinking of supply chains, i.e. include a value-appropriating dimension; one must according to Cox study both the many buyer and supplier relationships that exist and the extended network of power relationships that the buyer and its 1st tier suppliers must manage. Such extended networks of two-sided power relationships are called *power regimes*.⁷⁷

To identify where the value is being appropriated in the supply chain one first need to analyze each dyadic relationship and classify it with the help of the power matrix. These connections and relationships are then connected to each other, which will enable one to see which organizations will retain appropriated value and which will not.⁷⁸ Examples of how to map value appropriation based on power relationships are shown in figures 9 and figure 10.

⁷⁶ see Saunders, Fisher and Turnbull et al in Cox, A. (2001 B) p. 29-30

⁷⁷ Cox, A. Sanderson, J. Watson, G. (2001) p. 28-32

⁷⁸ *Ibid* p. 32

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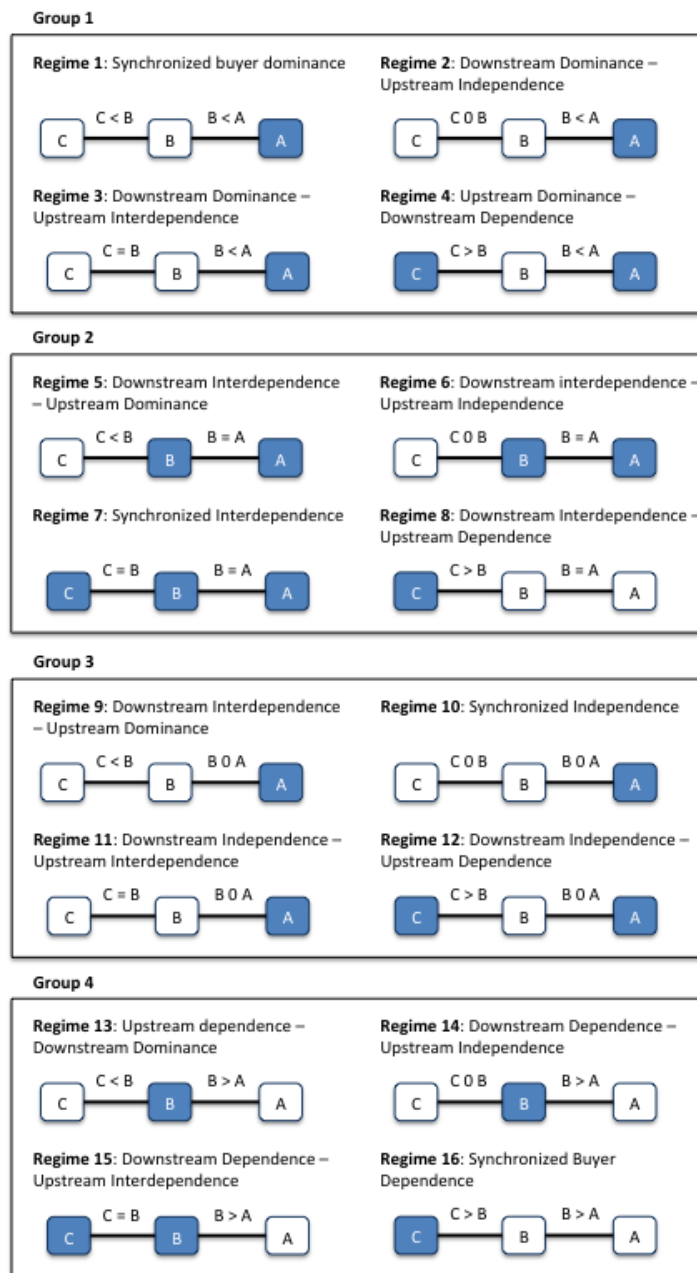


Figure 9: The method of mapping value appropriation in simple supply chains⁷⁹

In figure 9, A, B and C each represents an organization and together a simple supply chain where A is downstream and C is upstream. Within each group, A and B have

⁷⁹ Inspired by Cox, A. Sanderson, J. Watson, G. (2001) p. 33

the same power relationship and this changes between the different groups. The coloring represents which actor that is appropriating value; white means that the organization is not appropriating value and colored means that it is.

Figure 10 consists of the same type of symbols as in figure 9 but presents the power and appropriated value situation in a more complex supply chain. The difference between Power Regime 1 and 2 is the power situation between A and B and the effects on the appropriated value that it implies.

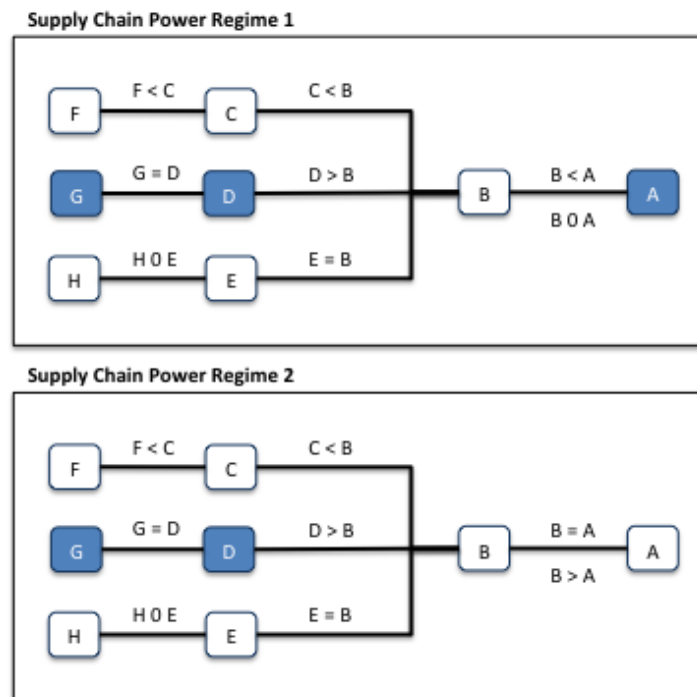


Figure 10: The method of mapping value appropriation in complex supply chains⁸⁰

A result of an analytic description of a supply chain's power regime can indicate whether or not it would be advantageous to adapt ISCM. ISCM would only be possible in situations where buyer and suppliers are interdependent or when a buyer is the focal organization in the chain, i.e. close to the end customer and undertaking final assembly, and can impose buyer dominance throughout the chain.⁸¹

We draw the conclusion that when deciding if and how much a manufacturing company should control or delegate contracting the company should according to

⁸⁰ Inspired by Cox, A. Sanderson, J. Watson, G. (2001) p. 34

⁸¹ Cox, A. Sanderson, J. Watson, G. (2001) p. 34-35

this research analyze what type of power relationships it has with the 1st and 2nd tier suppliers. There might also be a connection with where the value is appropriated in the supply chain and whether delegation or control is to prefer. When conducting such an analysis one would also go into areas related to both principal-agent theory and general purchasing leverage research, since they are part of the power matrix attributes, which for us indicates that it is a comprehensive model and therefore favorable to use or relate to when handling issues related to the purpose of this report.

4.4 Identified models

In section 4.1 we describe the focus areas for this chapter. We have now discussed *what* issues to consider when it comes to deciding whether to control or delegate purchasing activities with the 2nd tier suppliers, as well as *why* these issues should be considered. The next focus area is *how* to delegate or control. For this purpose, we have used Amaral et al's six procurement models⁸² (see table 17) to demonstrate different approaches to delegating and controlling purchasing. The six models describe how goods and ownership of goods flow through the supply chain, as well as between which parties' negotiations are conducted. Amaral et al also describe the advantages and disadvantages connected to each model.

Amaral et al start their discussion on delegation and control of purchasing⁸³ by describing the relationships in a supply chain with a starting point in terminology from criminal justice. *Means, motive* and *opportunity* are the words being used. Delegating the responsibility of purchasing to the 1st tier supplier creates *means* by giving the 1st tier supplier some measure of decision control. As for the *motive*, Amaral et al uses the expectation that "*all economic entities serve their own interests first*". *Opportunity*, then, arises when the manufacturing company is unable to monitor and oversee the 1st tier supplier's actions and contributions.⁸⁴ The reasoning that Amaral et al uses can be related to the agency problems discussed in section 4.2.

Furthermore the authors argue that control over the buying decision is a potentially great asset. Sellers depend on satisfying their customers, which is why customers are often able to extract preferential treatment from the sellers in the form of e.g. low prices, short lead times, liberal return privileges, forgiveness of occasional contract

⁸² The research performed by Amaral et al originates from the problems that OEMs can encounter in how to manage purchasing in the supply chain when outsourcing production such as loss of purchasing leverage. The findings are based on supply chain audits and interviews in numerous industries.

⁸³ Although Amaral et al refers to the phenomenon as outsourcing of procurement.

⁸⁴ Amaral et al (2006) pp. 221-222

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non compliance etc. Logically, the further down in the supply chain a manufacturer can control the buying decision, the more preferential treatment it will receive.⁸⁵

Amaral et al goes on to discuss how a manufacturing company can decide what approach to take in delegating or controlling purchasing. The purchasing function can be organized in nine sets of activities, divided in two dimensions, where the manufacturer can choose to delegate or control to various degrees (see table 16). The first dimension concerns the supply chain flows (in the table: *physical, informational and financial*) and the other concerns the type of purchasing activity (in the table: *planning, execution and management*).⁸⁶

	Physical	Informational	Financial
Planning	(1) Planning physical flows, e.g. determining materials requirements	(2) Planning informational flows, e.g. forecasting demands	(3) Planning financial flows, e.g. negotiating terms with suppliers
Execution	(4) Executing physical flows, e.g. receiving goods, assessing quality and tracking inventory	(5) Executing informational flows e.g. placing purchase orders and adjusting quantity or timing	(6) Executing financial flows, e.g. paying suppliers and maintain transaction records
Management	(7) Managing physical flows, e.g. rebalancing inventory across locations	(8) Managing informational flows, e.g. identifying exceptions and deviations from plan	(9) Managing financial flows, e.g. monitoring costs

Table 16: Purchasing activities in two dimensions⁸⁷

Different hazards or risks are connected to delegating each of the above-described nine purchasing activities. These are described below as the *basis of opportunity* and the *means-motive hazards*.

Planning- Physical (1)

The basis of opportunity is that deciding how much to order from whom is somewhat subjective, which can lead to self-serving or myopic materials choices by the 1st tier suppliers.

⁸⁵ Ibid pp. 222-223

⁸⁶ Amaral et al (2006) p. 223

⁸⁷ Ibid

Planning- Informational (2)

The basis of opportunity is that the 1st tier suppliers can conceal poor forecasting within the inevitable errors, so the hazard of forecast manipulation is there.

Planning- Financial (3)

The basis of opportunity is that the manufacturer may lack visibility into the financial relationship between the 1st and 2nd tier suppliers, which might lead to self-serving or myopic supplier selection and engagement.

Execution- Physical supplier (4)

The basis of opportunity is that the 1st tier gains physical possession of materials, whose location and status may be unknown to the manufacturer. This can lead to diversion of materials by the 1st tier supplier.

Execution- Informational (5)

The basis of opportunity is that the manufacturer might provide guidelines but does not oversee every order the 1st tier supplier places. Also, the manufacturer cannot review the reasonableness of order changes with the 2nd tier suppliers. This might lead to violation of purchasing intent and inconsiderate treatment of 2nd tier suppliers.

Execution- Financial (6)

The basis of opportunity is that the manufacturer lacks visibility into the timing of cash flows; the 1st tier supplier can obscure individual transactions or charges. Also, the 1st tier supplier can use its knowledge of the manufacturer's pricing with the 2nd tier suppliers to negotiate similar prices for itself or for competing manufacturers. This may lead to the 1st tier supplier delaying payments, billing incorrectly and exploiting 2nd tier pricing information.

Management- Physical (7)

The basis of opportunity is that the manufacturer lacks visibility into the inventory levels at assembly facilities. That might lead to inappropriate inventory balancing and freight expediting by the 1st tier supplier.

Management- Informational (8)

The basis of opportunity is that the 1st tier supplier owns the raw data about purchasing decisions and supplier performance, providing the manufacturer with only summary reports. Also, deviations from plan may be difficult to anticipate and write into contracts, and corrective actions may be judgment calls. This might lead to the 1st tier supplier manipulating data and metrics and neglecting to respond to problems and issues.

Management- Financial (9)

The basis of opportunity is that managers in manufacturing companies may fail to enforce requirements for authorization of spending and deviations from contracts. By contract, the 1st tier suppliers can often pass on increases in materials prices and must share reductions, but their promptness is difficult to monitor. Also, the competence of the 1st tier supplier is hard to determine, especially the knowledge and skills of its employees. This may lead to phantom charges or selective disclosure of charges in materials costs.⁸⁸

4.4.1 The six procurement models

Amaral et al have compared six procurement models, which address the means-motive-opportunity risk described in section 4.4 ranging from greatest hazard to lowest hazard (see table 17). The three-by-three structure in the *Degree of Hazard Mitigation* column refers to the arrangement of the nine purchasing activities (table 14). We consider the top two models to be models for delegating purchasing and the bottom four to be models for controlling purchasing.

⁸⁸ Amaral et al (2006) pp. 224-227

	Procurement Model	Description	Degree of Hazard Mitigation			Summary of hazard mitigation
Means-motive-opportunity risk faced by OEM	High	Turnkey	-----			All hazards are present. The OEM forfeits preferential treatment.
	Turnkey with audits	OEM audits the transaction prices and quantities in the turnkey relationship.	△	△	△	Audits can detect errors and deter fraud. However, OEMs may not discover all problems, or recover all losses, particularly the time value of money.
	Supplier rebates	Supplier sells goods at CM price, and gives rebates to OEM.	△	△	△	The tracking and collecting of rebates provides an audit trail. The OEM can mask its preferred prices and retain its relationships with suppliers. However, rebates are difficult to track, and the OEM essentially gives the supplier free loans.
	Buy-sell	OEM buys from supplier at a private price and sells to CM at a higher price.	●	△	●	The OEM controls operations, prices are masked, and the OEM owns the relationship with the supplier. The OEM can better monitor performance with the resulting timely and accurate information.
	Consignment	OEM buys and owns the inventory, which the CM holds.	△	●	●	The OEM conducts most procurement activities, reducing the CM's means and opportunities to violate OEM goals. The CM has no incentive to manage inventory properly.
	Low	In-house	OEM buys directly from suppliers, manages storage, and delivers to CMs.	●	●	●

Key. ● = hazards are fully mitigated. △ = hazards are partially mitigated.

Table 17: Description of Amaral et al's six procurement models arranged in order from least hazards mitigated to the most hazards mitigated (top-to-bottom). Amaral et al refers to the 2nd tier supplier as "supplier", the 1st tier supplier as "CM" (contract manufacturer) and the manufacturing company as "OEM".⁸⁹

Each of the procurement models will be described more in depth below.

The Turnkey model

In this model, the 1st tier supplier negotiates with and buys directly from the 2nd tier supplier. On the scale mentioned in chapter 1, with complete delegation on the one extreme and complete control on the other, this model would be placed at the delegation extreme. Advantages and disadvantages of this model are described in table 18.

⁸⁹ Amaral et al (2006) p. 228

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Advantages	Disadvantages
The manufacturer can use the 1 st tier supplier's purchasing leverage, and still keep overhead costs low.	The model carries all of the hazards described earlier.
The 1 st tier supplier can consolidate the demand uncertainty of several manufacturers to minimize inventory.	The manufacturer forfeits preferential treatment and lose visibility into true purchasing and materials costs.
	For large manufacturers and for non-commodity parts, the 1 st tier supplier's leverage will probably be weaker than the manufacturer's.
	Even if the 1 st tier supplier has better leverage, it might fail to pass savings on to the manufacturer.
	If the 1 st tier supplier can earn margins on materials purchasing, it may be less eager to reduce manufacturing costs.

Table 18: Advantages and disadvantages of the Turnkey model⁹⁰

The Turnkey with audits model

In order to avoid some of the hazards that are present in the turnkey model, some manufacturers have added audits, creating the *turnkey with audits model*. In this model, the manufacturer maintains the advantages of the turnkey model but tries to avoid fraud and error by auditing. However, when manufacturers have greater purchasing leverage than their 1st tier suppliers, they often choose to use one of the remaining models. Advantages and disadvantages of this model are described in table 19.

Advantages	Disadvantages
The manufacturer can verify if the 1 st tier supplier paid suppliers on time, produced accurate invoices, provided truthful performance data and shared suppliers' price reductions promptly.	Audits are no guarantee to discover all problems, and the time value of money is often lost.
	The manufacturer forfeits preferential treatment and lose visibility into true purchasing and materials costs.
	The manufacturer bears the cost of the audits.

Table 19: Advantages and disadvantages of the turnkey with audits model⁹¹

⁹⁰ Amaral et al (2006) p. 227

⁹¹ Ibid pp. 227-228

The Supplier rebates model

In this model, the 2nd tier suppliers sell goods to the 1st tier suppliers (“at 1st tier price”) and gives rebates to the manufacturer. It should be used instead of the turnkey with audits model when the manufacturer can negotiate better prices and effectively monitor and collect private rebates from the 2nd tier suppliers, as the same hazards can be avoided. Advantages and disadvantages of this model are described in table 20.

Advantages	Disadvantaged
2 nd tier suppliers can safely offer manufacturers preferential pricing, without revealing their prices to others.	The manufacturer stands for the cost of tracking and processing rebates.
The manufacturer can detect unauthorized part substitutions from the 1 st tier supplier because of missing rebates.	For the 2 nd tier suppliers, there is an additional cost for negotiating with both the 1 st tier suppliers and the manufacturers.
	The intent of the rebate model can be undermined by collusion between the 1 st and 2 nd tier suppliers.

Table 20: Advantages and disadvantages of the Supplier rebates model⁹²

The Buy-Sell model

In the widely used Buy-Sell model, the manufacturer buys from the 2nd tier supplier at a private price and then sells to the 1st tier supplier at a higher price. This way, the manufacturer focuses on the strategic issue of the purchase, while the 2nd tier supplier delivers the materials directly to the 1st tier suppliers once the transaction has been made between the manufacturer and the 2nd tier supplier and in that way focuses on the tactical issues of the purchasing process. The model is most appropriate when the manufacturer has greater purchasing leverage than the 1st tier supplier. Advantages and disadvantages of this model are described in table 21.

⁹² Amaral et al (2006) pp. 228-229

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Advantages	Disadvantages
2 nd tier suppliers can safely offer manufacturers preferential pricing, without revealing their prices to others.	The overheads required for the manufacturer to manage purchasing are high.
Immediate price settlements can be made.	The manufacturer might have to invest in systems and processes that enable the buy-sell execution.
For the 1 st tier suppliers, the model may bring stable prices that help them manage cash flow.	The manufacturer must replicate the channel functions of a materials reseller.
The model can provide tax savings, because a multinational manufacturer can decide where to record the virtual transaction.	The 1 st tier supplier still controls inventory after taking physical possession.
	Additional administrative workload for the manufacturing company since it will have to act as a material reseller.

Table 21: Advantages and disadvantages of the Buy-Sell model⁹³

The Consignment model

In this model, the manufacturer buys and owns the inventory, but the 1st tier supplier stores it. It is a common model to use for unique, slow moving, proprietary or scarce parts. Advantages and disadvantages of this model are described in table 22.

Advantages	Disadvantages
Manufacturers can mask prices and establish inventory buffers above the 1 st tier supplier's standard policy	The manufacturer does not give the 1 st tier supplier any financial motive to avoid excess inventory.
The manufacturer reduces various risks by being responsible for most of the purchasing activities.	The manufacturer might have difficulties monitoring the inventory levels at the 1 st tier supplier. If so, the manufacturer must link its information system to that of the 1 st tier supplier.
The 1 st tier supplier cannot divert materials to other manufacturers, since the manufacturer owns the inventory.	

Table 22: Advantages and disadvantages of the Consignment model⁹⁴

The In-house model

With the In-house model, the manufacturer buys directly from the 2nd tier supplier and also manages storage and delivery to the 1st tier supplier. Advantages and disadvantages of this model are described in table 23.

⁹³ Amaral et al (2006) p. 229

⁹⁴ Ibid p. 229

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Advantages	Disadvantages
All the means-motive-opportunity hazards are eliminated since the manufacturer completely controls purchasing	In-house procurement is costly; it requires a fully staffed organization, highly integrated information systems and distributed locations to plan, execute and manage the inbound supply chain from the 2 nd tier suppliers to the 1 st tier suppliers.
	Manufacturers must keep up to date with technical developments.
	Manufacturers must stay in contact with potential suppliers all over the world.
	Manufacturers must maintain inventory storage locations close to the 1 st tier suppliers.

Table 23: Advantages and disadvantages of the In-house model⁹⁵

4.4.2 Shortcomings of the six procurement models

Amaral et al have provided us with six different procurement models, both for delegating and controlling purchasing, and describes the advantages and disadvantages connected to each of them. What is not explicitly discussed by Amaral et al is in what situations these models should be used, which is something we consider interesting to investigate. That is why the last focus area of this chapter is *when* to delegate or control purchasing activities with the 2nd tier suppliers. For that reason, we have included external cases from the research of Ellram and Billington⁹⁶ that will demonstrate how, and in what situations, Amaral et al's models are used in practice. The external cases will be presented in the next section, section 4.5.

4.5 External cases

Ellram and Billington examine how manufacturers can keep its purchasing leverage for intermediate materials when the production of the parts that uses the intermediate materials is outsourced, i.e. when a (1st tier) supplier produces parts that need materials that is purchased from a 2nd tier supplier. They do this by presenting cases in three different categories: companies that have been unsuccessful, companies that have been successful, and companies that have achieved mixed results in leveraging purchased inputs used in outsourcing, or, as we have described it earlier, in controlling purchasing with both the 1st and 2nd tier suppliers. In which of the categories unsuccessful, successful and mixed results the case companies have been placed depends on their own assessment of the

⁹⁵ Amaral et al (2006) p. 230

⁹⁶ Ellram and Billington (2001)

situation. Mixed results mean that the companies feel satisfied with some aspects of their arrangement and less satisfied with other aspects.⁹⁷

We will present the cases according to which of Amaral et al's models are being used, in order to make it easier to understand when the different models might be suitable or not. Some cases have been divided into sub-cases, since the investigated company uses more than one model. A summary of the cases and a brief description of the special characteristics of the cases, as well as which model that is used in each case and whether or not it is successful, is provided in table 24 at the end of section 4.5.

4.5.1 Cases that use the Turnkey model

4.5.1.1 Oil industry (Oil)

Oil's situation in outsourcing purchasing leverage is unique in the sense that it is very satisfied with some aspects of its procurement model, and less satisfied with others. It decided to outsource the purchasing of pipes, valves and fittings to key suppliers (distributors in figure 11), who they then discovered served a number of the Oil's competitors, and therefore could provide better in-stock services and gain better volume leverage than the oil company itself could manage. Oil also reduces its burden of paper work and coordination in comparison to earlier when they dealt directly with the 2nd tier suppliers. Despite of these advantages, there is another level in this case that causes problems. Oil outsources the building and maintenance of its refineries and pipelines to a different set of suppliers (contractors in figure 11). The problem arises when the contractors disregard to utilize the contracts already set up with the distributors (scenario 1).⁹⁸

⁹⁷ Ellram & Billington (2001)

⁹⁸ Ibid pp. 20-21

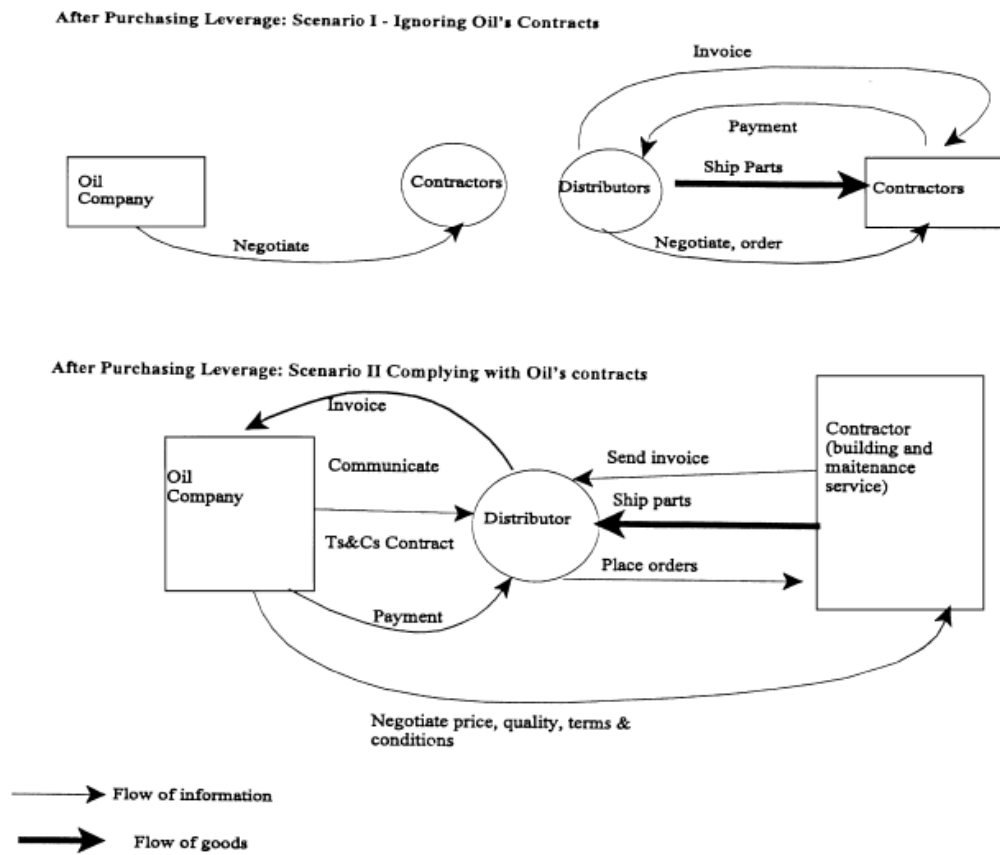


Figure 11: Purchasing leverage in oil industry with distributors⁹⁹

This lack of compliance with Oil's distributor contracts makes it hard for the oil company to reach the volumes it has committed to with the distributor. It is also creating higher costs for construction. The scenario that the Oil would like to see with its contractors and distributors is depicted in scenario 2 in figure 11.¹⁰⁰

4.5.2 Cases that use the Turnkey with audits model

Ellram and Billington do not present any cases that use the Turnkey with audits model.

⁹⁹ Ellram & Billington (2001) p. 21

¹⁰⁰ Ibid

4.5.3 Cases that use the Supplier rebates model

4.5.3.1 Personal Computer industry (PC 1)

The PC Company uses a number of different approaches to purchasing leverage (see also cases PC 2, 3 and 4). If the PC Company relies on both internal manufacturing and contractors for the same items, it negotiates all the prices with the 2nd tier suppliers, but lets the contractors buy directly from the 2nd tier suppliers at normal prices. The 2nd tier supplier then gives the PC Company a rebate directly, to get the price down to the PC Company's negotiated price. The pricing is entirely masked towards the contractor.¹⁰¹

4.5.4 Cases that use the Buy-Sell model

4.5.4.1 Automotive industry (Auto)

Several companies in the automotive industry that is presented in Ellram and Billington's study use the same process to successfully leverage purchasing with 2nd tier suppliers. In the cases, two types of raw materials are being leveraged; steel and plastic resin. The process is depicted in figure 12.

¹⁰¹ Ellram & Billington (2001) p.22

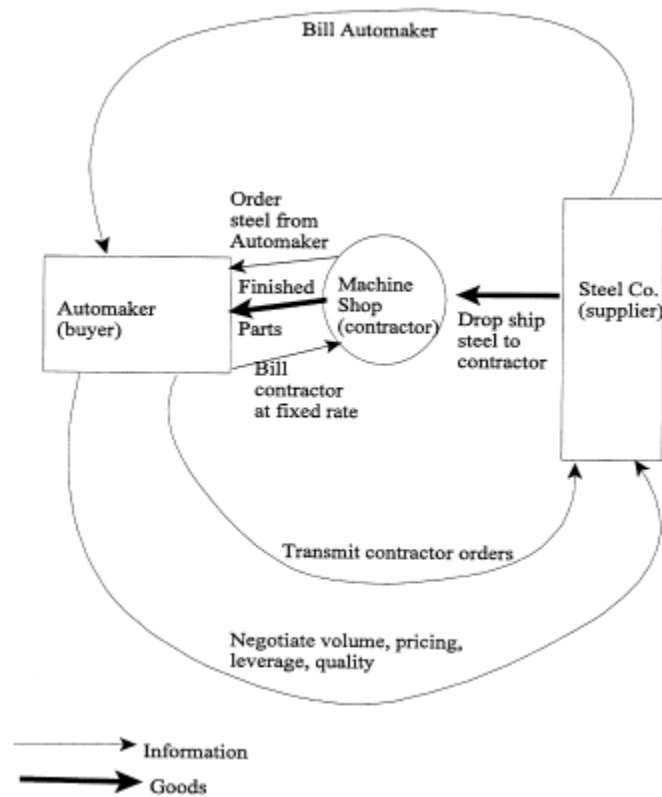


Figure 12: Description of how Auto control purchasing¹⁰²

Auto conducts negotiations with the 2nd tier suppliers, where a price is agreed. The 1st tier supplier places an order that is electronically transmitted via Auto to the 2nd tier supplier. The 2nd tier supplier then delivers the material directly to the 1st tier supplier, and invoices Auto at the agreed price. Auto then invoices its 1st tier supplier at a different price. The “masked” price eliminates any temptations that the 1st tier supplier might have to share the price information with its other customers, or to try to get the same price from the 2nd tier supplier as Auto. The foremost advantage with the process, as expresses by Auto, is that the Auto can control the quality of the raw materials that is used by its 1st tier suppliers. The 1st tier suppliers have also acknowledged this advantage as it takes away their burden of managing and resolving quality issues with the 2nd tier supplier.¹⁰³

¹⁰² Ellram & Billington (2001) p. 19

¹⁰³ Ibid p. 19

4.5.4.2 Personal Computer industry (PC 3)

If the PC Company is not a large part of the contractors business, it negotiates all the prices with the 2nd tier suppliers and has the 1st tier suppliers order through the PC Company, who passes the order on to the 2nd tier suppliers (see figure 13).¹⁰⁴

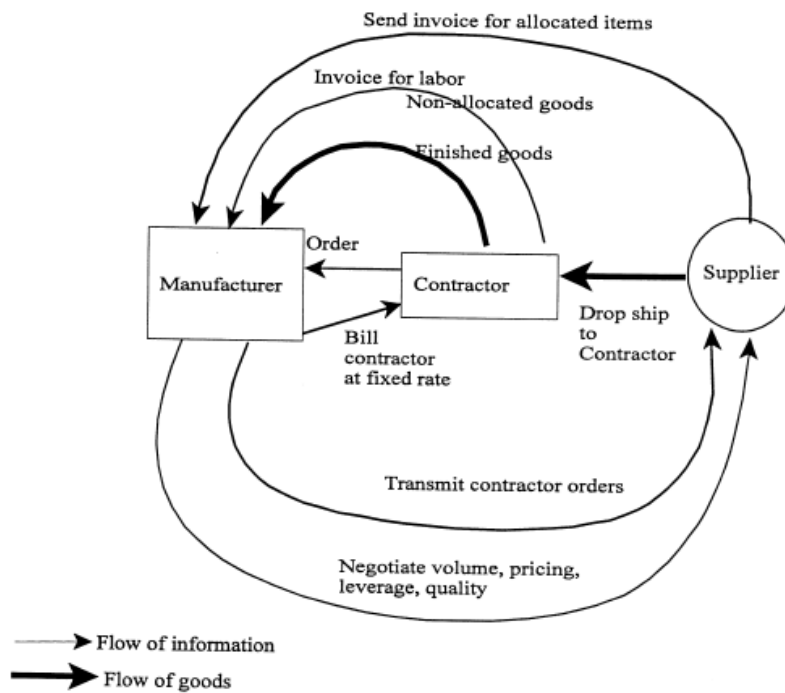


Figure 13: Description of how the PC Company controls purchasing¹⁰⁵

4.5.5 Cases that use the Consignment model

4.5.5.1 Motivational training/products company (MTPC)

This company is in the field of personal motivation and began its business by manufacturing and selling audiotapes. As producing was not one of the company's core competencies, it started outsourcing this business. To continue the relationship it had with its suppliers (that became the 2nd tier suppliers), it purchased all of the parts that went into the 1st tier supplier's production. The parts were shipped directly from the 2nd tier supplier to the 1st tier supplier, while MTPC controlled the invoices and kept track of inventory in its own books. MTPC experienced a number of negative consequences, mostly connected to accounting problems. For example, if inputs were unusable inventory counts had to be adjusted. Due to physical

¹⁰⁴ Ellram & Billington (2001) p. 22

¹⁰⁵ Ibid p.23

distance and separation of accountability, the frequency of stock-outs increased. This in turn led to rush orders, premium transportation, and higher overall supply chain costs. Also, accounting problems had to be extensively discussed with the 1st tier supplier, leading to increased transaction costs and excess paper work and inefficiency. MTPC found that by allowing the 1st tier supplier to be responsible for purchasing parts necessary for production, the material costs were significantly decreased. The reason for this was that the 1st tier supplier was already purchasing similar parts for other customers, which enabled it to consolidate volumes and achieve a lower price than MTPC. Hence, MTPC was better off delegating the responsibility of purchasing to its 1st tier supplier.¹⁰⁶

4.5.6 Cases that use the In-house model

4.5.6.1 High tech office equipment (HTOE 1)

HTOE has some 1st tier suppliers that use components whose technology is proprietary to either HTOE or the 2nd tier supplier. In these cases, HTOE buys all of the needed components directly from the 2nd tier supplier, has them shipped to its own storage, and then delivers them to the 1st tier suppliers as needed. HTOE does this because it does not want the 1st tier suppliers to have access to any price information or extra parts, as the components in question are of high importance for HTOE's core competencies.¹⁰⁷ HTOE also uses another approach; see case HTOE 2 in section 4.5.7.1.

4.5.6.2 Personal Computer industry (PC 1)

When dealing with contract manufacturers (1st tier), the PC- company negotiates prices with all its component suppliers (2nd tier), orders all the parts, has them shipped to its own facilities where it kits them before shipping them to the contractors for assembly (see figure 14). Since it is very expensive to go through this process, the contractors are only supposed to be used as temporary fill-in when there are shortages in manufacturing capacity. If the PC company noticed that the contractors will be used long term, it switches to another approach because it reduces the cost, management and time delays to the PC company (see cases PC 2, 3 and 4).

¹⁰⁶ Ellram & Billington (2001) p. 18

¹⁰⁷ Ibid p. 20

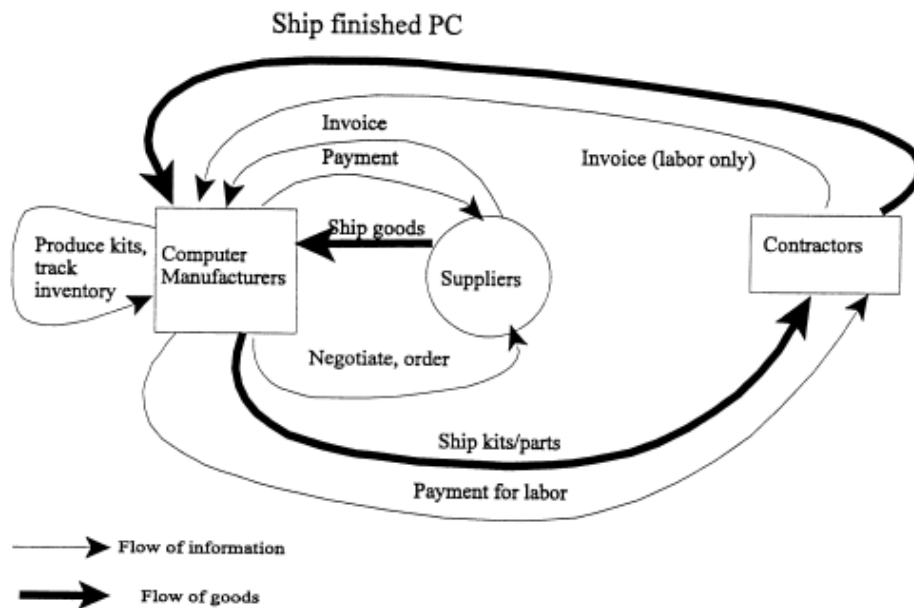


Figure 14: Description of how the PC company controls purchasing¹⁰⁸

4.5.7 Cases that use models not defined by Amaral et al

There were two cases described by Ellram and Billington that uses a model that is not represented among Amaral et al's. We have called this the *COI (Control with Open Information)* model, as the arrangement in this model is that the manufacturer sets up a contract with the 2nd tier suppliers, stating in the contract which 1st tier suppliers are allowed to make call-offs on this contract. The 1st tier suppliers can then make call-offs as needed, without further involvement from the manufacturer. There are no masked prices in this model, in contrast to the other four procurement models that we have classified as controlling purchasing (i.e. the Supplier Rebates model, the Buy-Sell model, the Consignment model and the In-house model).

The two cases in Ellram and Billington's research that use the *COI* model are described below in section 4.5.7.1 and 4.5.7.2.

4.5.7.1 High-tech office equipment (HTOE 2)

HTOE started to control purchasing after it discovered that one of its competitors paid 6 percent less for resin, while using only one fourth as much. The competitor gained considerable leverage because of standardization (it was using 20 types of resins, in comparison to the 100 types used by HTOE) and because it contracted directly with the 2nd tier suppliers. After standardizing and starting to contract with

¹⁰⁸ Ellram & Billington (2001) p. 23

its 2nd tier suppliers, HTOE had cost savings of 11 percent over the competitor. HTOE's process involves negotiating and setting up a contract with the 2nd tier suppliers on behalf of the 1st tier suppliers. The 1st tier suppliers can then order directly from the 2nd tier supplier, and HTOE does not have to be involved any longer.¹⁰⁹

4.5.7.2 Personal Computer industry (PC 2)

If the PC company is a large part of the contractors business, it negotiates all the prices with the 2nd tier suppliers and then lets the contractor place orders, receive shipments and pay its own bills. This is the preferred strategy by the PC company because it minimized cost and management effort while increasing speed.¹¹⁰

4.5.8 Summary of external cases

Table 24 below summarizes the external cases described in section 4.5. The first column represents each case and the procurement model connected to them, presented in the same order that Amaral et al presents the procurement models. The labels of the cases are the same as in the headings for each case in section 4.5. The *COI* model has been placed between the *Turnkey with audits* model and the *Supplier rebates* model, as we consider it to be procurement model that involves controlling purchasing, but is closer to delegation than the *Supplier Rebates*. The special characteristics that have been identified are listed, and the X-symbol indicates if a case fits with a certain characteristic. In the column *Success* we have listed whether or not the arrangement/procurement model used was a success, in accordance with Ellram and Billington's classifications.

¹⁰⁹ Ellram & Billington (2001) pp. 19-20

¹¹⁰ Ibid p. 22

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	Special characteristics of cases									
	1st tier able to consolidate	Standardized material	Sensitive price information	Long term relationship with 1 st tier suppliers	Manufacturing company makes up large part of 1 st tier supplier's business	Quality is important	Existing relationship with 2 nd tier suppliers	Proprietary parts/technology	Success?	
Turnkey Oil	X								Mixed	Delegation
COI HTOE (1)		X							Yes	Control
COI PC (2)				X	X				Yes	
Supplier Rebates PC (4)			X						Mixed	
Buy-Sell Auto			X			X			Yes	
Buy-Sell PC (3)				X					Mixed	
Consignment MTPC	X						X		No	
In-House HTOE (2)			X					X	Yes	
In-House PC (1)			X					X	Mixed	

Table 24: Summary of external cases

Since the cases are described on different parameters, it is hard to draw any conclusions about connections between a particular procurement model and any special characteristics. What we can make out is that both cases that handle proprietary parts or technology use the In-House model. How strategically important the part or material is to the manufacturing company might also be connected to how sensitive the price information is, which could explain that all cases that are described as having sensitive price information use controlling strategies.

4.6 Selected theoretical framework

Throughout chapter four we have presented theories connected to delegation and control of contracting. In this section we will present what areas that we have selected out of the presented theoretical fields of study, all presented in table 25¹¹¹. The selected theoretical areas for this thesis have served as a foundation when deciding what type of information that we have gathered from our case studies and what we have focused on when conducting our analysis.

Initial focus areas	Theoretical fields of study	Selected theoretical areas for this thesis
<i>What</i> issues to consider & <i>why</i> they should be considered?	Principal agent theory for delegation and control of contracting with 2 nd tier suppliers	Risk for conflicting agenda
		Changes in price, costs, or product related attributes related to hidden information and hidden action
	Power and relationships between buyers and suppliers in a 3 tier supply chain	Buyer and supplier power
		The power matrix
		Purchasing leverage
<i>How</i> to delegate or control?	Identified models	Six procurement models
	External cases	Description and comparison + one additional procurement model
<i>When</i> to delegate or control?		

Table 25: Selection of theoretical framework

As mentioned we determined areas that we identified as interesting and relevant when conducting our multiple case study from the theoretical fields of study. These have been used as a base when constructing a case report guide, which we have

¹¹¹ We will not argue for our selection or have a discussion regarding the different theoretical fields in this section since we consider that this have been done in the respective sections when the theoretical fields have been presented.

used when describing each case. The case report guide is found in appendix 2 and the connections between the guide and the selected theoretical areas for this thesis are shown in figure 15.

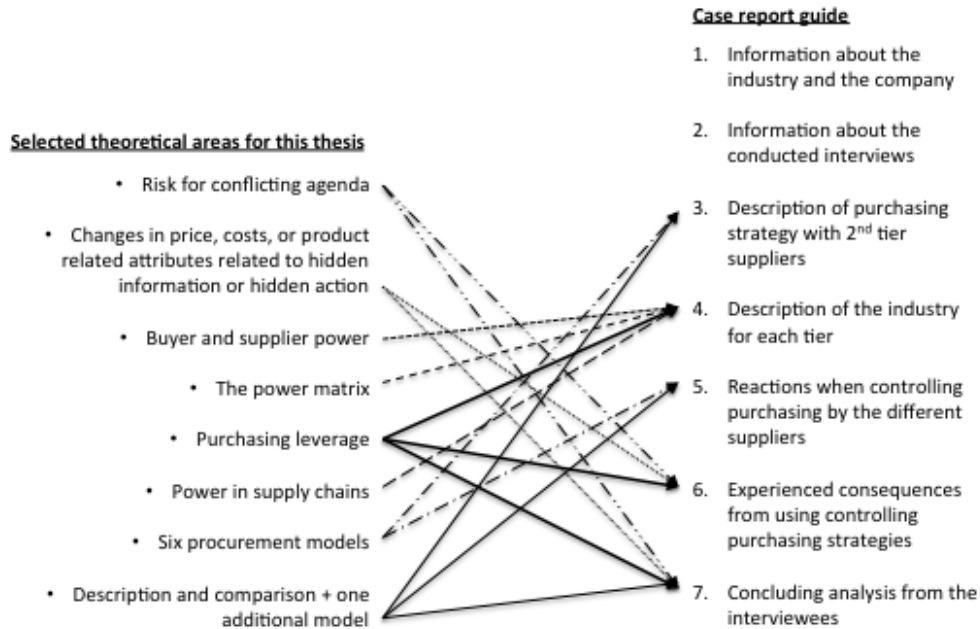


Figure 15: Connections between selected theoretical areas for this thesis and case report guide. The variations in the used arrows are to facilitate for the reader to follow which area that is included in which part of the case report guide.

5. Empirical data

In this chapter we will present the cases that we have studied in our multiple case study. The data is sorted in order according to a predetermined case report guide, which is found in appendix 2. In cases where the studied organization uses more than one procurement model within the same segment we have chosen to present that as well. We consider this to be relevant information since it may show the reasons for choosing a certain model over another and it may present the differences of the different models more clearly.

5.1 Case report, Alfa Laval

5.1.1 Alfa Laval and its industry

Alfa Laval is a leading global supplier of products and solutions for heat transfer, separation and fluid handling.

5.1.2 Conducted interviews

Åke Berggren is the Global Purchasing Manager for Castings and Forgings at Alfa Laval, which are one out of five commodity groups. He has experience from negotiating with and buying from 2nd tier suppliers within Forgings. In this case it is the material (the steel) for forgings that are used in Alfa Laval's separators that is purchased from the 2nd tier suppliers. The material that is used in Alfa Laval's forgings is relatively expensive. In total, approximately 2000 tons of steel per year is used for forgings within Alfa Laval. Berggren started working with forgings five years ago, and estimates that the strategy to negotiate and contract with the 2nd tier suppliers has been used for 10-15 years.

Robert Andersson is a Global Strategic Purchaser at Alfa Laval. He works in the division of global purchasing which covers all of Alfa Laval where he purchases components and material to 7-8 production sites worldwide. Within this division he works in the commodity group Machining, Forming and Fabrications. He is responsible for choosing and developing relationships with suppliers and handling negotiations within this particular commodity group. Within Andersson's commodity group, purchasing is delegated to the 1st tier suppliers.

Johan Fröjd is a Global Strategic Purchaser at Alfa Laval. Fröjd manages the commodity group *Metals* on a global level. The metals that he purchases are among others stainless steel, titanium, nickel alloys, copper and aluminum. Also in the commodity group *Metals*, purchasing is delegated to the 1st tier suppliers. However, Alfa Laval *Metals* regularly buy directly from steelworks for its own, in-house production. Fröjd expresses that: "To handle a steelwork means to act both as a salesman and a purchaser at the same time". It is hard to handle steelworks because they are not very flexible. As an example, if a batch size or a certain lead-time does

not suit the manufacturing company (Alfa Laval) it can be very hard to make the steelwork change their mind.

The total purchasing volume for the Alfa Laval group is approximately 7-8 billion SEK annually.

5.1.3 Alfa Laval's purchasing strategy with 2nd tier suppliers

In the Forgings segment, there are three different situations of interaction. The first and second situation mainly involves large forgings for the separators, while the third situation involves smaller, more standardized forgings for e.g. pumps and valves. A visual description of the different situations is provided in figure 16.

In the first situation, Alfa Laval sets up a contract with the 2nd tier suppliers (the steelworks), and the 1st tier suppliers (the forging suppliers) are allowed to make call-offs on that contract. The steelworks then deliver the material directly to the forging suppliers and Alfa Laval does not need to be further involved in the process. The prices are transparent towards the 1st tier suppliers, who are invoiced by the 2nd tier suppliers.

In the second situation, Alfa Laval buys the steel directly from the steelworks, and stores it at the 1st tier supplier (the forging supplier). Alfa Laval prefers the first situation to the second, since the company does not want to own the material, but sometimes the forging suppliers cannot financially cope with the amount of tied-up capital. As in the first situation, the prices are transparent towards the 1st tier suppliers. Hence, the only difference from the first situation is that Alfa Laval here owns the material from the beginning.

The third situation is when the 1st tier suppliers use their own contracts to buy steel from the steelworks, i.e. the purchasing is delegated to the 1st tier suppliers. As mentioned above, this approach is used mainly for smaller, more standardized forgings. However, even for these small forgings, the first approach (where the 1st tier supplier uses Alfa Laval's contract with the 2nd tier supplier) is used on occasion. Usually though, the forges already have god contracts and prices with the steelworks, and use these instead of Alfa Laval's.

Can Scania be stronger than steel?

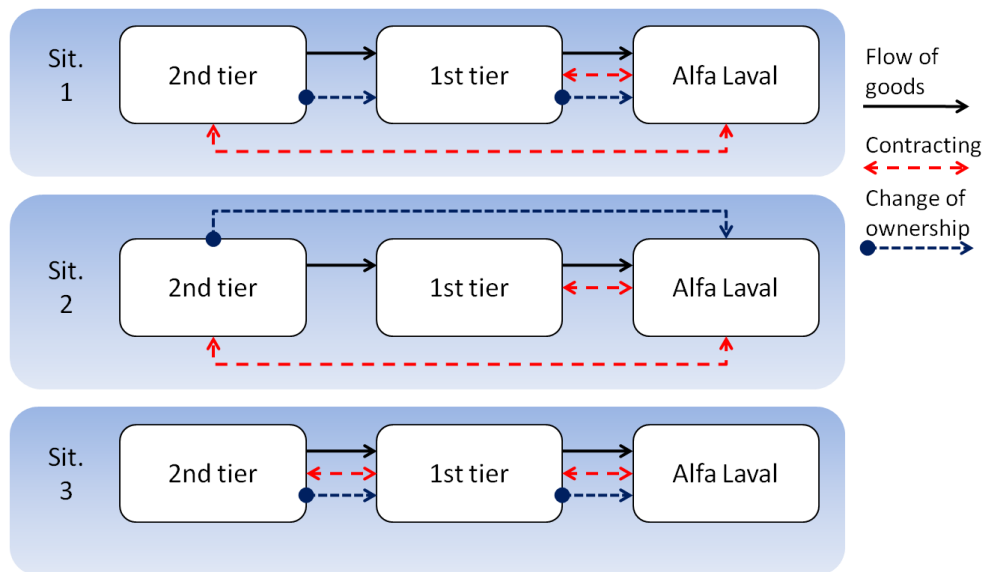


Figure 16: Description of the supply chain when Alfa Laval controls (Sit. 1 and 2) and delegates (Sit. 3) purchasing of steel for forgings.

In all the three situations (even when the company does not contract with the 2nd tier suppliers), Alfa Laval carefully controls quality at both the 1st and 2nd tier supplier.

5.1.4 Description of the industry for each tier

5.1.4.1 1st tier suppliers

The forging suppliers that Alfa Laval uses are relatively small; Alfa Laval has approximately 15-30% of their total business.

5.1.4.2 2nd tier suppliers

The steelworks that Alfa Laval negotiates with are specialized on certain types of steel; the main part is special alloy steel.

Alfa Laval normally use well known steel mills. If capacity issues occur, Alfa Laval sometimes ships the steel from one region to another.

The steelworks are subject to rigorous quality examinations by Alfa Laval, and the forging suppliers also conduct their own quality assurance process on the steel that they buy (which is stipulated by Alfa Laval).

5.1.5 Reactions from suppliers when controlling purchasing

5.1.5.1 Reactions from 1st tier suppliers

The smaller forging suppliers appreciate that Alfa Laval controls the purchasing of steel, especially in times when material is scarce. The explanation for this is that the forging suppliers (with their relatively small size) risk being overlooked by the steelworks, while Alfa Laval gets more attention.

Berggren has experienced one forging supplier that was hesitant to letting Alfa Laval control the purchasing of steel at first, since it already had a relationship with a different steelwork. The forging supplier however agreed to using Alfa Laval's contract, and now has a good relationship with the new steelwork, in addition to better prices.

Because Alfa Laval only negotiates the value added with the forging suppliers, Alfa Laval had a fear at first that the forging supplier would feel that they lost margins on the material price, and thus be resistant to letting Alfa Laval control the purchasing of steel. This has however not been a problem.

5.1.5.2 Reactions from 2nd tier suppliers

The 2nd tier suppliers have not shown any negative reactions regarding the transparent pricing towards the 1st tier suppliers. The reason for this might be that the steelworks that Alfa Laval uses are specialized in a certain type of steel, where it has been tradition for a long time that manufacturing companies negotiate the prices for their 1st tier suppliers. Because of this tradition, the steelworks have gotten used to the concept.

5.1.6 Experienced consequences from using controlling purchasing strategies

A negative consequence is that the administrative burden inevitably increases as Alfa Laval takes on a larger role in the supply chain. Also, the biggest challenge is to keep material available. Here, the making of a prognosis can be a problem area.

Alfa Laval has experienced a financial gain by controlling the purchasing of steel, since it is able to consolidate volumes and in so doing acquire better purchasing leverage which has resulted in better prices. Another positive consequence is that Alfa Laval has built up a strong relationship with the steelworks, which means that it can reprioritize orders at the steelworks, when/if something changes in the company's production schedule, i.e. the strong relationship makes up for the problems that sometimes occur with faulty prognosis. Berggren thinks that this would be hard to do for a forging supplier, since they do not have the size or the relationship that Alfa Laval has.

5.1.7 Concluding analysis by the interviewees

5.1.7.1 Reasons to control/delegate purchasing

Because Alfa Laval has such high quality standards, the company does not want to leave all the responsibility to the forging suppliers but rather keep track of the source of the material. If something goes wrong because of inferior quality in the material, it can have huge negative consequences, both from a safety and a brand name point of view. The safety aspect is the main argument that Alfa Laval uses with both the steelworks and the forging suppliers to get them to accept that Alfa Laval wants to control the purchasing of steel; something all parties usually understand.

5.1.7.2 Important factors to consider when controlling/delegating

At Alfa Laval, it is the same person that deals with both the steelwork and the forging supplier. Organizationally, this is easier.

5.1.7.3 When a controlling strategy is suitable

The main condition for a controlling strategy to be successful is to be able to consolidate large volumes, and consequently receive lower prices. Also if quality is an important aspect of the final product, a controlling strategy is preferred.

Berggren compares the strategy used when purchasing steel for forgings with the one used for castings, where the purchasing is delegated to the 1st tier suppliers. Here, a different process is used where the casting suppliers mix the compound themselves (which means that there is less need to control the source). However, Alfa Laval still controls the quality of the end product carefully.

5.2 Case report, Cargotec

5.2.1 Cargotec and its industry

Cargotec is a corporate group that offers solutions for loading and unloading goods on land and sea on a global level. The group consists of Hiab (inland transport & distribution and industry), Kalmar (ports and terminals) and McGregor (offshore logistics and merchant shipping). Cargotec company group was created in 2005, which makes it a young group of companies. However the individual companies are older, some date back to the early 20th century. It is Finnish owned by a strong Finnish business family named Herlin and run by a Finnish President and CEO. It has approximately 10 000 employees and approximately 30 billion SEK in sales.

Cargotec is developing a strategy to be able to find synergies between all three companies. This has put new demands on the purchasing division, which is increasing its number of strategic purchasers. The purchasing division is today a matrix organization where the majority of the purchasers are situated at the production or assembly sites.

The purchased categories that have been investigated for the purpose of this thesis are steel and steel components as well as the areas cabins and fasteners.

In total, Cargotec buys approximately 350 000 tons of steel annually. Steel and steel components make up approximately one third of the total purchased volume of direct material to Cargotec. To get an idea of the relative size of Cargotec's total volume of purchased steel: if put together, the amount would make up about one third of the production of one of Sweden's major steelworks.

For cabins, a cost break down shows that 32% of costs come from the 1st tier, while 68% come from the 2nd tier, making it vital to include the 2nd tier suppliers to achieve permanent savings. Around 20% of the costs associated with the 2nd tier derive from specified components i.e. articles designed by Cargotec. This means that the 2nd tier suppliers are aware that the bargaining power lies with Cargotec (and not the 1st tier suppliers), which makes it hard for the 1st tier suppliers to achieve good deals with the 2nd tier suppliers without help from Cargotec. Hence, in the cabin segment, Cargotec works a lot on negotiating and contracting with the 2nd tier suppliers.

The cost break down for fasteners looks about the same as for cabins; however, the 2nd tier supplier base here is a lot less complex. It is still important to keep track on which the 2nd tier suppliers are and what their prices look like, to be able to put pressure on the 1st tier suppliers to improve their prices through negotiations or by switching the 2nd tier suppliers they currently work with. In the fastener segment, Cargotec has not yet started contracting with 2nd tier, but see potential in doing so in the future.

5.2.2 Conducted interviews

At Cargotec two face-to-face interviews, with Hans Lindblom and Alf-Gunnar Karlgren, were made at Cargotec in Akalla.

Hans Lindblom is Vice President & Deputy at Cargotec Global Sourcing. Lindblom has worked eight years within what today is the Cargotec group and has earlier experience from the construction industry.

Alf-Gunnar Karlgren works with purchasing as Global Category Director at Cargotec. Karlgren started his career at Cargotec as a trainee within Kalmar and has international experience from his work at Cargotec. His areas are cabins and fasteners.

5.2.3 Cargotec's purchasing strategy with 2nd tier suppliers

2,5 years ago all the responsibility for contracting with the 2nd tier rested on the 1st tier suppliers. Since then, Cargotec has been working a lot with identifying opportunities for savings in the purchasing area. To negotiate and contract directly with the 2nd tier suppliers has been recognized as an area that can bring several benefits to the company, which is one of the reasons why Cargotec gradually has

started using controlled purchasing strategies in some areas (which are described in the next section). There are also other reasons, which will be discussed in section 5.2.7.1.

5.2.3.1 Steel

Cargotec buys three types of steel: high quality steel (s1), 355 (s2) and SBS, ship building steel (s3). The different characteristics of the steel when it comes to purchasing and industries are found in table 26.

Type of steel	Purchasing volume (10 ³ ton)	Controlling strategy today ¹¹²	Potential supply market
s1	20	100 %	1 st tier: few, local 2 nd tier: few, global and regional
s2	70	50 %	1 st tier: many, local 2 nd tier: many, regional
s3	250	0 %	1 st tier: few, local 2 nd tier: many, regional

Table 26: Characteristics of the three different types of steel that is purchased of Cargotec

s1 steel

Until recently Cargotec has bought this steel itself for own processing which has given the company a lot of experience in buying steel. Now, when it has started to outsource the processing the company experiences that the suppliers do not have the same know-how as Cargotec, which is why it has decided to control the purchasing with the 2nd tier suppliers to 100 %. The 1st tier suppliers make call-offs on Cargotec's contracts and the 2nd tier suppliers deliver the material directly to the 1st tier suppliers.

With one specific 2nd tier supplier (which represents a large and important supplier for Cargotec and its 1st tier suppliers) the call-off from the 1st tier suppliers is sent via Cargotec to the 2nd tier suppliers. The invoice from the 2nd tier supplier is then sent directly to Cargotec, who in turn invoices the 1st tier suppliers for the steel that is used by them (this situation is depicted below in figure 17 as situation 1). Hence, Cargotec owns the material in two turns, first when it is bought from the 2nd tier supplier, and second when it is bought "back" from the 1st tier supplier after having been welded or machined. This is because the 2nd tier supplier does not want the price that they give Cargotec to leak out to the market since it is lower than what the individual 1st tier suppliers get. The steelwork is working in a similar way with other manufacturing companies. Lindblom estimates that Cargotec needs one half time employee extra in order to handle the additional ordering that is needed for this

¹¹² Percent of controlled purchasing of material from 2nd tier suppliers

arrangement, but that it is still profitable compared to letting 1st tier supplier buy steel on their own, higher, steel price.

With another steelwork that Cargotec works with the pricing is transparent towards the 1st tier suppliers. Here, this was not a sensitive issue, and the invoicing and call-offs are direct between the 1st and 2nd tier suppliers (depicted as situation 2 in figure 17).

The two different approaches of controlling purchasing with the 2nd tier suppliers in the case of s1 steel are depicted in figure 17.

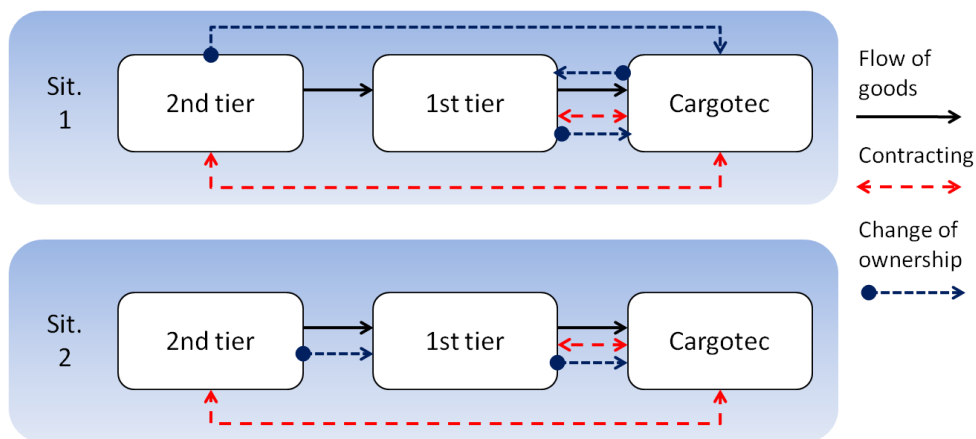


Figure 17: Description of the supply chain when Cargotec controls purchasing of s1 steel. In the first situation (Sit. 1) the call-offs and invoicing go through Cargotec. In the second situation (Sit. 2) the call-offs and invoicing are direct between the 1st and 2nd tier supplier (hence the difference in the “change of ownership” flow).

s2 steel

For this kind of steel the goal for Cargotec is to control approximately 50 percent at the time being. However, this may not be the final strategy. In this case Cargotec works with dealers (distributors) that keeps the steel in stock and takes care of other logistic issues, as the 2nd tier suppliers and different kind of machining companies, as the 1st tier suppliers. Cargotec would not decline an offer to work directly with steelworks in this case but the company has little experience in comparison to purchasing the high quality steel (s1), which limits its competence to do good business with the steelworks.

Negotiations for s2 steel are either conducted between Cargotec and the dealers (2nd tier) or between the 1st and 2nd tier where Cargotec only introduces the contact. If Cargotec can get good prices from 1st tier supplier and it shows open books about its steel prices then Cargotec will not interfere in the purchasing within the supply chain, because it would be unnecessary work.

Can Scania be stronger than steel?

The negotiated prices between Cargotec and 2nd tier suppliers, distributors, are not masked in any way.

Even when Cargotec delegates the purchasing to their 1st tier suppliers they keep track on the market and use the information to advise the suppliers when to buy steel and when to wait. Also, Cargotec needs to have contract with some dealers in order to have insight in what the prices should be when it negotiates with other 1st tier suppliers that purchase their own steel.

To summarize, with the s2 type steel, Cargotec controls the purchasing in 50 percent of the cases (depicted as Sit.3 in figure 18), and delegates the responsibility of contracting with the 2nd tier suppliers in the remaining 50 percent of the cases (depicted as Sit. 4 in figure 18).

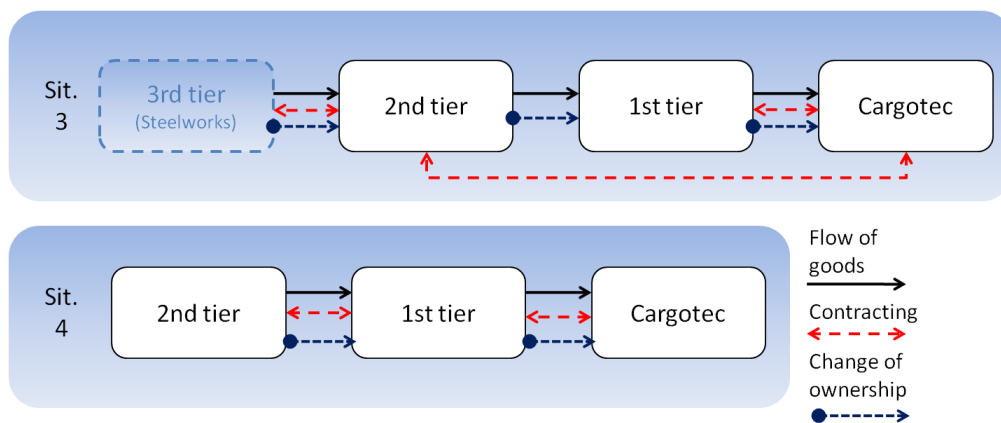


Figure 18: Description of the supply chain when Cargotec controls (Sit. 3) and delegates (Sit. 4) purchasing of s2 steel.

s3 steel

Cargotec does not control any purchasing with the 2nd tier suppliers for the third type of steel (s3). Cargotec did a check a couple of years ago and found out that some of its suppliers had up to a 20% margin on the purchasing price of steel. This indicates that the company could do some savings if working towards controlling some part of the purchasing also with this type of steel.

A reason for why Cargotec is not controlling purchasing more in this case is due to the volume it is purchasing relative the market volume. This type of steel is produced in a much larger volume than for example s1. Even if Cargotec purchases s3 to a larger extent than s1, it is a smaller amount relative the market volume. Therefore it is harder to get the attention or any price benefits from the steelworks to initiate a relationship and a contract. S3 is primarily bought in China, where the steelworks do not generally sell to end customers (which are usually manufacturing companies such as Cargotec). Also, Cargotec's relationship with the 1st tier suppliers

in China has more of a partnership character, which is why it has not been relevant to remove their responsibility for purchasing. The 1st tier suppliers also have better resources and competence to work with the 2nd tier suppliers here, than do Cargotec.

At this moment Cargotec has not decided how it should proceed with its strategy for this kind of steel, but is currently working on building up their own resources and competence to take over perhaps a small part of the purchasing activities with the 2nd tier.

Figure 19 describes how Cargotec currently works with delegating purchasing of s3 type steel.

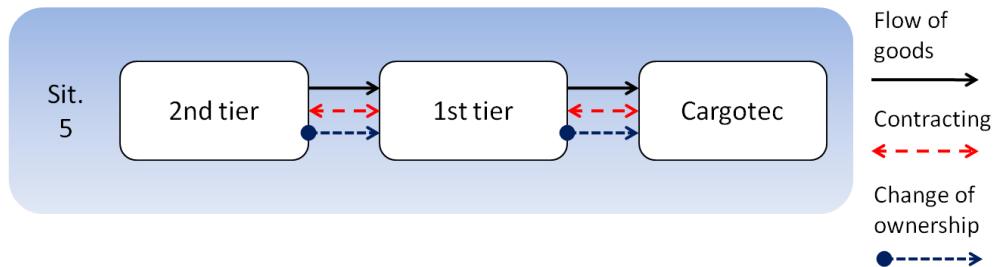


Figure 19: Description of the supply chain when Cargotec delegates purchasing of s3 steel.

5.2.3.2 Cabins

In the cabin segment, Cargotec writes contracts with the 2nd tier suppliers that stipulate which of the 1st tier suppliers are allowed to make call-offs on their contract. The prices are always transparent towards the 1st tier suppliers when Cargotec's contracts with the 2nd tier. This is an incentive for the 1st tier suppliers to improve their own purchasing processes. Cargotec has not experienced any problems with transparent prices. Figure 20 describes the supply chain when Cargotec controls purchasing in the Cabins segment.

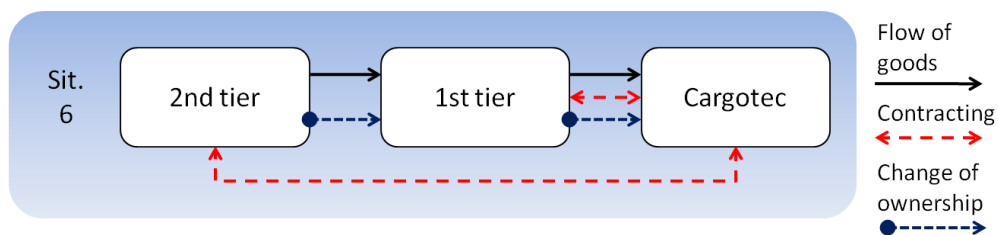


Figure 20: Description of the supply chain when Cargotec controls purchasing in the Cabins segment.

5.2.4 Description of the industry for each tier

5.2.4.1 Steel (s1)

The 1st tier suppliers are welding companies and/or machine processing companies.

For the first type of steel (s1) the 1st tier suppliers available on the market are few, approximately 10 in Europe. It is common that manufacturing companies buy or negotiate the steel from the 2nd tier suppliers on behalf of these suppliers (approximately 50 % of their customers do this).

For the first type of steel, high quality steel, the 2nd tier suppliers are leading steelworks on a global or regional level. There are only a few that can produce the high quality steel that Cargotec uses.

5.2.4.2 Steel (s2)

For the second type of steel (s2) the competition between the 1st tier suppliers is very strong. They are of the same type as for s1 steel, i.e. welding companies and/or machine processing companies. There is a lot of movement of volumes between suppliers, which forces them to have open books towards the manufacturing companies. The 1st tier suppliers are many and local.

For the second (s2) and third type (s3) of steel, Cargotec has dealers (distributors) as 2nd tier suppliers. This because these types of steel are more widely used and produced in higher volumes than the high quality steel, which means that the volumes of Cargotec are not large enough to negotiate directly with the steel works. That is, in absolute numbers Cargotec's volumes in the second and third type are larger than its volumes in the high quality steel, but in relation to the huge amount being produced, it is not very large at all.

5.2.4.3 Cabins

The 1st tier suppliers used by Cargotec vary a lot in size. The tasks that the 1st tier suppliers perform in this case are primarily welding and assembly.

The 2nd tier suppliers are in this case component manufacturers, who in turn buy from raw material producers.

5.2.5 Reactions from suppliers when controlling purchasing

5.2.5.1 Reactions from the 1st tier suppliers- Steel

For the high quality steel (s1) purchasing, Cargotec has, as mentioned above, a lot of experience since the company up until a year ago used this type of steel in its own production. Here, the 1st tier suppliers have not shown any resistance to letting Cargotec handle the negotiations and contracting with the 2nd tier suppliers. Instead, they seem to focus on developing and safeguarding the relationship with Cargotec and their other customers and through that expand their customer base. This way

they might be able to get higher purchasing volumes and better prices from the steel works themselves in the future.

The reactions from the 1st tier suppliers when it comes to s2 type steel are mixed. They want to keep their relationships with the dealers and are afraid of losing them if Cargotec starts to control the purchasing. Sometimes the 1st tier suppliers think that they know the steel industry better. Cargotec uses open books to show the 1st tier suppliers that they are actually getting worse prices than Cargotec and convince the suppliers that it would be better if Cargotec controls the purchasing. However, if it turns out that the 1st tier suppliers are getting better prices, Cargotec does not get involved.

The 1st tier suppliers are eager to know what prices Cargotec has and how they work with their purchasing processes.

5.2.5.2 Reactions from the 2nd tier suppliers-Steel

For the high quality steel (s1) the 2nd tier suppliers (steelworks) are very restrictive when it comes to showing prices. Cargotec has also experienced some negative reactions because the steelworks would rather negotiate with the 1st tier suppliers than with Cargotec, which would earn them a better margin since Cargotec gets better prices.

The prices are here very sensitive information that the steel works want to keep secret, which is not the case for s2 where dealers are used.

5.2.5.3 Reactions from the 1st tier suppliers- Cabins

The first step that Cargotec took was to start benchmarking the prices they received from their 1st tier suppliers. The larger 1st tier suppliers reacted negatively towards this (since they missed the opportunity to keep the savings they could have made for themselves), while the smaller were positive since they did not have the competence and/or the leverage to achieve better prices themselves. Now that Cargotec is even more involved in negotiating and contracting with the 2nd tier, the larger 1st tier suppliers are coming around (mostly because, together with Cargotec, they have created a better supplier base that they can also use with their other customers).

5.2.5.4 Reactions from the 2nd tier suppliers- Cabins

The reactions from the 2nd tier suppliers have been mixed, but mostly positive due to the fact that Cargotec are referring their 1st tier suppliers as customers to them.

5.2.6 Experienced consequences from using controlling purchasing strategies

Cargotec would like the steelworks for s1 to invoice the 1st tier suppliers directly and then send a rebate to Cargotec. It would save Cargotec and the process

administrative work. This rebate system was however not accepted by the steelwork since it gives them more work.

The negotiation situation with the 1st tier suppliers changes because both parties have the same information about the raw material/component prices from the 2nd tier. This is not necessarily negative, but it changes the way negotiations are conducted.

It is important for Cargotec not to take too much responsibility when it comes to the contact with the 2nd tier suppliers, as there is a risk that the 1st tier suppliers will “let go” of their part of the responsibility. In this case, Cargotec believes that it is better to push the 1st tier suppliers to become better themselves, than to take over completely. Cargotec ensures that their 1st tier suppliers keep improving partly by a “whip” approach (i.e. put the demand to continue to improve as well as definitions on where different responsibilities lie in the contract), and partly by a “carrot” approach (i.e. if the 1st tier suppliers show that they take initiative to improve by reducing cost or prices, they get to share the savings with Cargotec).

Cargotec has experienced that when overall prices are decreasing, they can get a better price from the 1st tier suppliers (who are stuck with inventory bought at a higher price) if they bring tenders from the 2nd tier suppliers.

When overall prices are going up, the situation is reversed. However, when overall prices are going up, the price increases would inevitably come sooner or later anyway, regardless of whether or not Cargotec is involved in the 2nd tier.

5.2.7 Concluding analysis by the interviewees

5.2.7.1 Reasons to control/delegate

2,5 years ago all the responsibility for contracting with the 2nd tier was on the 1st tier suppliers. Cargotec kept receiving increases in price and started to investigate exactly what components were included in the cabins, how much each component cost etc. and this way found many possible saving opportunities. The 1st tier suppliers did not have the competence, or the bargaining power, to improve prices. This is the reason why Cargotec saw it fit to start being more involved with the 2nd tier suppliers.

Also, Cargotec is a global company and thus has many contacts with (2nd tier) suppliers all over the world. The 1st tier suppliers that Cargotec works with usually do not have this network of contacts.

A final reason why Cargotec started controlling purchasing is that most of the steel components that are purchased are made according to Cargotec’s own design. Therefore Cargotec must investigate how the 1st tier suppliers are purchasing steel, if

they are doing it in a professional and good way according to Cargotec's requirements, or if Cargotec should start to control the purchasing.

5.2.7.2 Important factors when controlling/delegating

Whether or not to control purchasing depends a lot on the traditions within the industry. As an example, within the s3 industry there is no tradition of manufacturing companies to control purchasing. However, for the s1 industry there is a lot more tradition of doing so.

A big part of the purchasing strategy in the supply chain is to understand the supply chain and the different industries, within that knowledge lies the key to a successful discussion with the 2nd tier suppliers. Because the 1st tier suppliers have such good knowledge of the industry (both in the 1st and 2nd tier), it is important to have a good relationship with the purchasers at the 1st tier suppliers in order to achieve good bargaining potential with the 2nd tier suppliers. Cargotec therefore have regular meetings with the purchasers at the 1st tier suppliers, and in addition, have put demands on them to develop their competence and hire more purchasers. These demands apply both when Cargotec negotiates and contracts with the 2nd tier themselves, as well as when this responsibility is delegated to the 1st tier suppliers. This is important since the 1st tier suppliers in many cases still have a good connection with the 2nd tier suppliers.

5.2.7.3 When a controlling strategy is suitable

*"The more common type of steel that we are dealing with, the more difficult it becomes to control the purchasing with the 2nd tier suppliers"*¹¹³

Even if the volumes are not that big, the steelworks that are specialized (such as steelworks that produce high quality steel) can be interested in working close with a manufacturing company. Reasons for this could be that both parties can help each other with R&D of new types of steel or similar issues. This is the case with Cargotec and one big 2nd tier supplier when it comes to s1 but is applicable for other actors as well.

Which articles that are suitable for controlling depends on the cost structure of each article or segment, on how much it would cost to control it and how good the 1st tier suppliers are at purchasing it. This analysis and decision is a crucial part of all category strategies for Cargotec. Also, Cargotec finds it important to categorize its products. For example, when it comes to commodities, the benefit of Cargotec negotiating with the 2nd tier is not as large as for strategic products (such as cabins). However, in the commodity case, Cargotec still wants to benchmark other 2nd tier suppliers to put pressure on the 1st tier suppliers. The cabin segment is also suitable

¹¹³ Hans Lindblom, Vice President & Deputy at Cargotec Global Sourcing, 2011-03-23

for this type of approach (i.e. negotiating and contracting with the 2nd tier) because the 2nd tier supplier base is very complex.

Cargotec suggests some conditions for how to successfully work with controlling purchasing. In order to succeed with controlling strategies one must:

- A. Have done good research of the supply chain and the different industries and have a strategy built on such knowledge. The company should know how hard (cost in time and money) the strategy would be to realize.
- B. Investigate what competence level the 1st tier suppliers have when it comes to purchasing. What they lack in competence they need help to develop or the manufacturing company should start to control purchasing directly.
- C. Have a manageable supplier base. It is not possible to work with 2nd tier suppliers if one does not have a manageable number of 1st tier suppliers. There are a lot of different players that need to be convinced when one starts to control purchasing. Cargotec went from approximately 465 suppliers to 20-30 suppliers for the European region when the controlling strategy was implemented.

5.3 Case report Scania, Global Purchasing Chemicals (SMR)

5.3.1 Scania and its industry

General information about Scania can be found in chapter 2. This case presents how the commodity group Chemicals, which internally is named SMR, within the global purchasing department at Scania, is working with their purchases of raw material from their 2nd tier suppliers. Within Chemicals there are two other segments, apart from SMR: SMD (project purchasers) and SMQ (quality). Together the three segments purchase plastic products and materials that are injection-moulded, which includes everything made out of plastic inside the cabin (e.g. dash boards and roof shelves) as well as plastic components on the exterior of the truck (e.g. mud guards). The group also buys rubber, fabrics, windshields and paint.

The budget for injection-moulded parts within SMR is around 850 MSEK per year. Out of all the plastic components that are purchased, around 60% of the price comes from raw materials (i.e. around 510 MSEK per year).

We will, for the remainder of this case report, refer to Scania Chemicals as simply Chemicals, as not to confuse it with any other reference to Scania, where we are talking about the purchasing group that deals with forged parts. However, in some situations in this case report a reference to Scania as a company will be necessary.

5.3.2 Conducted interviews

One interview was made connected to this case. The interview was with Anna Lindgren at Scania in Södertälje. Lindgren works as a sourcing manager at SMR

within the Scania global purchasing division, within the commodity Chemicals (SMR). Besides her strategic sourcing responsibilities she is the team leader in a team consisting of three people where she is responsible for all of the purchasing activities connected to raw material. The main activities for Lindgren is to negotiate new business deals, monitor the market, evaluate existing suppliers and find new ones.

5.3.3 Chemicals' purchasing strategy with 2nd tier suppliers

Chemicals has been using the strategy of negotiating with the 2nd tier suppliers in the area of injection-mouldings for an extended period of time (around 10 years). The 1st tier suppliers are in this case companies that do injection-moulding and the 2nd tiers are companies selling plastic resin mixtures of different sorts. Out of the 510 MSEK, which is the raw material part of the purchasing budget at SMR, Chemicals negotiates around 50 percent directly with the 2nd tier suppliers, (see figure 21, wherein the 50 percent that is controlled is referred to as situation 1, and the remaining 50 percent, which is delegated, as situation 2). The 50 percent share that is controlled consists of materials that are specific to Scania, where Scania decides for example the surface finish and feel of the material. The main reason that Chemicals does not control the remaining 50 percent is that those materials/components are not specific to Scania. Also, it has been estimated that the 1st tier suppliers for these non-specific materials are able to consolidate volumes from several customers that are much larger than what Scania could reach. Thus, Scania does not have any extra leverage in this area.

The Chemicals division has regular meetings (once a week) with representatives from R&D, where it is decided what materials to use for new articles. What type of mixture of resin is to be used will then affect if Chemicals will negotiate the price with the 2nd or the 1st tier suppliers.

Chemicals negotiate prices and terms of payment with the 2nd tier suppliers (the raw material producers) on behalf of the 1st tier suppliers (the injection-moulders). The contract specifies which of Chemicals' 1st tier suppliers that are allowed to make call-offs on the contract, and also that all of Chemicals' suppliers should get the same price regardless of their ordering volumes. The 2nd tier suppliers then deliver directly to the 1st tier suppliers after receiving a call-off from them. The 2nd tier suppliers invoice the 1st tier suppliers according to the contract set up by Chemicals, and the 1st tier suppliers in turn invoice Chemicals. The prices are transparent in all tiers. This way, Chemicals avoids being too involved in the operational contact between the 1st and the 2nd tier supplier.

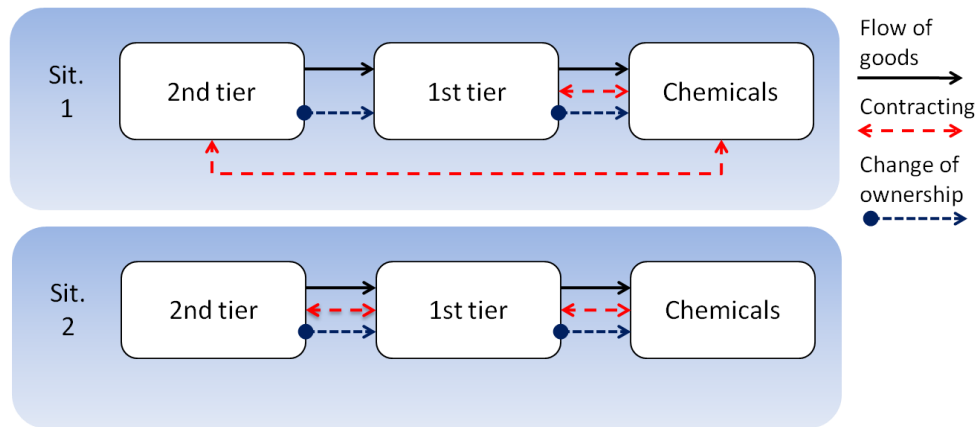


Figure 21: Description of the supply chain when Chemicals control (Sit. 1) and delegates (Sit. 2) purchasing of plastic resin.

Chemicals tries to set up contracts with the 2nd tier suppliers that are as long as possible, to avoid too many negotiations (they would prefer to renegotiate semi-annually but at the most every quarter). The contracts that are set up between Chemicals and the 1st tier suppliers stipulate that Chemicals is responsible for negotiating prices and terms of payment with the 2nd tier suppliers, while the 1st tier suppliers are responsible for all other contact with the 2nd tier supplier, e.g. quality control and terms of delivery.

5.3.4 Description of the industry for each tier

5.3.4.1 1st tier suppliers

The overall policy that Scania has is, as mentioned before, to work with small- to medium sized suppliers and that Scania should make up between 10-25 percent of the suppliers total business. However, the 1st tier suppliers (the injection-moulders) that are used by Chemicals in this case are very diverse when it comes to size. There are also differences in the share of their total business that comes from Chemicals (from around 10 percent up to 55 percent).

The industry of the 1st tier supplier is very exposed to competition, and some of the suppliers went bankrupt during the crisis years of 2009-2010.

5.3.4.2 2nd tier suppliers

Chemicals use basically 4 larger and some smaller raw material producers to supply its 1st tier suppliers. The larger 2nd tier suppliers are big players and Chemicals' demand only make up a small amount of their volumes (can be as small as 0,1 percent). The industry itself is consolidated and consists mostly of large, global players.

The negotiation with the 2nd tier suppliers have previously been based on a chart of raw material pricing from an independent source, called ISIS, but Chemicals is now striving to hold more open negotiations, i.e. by discussing the cost break-down of the 2nd tier supplier as well as more “soft” aspects such as the long term relationship and the development of volumes (where the 2nd tier suppliers need to show commitment to Scania if they want to keep Scania as customers). This way, Chemicals can expose the 2nd tier suppliers to competition and make better comparisons between them.

5.3.5 Reactions from suppliers when controlling purchasing

5.3.5.1 Reactions from 1st tier suppliers

The 1st tier suppliers have had mixed reaction, but mostly positive, to Scania controlling purchasing. In the case where Scania delegates purchasing, the forges are content with handling the purchasing activities with the 2nd tier suppliers themselves. Lindgren mentions that the forges have a better opportunity of adding to the price when they handle the negotiations themselves.

5.3.5.2 Reactions from 2nd tier suppliers

The 2nd tier suppliers have mostly reacted positively to the arrangement. They appreciate having a close relationship with Scania and the possibility to participate in joint development projects. As an example, Scania is always trying to make its trucks lighter, and thus trying to find more lightweight materials. For this reason, Chemicals tries to hold regular development meeting with the 2nd tier suppliers to reach these goals.

There have been no negative reactions from the 2nd tier suppliers on account of the transparent pricing towards the 1st tier suppliers. Even though some of the 1st tier suppliers use their knowledge of Chemicals’ pricing to get better prices on behalf of their other customers, the 2nd tier suppliers know about this and have not reacted noticeably.

5.3.6 Experienced consequences from using controlling purchasing strategies

One of the positive consequences of the controlling strategy that Scania uses is that Scania and the 2nd tier suppliers are closer to each other and can easier initiate development projects together. Also, Scania gets a very good insight into costs and pricing, as well as better coordination of goods in the supply chain. This is something that Scania misses out on when delegating purchasing. Lindgren expresses that if controlled purchasing strategy is done correctly, there are few draw backs with the arrangement.

Lindgren wishes that they would have more time to map the situation better at Chemicals in order to better assess what materials/components/suppliers to focus

on. For example, Chemicals does not know a lot about the 1st tier suppliers purchasing competence, or their consolidated volumes at the 2nd tier suppliers. There might be a 1st tier supplier that actually could achieve better prices than Chemicals with the 2nd tier suppliers. There could also be a case where it would be better to focus on a specific material, where the 1st tier suppliers do not have strong buying leverage.

A negative consequence that does exist is that Chemicals must negotiate with two different parties instead of one, which of course takes up more time and resources. Chemicals is actually hiring an additional employee whose work tasks will consist solely of dealing with raw materials purchasing. Another negative consequence mentioned is that competitors to Scania that use the same 1st tier suppliers, but does not put time and resources on negotiations with the 2nd tier suppliers, sometimes still get the same prices. This is because the pricing is transparent and the 1st tier suppliers can use their knowledge of Chemicals' pricing to get better prices on behalf of their other customers. Also, even though it is in the contract between Chemicals and the 1st tier supplier that the 1st tier supplier should handle quality and delivery issues with the 2nd tier suppliers, the 1st tier suppliers sometimes comes to Chemicals for help if something has happened, e.g. late deliveries or shortage of material. To avoid this, Chemicals gives out Scania's production forecasts to the 1st tier suppliers, who then break the forecasts down and sends them out to their respective suppliers.

5.3.7 Concluding analysis by the interviewees

5.3.7.1 Reasons to control/delegate purchasing

Lindgren has experience from another division within Chemicals (Rubber), where a controlling strategy was not used. The major difference is that, at times when prices were going down, she experienced that she was in a worse position there than at Chemicals. She still had to keep watch over the development in pricing, since the 1st tier supplier were not going voluntarily going to tell her about price reductions, but she did not receive the full benefits when controlling the purchasing.

5.3.7.2 Important factors to consider when controlling/delegating

For the controlling strategy to work there has to be cooperation between both the 1st and 2nd tier and Chemicals. This is because all parties need to be included in decisions regarding what materials to be used and what techniques to use. Meeting with all three parties are therefore set up and is a necessity.

The future strategy within Chemicals when it comes to controlling purchasing that is relevant to this case is to:

- A. Increase the share of raw materials purchased by Chemicals (the goal is 70 percent).

- B. Move towards more open negotiation with the 2nd tier suppliers.

5.3.7.3 When a controlling strategy is suitable

Lindgren suggests that it would be more suitable to use a controlling strategy for components that have raw materials as a major cost driver, than for other products. Also, in this particular case, the components in question are very visible on the truck and there is already a lot of competence within Scania to handle these kinds of components. There could be a difference when it comes to components that are not as visible to the customer and where the most important factor is something else, e.g. durability. In short, the characteristic of the product, the knowledge and experience that the manufacturing company has about it is of importance.

5.4 Case report, GloboMan

5.4.1 GloboMan and its industry

GloboMan is a global manufacturing company, producing customized equipment for their customers. GloboMan is a fictitious name for a real company, who wishes to be anonymous in this thesis. Therefore, no further description about the specific industry that the company is in will be provided here.

GloboMan produces between 300-1000 customized units per year, and buys a lot of stainless steel that is used in these units. Within the stainless steel business, GloboMan has worked a lot with securing supply, quality and prices. GloboMan is big within this segment and works primarily with one to two 2nd tier suppliers. This arrangement has worked well for GloboMan and its subcontractors who through this get a secure supply. Especially during 2007/2008 supply was a big problem for others in the industry, but GloboMan managed well because of its relationship with the 2nd tier suppliers.

5.4.2 Conducted interviews

At GloboMan, two face-to-face interviews were conducted, with M. Nilsson and K. Jonsson (fictitious names).

Nilsson works as Supply manager, within the area of tubes (all produced from stainless steel). Within the division in which Nilsson works there are two segments: OEM-products and subcontracted goods, where OEM-products are semi-assembled products and subcontracted goods usually are made from raw materials.

Jonsson works within Supply Management at GloboMan. In Supply Management, Jonsson negotiates and secures quality with suppliers in China, India and Brazil.

5.4.3 GloboMan' purchasing strategy with 2nd tier suppliers

The arrangement is set up in the way that GloboMan's 1st tier suppliers (the subcontractors or third party suppliers) can make call-offs on GloboMan's contracts

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with the 2nd tier suppliers. This arrangement came naturally because GloboMan used to have a lot more production in-house which meant that the company already had the necessary connections with the 2nd tier suppliers. Now that more of the production is outsourced, GloboMan still wants them to get competitive prices.

Normally GloboMan contracts directly from the steelworks (see situation 1 in figure 22), but for some specific products, GloboMan has to go through a distributor (see situation 2 in figure 22). Sometimes, the distributor has the “exclusive rights” of reselling the steelwork’s materials. The preferred case is when GloboMan can buy directly from the steelworks. However, the steelworks are good at producing, but not always as good at logistics for example (where the distributors are better), which means that there is a trade-off. For OEM-products, the interaction in the supply chain is similar to that depicted in situation 1 in figure 22, with the exception that the 2nd tier suppliers are not steelworks but OEM-suppliers.

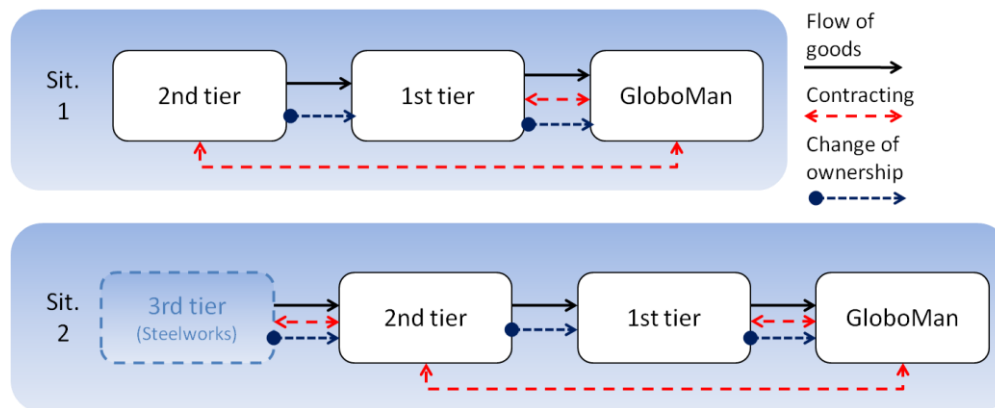


Figure 22: Description of the supply chain when GloboMan controls purchasing of steel directly with the steelworks (Sit. 1) and with a distributor (Sit. 2).

GloboMan’s subcontractors/third party suppliers can buy from the steelworks at the prices that GloboMan has negotiated. In the contract between the 2nd tier suppliers and GloboMan it is stipulated which subcontractor/third party suppliers that are allowed to make call-offs on GloboMan’s contracts. The subcontractors/third party suppliers are not allowed to see all the prices negotiated by GloboMan, but only the prices that concerns them directly, i.e. the prices for the materials or products that they buy on account of GloboMan. This agreement exists to “protect” the 2nd tier suppliers, who might not want other companies to free ride on GloboMan’s contracts. GloboMan sometimes holds meetings with the 2nd tier suppliers to check that the 1st tier suppliers are behaving accurately (which they usually do). There is usually a stronger incentive for the 2nd tier suppliers to follow up this kind of information than it is for GloboMan.

The contract between the 1st tier supplier and GloboMan stipulates confidentiality policies (i.e. that the 1st tier supplier is not allowed to reveal the prices that are used) and for what purposes the 1st tier supplier is allowed to make call-offs on GloboMan's contracts (i.e. that it can only use the contract for what it produces for GloboMan).

5.4.4 Description of the industry for each tier

5.4.4.1 1st tier suppliers

With regards to the size of the companies in the supply chain, the 1st tier suppliers are often smaller firms in comparison to GloboMan, and there are relatively many of them on the market. GloboMan usually has a large part of the 1st tier suppliers' volumes, though GloboMan tries not to be "too" big. The location of the 1st tier suppliers is geographically close to GloboMan's production sites.

For some specific products of GloboMan, the 1st tier suppliers are large, global players

5.4.4.2 2nd tier suppliers

The 2nd tier suppliers consist of stainless steel producers. The ones that GloboMan works with have a "wide" presence, in the sense that it has incorporated a large part of the supply chain in its own business by vertical integration from ore and scrap metal to delivering a complete scope of stainless steel products. The 2nd tier suppliers are generally large players, and there are not many of them. In total, 29 million tons of stainless steel was produced in 2010. A noticeable trend in the industry is that the Chinese players are growing rapidly (from 7 million tons in 2008 to 10 million tons in 2010; the 3 million tons increase represent almost the whole total increase in production worldwide).

GloboMan is not very big in comparison to the steelworks or the distributors; however they are big within their niche (which is stainless steel with high quality demands and thin products). The steelworks and the distributors are large and act on consolidated markets. GloboMan negotiates with key account managers at the distributors and the steelworks. They have a sound relationship and GloboMan is an important client.

5.4.5 Reactions from suppliers when controlling purchasing

5.4.5.1 Reactions from 1st tier suppliers

The 1st tier suppliers are usually positive to the arrangement. They feel safe both from a supply perspective and from a quality perspective. If something goes wrong the 1st tier suppliers have more power through GloboMan.

In some cases however, the 1st tier suppliers have experienced some difficulties with quality and delivery issues from the 2nd tier suppliers. When this happens, they feel a little frustrated because they have not been involved in the negotiation process and because they do not have a lot of influence. However, this is very rare.

5.4.5.2 Reactions from 2nd tier suppliers

The 2nd tier suppliers sometimes have a more negative attitude towards the arrangement. In one case, GloboMan experienced inferior quality, and was duly compensated by the distributor, but the distributor in turn was not compensated by the steelworks. Since GloboMan can have hard time delivering correct prognosis, this can also cause problems and negative attitudes for the 2nd tier suppliers. In general though, the 2nd tier suppliers are positive, mostly because there is less administrative work for them. Instead of negotiating and contracting with several of GloboMan's 1st tier suppliers, they only have to make one contract (with GloboMan).

The most common doubt is that GloboMan gets too much insight into the 2nd tier suppliers' processes. Also, the 2nd tier suppliers have expressed doubts concerning that neither they nor GloboMan can control if the 1st tier suppliers use the contract to purchase material for any of their other customers. If they do, it might impact both GloboMan and the steelworks/dealers negatively. The steelwork/dealers might sell to a lower price than they normally would to that specific customer and in the worst case for GloboMan, the material ends up with one of their competitors (who might not have the purchasing leverage that GloboMan has). GloboMan is currently working on how this issue can be solved, though Jonsson emphasizes that it is very hard to come up with a solution that satisfies everyone in the arrangement. Some years, the 2nd tier suppliers have also been unhappy about the fact that GloboMan has failed to reach the volumes agreed upon.

The pricing is always transparent towards the 1st tier suppliers, something the steelworks/dealers have not complained about; however, there are confidentiality agreements. None of the parties are interested in working with masked prices because that demands a much more complicated administrative model.

5.4.6 Experienced consequences from using controlling purchasing strategies

The consequences that GloboMan has experienced are mostly positive. GloboMan has larger volumes than the 1st tier suppliers and this comes through in the pricing. Jonsson estimates that GloboMan can get around 10-15% better prices than GloboMan's 1st tier suppliers. It is also positive to have a relationship with the 2nd tier suppliers because GloboMan can push and involve itself in the development of the material or the processes of the 2nd tier suppliers.

The negative aspects can be that the prices leak which might lead to that the relative price level goes down. The price visibility towards the 1st tier suppliers might lead to

them taking advantage of the situation. The 2nd tier suppliers are not always happy that the prices go down and that they cannot get the margins that they want.

Another negative aspect is that if GloboMan no longer is happy with the 2nd tier suppliers it will be time consuming to replace them once the relationship has been built up. Still, GloboMan has not considered using additional 2nd tier suppliers, because they do not want to split up the volumes (which is what gives them leverage).

5.4.7 Concluding analysis by the interviewees

5.4.7.1 Reasons to control/delegate purchasing

The foremost reasons to control purchasing are securing quality and supply. It is also considered where GloboMan feels it has better purchasing power than the 1st tier suppliers (potential savings), and where they have the volumes that are needed. GloboMan is working with many thousand tons of stainless steel per year, while individual 1st tier suppliers generally work with only 5-10 percent of this volume. Usually the strategy where GloboMan negotiates directly with 2nd tier is preferred within the company, a lot because the 1st tier suppliers have to buy based on GloboMan's specifications.

5.4.7.2 Important factors when controlling/delegating

The most important factor is that the company in question has enough volume.

5.4.7.3 When a controlling strategy is suitable

A large part of GloboMan's total costs are made up of material costs, which means that even the smallest saving has a big impact on their results. GloboMan sometimes also need to approve certain aspects before the subcontractor is allowed to use the material or subcomponent in question (because the components are designed by GloboMan). In cases like that, a controlling strategy could be suitable.

5.5 Case report, Globotech

5.5.1 Globotech and its industry

Globotech is a fictitious name for a real company, who wishes to be anonymous in this thesis. Therefore, the description about the specific industry that the company is in will be limited. Globotech is a global organization in all aspects that produces and sells high tech, electronic products. The type of products that Globotech produces have a short life cycle and the market is dynamic where consumers' needs and behaviors are central. In general the cost of raw materials in these products is low relative to the costs of the value adding processes. The industry in which Globotech acts is known for high competition and fast changes of market conditions.

5.5.2 Conducted interviews

One interview was made at Globotech's head office in southern Sweden. The interviewee is Head of Sourcing for a certain commodity group of articles at Globotech; we will in this report refer to him as Persson. His commodity group consists of many different types of articles made of many different types of material such as plastics, paint and metals.

Persson's work activities consist of maintaining a good supplier base, selecting the suppliers for each component and negotiate prices.

5.5.3 Globotech's purchasing strategy with 2nd tier suppliers

At Globotech, there are three main alternatives when sourcing, depending on the commodity and the supplier. The first is that the product/material is sourced by the supplier or produced in house. The second is that the product/material is sourced by the party with the best total cost/lead time etc. The third is that the product/material is always sourced by Globotech. Persson would like to use the second option more and argues that this would open up for new solutions; it all comes down to what is best for Globotech. Persson also thinks that it is good to change the conditions for the suppliers every now and then, to keep them on their toes.

Globotech both delegates and controls purchasing, related to its 2nd tier suppliers, to its 1st tier suppliers. Persson works with controlling purchasing primarily when it comes to raw materials, which in this case is plastic resin and paint, and cosmetic products, e.g. buttons, tape etc. This case focuses primarily on Globotech's work with raw materials. Figure 23 depicts the flow of goods and where contracting is made in the supply chain when Globotech is controlling the purchasing, as well as the how the ownership of the goods changes.

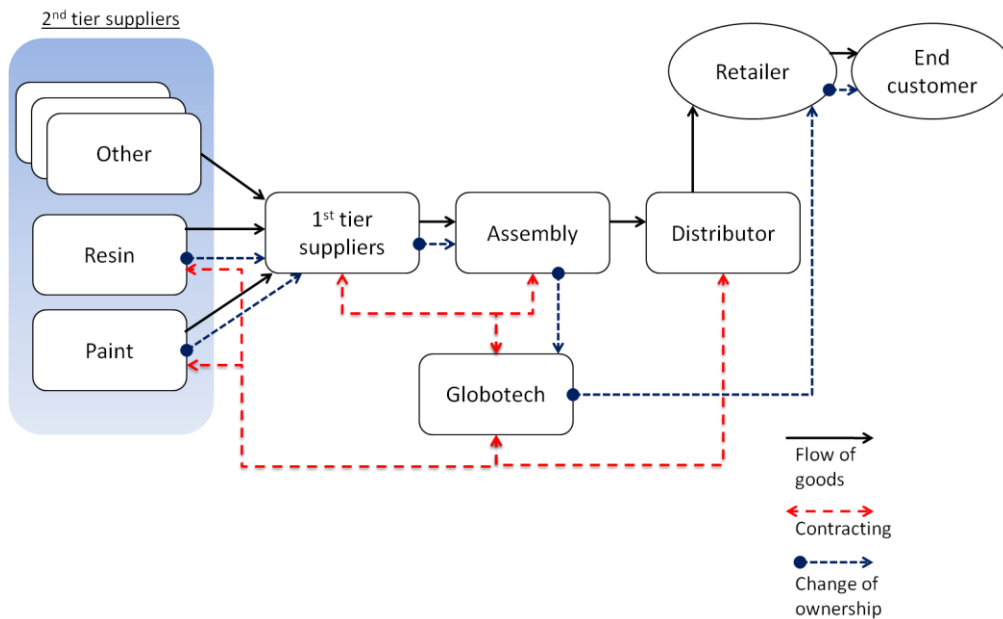


Figure 23: Description of the supply chain when Globotech controls purchasing

As shown in figure 23, the 2nd tier suppliers deliver raw materials directly to the 1st tier suppliers, which in turn deliver parts to the assembly. After assembly the products are shipped to a distributor who sends them to a retailer where they are sold to the end customer. In the case where Globotech controls purchasing it has contracts with all of the different actors, except the retailer and the end customer. The price information between the different actors is not concealed in any way i.e. the 1st tier suppliers have full insight in the prices that Globotech has negotiated with the 2nd tier suppliers, and buys directly from the 2nd tier suppliers at this price. The ownership of the goods follows the same route as the goods itself, except where the goods travel from the assembly to the distributor. Here, Globotech owns the goods and then sells it to the retailer.

For paint and resin this controlled purchasing strategy has been used for a long time.

5.5.4 Description of the industry for each tier

5.5.4.1 1st tier suppliers

These are smaller actors compared to both the 2nd tier suppliers and Globotech. Geographically they are situated near the assembly factory due to the lead-time demands that is affecting the industry.

5.5.4.2 2nd tier suppliers

The 2nd tier suppliers that deliver plastic resins and paint are usually huge companies. Geographically they are spread out all over the world. On some markets there are local suppliers available but Globotech has chosen to use global players with a known support and quality level.

5.5.5 Reactions from suppliers when controlling purchasing

5.5.5.1 Reactions from 1st tier suppliers

According to Persson, the 1st tier suppliers are generally satisfied with working with the controlling strategy where Globotech negotiates resin and paint. Due to the involvement of Globotech the lead-time is reduced which stabilizes the production and logistical planning of the different tiers.

However, it takes away the opportunity for the 1st tier suppliers to mask their prices and add a margin of their own.

5.5.5.2 Reactions from 2nd tier suppliers

The 2nd tier suppliers are generally positive towards the controlling purchasing strategy applied by Globotech, Persson says. This is both because it allows them to have better control over material changes and development of the products and gives them better information of demand variations. However Globotech does not give any forecasts to them of volumes but more of an idea of the amount of next year's spends in order to agree of a pricing model. The raw material suppliers are also positive since they get access to Globotech's other 1st tier suppliers which then will increase their customer base.

5.5.6 Experienced consequences from using controlling purchasing strategies

There is a general view within Globotech that the company should not be involved with 2nd tier suppliers. The reason for such a view is that Globotech wants the 1st tier suppliers to solve any potential issues with the 2nd tier suppliers themselves without involvement from Globotech. Globotech is afraid that its involvement would require a lot more work for the purchasing division. The issue regarding the level of involvement has created different attitudes within the company; R&D is usually positive while the quality engineers are sometimes negative towards the strategy due to the fact that they belong to the part of the organization that needs to handle potential quality issues. However, the approach about controlling purchasing is changing within Globotech towards a situation where Globotech will control more of the purchasing in the supply chain if it shows to be beneficial from a strategic or total cost point. In practice the problems and challenges are inferior to the advantages that come with the strategy. The priority to keep production running is higher than who owns the agreement. This means that even if the 1st tier supplier owns the purchasing agreement with the 2nd tier (i.e. if Globotech delegates the

responsibility to purchase from the 2nd tier suppliers to the 1st tier suppliers), Globotech will still need to act if something goes very wrong.

Persson has not personally experienced any negative consequences of a controlling strategy. He emphasizes that Globotech has no obligations towards the 2nd tier suppliers, e.g. to purchase a specified quantity. Also, Persson sees no need for Globotech to build up more technical knowledge within the purchasing division to be able to negotiate further down in the supply chain. Though he admits observing that there is a higher pressure on the purchasing organization of Globotech (mostly concerning quality) and if there are any problems with the supply or other issues Globotech will be responsible in the end.

5.5.7 Concluding analysis by the interviewees

5.5.7.1 Reasons to control/delegate purchasing

The original motivation to use a controlling strategy was to secure supply on short notice (to shorten lead time is priority number 1) and to secure competitive prices. The process for identifying where Globotech should use the strategy is not explicitly expressed within the company. It is done “where it is needed” when Globotech tries to identify bottlenecks in the supply chain. In this particular case it was identified that paint and resin are the bottlenecks when it comes to lead time, so Globotech started to secure the supply by contracting with the 2nd tier suppliers. Lead-time is the most important factor together with high customer demands in a supply chain such as the one for Globotech where products are supposed to be able to change and reach customers in short time periods.

5.5.7.2 Important factors to consider when controlling/delegating

Persson comments that even if Globotech does not mask their prices in any way for the 1st tier suppliers this could be important if the price information is sensitive.

5.5.7.3 When a controlling strategy is suitable

Persson mentions four suggestions concerning what kind of situation a company should be in to adopt a controlling strategy:

- A. If the company is sensitive to lead time deviations.
- B. If the 1st tier supplier does not have the appropriate purchasing competence. Meaning that the manufacturing company has to pay too much for suppliers’ sourced components, it could be relevant to adopt the strategy. This was emphasized strongly.
- C. If the manufacturing company has more purchasing leverage than the 1st tier supplier.
- D. If the construction of a certain product is very demanding in terms of quality and materials or of strategic interest.

6. Cross case analysis

In this chapter we present our cross case analysis in which we will analyze the findings from our multiple case study and compare it to our theoretical framework. The structure of the cross case analysis will be similar to the case report guide found in appendix 2. The result of the cross case analysis will serve as the foundation for our decision-making tool, which is presented in chapter 7.

The structure of the cross case analysis is based on the different sections in the case report guide that is found in appendix 2. Each section is in turn divided in four different parts:

1. *Consolidated overview* – consolidated information from the relevant section in each case report is presented to form an overview with the aim to help identify connections between cases and conclusions from our findings.
2. *Identified connections* – first analysis based on the consolidated overview.
3. *Theoretical aspects* – second analysis where the identified connections are compared with our theoretical framework.
4. *Implications for decision-making tool* – description of what implications the conclusions from the analysis will have on the creation of the decision making tool.

Throughout the cross case analysis we will use the six procurement models presented in section 4.4.1, with the addition of the COI model presented in 4.5.7, as a base when comparing cases and identifying connections,. A short repetition of the models is provided below in table 27.

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Procurement model	Brief description
Turnkey	The 1 st tier supplier negotiates with and buys directly from the 2 nd tier supplier
Turnkey with audits	The manufacturing company audits the transaction prices and quantities in the turnkey relationship
COI (Control with open information)	The manufacturing company sets up a contract with the 2 nd tier suppliers, allowing its 1 st tier suppliers to make call-offs to this contract
Supplier rebates	The 2 nd tier suppliers sells goods to the 1 st tier supplier at a "1 st tier supplier price", and sends rebates to the manufacturing company
Buy-Sell	The manufacturing company buys from the 2 nd tier supplier at a private price and sells to the 1 st tier supplier at a different (higher) price
Consignment	The manufacturing company buys and owns the inventory, which the 1 st tier supplier holds
In-house	The manufacturing company buys directly from the 2 nd tier supplier, manages storage and delivers to the 1 st tier supplier

Table 27: Description of the procurement models¹¹⁴

6.1 Analysis of used strategies

This section of the analysis is connected to section 3 in the case report guide, where the used strategies are described.

6.1.1 Consolidated overview

In table 28 below, we have categorized the strategies used in each case according to the seven procurement models described in chapter 4 (see table 27 for an overview). Some of the case companies use more than one procurement model, as described in the case reports in chapter 5, which is why we have divided these into sub cases.

¹¹⁴ Amaral et al (2006), with the exception of the COI model which we have created ourselves

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		Procurement models						
		Turnkey	Turnkey with audits	COI	Supplier rebates	Buy-sell	Consignment	In-house
Case	Alfa Laval		Sit. 3	Sit. 1			Sit. 2	
	Cargotec	Sit. 5	Sit. 4	Sit. 2,3,6		Sit. 1		
	Chemicals	Sit. 2		Sit. 1				
	GloboMan			X				
	Globotech ¹¹⁵			X				

Table 28: Procurement models used by case companies (Sit. stands for situation, X marks the procurement model when there were only one procurement model in the case).

In order to be able to draw any conclusions on the situations in which the models are used, we have designed table 29, which, similar to table 25 in section 4.5.8, captures the special characteristics of each case.

¹¹⁵ Globotech normally uses the Turnkey or Turnkey with audits procurement models when handling purchasing with 2nd tier suppliers in the company as a whole, which is mentioned in the case report. Globotech was the first interview that was conducted. At that time we were focusing on the situations where manufacturing companies are controlling purchasing activities with the 2nd tier suppliers. Because of this, the case report almost only handles the situation where Globotech controls purchasing and that is why we only present and analyze the case where Globotech uses COI. During the progress of the thesis we have included cases where the manufacturing companies were delegating purchasing activities as well.

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	Special characteristics of cases								Procurement model used	
	Sensitive price information	Specialized material	Expensive material	Existing relationship with 2nd tier	Quality is important	Standardized material	Strategically important material	Raw material is major cost driver		
Cargotec (s1)- sit. 1	X	X		X					Buy-Sell	Control
Alfa Laval- sit. 1		X	X		X				COI	
Cargotec (s1)- sit. 2		X		X					COI	
Cargotec (s2)- sit. 3						X			COI	
Cargotec (Cabins)- sit. 6		X					X		COI	
Chemicals- sit. 1		X						X	COI	
GloboMan		X						X	COI	
Globotech							X		COI	
Alfa Laval-sit. 2		X	X		X				Consignment	Delegation
Cargotec (s3)- sit. 5						X			Turnkey	
Chemicals-sit. 2						X		X	Turnkey	
Alfa Laval- sit. 3					X	X			Turnkey with audits	
Cargotec (s2)-sit. 4						X			Turnkey with audits	

Table 29: Special characteristics of cases

The connections identified in table 29 are discussed in the next section, 6.1.2.

6.1.2 Identified connections

In a majority of the investigated cases (seven instances out of thirteen) the COI model is used. Four other models have also been identified: the Turnkey with audits model (two instances), the Turnkey model (two instances), the Buy-Sell model (one instance), and the Consignment model (one instance).

It is hard to draw conclusions on which special characteristics that should be in place for a company to use a specific model. There seems to be similar characteristics in

some models, but at the same time, these characteristics are not exclusive but present also in other models. However, it could be possible to make out a pattern as to which special characteristics should be in place for a company to control or delegate purchasing activities with the 2nd tier suppliers. Whether or not the material or product being produced by the 2nd tier suppliers is specialized or designed by the case company itself seems like an important factor. In all cases where the purchasing activities with the 2nd tier suppliers are delegated, the material or product produced by the 2nd tier suppliers are standardized, or at least not specific to the case company. Also, high raw material costs (expensive material) or the fact that raw material is a major cost driver in the end product seems to be a common denominator for cases where a controlling strategy is used. However, this appears to be a characteristic also in some of the cases where a Turnkey model is used. Whether or not price information is sensitive seems to be of importance when choosing which model to use, but of less importance when deciding whether to delegate or control purchasing activities with the 2nd tier. To our understanding, it is often the 2nd tier suppliers who determine if the price should be visible towards the 1st tier suppliers or not.

6.1.3 Theoretical aspects

When comparing the special characteristics of the cases we have investigated to the external cases presented in section 4.5, it is possible to make out some patterns. However, we have focused on characteristics such as the degree of standardization of the material or component being purchased from the 2nd tier suppliers, if raw material makes up a large part of the total cost of the end product, whether or not price information is sensitive and if there is an existing relationship with the 2nd tier suppliers. The reason we have focused on this is that these areas kept resurfacing in our investigation of the case companies. This can be seen in contrast to the special characteristics of the external cases, where the focus lies on how the arrangement is set up. The only area we can really compare is sensitive or not sensitive price information, which is an area that is represented in both our cases and the external cases investigated by Ellram and Billington. The conclusion that can be drawn is that sensitive price information affects which model that is used; narrowing the options to the Supplier rebates model, the Buy-Sell model, the Consignment model or the In-House model.

6.1.4 Implications for the decision making tool

The patterns we have identified can have implications for the decision making tool. First, we have identified that when the product or raw material being bought is standardized, companies tend to delegate purchasing to the 1st tier suppliers, while specialized products and materials seem to encourage companies to control purchasing. The cost of raw material and the share of that cost in the total cost of the end product also seem to be an important factor. If the share is high, companies tend to control purchasing activities with the 2nd tier suppliers. We have also been

able to identify that if price information in the supply chain is sensitive, the number of viable procurement models decrease from seven to four (leaving the Supplier rebates model, the Buy-Sell model, the Consignment model, and the In-house model as viable options). The implications for the decision making tool are summarized in table 30.

Implication	Description
IMP1.1	Specialized material
IMP1.2	Cost of raw material
IMP1.3	Sensitive price info.

Table 30: Implications for the decision making tool (1)

6.2 Supply chain situation

This section of the analysis is connected to section 4 in the case report guide, where the supply chain situation is described.

6.2.1 Consolidated overview

Table 31 describes the industry for the 1st tier suppliers, in connection to the procurement model being used in each case.

Can Scania be stronger than steel?

	Industry for 1 st tier suppliers							Procurement model used	
	Few on the market	Many on the market	Local	Small*	Diverse in size	Strong competition	Manufacturing company makes up large part of 1 st tier supplier's business**		
Cargotec (s1)- sit. 1	X		X					Buy-Sell	Control
Alfa Laval- sit. 1				X			X	COI	
Cargotec (s1)- sit. 2	X		X					COI	
Cargotec (s2)- sit. 3		X	X			X		COI	
Cargotec (Cabins)- sit. 6					X			COI	
Chemicals- sit. 1					X	X	X	COI	
GloboMan		X		X				COI	
Globotech				X				COI	
Alfa Laval-sit. 2				X			X	Consignment	Delegation
Cargotec (s3)- sit. 5	X		X					Turnkey	
Chemicals-sit. 2					X	X	X	Turnkey	
Alfa Laval- sit. 3				X			X	Turnkey with audits	
Cargotec (s2)-sit. 4		X	X			X		Turnkey with audits	

Table 31: Connection between type of industry for the 1st tier suppliers and the model being used in each case (*in comparison to manufacturing company, **around 30 percent and above)

Table 32 describes the industry for the 2nd tier suppliers, in connection to the procurement model being used in each case.

Can Scania be stronger than steel?

	Industry for 2 nd tier suppliers							Procurement model used		
	Few on the market	Many on the market	Large*	Global	Regional	Local	Highly specialized			Dealers or CM's** are used****
Cargotec (s1)- sit. 1	X		X	X	X				Buy-Sell	Control
Alfa Laval- sit. 1						X	X		COI	
Cargotec (s1)- sit. 2	X		X	X	X				COI	
Cargotec (s2)- sit. 3		X			X			X	COI	
Cargotec(Cabins)-sit. 6								X	COI	
Chemicals- sit. 1			X	X					COI	
GloboMan	X		X				X		COI	
Globotech			X	X					COI	
Alfa Laval-sit. 2						X	X		Consignment	
Cargotec (s3)- sit. 5		X			X			X	Turnkey	Delegation
Chemicals-sit. 2			X	X					Turnkey	
Alfa Laval- sit. 3						X	X		Turnkey with audits	
Cargotec (s2)-sit. 4		X			X			X	Turnkey with audits	

Table 32: Connection between type of industry for the 2nd tier suppliers and the model being used in each case (*in comparison to manufacturing company, **Component manufacturer, *as opposed to raw material producers)**

The connections identified in tables 31 and 32 are discussed in the next section, 6.2.2.

6.2.2 Identified connections

When models that involve controlling purchasing activities with the 2nd tier suppliers are used, the 1st tier suppliers seem to be small firms. The 1st tier suppliers do not appear to have any significant power in the supply chain, at least not power by size. In the only case where a turnkey model is the only model being used (Cargotec s3), the 1st tier suppliers are few on the market, which might imply that they have more power in the supply chain. At the same time, many of the cases demonstrate a situation where the 2nd tier suppliers are large companies that seem to possess a lot of power in the supply chain.

6.2.3 Theoretical aspects

We have used Cox's model for mapping power regimes in the supply chain (see section 4.3.4) in order to analyze the interrelations between power relationships and delegation and control of purchasing. Below we have mapped the power and where value is appropriated in the supply chain for each of the cases. Here, most cases are not divided into sub cases because the 1st and 2nd tier suppliers are the same. The exception is the Cargotec case, where the 1st and 2nd tier suppliers differ from sub case to sub case.

6.2.3.1 Power situation in Globotech's supply chain

The actors that are described in figure 24 are Globotech, the 1st tier suppliers and the 2nd tier suppliers. The other actors such as distributors are outside the scope for this report. The description in the case report presents a situation where the 2nd tier and Globotech have a stronger power situation than the 1st tier. This is called upstream dominance-downstream dependence.

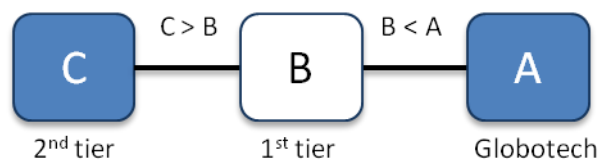


Figure 24: Power situation in Globotech's supply chain

The appropriated value is in this case concentrated to Globotech and the 2nd tier suppliers.

6.2.3.2 Power situation in Cargotec's supply chain (s1 steel)

In figure 25 below the power situation in Cargotec's supply chain for s1 steel is described.

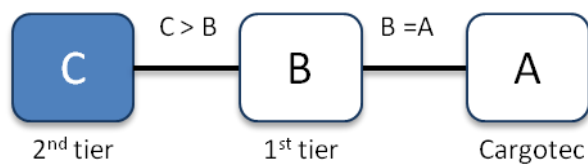


Figure 25: Power situation in Cargotec's supply chain (s1 steel)

The supply chain is characterized as downstream interdependence-upstream dependence, where the value is appropriated upstream, at the 2nd tier supplier. The relationship between Cargotec and the 1st tier supplier is affected by the fact that while Cargotec is an attractive customer for the 1st tier supplier, the 1st tier suppliers offering is relatively unique on the market. In the relationship between the 2nd tier supplier and the 1st tier supplier, the 2nd tier supplier is dominant due to

circumstances such as information advantages and the 2nd tier supplier's unique offering.¹¹⁶

6.2.3.3 Power situation in Cargotec's supply chain (s2 steel)

In figure 26 below the power situation in Cargotec's supply chain for s2 steel is described.

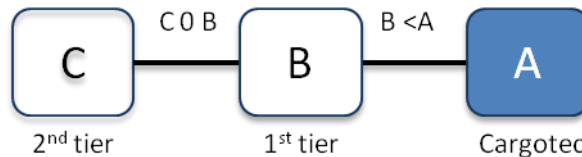


Figure 26: Power situation in Cargotec's supply chain (s2 steel)

In the relationship between Cargotec and the 1st tier suppliers, Cargotec is the dominant player since the competition is so strong in the industry for the 1st tier suppliers. Between the 2nd tier suppliers and the 1st tier suppliers is independence. There are many players in each tier, the 1st tier supplier has a relatively low share of the 2nd tier supplier's total business, and the 2nd tier supplier's offering is standardized. The relationship is characterized as downstream dominance-upstream independence.¹¹⁷

6.2.3.4 Power situation in Cargotec's supply chain (Cabins)

Here we do not have sufficient information to assess the power situation in the supply chain.

6.2.3.5 Power situation in Chemicals' supply chain

In figure 27 below the power situation in Chemicals' supply chain is described.

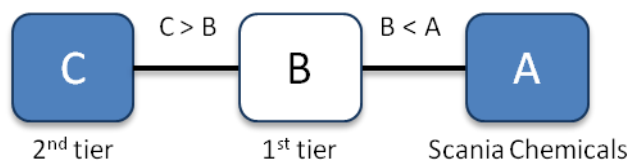


Figure 27: Power situation in Chemicals' supply chain

This supply chain is characterized as an upstream dominance-downstream dependence where the value is appropriated by the 2nd tier suppliers and Chemicals. The situation may be different in the case where Chemicals does not buy plastic

¹¹⁶ See Cox in chapter 4.3.4

¹¹⁷ See Cox in chapter 4.3.4

resin that is specific for them and where they do not control the purchasing with their 2nd tier suppliers.

6.2.3.6 Power situation in GloboMan's supply chain

In figure 28 below the power situation in GloboMan's supply chain is described.

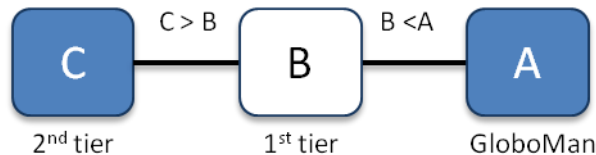


Figure 28: Power situation in GloboMan's supply chain

The relationship in the supply chain is characterized as upstream dominance-downstream dependence, where the value is appropriated at the 2nd tier supplier and at GloboMan. In the relationship between GloboMan and the 1st tier supplier, GloboMan is the dominant player. The 1st tier suppliers are small and many and GloboMan has a large share of the suppliers' total business, which means that the 1st tier suppliers are highly dependent on GloboMan for revenue. In the relationship between the 2nd tier supplier and the 1st tier supplier, the 2nd tier supplier is the dominant player. There are only a few, large 2nd tier suppliers and the 1st tier supplier has a low share of the total business for the 2nd tier supplier.

6.2.3.7 Power situation in Alfa Laval's supply chain

In figure 29 below the power situation in Alfa Laval's supply chain is described.

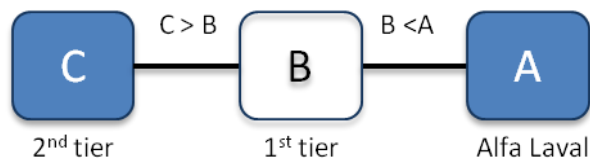


Figure 29: Power situation in Alfa Laval's supply chain

The relationship in the supply chain is characterized as upstream dominance-downstream dependence and the value is appropriated at Alfa Laval and the 2nd tier supplier. In the relationship between Alfa Laval and the 1st tier supplier, Alfa Laval is the dominant player; the 1st tier suppliers are small and Alfa Laval has a large share of the total business for the 1st tier suppliers, which means that the 1st tier suppliers rely heavily on Alfa Laval for revenue. In the relationship between the 1st tier supplier and the 2nd tier supplier, the 2nd tier supplier is the dominant player, much due to its unique offering on the market.

6.2.3.8 Summary of power situations

Table 33 provides an overview of the different power situations in relation to the models being used in each case.

	Downstream interdependence- upstream dependence	Downstream dominance- upstream independence	Upstream dominance- downstream dependence	Procurement model used	Delegation or control
Cargotec s1	X			Buy-Sell and COI	Control
Cargotec s2		X		COI and Turnkey with audits	Control and delegation
Globotech			X	COI	Control
Chemicals			X	COI and Turnkey with audits	Control and delegation
GloboMan			X	COI	Control
Alfa Laval			X	COI, Consignment and Turnkey with audits	Control and delegation

Table 33: Summary of power situations in relation to model used

We have found it hard to draw any conclusions regarding the impact of the power situation on the decision to use a controlling or a delegating purchasing strategy. Four cases out of six have a power situation that is characterized as upstream dominance-downstream dependence. However, there is no clear connection between the power situation and the models being used in these cases except that the COI model is used in all cases to some extent. In two cases the power situation is unique to the sample: Cargotec s1 and Cargotec s2 where the power situation is characterized as downstream interdependence-upstream dependence and downstream dominance-upstream independence respectively. The first is the only case where a Buy-Sell model is being used, but since there is only one case we consider it uncertain to draw any conclusion based on this.

In summary, the only conclusion we have been able to draw from the connection between power situation and what procurement model to use is that it seems that it is possible to use different models under the same power situation, i.e. a specific power situation does not call for a specific procurement model.

6.2.4 Implications for the decision making tool

Since we can find no connection between the power situation and the procurement model being used, the only implication for the decision making tool will be that what type of power situation a company is in does not limit the procurement models available as viable options.

6.3 Reactions to different procurement models

This section of the analysis is connected to section 5 in the case report guide, where the reactions to different procurement models are described.

6.3.1 Consolidated overview

Diagrams 1 and 2 present a consolidated overview of the perceived reactions from the 1st and 2nd tier suppliers. Table 34 provides information of how to interpret the diagrams, such as used abbreviations.

Case	Abbreviation	Procurement model used
Alfa Laval – situation 1	A1	COI
Alfa Laval – situation 2	A2	Consignment
Alfa Laval – situation 3	A3	Turnkey with audits
Cargotec – situation 1	C1	Buy-sell
Cargotec – situation 2	C2	COI
Cargotec – situation 3	C3	COI
Cargotec – situation 4	C4	Turnkey with audits
Cargotec – situation 5	C5	Turnkey
Cargotec – situation 6	C6	COI
Chemicals – situation 1	H1	COI
Chemicals – situation 2	H2	Turnkey
GloboMan	GM	COI
Globotech	GT	COI

Table 34: Abbreviations for manufacturing companies and situation

Can Scania be stronger than steel?

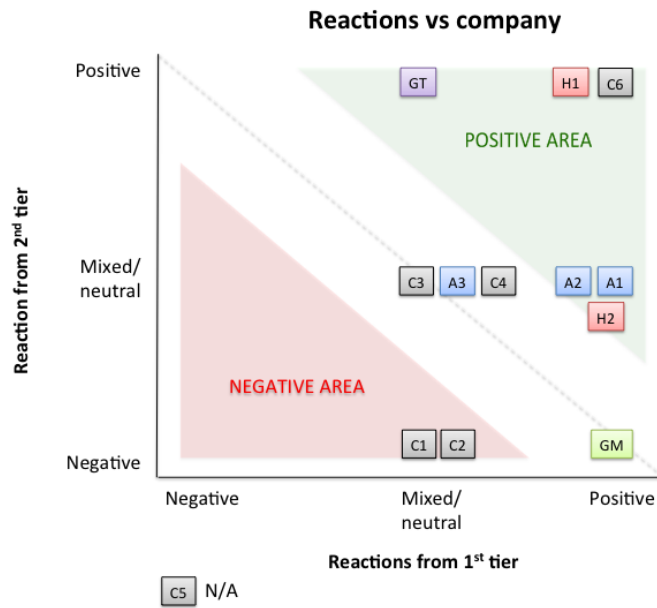


Diagram 1: Consolidated overview of perceived reactions from the 1st and 2nd tier suppliers, sorted by manufacturing company

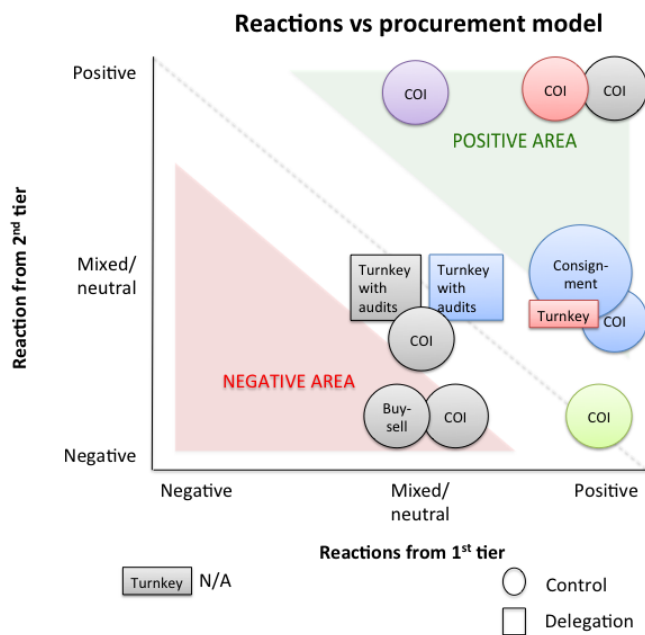


Diagram 2: Consolidated overview of perceived reactions from the 1st and 2nd tier suppliers, sorted by procurement model

The connections identified in diagrams 1 and 2 are discussed in the next section, 6.3.2.

6.3.2 Identified connections

The reactions from the 1st tier suppliers seem to be mostly positive regardless of what model is being used. The 2nd tier suppliers have shown more negative reactions, mostly due to sensitive information regarding prices and processes that the 2nd tier suppliers wish to keep for themselves, but the majority of the reactions that have been described are still positive, or at least neutral.

For the COI procurement model, there seems to be a fairly wide dispersion of reactions from the 1st and 2nd tier suppliers. We have not been able to find a valid explanation for this, as there does not seem to be a strong connection between the specific manufacturing companies and the reactions from the 1st and 2nd tier suppliers either. That is, the explanation that some manufacturing companies handle the situation in the supply chain better and hence get more positive reactions from suppliers is not valid. For example, Cargotec uses the COI model in more than one instance, but have received different reactions in all instances.

In the cases where a Turnkey or Turnkey with audits model is being used, we have no information about the reactions from the 2nd tier suppliers, since the manufacturing companies have no, or limited, contact with them.

6.3.3 Theoretical aspects

As mentioned, both the 1st and 2nd tier suppliers seem generally positive towards all the procurement models. One reason for this, that we have to consider in order to not mislead ourselves, can be that these reactions have been described to us by the manufacturing companies. Hence, all the information is based on what the 1st and 2nd tier suppliers have told them, or even sometimes what the manufacturing company has read between the lines in their communications. Since the manufacturing company is a customer of both the 1st and 2nd tier supplier, and in many cases the manufacturing company is an important customer, it is not far-fetched to assume that the suppliers are not always telling the manufacturing company everything. To reinforce this reasoning, in connection to the power situations discussed in section 6.2.3, most of the manufacturing companies (all but one) in the cases we have investigated have had a dominant position in relation to the 1st tier supplier.

6.3.4 Implications for the decision making tool

In this section it has been difficult to draw any conclusions on how the model being used affects the reactions of the 1st and 2nd tier suppliers. The main reason for this is that almost all the reactions, from both the 1st and 2nd tier suppliers, have been positive. We can speculate on the reasons for this being the power situation and the fact that the manufacturing company is a customer of both the 1st and 2nd tier suppliers.

6.4 Experienced consequences from using controlling strategies

In this section, we will analyze the information connected to section 6 (experienced consequences from using controlling strategies) in the case report guide.

6.4.1 Consolidated overview

Table 35 presents an overview of what the interviewees expressed as positive and negative consequences for their situations; it is sorted by which procurement model is being used (see table 27 for an overview of the models). In the areas where there is no X-symbol marked we have either not been given an answer that explicitly is connected to that particular field or the interviewees did not have a specific opinion and no other conclusion could be made without too much speculation.

Case ¹¹⁸	Procurement model used	Positive consequences					Negative consequences				
		Financial gain due to consolidated volumes	Better insight to price structures	Better relationship and cooperation with 2 nd tier	Better coordination of goods	Shorter lead time	Resource demanding	Challenge to keep material available	Misuse of price information	Extra margin taken by 1 st tier	
C1	Buy-sell	X	X				X				Control
A1	COI	X		X			X	X			
C2	COI	X	X				X				
C3	COI	X	X				X				
C6	COI		X				X				
H1	COI			X	X		X		X		
GM	COI	X		X					X		
GT	COI			X		X	X				
A2	Consignment	X		X			X	X			
C5	Turnkey									X	Delegation
H2	Turnkey									X	
A3	Turnkey w. audits	X									
C4	Turnkey w. audits	X									

Table 35: Overview of experienced consequences for each case sorted by which procurement model that is used.

¹¹⁸ According to abbreviations stated in table 34

The connections identified in table 35 are discussed in the next section, 6.4.2.

6.4.2 Identified connections

We do not consider it to be possible to make any connections between the experienced consequences and the specific model being used since we do not have sufficient information. The most used model, COI, is in this case hard to make a specific conclusion about since the consequences that are experienced with this model is very similar to the ones experienced for other controlling procurement models as well.

After summarizing our findings we conclude that even though we cannot find any model-specific connections, we can still find connection for controlling and delegating strategies. As displayed in table 35, some consequences are recurring in almost every case, e.g. financial gain due to consolidated volume (for all procurement models) and resource demanding (for controlling procurement models) Our findings for each procurement strategy are presented in table 36, which describes the consolidated overview of the experienced consequences for all delegating models and all controlling models.

Purchasing strategy	Positive consequences	Negative consequences
Control	<ul style="list-style-type: none"> - Better purchasing leverage (financial gain) due to consolidated volumes by manufacturing company - Better relationship with 2nd tier, which may lead to improvements in R&D and in the supply system - Better insight in costs and prices for negotiating with 1st tier. 	<ul style="list-style-type: none"> - Resource demanding due to: administrative work, double negotiations - Higher risk for increased workload due to larger responsibility in the supply chain.
Delegation	<ul style="list-style-type: none"> - Better purchasing leverage (financial gain) due to consolidated volumes by 1st tier 	<ul style="list-style-type: none"> - Increased risk for information rents taken by 1st tier.

Table 36: Overview of experienced consequences consolidated for controlled and delegated procurement models.

6.4.3 Theoretical aspects

The findings from this section from the interviews are mainly connected to the sections describing agency problems and purchasing leverage in our theoretical framework.

6.4.3.1 Agency problems

The consequences experienced from the interviewed companies present issues that are to some extent aligned with the theories presented in sections 4.2.2.1,

conflicting agenda, and 4.2.2.2, *changes in price costs or product attributes related to hidden information and hidden actions*. One of the issues is the increased risk for information rents taken by 1st tier suppliers when delegating, which is presented in table 33. According to Melumad et al a lack of monitoring the agent could have such an effect and by delegating purchasing the possibility of monitoring the agent (1st tier suppliers) and the purchasing actions itself has increased in difficulty for the principal. Mookherjee also emphasizes the increased risk of information rents taken by the 1st tier suppliers when delegating. The issue of increased risk for information rents taken by the 1st tier suppliers when delegating is therefore considered to have been strengthened by our empirical findings.

Melumad et al argues that controlling purchasing would lead to an increase of visibility of both hidden information and hidden actions. Several of our interviewees, at companies that are controlling purchasing, described that they experienced a situation where the company had better insight in costs and prices with their 1st tier suppliers when using a controlling strategy than if they were to delegate. Other issues were also improved due to using controlling models such as improvements in R&D relationships with 2nd tier suppliers and improved supply management. Those improvements were highlighted by Ellram & Billington in their research.

One important factor that we found and that is in alignment with our theoretical framework is that to control purchasing seems to include a risk of increased workload for the manufacturing company. The risk for increased workload when controlling purchasing is mentioned during several of the interviews that we conducted and is a strongly identified connection. Kayış et al also handle it by pointing out that by delegating the manufacturing company will reduce the overall workload. Both Melumad et al and Mookherjee argues in favor of delegation due to how it enables information and communication to flow easier than if companies would control. In doing so it decreases information and communication processing costs which workload could be a part of.

6.4.3.2 Purchasing leverage

Increased purchasing leverage due to consolidated volumes that led to improved prices was a recurrent consequence experienced by our interviewees. We found that the issue of being able to consolidate volumes was clearly one of the main issues that were emphasized. This finding goes hand in hand with the conclusions made by Ellram & Billington in their research with purchasing leverage. We will present further findings pointing at the importance of consolidated volume and the impact it has on choosing whether to delegate or control purchasing in section 6.5.

6.4.4 Implications for the decision making tool

We have been able to identify that it is important to consider relative volume both in relation to the market and towards the 1st tier suppliers when deciding whether to delegate or control purchasing. Also, savings should be compared to the potential

increase in administrative workload due to purchasing work connected to e.g. negotiating and keeping track of the supply market and invoice work. It is also important to assess to what extent the manufacturing company currently is involved with the 2nd tier supplier today, and estimate how much extra work would be involved if switching procurement model.

Furthermore, if the manufacturing company lacks insight into costs of raw material in the supply chain, it should investigate the possibility of controlling purchasing. Lack of insight can also lead to suspicions that information rents are taken by the 1st tier supplier, which promotes using a controlling strategy.

There might also be reasons other than reduced price that promotes using a controlling strategy, such as joint R&D projects and supply planning with the 2nd tier supplier. The implications for the decision making tool are summarized in table 37.

Implication	Description
IMP4.1	Relative volume
IMP4.2	Savings compared to increased workload
IMP4.3	Nature of the existing relationship
IMP4.4	Lack of insight
IMP4.5	Suspicious of information rents taken by 1 st tier supplier
IMP4.6	Other strategic reasons to control (e.g. joint R&D)

Table 37: Implications for the decision making tool (4)

6.5 Why, how and when to control

In this section, we will analyze the information connected to section 7 (concluding analysis from the interviewee) in the case report guide. This information will be a mixture of the different thoughts from the interviewees in the final stages of the interviews.

6.5.1 Consolidated overview

The consolidated overview is structured into two areas: important factors to consider when deciding whether to control or delegate (table 38) and when a controlling procurement model is suitable (figure 30), all according to the opinions of the interviewees. Figure 30 depicts our findings so that if the three dimensions presented are high in a certain situation for a manufacturing company, then a controlling procurement model could be suitable to use.

Important factors to consider when deciding whether to control or delegate

1. *Cost structure* – cost breakdown for each article group for finding possible savings and important focus areas.
2. *Supply chain & industry knowledge* – key to successful negotiations with 1st and 2nd tier. Advantage to control at least some of the purchasing to acquire information.
3. *Amount of purchasing workload for the manufacturing company* – compare how it differs from the interaction that exists today.
4. *Size of supplier base* – manageable supplier base facilitates decision-making and improvements.
5. *Need of price masking*
6. *Experience of controlling procurement models in the industries* – favorable to implement if there is a tradition to control.

Table 38: Consolidated overview of the concluding analysis of the interviewees.

When a controlling procurement model is suitable

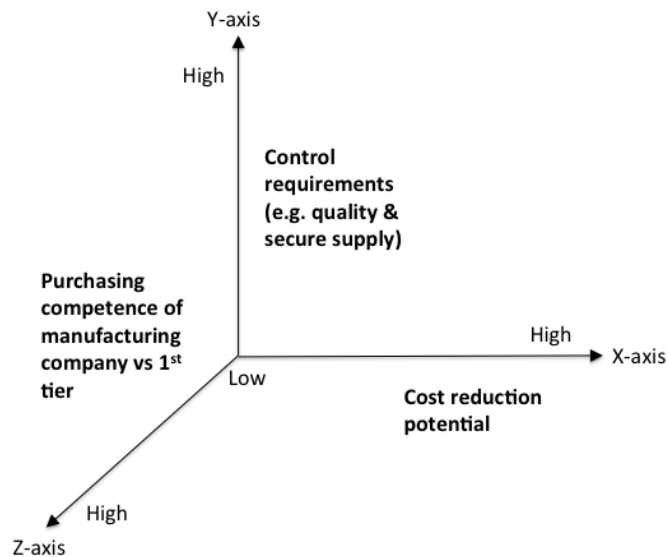


Figure 30: Consolidated overview of identified reasons to control and when controlling procurement models are suitable. High in all three dimensions indicates that a controlling procurement model is suitable.

6.5.2 Identified connections

Since there are no comparisons between models or purchasing strategies there are no connection to be identified in this section. What we do conclude is that all of the presented reasons in figure 30 and table 38 are according to us aligned with the total findings and earlier discussions made in our analysis.

6.5.3 Theoretical aspects

In this section of the analysis we find many aspects that have already been handled and discussed that again are being emphasized. These are issues such as increased

level of workload, possibility to improve quality and supply and consolidation of volumes when controlling purchasing. Several of these aspects are discussed in section 6.4.3 under agency problems and purchasing leverage.

Asset specificity, incorporated in cost reduction potential (X-axis) in figure 30, is found in our theoretical framework as a part of the power matrix in section 4.3.2 and is discussed by Ellram & Billington in relation to purchasing leverage in section 4.3.3, in addition to being one of the important factors identified from the interviews. The type of asset and its characteristics is important to consider both according to our empirical findings and our theoretical framework.

However, our theoretical framework does not directly address three of the issues that we consider to be of importance. First, it is the level of competence of the purchasing division (Z-axis in figure 30), second, it is the argument that to control only a little of the purchasing within a certain area can give a lot of insight and information to the supply chain (2nd factor in table 38) and third, if there is a tradition within the industry to control purchasing that facilitates the use of such a procurement model (6th factor in table 38). We do see that the competence of the purchasing division can be connected to the power situation in the supply chain since the more competent the purchasing function, the more purchasing leverage and other advantages it will be able to extract. The advantages of controlling at least some of the purchasing within a certain area can be seen in a principal-agent perspective. If the manufacturing company controls some of the purchasing it will get more insight to the information held, and actions performed by the 1st and 2nd tier suppliers and in so doing decreasing the hidden information and hidden actions.

Furthermore, several interesting areas were stressed after reviewing this part in the case reports that were not explicitly mentioned in our theoretical framework but still important to consider; these are factors 2, 4 and 6 in table 38. These are larger issues that sometimes are an area of research and improvement itself and which can initially be seen as outside the scope of this thesis but that have been identified by the interviewees as something affecting the decision of whether to control or delegate purchasing. A reason for why we have not found these aspects in the research presented in the theoretical framework can be because it has been too narrow and limited in its scope or method.

6.5.4 Implications for the decision making tool

Since these are the analyses and consolidated reflections made by the interviewees we consider this information to be of great importance to the decision making tool. Therefore we have taken all of the factors presented in table 38 into account when creating our decision making tool as presented in table 39.

Can Scania be stronger than steel?

Implication	Description
IMP5.1	Cost structure
IMP5.2	Supply chain and industry knowledge
IMP5.3	See IMP4.2 and IMP4.3
IMP5.4	Supplier base
IMP5.5	See IMP1.3
IMP5.6	Tradition in the industry
IMP5.7	Purchasing competence of 1 st tier supplier
IMP5.8	Control requirements (see also IMP4.6)
IMP5.9	Savings potential (see also IMP4.2)

Table 39: Implications for the decision making tool (5)

7. The decision making tool

In this chapter of the thesis, we will describe the decision making tool that has been designed based on our analysis of the collected empirical data in relation to our theoretical framework. First we introduce the architecture of the decision making tool briefly, moving on to a hands-on description and recommendations on how to use the tool.

7.1 Introducing the decision making tool

When creating the decision-making tool, we have used the “implications for the decision making tool” from the cross case analysis (chapter 6) and our theoretical framework as a base. The implications stated in chapter 6 and the explicit connections to the tool presented in this chapter are summarized in appendix 3.

The decision making tool we have created to help manufacturing companies decide whether to control or delegate purchasing activities with the 2nd tier suppliers is named the *3Part CoD-tool* (3 part Control or Delegation tool). It is made up of three main parts, which are described below and depicted in figure 31.

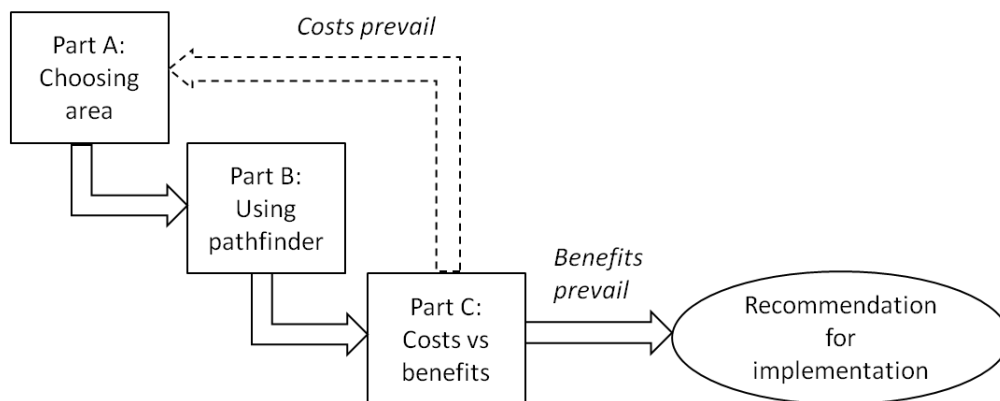


Figure 31: The connections between the three main parts of the 3Part CoD-tool

The 3Part CoD-tool consists of parts A, B and C:

- A. *Choosing a suitable area of investigation*
- B. *Using the step-by-step pathfinder (see figure 32) as a guide to determine what procurement model to use in the chosen area.*
- C. *Estimating and evaluating the costs versus the benefits (see figure 33) of using the procurement model suggested in part B.*

As depicted in figure 31 the result of part C will either be a recommendation for implementation, or a feed-back loop that takes the user back to part A of the tool.

7.2 How to use the 3Part CoD-tool

In this section we describe each of the three parts in the 3Part CoD-tool in detail, exemplifying where necessary.

7.2.1 Part A: Choosing a suitable area of investigation

One main lesson we have learnt from conducting our multiple case report and analysis is that it is not common to use one single procurement model and apply this to a whole company. Instead, a customized approach to different areas is recommended. The nature of these areas might be different from company to company, depending on the company structure, what business situation the company is in and the characteristics of the markets that exist in the supply chain. Hence, it is important to choose a suitable area of investigation.

Examples of areas of investigation: a specific group of products, a specific type of raw material, one or several specific 2nd tier suppliers, or one or several specific 1st tier suppliers.

Important factors to consider that may facilitate the use of the remaining parts of the 3Part CoD-tool, when deciding on a suitable area of investigation are:

- A1. The nature of the existing relationship with both the 2nd and 1st tier suppliers
- A2. The nature of the existing supplier base for that area.
- A3. The competence of the 1st tier suppliers purchasing division.

A1, the nature of the existing relationship with both the 2nd and 1st tier suppliers: for example, a manufacturing company might recognize that it already has a relationship with a raw material producer (2nd tier supplier) because of quality assessments or other activities that are already being conducted. In such a case, it is easier to “add” to that relationship and start negotiating prices, than if there is no existing relationship to start from. This is something that also will be incorporated in Part C since it will affect the costs of building up a relationship with the relevant suppliers.

A2, the nature of the existing supplier base for that area: it is easier to investigate an area where both the 1st and 2nd tier supplier base is manageable, i.e. there are not too many players to keep track of. If a company already has plans of reducing its supplier base then it should make such changes before investigating whether to control or delegate purchasing.

A3, the competence of the 1st tier suppliers purchasing division: when choosing an area of investigation it is important to consider the competence of the 1st tier supplier’s purchasing division in relation to the one at the manufacturing company. When choosing area of investigation either chose one where the competence of the 1st tier supplier’s purchasing division is less developed than the one of the

manufacturing company or exclude the suppliers that presumably has a more competent purchasing division.

When the choice of investigation area is complete, proceed to Part B of the 3Part CoD-tool.

7.2.2 Part B: Using the step-by-step pathfinder

The step-by-step pathfinder serves as a guide to determine what procurement model to use in the chosen area and is illustrated in figure 32. To follow the pathfinder, connect each decision box to the question with the same number. Then, based on your answer to the question, follow the appropriate arrow to the next step in the pathfinder. The darker boxes represent end-points, where the suggested procurement model is stated.

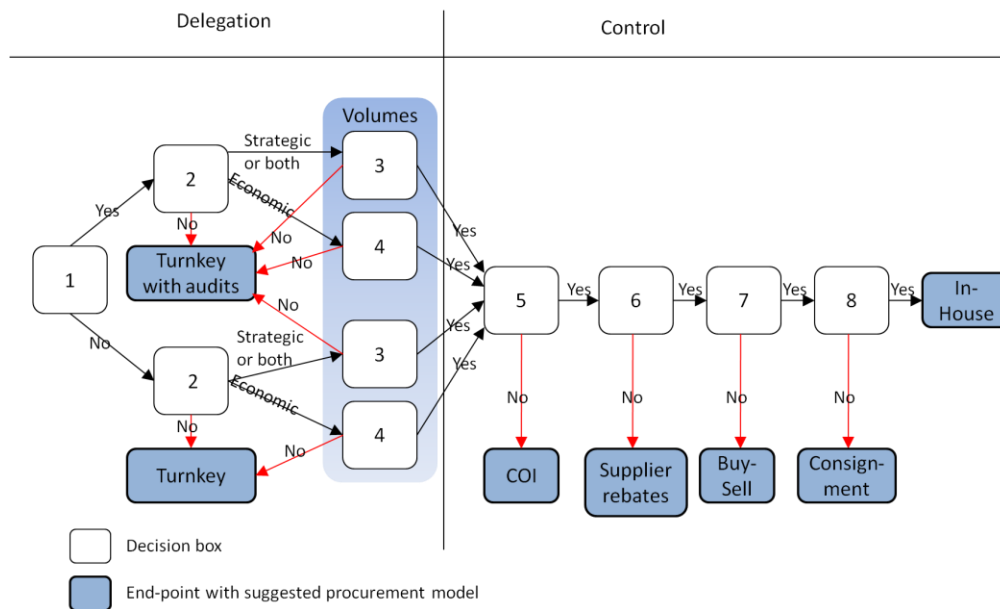


Figure 32: The step-by-step pathfinder of the 3Part CoD-tool

Questions connected to the decision boxes:

1. Does your company suffer from a lack of insight into what prices the 1st tier suppliers are getting from the 2nd tier suppliers **AND/OR** do you suspect they are adding unreasonable margins on material costs?
2. Is the specific component or raw material of high strategic **AND/OR** economic importance?
 - Strategic importance: disturbances in supply from 2nd tier suppliers is a recurring problem for the 1st tier suppliers **OR** there is a will to work closer together with the 2nd tier suppliers in development

- projects **OR** the quality demands on the specific component or material is high.
- Economic importance: the cost of raw material is a big part of the total cost for the end product.
3. Are the consolidated volumes of your company equal to or larger than that of the individual 1st tier suppliers?
 4. Are the consolidated volumes of your company significantly larger than the volumes of the individual 1st tier suppliers?
 5. Is price visibility towards the 1st tier suppliers a sensitive issue **OR** is there a risk that the 1st tier suppliers' knowledge about prices from the 2nd tier suppliers will affect your company negatively?
 6. Is there a risk that the 2nd tier suppliers will neglect to follow the rebate system in a correct way **AND/OR** are the steelworks very reluctant to additional administrative work **AND** is it true that the 1st tier suppliers do not have any incentive to agree to the supplier rebate procurement model?
Example of incentives for the 1st tier suppliers: better prices at the 2nd tier supplier selected by the manufacturing company.
 7. Is there a specific reason, such as special characteristics of the materials or products, to why you would like to own the inventory management at the 1st tier suppliers? *Examples of characteristics of the materials or products that would favor one to answer yes: highly proprietary to your company, unique, slow moving, scarce.*
 8. Is there any specific risk connected to the material or product so great that it is worth controlling all purchasing activities? This will include having to keep up to date with technical developments, maintain inventory and storage and be responsible for logistics.

After reaching a suggested procurement model, estimate and evaluate the costs and the benefits associated with using the model according to the process described in Part C of the 3Part CoD-tool.

7.2.3 Part C: Cost versus benefit evaluation

Figure 33 describes the process of estimating and comparing costs and benefits connected to the suggested procurement model.

Can Scania be stronger than steel?

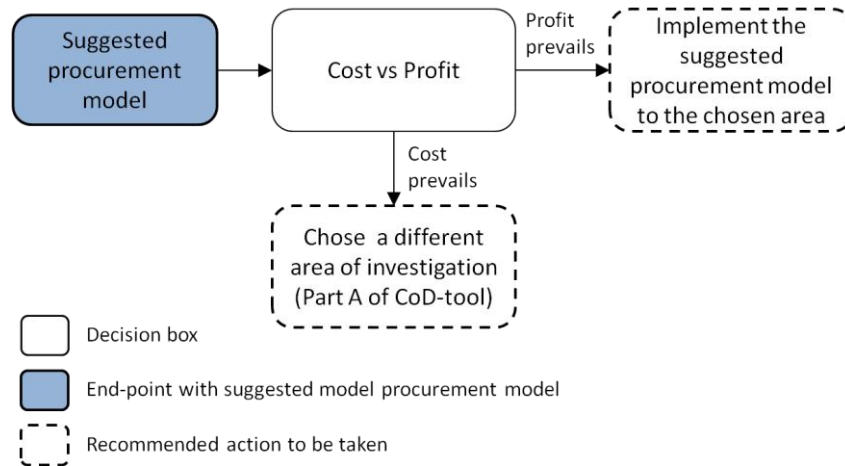


Figure 33: Cost versus benefit evaluation

The explanation for this part of the 3Part CoD-tool is that even if all the major determinants point towards the usage of a specific model, there may be costs associated with this model that is not covered by the profit or non-financial advantages that follow with the model. The further the models are placed to the right in figure 32, the more administrative work they demand and at the same time they reduce certain risks which, if they are realized, might be costly. Hence, even if the manufacturing company can consolidate volumes and obtain lower prices or receive other benefits such as better control of quality, faster deliveries and participation in development projects due to improved relationship with 2nd tier suppliers, the costs that come with the suggested procurement model might be higher than the financial and non-financial benefits combined, making it a bad investment.

After comparing the expected costs to the expected benefits for the recommended procurement model, action should be taken according to the results (see figure 33). If the costs prevail then one should return to Part A of the 3CoD-tool and choose another area of investigation and if the benefits prevails than one should plan for implementation of the suggested procurement model in the chosen area.

In this process, the costs may be easier to estimate than the benefits, since the benefits include both financial and non-financial parameters. Therefore one way of addressing this issue would be to compare the costs with how much the price of the material needs to be reduced in order to reach that same amount. If the needed price reduction is estimated as reasonable and reachable with regards to earlier identified purchasing volume and purchasing competence for the manufacturing company, including a comparison of other benefits and disadvantages, then the suggested procurement model is favorable to implement.

7.3 Revisions to the 3Part CoD-tool

This section was created as a result of a workshop session held at Scania¹¹⁹, where the 3Part CoD-tool was presented along with an example of how to apply the tool on the Scania case. The purpose of the workshop was to validate the 3Part CoD-tool and the initial application of the tool on the case where Scania purchases forgings. It was also to receive general comments from purchasing experts with knowledge of the different industries and processes that the application incorporates and suggestions for improvements before finalizing our research.

The workshop started with a short presentation of our research by us, followed by discussions in first smaller groups and then a discussion in one large group. The workshop lasted for two hours and the discussions that were held gave rise to some areas for improvement of the 3Part CoD-tool.

7.3.1 Revisions to Part A: Choosing a suitable area of investigation

One concern that was raised in Part A was that the instructions on how to choose a suitable area were not clear enough for an inexperienced person to handle. Another concern was that the process of choosing area was very subjective, and there were misunderstandings about the “important factors to consider” (see A1, A2, and A3 below).

To remedy these concerns, we want to clarify how one should go about the process of choosing a suitable area for investigation.

First, it is a condition that the person using the 3Part CoD-tool has sufficient knowledge of the industry and the company situation. The subjectiveness of choosing a suitable area will be hard to get around; therefore a good knowledge of the situation is essential.

Second, the “important factors to consider” (A1, A2, and A3) are not meant to be viewed as *conditions* for choosing a certain area, but rather as factors that *facilitate* the process, if fulfilled. We consider it important to stress that the user of the tool should first focus on an area where there is a problem or potential to improve the situation in the supply chain, then consider the factors (A1, A2, and A3) as facilitators. We will list the factors below for repetition, but not go into detail or exemplify; for that view section 7.2.1.

¹¹⁹ Participants: Jansson H. (Master Thesis Student), Leickt, P. (Senior Sourcing Manager, Forgings and Fasteners), Lindgren A. (Sourcing Manager, Chemicals), Matsdotter-Bauer, F. (Commodity Manager, Forgings and Fasteners), Strand D. (Sourcing Manager, Sheet Metal), Thorsén R. (Sourcing Manager, Forgings and Fasteners), Wansölin S. (Master Thesis Student)

- A1. The nature of the existing relationship with both the 2nd and 1st tier suppliers
- A2. The nature of the existing supplier base for that area.
- A3. The competence of the 1st tier suppliers purchasing division.

7.3.2 Revisions to Part B: Using the step-by step pathfinder

In Part B of the 3Part CoD-tool, one specific concern was raised about the ambiguity of decision box 2 in the step-by-step pathfinder, which is connected to the question:

- 2. *Is the specific component or raw material of high strategic or economic importance?*
 - *Strategic importance: disturbances in supply from 2nd tier suppliers is a recurring problem for the 1st tier suppliers **OR** there is a will to work closer together with the 2nd tier suppliers in development projects **OR** the quality demands on the specific component or material is high.*
 - *Economic importance: the cost of raw material is a big part of the total cost for the end product.*

The participants of the workshop expressed that it would have been helpful to know what constitutes “a big part of the total cost for the end product”, expressed for example in a percentage share. However, we do not feel that we have enough grounds from theoretical and empirical data to make a statement about this. Therefore we will not change the wording in the question connected to decision box 2, and Part B of the 3Part CoD-tool will remain in its original form (see section 7.2.2). For an example of how to discuss this issue in a real case see our application on the Scania case in section 8.2.

7.3.3 Revisions to Part C: Cost versus benefit evaluation

In Part C, no specific areas for improvement were discussed, and Part C of the 3Part CoD will therefore remain in its original form (see section 7.2.3).

8. Application of the decision making tool on the Scania case

In this chapter we apply the revised version of the 3Part CoD-tool (see section 7.3) on the Scania case, following the how-to-guide in chapter 7, in accordance to the second part of the purpose of this thesis stated in chapter 1. The application has been made in collaboration with Patrik Leickt, Senior Sourcing Manager (commodity forgings and fasteners) at Scania Global Purchasing Department. Discussion points and opinions from other Scania employees that arose at a workshop we organized have also been considered.

The case we are using to test the 3CoD-tool is the Scania case, which is described in chapter 2. The application of the 3Part CoD-tool on the Scania case constitutes the second part of the purpose of this thesis. A repetition of the different parts of the decision making tool is provided here:

- Part A. Choosing a suitable area of investigation*
- Part B. Using the step-by-step pathfinder as a guide to determine what procurement model to use in the chosen area.*
- Part C. Estimating and evaluating the costs versus the profits of using the procurement model suggested in part B.*

8.1 Part A: Choosing a suitable area of investigation

The area we have chosen to investigate at Scania is a specific raw material, namely steel for forgings. We started out with three suggestions of areas of investigation:

- I. The first was a smaller area where we were to identify one or a few steelworks that was used by many forges and focus on that/them alone.
- II. The second suggestion was to choose a certain type of steel or a certain type of products and focus on forges and steelworks that handled that type of material or products.
- III. The third was to choose the whole area of steel for forgings for Scania and investigate the overall potential that lies there.

After consulting with experts at Scania Global Purchasing, Power Train¹²⁰, we chose the third alternative. The choice was made in accordance with Scania's wish to prioritize the investigation of the full potential first, before investigating smaller

¹²⁰ Patrik Leickt, Senior Sourcing Manager Forgings and Per Åke Persson, Executive Supplier Quality Manager.

areas. There was also a suspicion that the two other suggestions would result in difficulties in finding adequate and sufficient information.

We continued to look into the different factors that were important to consider in Part A.

1. The nature of the existing relationship with both the 2nd and 1st tier suppliers
2. The nature of the existing supplier base for that area.
3. The competence of the 1st tier suppliers purchasing division.

For the first factor, Scania already has an existing relationship with the steelworks due to the extensive approval process performed by Scania. The steelworks have to go through this process before the forges are allowed to purchase steel from them, see description in section 2.3. Scania also has a close relationship with several of the forges, and often works together in improvement projects.

The second important factor, is not considered a barrier or an issue. Scania is currently working with approximately 30 forges and has approved approximately 30 steelworks. Since Scania already today is handling both of these supplier groups either in purchasing processes (1st tier) or in quality processes (2nd tier) they are both estimated to be manageable.

The third important factor is to consider the purchasing competence of the 1st tier suppliers in relation to the one of Scania. Scania has the impression that many of the smaller forges do not spend much time or resources trying to expose the steelworks to competition. Instead, they seem to continue using the already existing relationships. Only some of the larger forges are considered to have a purchasing competence that is close to Scania's; we will come back to the larger forges later on in Part B decision box 3.

After considering all three different factors we conclude that our chosen area of investigation shows potential when continuing with Part B in the 3Part CoD-tool.

8.2 Part B: Using the step-by-step model

The illustration of the step-by-step pathfinder is provided again in figure 34, in order to make it easier for the reader to follow the steps.

Can Scania be stronger than steel?

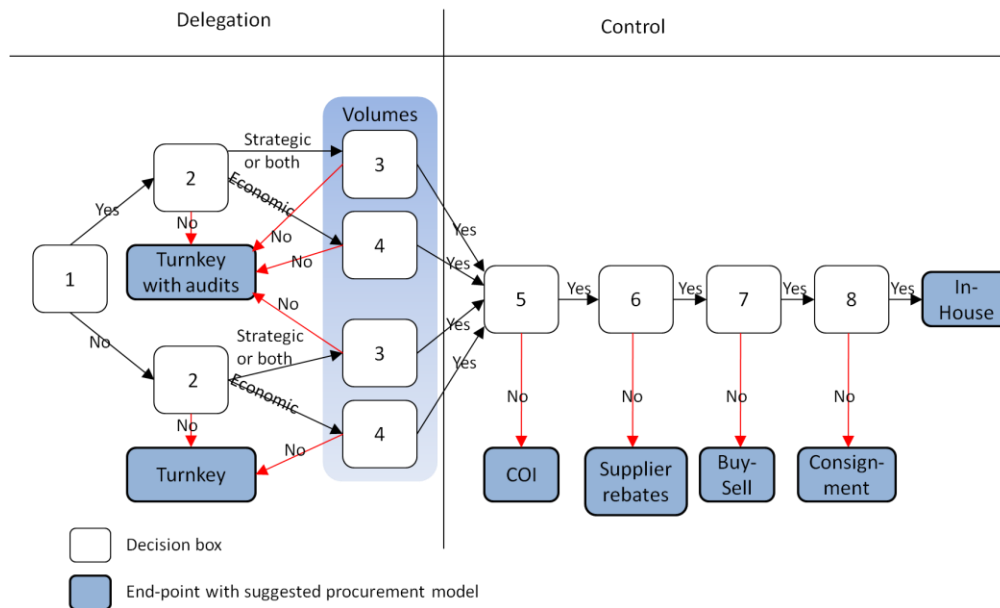


Figure 34: Part B of the 3Part CoD-tool, the step-by step pathfinder

We start on the first decision box (connected to question number 1), and move along the arrows in the step-by-step pathfinder according to the answers that each question produces.

1. *Does your company suffer from a lack of insight into what prices the 1st tier suppliers are getting from the 2nd tier suppliers **AND/OR** do you suspect they are adding unreasonable margins on material costs?*

Lack of insight is one of the major concerns that Scania has expressed within the area we are investigating. It is not uncommon that different forges present different base prices for steel, which raises the question of whether or not the forges are being honest about their prices, or if they are adding unreasonable margins for themselves.

Answer to question 1: Yes

2. *Is the specific component or raw material of high strategic or economic importance?*
 - *Strategic importance: supply continuity from the 2nd tier supplier is a recurring problem for the 1st tier suppliers **OR** there is a will to work closer together with the 2nd tier suppliers in development projects **OR** the quality demands on the specific component or material is high.*
 - *Economic importance: the cost of raw material is a big part of the total cost for the end product.*

Can Scania be stronger than steel?

As for the strategic importance of steel for forgings, it is considered high for two reasons. The first is that forged products are essential parts for how the trucks, buses and engines perform; they are being forged and not cast or produced in any other way because of the high demanding specifications that Scania has for these kinds of parts. The consequences and implications for defects are therefore big and many. They are also of importance for how the customers will experience the quality of the vehicles and engines in the long run and how they will perceive and market Scania as a brand in the future.

The second reason is that Scania already today puts a lot effort and resources into assessing and approving each steelwork regarding quality. There have been instances where the forges have had problems with deliveries from the steel works, and Scania has been forced to step in and secure supply even though this is currently considered to be the responsibility of the 1st tier suppliers.

Also the economic importance of steel for forgings is high; the cost of steel generally makes up over 50 percent of the total cost for a forged part.

Answer to question 2: Strategic or both

- 3. Are the consolidated volumes of your company equal to or larger than that of the individual 1st tier suppliers?*

The total volume that Scania can consolidate has been estimated to approximately 43 000 tons of steel per year. This has been done by consolidating the volumes that Scania purchases from each individual forge (a total of 85 000 tons), and subtracting the volumes of the largest forges (50 percent of the total, rounded up). The larger forges have been deemed as not willing to cooperate if Scania were to control purchasing with the steel works since they are estimated to have equal or better purchasing leverage and equal or better consolidated purchasing volumes than Scania towards the steelworks.

Realistically however, Scania could not use the total consolidated volume of 43 000 tons to negotiate with one single steelwork, since the company needs to spread the risks of delivery and quality problems. As mentioned before Scania has different kinds of steel qualities, different kind of steel and there are many different kinds of dimensions to the steel they would need to purchase, which would make single sourcing a very risky situation. Instead, Scania recognizes that there could be three steelworks that they would consider cooperate with. These steelworks should have shown good records of quality and prompt deliveries, as well as good cooperativeness in general, in the past. Dividing Scania's volumes three steelworks, we end up with just above 14 000 tons per steelwork per year, see diagram 3 for a summary.

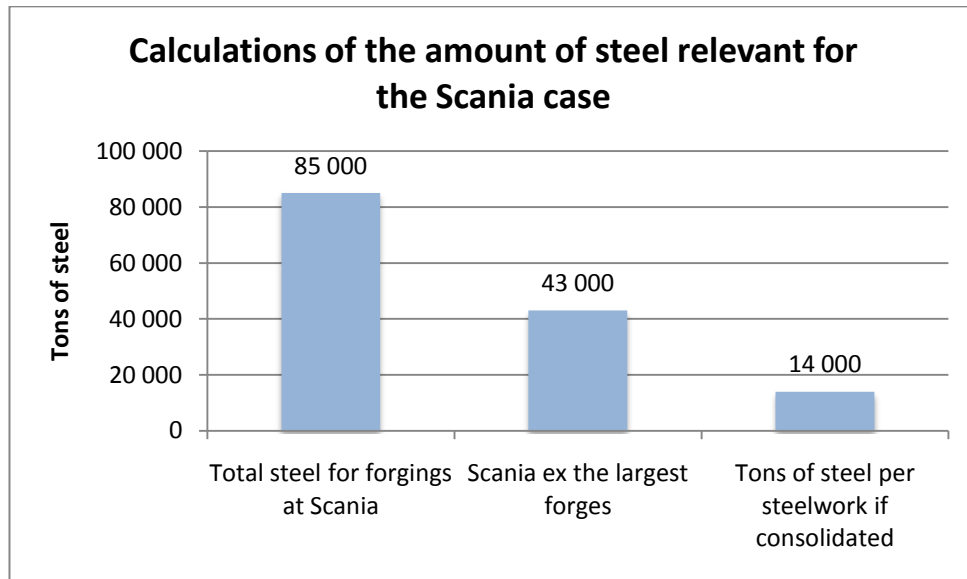


Diagram 3: Calculations of the amount of steel relevant for the Scania case

To be able to compare the volumes of Scania to that of the remaining, smaller, forges we have conducted a small survey among seven forges that are considered to represent a typical forge used by Scania¹²¹. The full results are presented in table 39 which is found in appendix 4. The total amount of steel that the forges purchase per year is presented in diagram 4 and the amount of steel that the forges purchase from their largest suppliers, i.e. steelworks, is presented in diagram 5. The forges have been assigned letters (A,B,C etc.) in order not to reveal their identities. The relevant amount for the Scania case is also presented in the diagrams in order to give the reader a possibility to compare it to the forges. In the diagram amounts that are less than 1000 tons is not presented in order to better manage the information given by the forges and to draw clearer conclusions.

¹²¹ The forges were telephoned and emailed for information. The selection was made by Patrik Leickt (Senior Sourcing Manager) and Maria Jansson (Sourcing Manager). Both working at Scania Global Purchasing, Power Train, commodity forgings and fasteners.

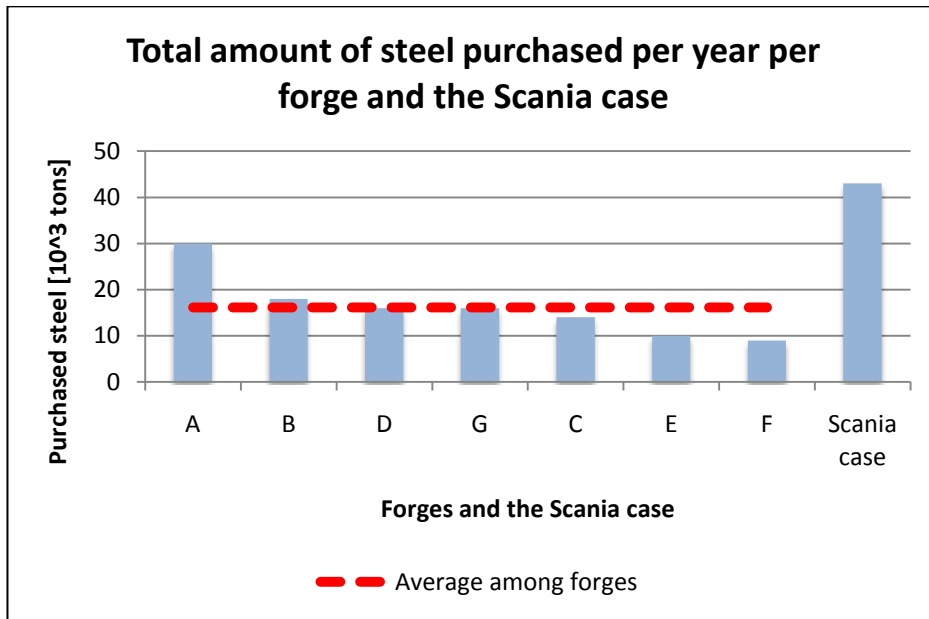


Diagram 4: Total amount of steel purchased per year per forge and the Scania case

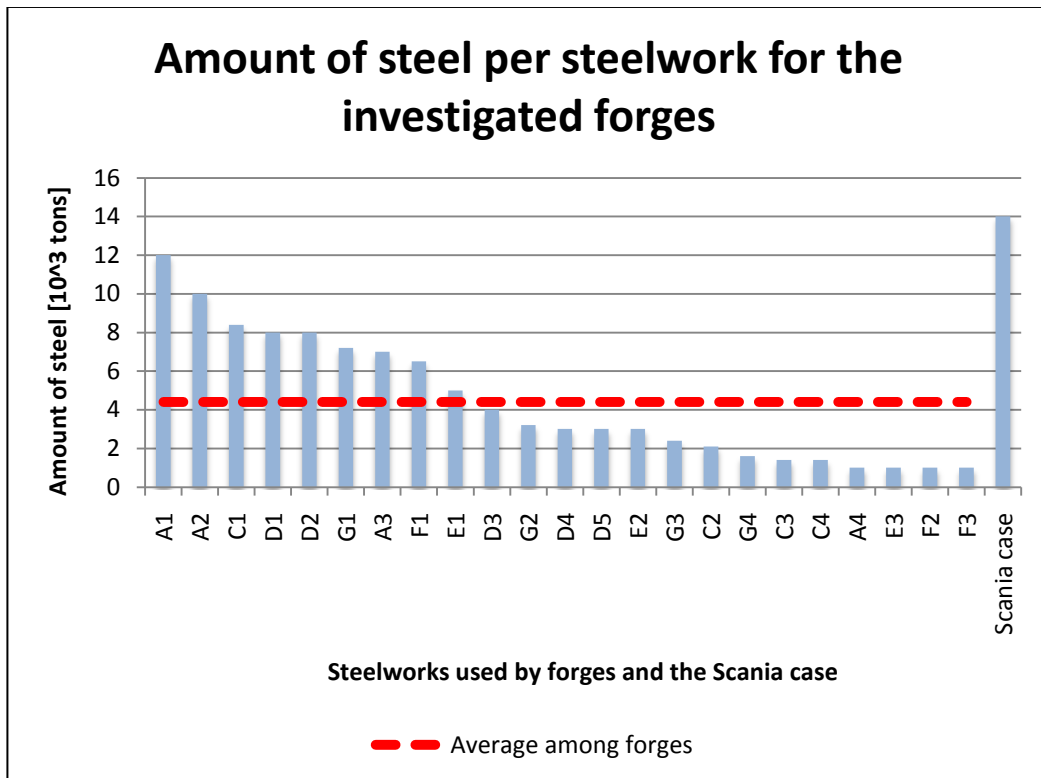


Diagram 5: Amount of steel per steelwork for the investigated forges

Can Scania be stronger than steel?

After comparing the amounts of purchased steel gathered from the forges in our survey and the amounts that are relevant in the Scania case we have made the following conclusions:

- The highest volume of steel that an individual forge purchases per year is 30 000 tons, while the amount of steel purchased in the Scania case is over 40 percent higher (43 000 tons). When comparing the average amount of steel that forges purchases from steelworks in total per year, which is 16 000 tons, the equivalent amount in the Scania case is almost 270 percent higher.
- The highest volume that an individual forge distributes to a specific steelwork is 12 000 tons per year; the amount of steel that would be purchased from a single steelwork in the Scania case would be approximately 17 percent higher (14 000 tons). Comparing the average amount of steel that forges purchases from a specific steelwork, which is 4 400 tons, the amount in the Scania case is over three times larger.

Answer to question 3: Yes

4. *Are the consolidated volumes of your company significantly larger than the volumes of the individual 1st tier suppliers?*

This question is not applicable since we do not encounter decision-box number four in the step-by-step model.

5. *Is price visibility towards the 1st tier suppliers a sensitive issue **OR** is there a risk that the 1st tier suppliers' knowledge about prices from the 2nd tier suppliers will affect your company negatively?*

According to sources at Scania, the steelworks will most likely not be willing to reveal the prices that Scania can negotiate to the forges. The goal for Scania if it starts negotiating with the steelworks is of course to receive lower prices, and if this goal is achieved the steelworks can react negatively to showing these prices to the forges, since the forges may misuse their knowledge about Scania's pricing.

Answer to question 5: Yes

6. *Is there a risk that the 2nd tier suppliers will neglect to follow the rebate system in a correct way **AND/OR** are the steelworks very reluctant to additional administrative work **AND** is it true that the 1st tier suppliers do not have any incentive to agree to the supplier rebate procurement model? Example of incentives for the 1st tier suppliers: better prices at the 2nd tier supplier selected by the manufacturing company.*

For the first two issues, if there is a risk that the 2nd tier suppliers will neglect to follow the rebate system and if the steelworks are very reluctant to additional

administrative work, we do not see any insurmountable obstacles. However, if one answers this question with a *no* (leading to an end point with the suggested procurement model Supplier Rebates), the implications for many of the 1st tier suppliers will be that they will have to change supplier (to a steelwork of Scania's choice), without enjoying any of the benefits connected to a controlling strategy (i.e. that they will not have to put time and effort into negotiations with steelworks and receive lower prices because of Scania's higher purchasing leverage). Therefore, there needs to be other incentives for the 1st tier suppliers in order to get them to cooperate. We have not been able to find any such incentives in this case, which is why the answer to this question is *yes*.

Answer to question 6: Yes

7. Is there a specific reason to why you would like to control the inventory management at the 1st tier suppliers and thus pay the connected costs?
Examples of characteristics of the materials or products, they are: highly proprietary to your company, unique, slow moving, scarce.

The forged parts that Scania purchases do not create any specific reason to control the inventory of the 1st tier suppliers. They are not estimated enough proprietary, unique, slow moving or scarce for Scania to increase its costs by controlling all inventory management.

Answer to question 7: No

8. Is there any specific risk connected to the material or product so great that it is worth controlling all purchasing activities? This will include having to keep up to date with technical developments, maintain inventory and storage and be responsible for logistics.

This question is not applicable since we do not encounter decision-box number eight in the step-by-step model.

8.2.1 Summary of part B in the 3CoD-tool for the Scania case

The path that the Scania case has traveled in the step-by-step pathfinder is shown in figure 35.

Can Scania be stronger than steel?

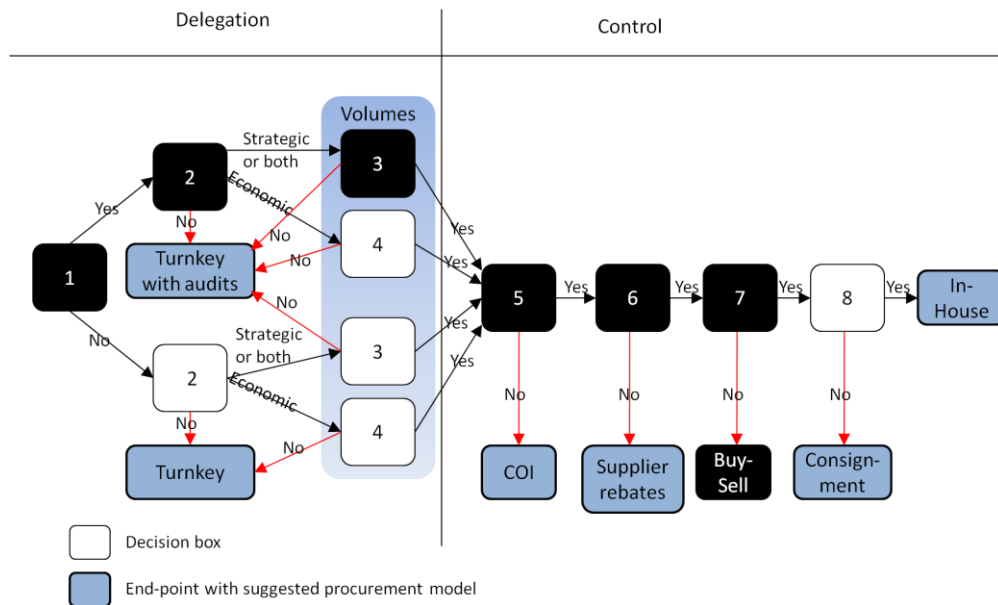


Figure 35: The path that the Scania case has traveled in the step-by-step pathfinder (indicated by decision-boxes and arrows in black)

The Scania case ends at decision-box number seven in the step-by-step model and Scania is suggested to use the Buy-Sell procurement model.

8.3 Part C: Cost versus profit evaluation

8.3.1 Cost

Cost drivers identified in the Scania case are presented in table 40 and have been identified in collaboration with sourcing managers at Scania¹²². The increase in workload was estimated by the authors and discussed at the workshop with Scania representatives.

¹²² Patrik Leickt, Senior Sourcing Manager Global Purchasing Forgings

Can Scania be stronger than steel?

Cost driver	Relative change from Scania	Estimated additional workload from today
Monitor the industry and market of steel, benchmark prices and performance of the existing suppliers	Already performed to a certain extent by sourcing managers and analysts	20 % of a full time sourcing manager's work load
Negotiate quarterly + additional renegotiations	New activity	40 % of a full time sourcing manager's work load
Building and maintain supplier relationships	Already performed to almost full extent due to extensive quality audits and evaluations	10 % of a full time sourcing manager's work load
Purchasing fire fighting when issues occur between the 2 nd and 1 st tier suppliers	Can be included in contracts and is already performed to a certain extent when there is a major problem.	30 % of a full time sourcing manager's work load
Handling of invoices	New activity	15 % of a full time sourcing assistant's work load
Material planning of new material flows	New activity	15 % of a full time material planner's work load
Handling of quality issues to a more detailed extent than before. Possibly in new areas that before were handled only by the forges.	Already performed in several areas but may need additional activities.	25 % of a full time quality engineer's work load

Table 40: Identified cost drivers in the Scania case.

The estimated increases in workload are by some sources¹²³ considered to be relatively high. We have decided to maintain these levels since we would rather have a margin above the real increase than below in order to be able to provide a good recommendation.

The identified cost drivers resulted in an increased workload equivalent to one additional sourcing manager working full time, one quality engineer working 25 percent, and one sourcing assistant and one material planner working 15 percent each.

¹²³ Findings in case reports and experiences from the workshop.

Can Scania be stronger than steel?

Work category	Estimated salary per month [SEK]	Social fees [SEK]	Increased workload [%]	Cost for Scania per month [SEK]	Cost for Scania per year [SEK]
Sourcing manager	30 000	9 426	100	39 426	473 112
Quality engineer	30 000	9426	25	9 857	118 278
Sourcing assistant	25 000	7 855	15	4 928	59 139
Material planner	30 000	9426	15	5 914	70 967
				Σ	721 496

Table 41: Cost calculations for the Scania case due to increased workload

Table 41 presents the estimated total cost for Scania per year if it were to implement the Buy-Sell procurement model; approximately 721 000 SEK.

Other internal overhead costs than social fees have not been included. This may indicate that our total costs are smaller than the real costs for Scania.

Additional costs that may occur could be increased logistical costs. When all forges need to have material from only three steelworks instead of approximately 30 (Scania approved) more material will need to be freighted and this may lead to additional costs. However, we believe that this will be included in the negotiations between Scania, the steelworks and the forges and not fully paid by Scania alone. The steelworks that will be interesting to work with may for Scania be of such size that they might have dealers spread out in Europe which may help to reduce the logistical costs. Also, logistical costs was not mentioned as a major cost driver in any of the cases we have investigated, which leads us to assume that there is no major difference in logistical costs when controlling purchasing compared to when delegating purchasing. This is an assumption that we share with purchasers at Scania. Therefore, we will not include any additional costs for logistics in our calculations.

8.3.2 Benefits

In accordance with the description of Part C we first calculate how much the price needs to be reduced in order for the Scania case to break even. This makes it easier when trying to estimate if it is the benefits or the costs that prevail at the end of this part.

Table 42 presents some information that has been used when calculating the needed price reduction. Table 43 presents the performed calculations together with the needed price reduction.

Can Scania be stronger than steel?

Information	Value
Amount of steel for the Scania case [A]	43 000 ton
Value of 1 euro in SEK [V]	9,24 SEK ¹²⁴
Estimated base price for steel [P]	650 euro (6006 SEK) ¹²⁵

Table 42: Information that is used for calculating the needed price reduction

Description of calculations	Euro	SEK
Cost of raw materials in the Scania case (A*P)	27 950 000	258 258 000
Price reduction needed per ton	1,8	16,8
Price reduction needed	0,28 %	0,28 %

Table 43: Descriptions of calculations and presentation of needed price reduction

The presented price reduction of 0,28 percent, see table 43, is valid if Scania will be able to negotiate the total sum of the base price for steel. One possibility is that a part of that price might be non-negotiable such as energy costs or other fixed costs. If that is the case than the needed price reduction for the new amount that is negotiable is changed. How the needed price reduction varies relative the negotiable amount of the base price is shown in diagram 6.

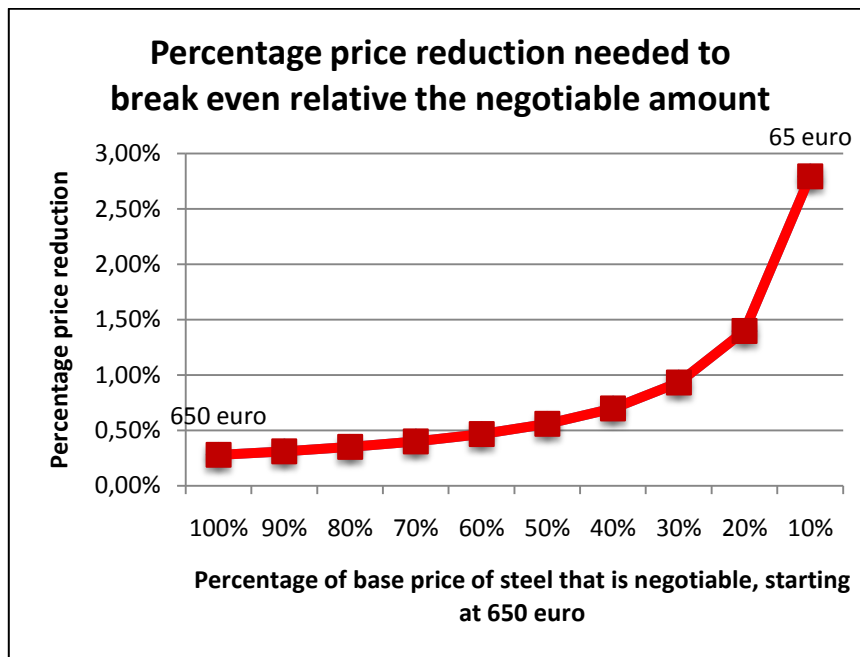


Diagram 6: Needed price reduction relative negotiable amount of base price of steel, starting at 650 euro/ton

¹²⁴ Forex – Currency converter (www) (2011-04-27)

¹²⁵ Estimated by Patrik Leickt, Senior Sourcing Manager, commodity Fasteners and Forgings at Scania

As a finish to our calculations we present a full overview of the savings that can be made with the Buy-Sell procurement model in diagram 7. The diagram presents what type of savings that can be made in the Scania case relative the estimated price reduction negotiated.

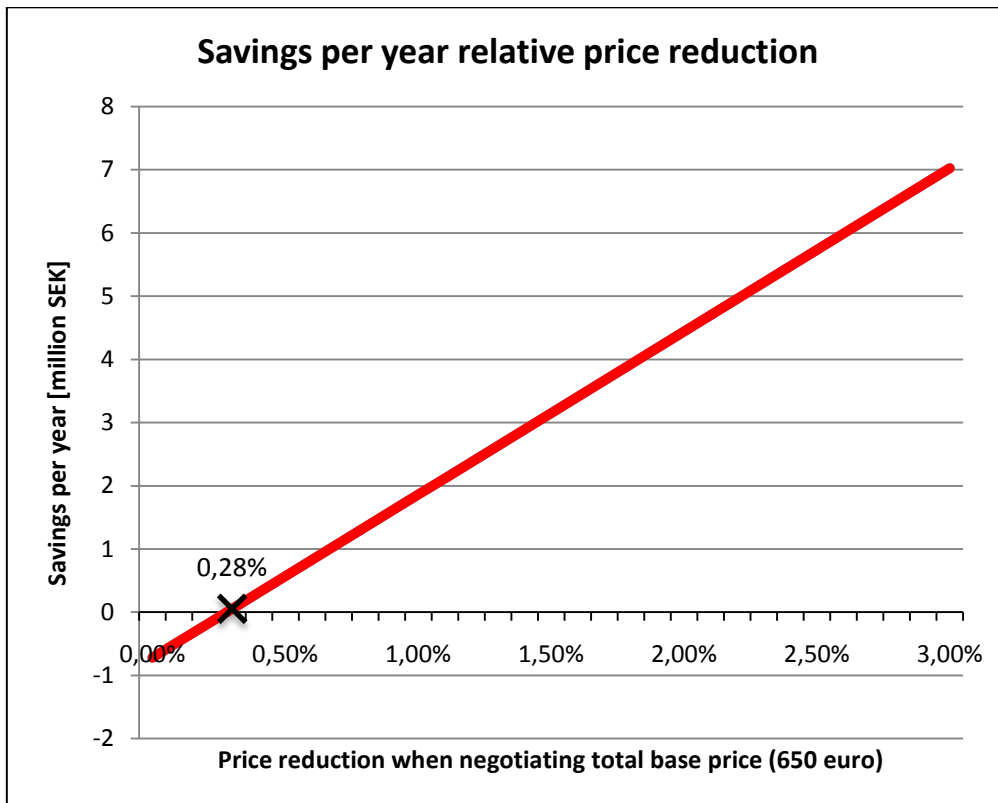


Diagram 7: Possible investment result relative negotiated price reduction when negotiating total base price for steel at 650 euro (0,28 % marks break-even point)

Finally we have identified other benefits that using the Buy-Sell procurement model in the Scania case might bring. These are *better quality, increased possibilities for joint research and development programs with the steelworks and more reliable and functional supply system*. All of these possible benefits will be results of increased interaction between the steelworks and Scania together with a better and deeper relationship between the two parties.

8.3.3 Estimation of reaching price reductions – will benefits prevail?

In order to reach a recommendation whether Scania should implement the Buy-Sell model in this specific case or not we have to estimate if the price reduction of 0,28 percent of the total base price of steel is reachable. According to many of the sourcing managers at Scania that we have spoken to this is hard to estimate. We have addressed this challenge by both analyzing how the increased volume and

other benefits might affect the possibility to negotiate a price reduction relative today's base price of steel.

Our conclusion from interviews conducted in our multiple case study is that a price reduction of 0,28 percent is considered low when being able to consolidate volumes like Scania is able to with steel for forgings. The average volume that the investigated forges (see section 8.2, decision box 3) were purchasing from a single steelwork is three times lower than what Scania would be able to consolidate. When discussing this issue at the workshop with Scania representatives many different opinions were heard. There were sourcing managers that had the impression that it would be very difficult to say and maybe to get the needed price reductions. At the same time there were sourcing managers that were convinced that getting a price reduction of 0,28 percent of the total price would not be a problem and that more could be had if implementing a controlling purchasing strategy. Considering both empirical data from other manufacturing companies and the ambivalent discussion in the workshop regarding purchasing leverage due to increase in volume, we draw the conclusion that reaching the price reduction of 0,28 percent is reasonable and feasible during the mentioned circumstances. This conclusion is strengthened by the assumption made by us that the purchasing organization at Scania is in the major part superior to the ones at the smaller or medium sized forges.

Also important, and by some sourcing managers at Scania considered even more important, are other aspects than volume that would make Scania a more interesting customer to the steelworks than the forges. Such aspects could be joint research and development processes, or that Scania could be a more stable customer than many forges due to its size and history both when it comes to ordering and supply systems and when it comes to financial security and strength.

Altogether we conclude from Part C in the 3Part CoD-tool that a price reduction of 0,28 percent seems feasible. Since there is a possibility to increase the price reduction further and that there are other potential benefits, *the total benefits will prevail the relative the total costs.*

8.4 Recommendation

The result from the application of the 3Part CoD-tool on the Scania case is that Scania should implement the Buy-Sell procurement model in the area of steel for forgings (see figure 36).

In the area we have investigated, the Buy-Sell model was the procurement model suggested by the step-by-step pathfinder. We found that Scania should control purchasing activities with the 2nd tier suppliers (the steelworks) for a number of reasons, among others that Scania is able to consolidate volumes that outweigh those of the individual forges and that the strategic and economic importance of

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steel for forgings is high. The reasons why Scania should use the Buy-Sell procurement model are also several. First, there are incentives for the forges to cooperate with Scania in the implementation process, in contrast to the Supplier Rebate model where no such incentives exist. For example, in the Buy-Sell model the forges are relieved of the task of negotiating with the steelworks, while still receiving the same or even lower prices for steel. This needs to be compared to the loss of volume, and therefore possibly loss of purchasing leverage, that the 1st tier suppliers will suffer from towards the steelworks, which might result in them getting higher prices from the steelworks when buying steel for other customers than Scania. Also, since there is no need for Scania to own the material throughout the supply chain (i.e. keep a consignment storage at the forges'), the Buy-Sell model is to prefer over the Consignment model, which is the next procurement model in the step-by-step pathfinder.

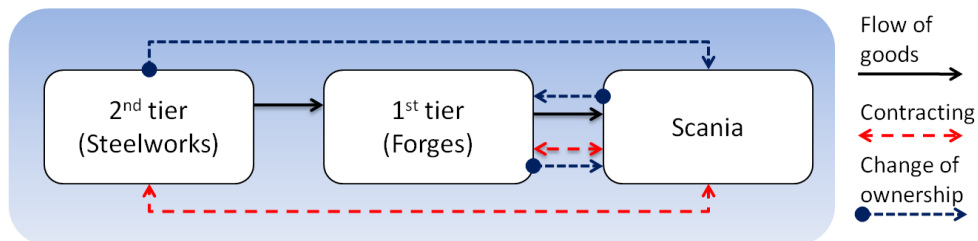


Figure 36: The Buy-Sell procurement model in the Scania case

9. Final results and conclusions

In this chapter we will discuss and draw conclusions on how well the purpose of the thesis has been fulfilled (section 9.1 and 9.2), general conclusions on delegation and control of purchasing, what our contribution to theory is, what our contribution to Scania is, and finally we will suggest topics for future research, both academically and for Scania specifically.

9.1 The 3Part CoD-tool and its usability and generalizability

In this section, we address the results of the first part of the purpose of this thesis, which is:

1. Create a framework that can serve as a decision making tool for manufacturing companies regarding the question if they should delegate or control purchasing activities with the 2nd tier suppliers.

The framework we have created has been named the 3Part CoD-tool (3 Part Control or Delegation tool).

The 3Part CoD-tool consists of three parts, A, B, and C, and is briefly described in figure 37.

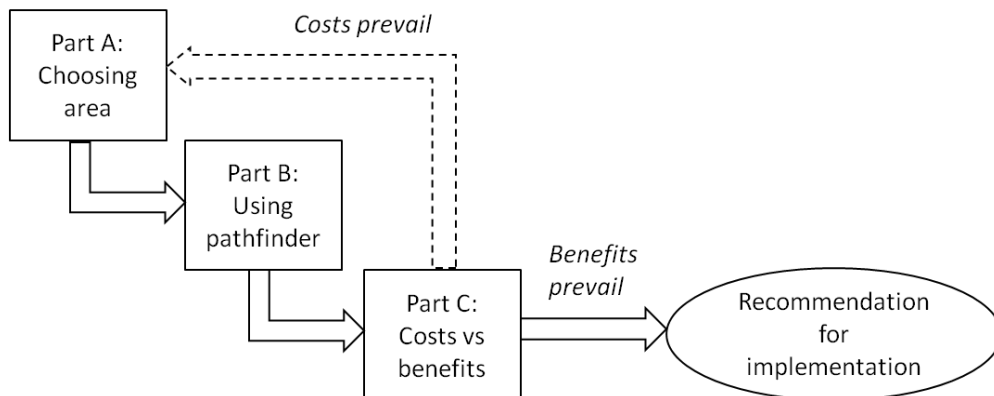


Figure 37: The connections between the three main parts of the 3Part CoD-tool

- A. Choosing a suitable area of investigation
- B. Using the step-by-step pathfinder as a guide to determine what procurement model to use in the chosen area.
- C. Estimating and evaluating the costs versus the benefits of using the procurement model suggested in part B.

As depicted in figure 37, the result of Part C will either be a recommendation for implementation, or a feed-back loop that takes the user back to Part A of the tool. Further information and discussion about the different parts of the 3Part CoD can be found in the following sections (9.1.1, 9.1.2 and 9.1.3). For full details on the 3Part CoD-tool, see chapter 7.

9.1.1 Part A

Part A of the 3Part CoD-tool is designed to help the user choose a suitable area of investigation. We have identified three factors that are important to consider when doing so, which are:

- A. The nature of the existing relationship with both the 2nd and 1st tier suppliers
- B. The nature of the existing supplier base for that area.
- C. The competence of the 1st tier suppliers purchasing division.

For a more in depth description of Part A, view chapter 7.

A condition in Part A is that the user of the tool has access to knowledge of the case and the supply chain and is able to identify areas of investigation that has potential. It is possible to try different areas iteratively but it will take a lot of time and may act as a hinder for change to occur. The first area of investigation does not have to be the right one the first time. In fact, it could be an advantage to test a couple of different areas of investigation in order to understand the differences in potential for that specific industry and company. Part A also requires the user to be innovative and to see possibilities in order to find new areas of investigation if the original one showed no potential for improvement.

9.1.2 Part B

The step-by-step pathfinder, which constitutes Part B of the 3Part CoD-tool, provides the user with a suggested procurement model, after answering a series of questions related to important aspects of the control or delegate-decision. Figure 38 depicts the step-by-step pathfinder; for full details and the questions connected to each decision box in the pathfinder, see chapter 7.

Can Scania be stronger than steel?

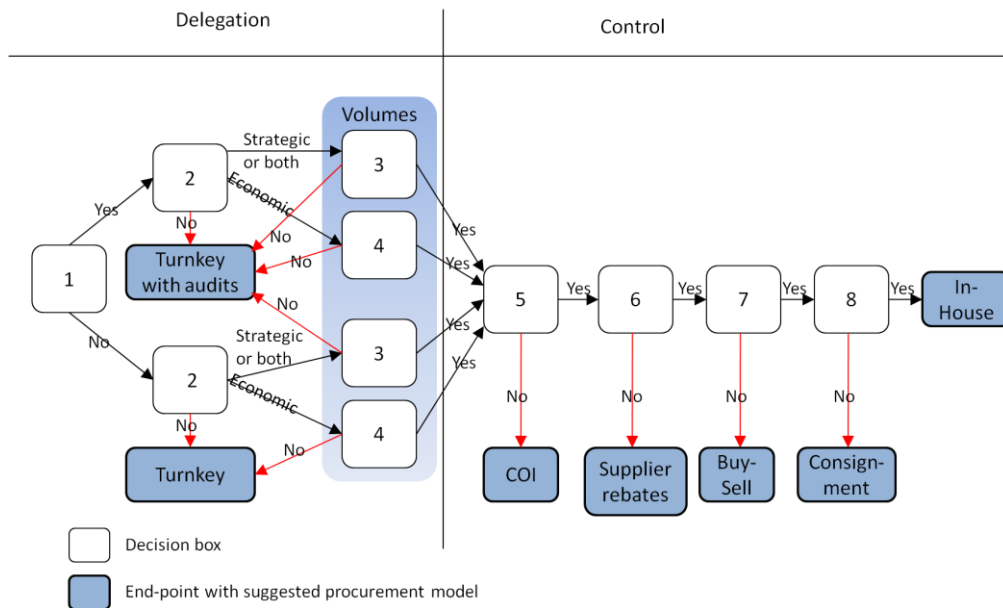


Figure 38: Part B of the 3Part CoD-tool, the step-by-step pathfinder

The step-by-step pathfinder is not as easy to understand and get an overview of as we had hoped, due to complex relationships that we could not evade. Some questions rely on subjective opinions and conclusions. However, the situation we are trying to bring clarity to is very complex, and we do not feel that we have grounds for putting objective parameters on the questions. An example is decision box two where the connected question involves determining if the cost of raw material is a big part of the total cost for the end product. Here we have not set a guideline as to what constitutes a big part of the total cost since we lack the grounds to do that. Some of the questions are also rather complex (e.g. number 6) and some very open (e.g. number 7 and 8). To distinguish the last four procurement models was difficult and may be the weaker part of the pathfinder.

The strength of the step-by-step pathfinder is that it incorporates relevant theory and empirical knowledge and that everything is connected to each other. Earlier research has mainly discussed advantages and disadvantages either in a broader sense or in small areas. With Part B a manufacturing company can follow one template that will suggest a procurement model given a certain area of investigation. This part also includes the new procurement model COI that can be of help in further research and to manufacturing companies in their purchasing processes in the supply chain.

9.1.3 Part C

Part C of the 3Part CoD-tool includes calculating and comparing costs and benefits of the procurement model suggested in Part B, and is depicted in figure 39. For full details on Part C, see chapter 7.

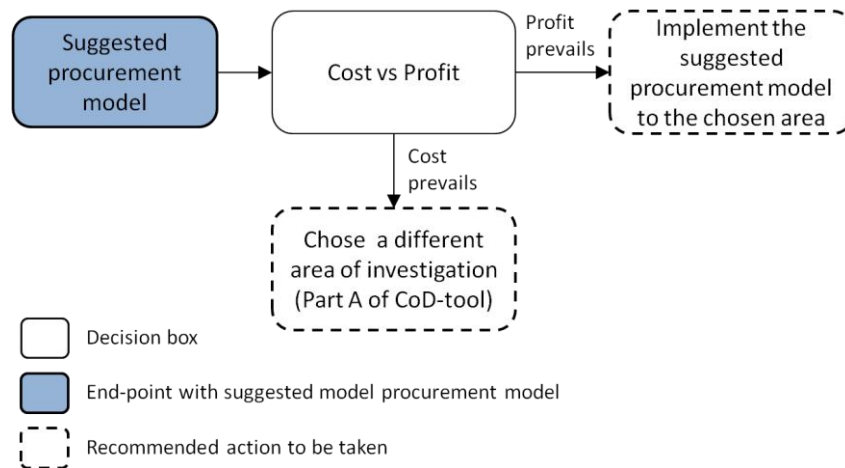


Figure 39: Part C of the 3Part CoD-tool, estimating and evaluating costs versus benefits

Part C is relatively open to interpretation and does not offer specific guidelines as to what should be included in the benefits (financial as well as non-financial) and costs calculated. We view this as positive since different situations generate different costs and benefits. There is however a difficult situation in the end of part C to assess if the estimated price reduction needed is reachable. This is again a very subjective estimation that will have great effect on the situation.

9.1.4 General reflections

Research has not been convergent when discussing if manufacturing companies should control or delegate its purchasing with 2nd tier suppliers. Different procurement models exists but they do not cover all relevant aspects and their connection to each other is not fully developed. The 3Part CoD-tool together with the COI procurement model is a good start in collecting and aligning research within the area and combine this with empirical findings in order to reach a holistic and practical solution. The tool incorporates the whole process from a possible problem or desire to improve a manufacturing company's situation, to a recommendation of a specific procurement model with identified and compared benefits and costs.

However, we want to highlight some areas that the 3Part CoD-tool does not include, so that the user can make a judgment on how usable the tool is in the specific situation. First, our aim has been to create a tool that is generally applicable, but since our empirical study is limited when it comes to type of industries (mainly steel and chemicals are covered), this may be reflected in the tool and thus, in which

industries the tool is suitable. There are no industry specific parameters incorporated in the tool but it is an important reflection to make before using it in a different setting. Also, if the usage of the 3Part CoD-tool results in a change of procurement model for the manufacturing company, the cooperation between the manufacturing company and the 1st and 2nd tier suppliers may entail challenges that require effective change management (see section 9.6.2); something this thesis does not handle.

Furthermore, our empirical study is also limited in terms of the number of cases we have investigated; all the procurement models that are described in theory are not covered by our cases. However, the tool is created based on both theoretical and empirical findings and we believe that we have been able to fill in the gaps in theory with empirical data and vice versa.

9.1.5 Summarized conclusions on the 3Part CoD-tool

In summary, the 3Part CoD-tool has some aspects that can be viewed as weaknesses, such as many subjective measures and occasionally complex questions, but is overall a tool that can help manufacturing companies decide whether to control purchasing activities with the 2nd tier suppliers, or to delegate that responsibility to the 1st tier suppliers.

The new procurement model COI, a part of Part B, will help future researchers map the different ways of working with purchasing in the supply chain. It will also help manufacturing companies as an additional suggestion in how they might choose to handle their purchasing with its 2nd tier suppliers.

9.2 The validity of the recommendations to Scania

In this section, we address the results of the second part of the purpose of this thesis, which is:

2. Apply the framework on the case of Scania and present a recommendation to Scania on whether or not to control purchasing, and contract with both the 1st and 2nd tier suppliers when purchasing forged parts, as well as an indication on how to do it.

The recommendation we have presented to Scania is to control purchasing in the area of steel for forgings by using the Buy-Sell procurement model. This recommendation is based on the application of the 3Part CoD-tool on the Scania case, which is described in more detail in chapter 8. We will in this section discuss the validity of the recommendation we have presented to Scania.

Our area of investigation is very large. This makes it harder and requires more resources to be specific and precise but it better shows the whole potential of what

can be accomplished with a change and if a change is to prefer or not. As a result of this, we have not been able to conduct a thorough and concrete investigation of, for example, what steelworks Scania might be able to work with in terms of relationship and competence of the steelworks (e.g. steelworks that can handle all the different types of steel or dimensions that is needed). Scania has instead estimated this. In the workshop that was held, comments were given regarding the assumption that Scania will be able to consolidate as much volume as we have predicted. Our estimation here was not done with the ambition to be precise, but our estimations might be high due to the complexity in types of steel and dimensions. Also, our recommendation to use the Buy-Sell procurement model relies on the assumption that the needed price reduction of 0,28 percent is feasible. This assumption has been based on a number of factors (see section 8.3.3) and is deemed reasonable by us.

The validity of the recommendation to Scania is, to some extent, affected by some of the drawbacks of the 3Part CoD-tool. For example, the subjectivity of some measures in the tool has forced us to rely on estimations made by Scania representatives. We do not necessarily view this as negative, as the Scania representatives undoubtedly have the best knowledge about Scania and Scania's situation in the supply chain.

Disregarding the impact of the drawbacks of the 3Part CoD-tool on the recommendation to Scania, we have sought to reinforce our arguments with basis in theory and empirical data, and therefore consider the recommendation valid.

9.3 General conclusions on delegation and control of purchasing

During the course of writing this thesis, we noticed that research in the area of controlling and delegating purchasing was not abundant. Surprisingly, we also found through our case studies that control and delegation of purchasing were well-used strategies in many companies. However, the way that these companies operate is often based on how they have done things in the past and not on an investigation aimed at finding the best alternative. The opinions on the concept of control and delegation of purchasing also differ a lot between purchasers and between companies. Some are very reluctant to even consider controlling purchasing and some see it as natural to investigate if control is favorable compared to delegation. What is the same for almost all is that they lack a structured way of handling such a decision and comparison. A decision-making process or investigation process similar to the one that we have constructed is needed, and we have taken some first steps.

Neither delegation nor control of purchasing should be seen as the best alternative or as an either or choice. It often seems best to at least have some of both in order to get full insight and limit hidden information and hidden action.

9.4 Contribution to theory

Our contribution to theory is that we have further developed the procurement models of Amaral et al, especially how and when to choose one procurement model before the other. We have put the procurement models into relation to principal agent theory, purchasing leverage and the concept of power relationships. Furthermore, we have identified a gap in the procurement models described by Amaral et al and created one additional procurement model, COI (Control with Open Information), that did not fit in to any of the descriptions of the already existing ones.

Additionally, we have created the 3Part CoD-tool, aimed at helping manufacturing companies decide when to control and delegate purchasing and when to use either procurement model. We have not only used our findings to construct the 3Part CoD-tool, but also applied them to a real case to show the applicability of our findings.

9.5 Contribution to Scania

We have presented a recommendation to Scania within the area of forged parts that entails changing procurement model from the current one used, and showed that there is potential in doing this. We have also given Scania a structured way of thinking when deciding how to act when it comes to purchasing in the supply chain and when handling related issues.

Additionally, we have described how other manufacturing companies are dealing with similar issues.

In summary, we have added to the knowledge on delegation and control at Scania, and provided the company with tools to evaluate the potential of different procurement models. Even though our thesis does not go into detail on the topic of practical implementation of the Buy-Sell procurement model, we consider our thesis as having laid the foundation for further exploration in this area (see section 9.7).

9.6 Suggestion for future research in academia

9.6.1 The relationship between volume and price

An issue that has been raised on some occasions during the process of writing this thesis is the relationship between volume and price, and that higher volumes do not necessarily entail lower prices. The comparison stands between being a large player and being able to consolidate volumes, and thus becoming an important customer, or being a small player and being able to “fill up” the excess capacity of the supplier, where the supplier has a small marginal cost and thus is able to give larger rebates.

Giving rebates to small customers will be less costly for the suppliers than giving rebates to large customers.

Another aspect of the issue is that there are also other factors that affect the prices a customer receives, such as the nature of the relationship with the supplier and what this relationship can offer the supplier in terms of e.g. joint development projects, stability and security.

In this thesis, we have made the assumption that higher volumes affect the price positively for the buyer to some extent. This assumption is based on strong evidence from both theoretical and empirical findings, which is why we have not discussed it earlier. However, it is an interesting issue that would benefit from being further investigated. For example, a potential research issue could be how volume affects price relative other factors, such as relationships and what type of increase in volume is needed to give a price reduction in different industries.

9.6.2 Change management in supply chain purchasing

In order to successfully implement a procurement model that is new to the supply chain, effective change management is required. The manufacturing company must determine how to best convince both the 1st and 2nd tier suppliers to cooperate and make the procurement model effective, as well as how it needs to change its own processes and routines to facilitate the use of the new procurement model. Theoretical areas that can be covered by this issue are change management, supply chain management and purchasing.

9.6.3 New perspectives of control and delegation of purchasing

The empirical investigation of this thesis has been conducted from the perspective of the manufacturing company. Another area of research that can be interesting is to view the issue of delegation and control of purchasing from the perspectives of the 2nd and/or 1st tier suppliers.

9.7 Suggestions for future research in the Scania case

9.7.1 Negotiation possibilities for Scania

Before any implementation of the Buy-Sell procurement model can be carried out, the negotiation possibilities for Scania with the steelworks should be investigated further. For example, an issue that was raised in section 8.3.2, is if Scania can negotiate the whole base price or if there are any limitations to this. This has an effect on what percentile price reduction is needed. By also investigating the steel industry and how the steelworks work and act in negotiations, it might be possible to make a better estimation of what price reduction Scania would get if it started to negotiate directly with the steelworks, i.e. not only if the 0,28 percent price reduction is possible, but if there is additional potential for even lower prices.

9.7.2 Implementation of the Buy-Sell procurement model

The successful implementation of the Buy-Sell procurement model requires preparations. A project plan needs to be prepared, where issues such as arguments for getting the steelworks and the forges to accept the new procurement model, operational routines, and new processes at Scania can be included.

9.7.3 Modifications to the 3Part CoD-tool and alternative uses of the 3Part CoD-tool

With a starting point in the 3Part CoD-tool that we have created, Scania can modify this to fit its own processes and position better. This can then be used to identify other areas where there might be potential for improvement.

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Anna Lindgren, Sourcing Manager, commodity Chemicals (participated in workshop)

Frida Matsdotter-Bauer, Commodity Manager, Fasteners and Forgings (participated in workshop)

Per-Åke Persson, Executive Supplier Quality Manager

Daniel Strand, Sourcing Manager, commodity Sheet Metal (participated in workshop)

Rita Thorsén, Sourcing Manager, commodity Fasteners and Forgings (participated in workshop)

Sara Wansölin, Master Thesis Student (participated in workshop)

Case company interviews

Åke Berggren, Global Purchasing Manager, Castings and Forgings at Alfa Laval, 2011-03-29

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Hans Lindblom, Vice President & Deputy, Global Sourcing at Cargotec, 2011-03-23

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M. Nilsson, Supply Manager, GloboMan (name and company name are fictitious), 2011-03-16

Persson, Head of Sourcing, commodity group X at Globotech (name and company name are fictitious), 2011-03-04

Appendix 1 – Case study questions and interview guide

This is a template that has been used as a guide for the interviewers when preparing before the interviews and during the discussions with the representatives of the case organizations. It includes questions that the interviewers would like to find answers to (alphabetical letters), questions that are used during interviews (numbers) and other information that needs to be communicated during the interview (bullet points). The disposition is meant to represent the flow of the interview.

A. Introduction

- The researchers describe the purpose of the research and the interview.

B. What are the specific conditions of which the organization and the interviewee are operating under?

1. Describe your position in the company and what your responsibilities are?
 - 1.1. What kind of business processes are you involved in?
 - 1.2. What kind of activities do you do in these processes?
 - 1.3. How is your department structured and how is that connected to the overall organization of the company?
2. What is your experience with controlling strategies?
 - 2.1. Are you only involved in one part of the process or with one supplier in the supply chain vs. the whole process and all suppliers?
3. Which are the components/products/material that are affected by a controlling strategy?

C. Who is part of the supply chain, how does that industry work and how do they interact?

1. Which are the 1st and 2nd tier suppliers?
2. How do the three parties interact today?
 - 2.1. Can you draw a picture of the situation with the flow of goods and information/contracting?
3. How does the business arrangement work between the three parties today?
4. How is business information shared and presented between the different parties?
 - 4.1. Ex prices.
 - 4.2. Do you have a specific type of contracting strategy that affects the situation a lot?
5. Do you use any type of tools in your cooperation?

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- 5.1. Ex integrated computer systems.
6. How does the industry of the 1st tier suppliers work and what does the competitive situation look like?
 - 6.1. Few/many suppliers?
 - 6.2. Few/many buyers?
 - 6.3. Consolidated/fragmented market?
7. How does the industry of the 2nd tier suppliers work and what does the competitive situation look like?
 - 7.1. Few/many suppliers?
 - 7.2. Few/many buyers?
 - 7.3. Consolidated/fragmented market?

D. Is there a correlation between when to control and which kind of relationship the different parties have with each other?

1. How would you describe the relationship between the 1st tier suppliers and the manufacturing company?
 - 1.1. Do you have an intended strategy for what type of relationship you have with them?
2. How would you describe the relationship between the 2nd tier suppliers and the manufacturing company?
 - 2.1. Do you have an intended strategy for what type of relationship you have with them?
3. How would you describe the relationship between the 1st and 2nd tier suppliers?

E. What are the reactions of the different suppliers when a controlling strategy is being used?

1. How do the 1st tier suppliers react to the controlling strategy?
2. How do the 2nd tier suppliers react to the controlling strategy?

F. Is there a certain characteristic to the products where organizations are controlling purchasing?

1. Is there a reason to why you are controlling this particular type of articles?
2. What type of articles do you consider is suitable for controlling purchasing?

G. What are the reasons for organizations to control purchasing?

1. What was your reason for developing this strategy?
 - 1.1. Did you identify any certain needs or problems? If s, what was it?
 - 1.2. How long has the organization been using the strategy?

H. What are the experienced consequences from the controlling strategy?

1. How would you describe the consequences of your selected strategy?
 - 1.1. Positive and negative?
2. Have you experienced any case where this strategy did not work with a certain type of articles?
3. Have you experienced any case where this strategy did not work with a certain type of suppliers?
4. Has this strategy put a lot of extra work on your purchasing division?
 - 4.1. Was it challenging to handle a new area of expertise?

I. What kind of controlling models in purchasing is used by organizations today?

1. What kind of advantages and opportunities are you experiencing with your controlling model?
2. What kind of disadvantages and risks are you experiencing with your controlling model?

J. Are there any different opinions on when, why and how and to what extent control of purchasing should be done?

1. Have you experienced different opinions from different functions in the company to what extent control of purchasing should be done?
 - 1.1. Purchasers vs. R&D, Quality?

K. What are the reflections, made by organizations controlling purchasing, about their used strategy?

1. Do you have any experiences from other companies that are working with controlling strategies with purchasing?
2. What do you consider to be the challenges working with this type of arrangement?
3. Have you considered changing the arrangement in any way?
4. What is your future plans for this kind of strategy?
5. In what kind of situation would you describe that a company should be in to adapt the same strategy that you have?
6. What would you consider to be the best practice/conditions for success for this kind of strategy?
7. Do you feel that there is a shift in risk when using a controlling strategy?

L. Finish

1. Do you have any written sources (internal?) regarding the subject that we can look at?
2. Do you know someone else within the company that you think that we should talk to?

Can Scania be stronger than steel?

3. Do you know someone else outside the company that you think that we should talk to?
4. Do you have any other company with experiences like the ones that we have talked about today?
5. Have you any reflections or do you get any associations that you would like to share with us after the interview?
6. Do you have any questions?
7. How did you experience the interview?
 - 7.1. Feedback to us
 - 7.2. Did you get the chance to explain your answers
 - 7.3. Were there questions you feel were missing?

M. Outro

- A. We will send our consolidated findings from this interview to you approximately (DATE) and we wish you to confirm that you agree with them or not.
- B. Is it OK if we contact you if we wish additional information after this interview?
- C. Information regarding when the thesis will be published

Appendix 2 – Case report guide

1. Information about the industry and company.

- Information about the industry in general
- Information about the company in general

2. Information about the conducted interviews.

- How many was made
- Where were they made and how.
- What type of people was interviewed?
 - o Positions
 - o Type of work activities

3. Description of purchasing strategy with 2nd tier suppliers

- Description
 - o Descriptive figure
 - o Flow of goods
 - o Flow of ownership
 - o Contracting
 - o Volume relations if available

4. Description of the industry for each tier.

4.1 1st tier suppliers

- Information about the industry for the 1st tier suppliers

4.2 2nd tier suppliers

- Information about the industry for the 2nd tier suppliers

5. Reactions when controlling purchasing by the different suppliers

5.1 Reactions by 1st tier suppliers

- Reactions by 1st tier suppliers

5.2 Reactions by 2nd tier suppliers

- Reactions by 2nd tier suppliers

6. Experienced consequences from using controlling purchasing strategies.

- Positive
- Negative

7. Concluding analysis by the interviewees

- Reasons to control/delegate
- Important factors when controlling/delegating
- When a controlling strategy is suitable

Appendix 3- Implications for the decision-making tool and connections to the 3Part CoD-tool

Implication	Description of implication
IMP1.1	Specialized material
IMP1.2	Cost of raw material
IMP1.3	Sensitive price info
IMP4.1	Relative volume
IMP4.2	Savings compared to increased workload
IMP4.3	Nature of the existing relationship
IMP4.4	Lack of insight
IMP4.5	Suspicious of information rents taken by 1 st tier supplier
IMP4.6	Other strategic reasons to control (e.g. joint R&D)
IMP5.1	Cost structure
IMP5.2	Supply chain and industry knowledge
IMP5.3	See IMP4.2 and IMP4.3
IMP5.4	Supplier base
IMP5.5	See IMP1.3
IMP5.6	Tradition in the industry
IMP5.7	Purchasing competence of 1 st tier supplier
IMP5.8	Control requirements (see also IMP1.1 and IMP4.6)
IMP5.9	Savings potential (see also IMP4.2)

Table 44: Summary of implications for the decision making tool found in the cross case analysis

Part of the 3Part CoD-tool	Derives from:	
Part A	General	IMP5.2 & IMP5.6
	A1	IMP4.3
	A2	IMP5.4
	A3	IMP5.7
Part B	DB1	IMP4.4 & IMP4.5
	DB2	IMP1.1, IMP1.2, IMP4.6, IMP5.1 & IMP5.8
	DB3	IMP4.1
	DB4	IMP4.2
	DB5	IMP1.3 (IMP5.5)
	DB6	Amaral et al on the Supplier Rebates procurement model
	DB7	Amaral et al on the Buy-Sell procurement model
	DB8	Amaral et al on the Consignment procurement model
Part C	IMP4.2, IMP5.3 & IMP5.9	

Table 45: Connections between the 3Part CoD-tool and the findings from the cross case analysis and the theoretical framework. DB in this table stands for decision box (referring to the step-by-step pathfinder).

Appendix 4 – Survey of purchasing volumes among forges that are supplying Scania

	Forges						
	A	B	C	D	E	F	G
Total amount of steel purchased per year (10 ³ tons)	30	18	14	≈16	10	9	≈16
Number of SWs used	4	>10	Mainly 4	8-10	Mainly 3	7	Mainly 4
Distribution of volume among the SWs (in thousand tons)	SW 1: 12 SW 2: 10 SW 3: 7 SW 4: 1	Depends on supply and price situation. Less than 1,8 per SW (our estimation based on the number of SWs used)	SW 1: 8,4 SW 2: 2,1 SW 3: 1,4 SW 4: 1,4 Remaining tonnage distributed to misc. SWs.	SW 1+2: 8 SW 3: 4 SW 4+5: 3 SW 6: 0,5 Remaining tonnage distributed to misc. SWs.	SW 1: 5 SW 2: 3 SW 3: 1 Remaining tonnage distributed to misc. SWs.	SW 1: 6,5 SW 2: 1 SW 3: 1 Remaining tonnage distributed to misc. SWs.	SW 1: 7,2 SW 2: 3,2 SW 3: 2,4 SW 4: 1,6 Remaining tonnage distributed to misc. SWs.

Table 46: Volumes of purchased steel, number of steelworks used, and distribution of volume among steelworks for forges delivering to Scania. The forges have been assigned letters (A, B, C etc.) in order not to reveal their identities. Only steelworks that is considered the largest suppliers of each forge are presented, the selection that this is was made by each forge. SW is short for steelwork.