Potential cost improvements and workable form of collaboration in Alvesta steel collaborative procurement project

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Business Process & Supply Chain Management, 5FE00E, Spring 2010

Author: Omid Sherkat
Tutor: Åsa Gustafsson
Examiner: Lars-Göran Aidemark
PREFACE

The last four months have involved hard work, but also given me new insights and knowledge about procurement and purchasing process and total cost of ownership. I have also gained knowledge in collaborative procurement which until starting this study was unfamiliar for me. This project also gave me a great opportunity for learning about the industrial operations and the way of doing business in some Swedish companies.

I am grateful towards Tomas Hedevik the Marketing manager of Alvesta municipality whom without his great helps and supports this project seemed impossible, and also my interviewees Peter Hedlund in Hyllteknik AB, Fredrik Klasson and Dick Johansson in BK Produkter AB, Peter Takács in Svets & Mekano AB, and also Ola Holgersson in Finnveden Powertrain AB, through which participation have made this study possible to conduct. I would therefore like to address a special gratitude to Diana Unander Nordle the Process Manager of Students Process Leader in the Regional Association of Southern Småland for introducing me this project through Alvesta municipality.

I would also like to thank my tutor Åsa Gustafsson for her insightful tips and persuasion and my examiner Lars-Göran Aidemark that have by the different seminars given me suggestions to essential improvements.

Last I hope the results of this thesis will have even a slight portion to decide about planning and implementing the project in Alvesta.

Växjö 25th of May 2010

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Omid Sherkat
Summary

Master thesis in Business Administration, 30ECTS, School of Management and Economics at Linnaeus University, Business Process & Supply Chain Management, 5FE00E, Spring 2010

Author: Omid Sherkat
Tutor: Åsa Gustafsson

Title: Potential cost improvements and workable form of collaboration in Alvesta steel collaborative procurement project

Background: There is an idea about starting collaborative procurement for steel-based products manufacturers in Alvesta region, Sweden. Collaborative procurement of purchasing group is an organization in which cooperative purchasing processes take place. A purchasing group consists of dependent or independent organisations that share and/or bundle together in order to achieve mutually compatible goals that they could not achieve alone. However, collaborative procurement has its own advantages and disadvantages.

Objective: This study describes the procurement and purchasing function, as well as identifies and explains the total cost of ownership in studied cases in order to find the potentials for collaborative purchasing which is aimed at reducing the total cost of ownership. Moreover, this investigation is looking for the workable form or even forms of purchasing group in this case.

Method: This is a multiple-case study with systematic combining approach as the orientation. Interview and documents are the instruments of data collection. Empirical data from each case has been analysed both within-case and cross-case. Construct validity, external validity, and reliability are scientific criteria for trustworthiness of this thesis.

Results, conclusions: All studied companies in this case are going through the complete process of procurement and purchasing. Amongst the studied sites, Finnveden Powertrain AB is an exceptional case by centralised purchasing. The total cost of ownership in studied cases contains the activities related to management, delivery, communication, price, and quality but not service. Ultimately, this investigation showed that the required elements and basements to establish a regional purchasing office in form of a third party formal separate organisation, at least as a feasible project based on analogous purchasing in different companies and other influential factors, are ready there.

Suggestions on further research: This study can be continued by choosing a larger sample to have a better view about procurement and purchasing process of manufacturers in this region. In addition, through more interviews the motives or even hinders of join a group purchasing among the increasing number of companies can be identified.
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Chapter 1 Introduction

In the first chapter I provide a background and definitions of procurement and purchasing, total cost of ownership, and collaborative procurement. Afterwards, the challenges of collaborative procurement as the problem of this study are being discussed.

1.1 Background

Dumond (1992) and Humphreys et al (1998) note that generally purchased inputs represent more than sixty per cent (60%) of a typical manufacturing organization’s operating expenses. Accordingly, Humphreys et al (1998) discuss that procurement decision has an immense impact on performance of the whole system that is not limited to cost control alone. Therefore, it is concluded by Humphreys et al (1998) that future manufacturing strategies will place significant emphasis on the control of purchased inventory and increasing the value of a JIT procurement system to the firm.

Quayle (2006) highlights the economies of bulk buying and reduction in administrative cost of purchasing as the advantages of centralisation of purchasing in complex companies which are in group of cost saving advantages.

Closer, longer-term relationships with suppliers are evident in some industries, reported notably in the Japanese automotive and textile industries, craft based Italian industries and various Swedish manufacturing industries (Harland et al, 1999). As cited by Harland et al (1999) the terms “partnership” and “partnership sourcing” have been used to refer to these closer, longer-term relationships with suppliers. Harland et al (1999) suggest that the concept of supply strategy integrates various existing bodies of knowledge and concepts, in which according to Harland et al (1999) the central to the concept of supply are the purchasing, use and transformation of resources to provide goods or service packages to satisfy end customers today and in the future, and the organisational structuring decisions that accommodate global markets. As implications for the future of supply, Harland et al (1999) predict that some supply chains would be very innovative with each link adding substantial value. Consequently, the management of these supply chains would need to be comprehensive according to Harland et al (1999). In other words, Harland et al (1999) believe that gaining and maintaining a
position from which it was possible to facilitate and influence supply chains would be very important.

“The purchasing function has also come under scrutiny in some organizations as target for outsourcing” (Leenders et al 2002, p.303). However, Leenders et al (2002) referring to the findings of a study by Centres of Advanced Purchasing Studies (CAPS) in 1997, restate that there was little outsourcing of typical supply management activities. Inventory monitoring, order placement, and order receiving were the activities most likely to be outsourced, with more than 40 percent of respondents expecting increased outsourcing in inventory monitoring and order placement according to CAPS study cited in Leenders et al 2002.

Forming collaborative procurement arrangements is found to be an increasing trend in purchasing and supply recently by Bakker et al (2006). Collaborative procurement can be seen as horizontal cooperation between organization that means bringing together or pooling of the purchasing functions of two or more organization according to Bakker et al (2006, p.15). Cooperative purchasing, group purchasing, buying offices and pooled purchasing are some examples of used terms in purchasing literature when referred to purchasing consortium as discussed in Tella and Virolainen (2005). The researchers explain that the terminology varies mainly due to the industrial branch and the nature of the parties involved in the purchasing cooperation. Despite the fact that there are certain patterns in the use of the terms in purchasing literature the terminology is not yet fully stabilised (Nollet & Beaulieu 2005).

“Purchasing group is an organization in which cooperative purchasing processes take place. A purchasing group consists of dependent or independent organisations that share and/or bundle together in order to achieve mutually compatible goals that they could not achieve alone” (Schotanus & Telgen 2007, p.53). Cooperative purchasing has its own advantages and disadvantages; however Schotanus and Telgen (2007) believe that advantages outweigh the disadvantages for many situations in the public and private sector.

Ellram and Maltz (1995) suggest the potential approaches to “outsourcing cost analysis”, in which if cost reduction is a key driver of the outsourcing decision, then accurate cost analysis must precede any correct decision. They discuss more that if baseline costs are not properly identified to establish a good benchmark, one cannot
determine savings sufficient to justify such a major change. Referring to Ellram and Maltz (1995) from the outsourcing decision perspective, the relevant costs are not always easy to determine. Furthermore, as other researchers have noted, firms frequently do not have appropriate cost information to make correct business decisions according to Ellram and Maltz (1995, p.64). In their case study, Ellram and Maltz (1995) found that a straight price comparison would have led rejection of the third-party alternative, even though outsourcing resulted in both initial and long-term cost reductions. The above researchers remind that although cost is not the only driver of the outsourcing decision, cost reduction is usually a major concern. Ellram and Maltz (1995) augmented that total cost of ownership (TCO) enables companies to properly identify and evaluate realistic cost for in-house and purchase alternatives.

McLaren et al (2002) analysed the expected costs and benefits of each type of collaborative supply chain management (SCM) systems. Although collaborative SCM systems are not in the scope of this study, but the partnership opportunity cost, or in the other words the cost of being tied to a partner due to system inflexibility can be seen pertinent here as collaborative purchasing is a sort of supply chain collaboration. McLaren et al (2002) declare that many previous studies attest to the transaction cost savings of collaborative inter-organisational systems, but ignore the switching costs required to change partners or business processes, and also the opportunity costs of not having a system flexible enough to do business with whichever partner is most suitable.

1.2 Problem discussion

Case introduction

Alvesta is a region in Småland province of southern Sweden. In this region there are a number of steel-based product manufacturers, which are not the competitors since each firm has its special products and therefore their own customers. Unprocessed steel sheets, tubes and other forms of steel are the basic purchasing items those are common among most of the companies in the region. In some cases each firm buys its needed steel from the sources those are suppliers for others. In terms of procurement function, each firm has an individual purchasing department, which procures all required goods and services for their production process. As a new idea, due to some logics such as; the similarity of purchasing the main raw materials, no competition, and also geographical closeness of present firms in the region it is proposed that by implementing a
collaborative procurement plan and centralising the steel procurement and logistics process they can earn more profit through the potential cost savings in purchasing and logistics. However, collaborative purchasing has its own challenges which are discussed here.

**Collaborative purchasing challenges**

Bakker et al (2006) recognized the improvement of effectiveness and efficiency as the two primary motives for collaboration. According to Bakker et al (2006), to improve the effectiveness, collaboration is useful when single organizations do not have the knowledge, resources or capabilities. However, these researchers discuss that for efficiency improvement, collaboration refers to economies of scale, reduced transaction costs, development of products/services, or accessing markets and/or technologies. Thereafter, Bakker et al (2006) acknowledge that for effectiveness improvement the constraints such as lack of expertise or resources play a role in determining the collaborative form like lead buying or using third parties to ensure expertise, whereas for the improvement of efficiency the constraints are not clear.

In another vein, Schotanus et al (2008) argue although cooperative purchasing forms such as purchasing groups, purchasing consortia, and buying offices are gaining popularity in the private sector as well as public sector, certain purchasing groups do not flourish. A reason for this reluctance is a dissatisfaction among various members of a group with the allocation of the cooperative gains supposed by Schotanus et al (2008). In a paper Schotanus et al (2008) analysed the unfairness resulting from using the commonly used Equal Price (EP) method for allocating gains under the assumption of continuous quantity discounts, in which the authors argue that this unfairness is due to ignoring a particular component of the added value of individual group members. “Hitchhikers’ problem” is an example of one of the problems of EP according to Schotanus (2005) cited in Schotanus et al (2008). They explains that this problem occurs when a small buying organization uses a contract negotiated by a large buying organization, while for large organizations, there may be no incentive to allow hitchhiking when equal price allocation method is used.

In a different study, Tella and Virolainen (2005) observed that the consortium members were a little suspicious of the benefits allocation in cases when the supplier does not have enough capacity for the whole demand of the purchasing consortium.
Bakker et al (2006) argue about different forms of collaborative procurement. Two distinctive structural forms can be recognised in the procurement literature: collaborative forms that are “member-owned”, informal and virtual organisations, and those that are “formal separate third-party organizations”, in which these extreme types can also be recognized in evolutionary models (Bakker et al 2006, p.17). In a scrutinized research on the typology of organisational forms of cooperative purchasing, Schotanus and Telgen (2007) discuss if the dimensions of the purchasing group are not coherent, then this may lead to failure or a relatively low performance of the group. The above researchers identify seven main dimensions of the typology, and they emphasise that when a suitable cooperative purchasing form needs to be chosen, so the different dimensions of purchasing group must be fitted together (ibid, p.56). Schotanus and Telgen (2007) concluded that it is highly crucial for all purchasing groups to find the best balance between the different dimensions, so as long as this balance is present, purchasing groups can maximise cooperative advantages and minimise related disadvantages.

In a study about changes in the National Health Service (NHS) purchasing issues in the United Kingdom, Laing and Cotton (1997, p.84) consider the network structures such as the purchasing consortia as strategic market investments on the part of the constituent organisations. The researchers hence argue that the opportunity costs associated with participation in such network structures must also be recognised and addressed in developing such purchasing structures. In particular, the “loss of freedom” and “dis-equilibrium in power” inherent in such a network structure have the potential as stressed by Laing and Cotton (1997). In this special study, Laing and Cotton (1997) found that through the growth of purchasing consortia as the number of participants increases, the problem of such growing divergence between individual members rises up. As an obvious consequence, these researchers state that given the range of different needs and opinions, gaining a coherence of views amongst members is a problem. Practically, Laing and Cotton (1997, p.89) observed that certain members felt their “voices” were lost amongst the “sea” of other request and thus their specific needs were likely to be overlooked, particularly this was severe amongst those members which felt themselves to be detached from the decision-making process by virtue of their lack of direct representation. At their conclusion, the above researchers argue that underpinning the effective operation of inter-organizational structures is the existence of common
objectives and a homogeneity of interest, while these tensions thus serve to highlight the centrality of communication to the effective operation of inter-organizational networks. To augment the discussion, Laing and Cotton (1997, p.90) suggest that as such, while at a conceptual level network structures may appear to provide a structural solution to the tensions between centralized and decentralized purchasing, the operational dynamics of such structures suggest that there are major questions over the ability of such structures to deliver the promised benefits.

Laing and Cotton (1997, p.90) remark that although their research reflect the very specific context and complexities of the nascent internal market in the NHS, it would appear reasonable, nevertheless, to contend that these challenges also reflect the underlying complexities inherent in any such network structures.

Surprisingly, Tella and Virolainen (2005) express that their interviews revealed a degree of uncertainty that the representatives of the member companies felt towards the commitment of other members in operation of the purchasing consortium. With a similar approach Doucette (1997) suggest that to be successful at obtaining purchase items a group purchasing organisation must be able to foster and maintain the commitment of its members.

1.3 Research question

RQ1. What are the main steps in the procurement process of Alvesta case-companies?

RQ2. What type of purchasing costs might be reduced or eliminated through collaborative purchasing among the steel-based products manufacturers in Alvesta?

RQ3. What form of collaborative purchasing can be workable for Alvesta case considering the extant characteristics and motives?

1.4 Purpose

This study describes the procurement and purchasing function, as well as identifies and explains the total cost of ownership in studied cases in order to find the potentials for collaborative purchasing which is aimed at reducing the total cost of ownership. Moreover, this investigation is looking for the workable form or maybe forms of purchasing group in this case.
### 1.5 Time schedule

Figure 1.1 is planned schedule of this thesis that is built on the assumed durations for each part of the project.

![Figure 1.1: Planned thesis schedule](image)

Figure 1.2 illustrates the actual time schedule of thesis. The reason of some delays and prolonged durations of such activities is related to changing the topic of this thesis on fifth of March 2010.

![Figure 1.2: Actual thesis schedule](image)
Chapter 2 Methodology

In this chapter the methodological aspects of the thesis are introduced. So, qualitative paradigm as the strategy, and the whole procedure of data gathering, data recording, analysis, and the measures are being discussed accordingly and thoroughly.

2.1 Strategy of inquiry

With a qualitative approach Lewis and Suchan (2002, p.301) argue that research methods with a purely positivistic perspective on supply chain may not explain the breadth of phenomena that occur within the networks of organizations and individuals. The authors emphasize that there is need to analyse logistics by process theories and an interpretivist framework to understand better the behavioural complexity or dimensionality of supply chain. On the other hand, Mentzer and Kahn (1995, p.232) stated “to date, all logistics researches has been founded in positivist paradigm and no logistics research founded in the interpretive paradigm”. According to Lewis and Suchan (2002) methodologies that capture members’ subjective experiences and learning, their interpretation of that experiences, and the actions that result from that interpretation are required to understand supply chain management (SCM) behaviour.

As Näslund (2002) cited, a qualitative research helps to understand relativistic issues from the inside, in the other words, this only can be understood from the point of view of the involved people in the activities. While, human behaviour was found by Fawcet et al (2008) at the root of nearly all of substantive barriers to SCM. Considering the need for the better understanding of behavioural factors on SCM, which is highlighted by Lewis and Suchan (2002) who believe the increasing complexity of logistics partly caused by the increasing interconnectedness of different supply chain members, it is worthy to understand the way people look at supply chain.

Positivism and interpretivism are epistemological considerations, which Bryman and Bell (2007) describe that a particularly central issue in this context is the question of whether or not the social world can and should be studied according to the same principles, procedures, and ethos as the natural sciences. Positivism is a position that advocates of the methods of the natural sciences to the study of social reality and beyond (Bryman & Bell 2007, p.16). One of the principles of positivism is that the purpose of theory is to generate hypotheses that can be tested and that will thereby
allow explanations of laws to be assessed which is the principle of deductivism (Bryman & Bell 2007, p.16). Interpretivism is a term given to a contrasting epistemology to positivism, which is predicted upon the view that a strategy is required that respects the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action.

Objectivism and constructionism are ontological considerations. According to Bryman and Bell (2007) the central point of ontology orientation is the question of whether social entities that have a reality external to social actors and is independent of them that is referred to objectivism position, or whether they can and should be considered social constructions built up from the perceptions and actions of social actors which is constructionism position.

Creswell (2009) describes that qualitative approaches completely differ from quantitative approaches, in which purposeful sampling, collection of open-ended data, analysis of text or pictures, representation of information in figures and tables, and personal interpretation of the findings all inform qualitative procedures. Many strategies exist according to Creswell (2009); however he recommends that qualitative researchers choose from among the strategies, such as narrative, phenomenology, ethnography, case study, and grounded theory. While Creswell (2009) points out in explore processes, activities, and events case study and grounded theory help researchers.

“Case studies can be used for different types of research purposes such as exploration, theory building, theory testing and theory extension/refinement” (Voss et al 2002, P.197). A particular area where cases are strong is theory building according to Voss et al (2002). “A theory may be viewed as a system of constructs and variables in which constructs are related to each other by propositions and the variables are related to each other by hypotheses” (Baccarach 1989 cited in Voss et al 2002). Mukherjee et al (2000), as cited by Voss et al (2002, p.198), suggests that cases are particularly useful when there is uncertainty in the definition of constructs. In addition, Bryman and Bell (2007) believe that multiple-case designs allow researcher to compare and contrast the findings deriving from each of the cases.

“Deductive approaches are concerned with developing propositions from current theory and make them testable in the real world. Inductive approaches, on the other hand, rely on ‘grounded theory’ (e.g., Glaser and Strauss, 1967) where theory is systematically
generated from data” (Dubois & Gadde 2002, p.559). Systematic combining is a process, in which theoretical framework, empirical fieldwork, and case analysis evolve at the same time and it is particularly useful for development of new theories, as Dubois and Gadde (2002) defined. Systematic combining that is proposed by Dubois and Gadde (2002) is closer to an inductive than a deductive approach, the continuous interplay between theory and empirical observation.

“Inductive data analysis” is one of the characteristics that might be used in qualitative inquiry according to Creswell (2009). Bryman and Bell (2007) explain the principle of induction, in which knowledge is arrived at through the gathering of facts that provide the basis for laws. With another perspective, Creswell (2009) describe that in the qualitative research one builds the patterns, categories, and themes from the bottom up, by organizing the data into increasingly more abstracts units of information. He adds this inductive process illustrates working back and forth between the themes and the database until the researchers have established a comprehensive set of themes. Creswell (2009) proposes that inductive data analysis also involves collaborating with the participants interactively; so that participants have a chance to shape the themes or abstractions that emerge from the process.

Dubois and Gadde (2002) describe that the systematic combining is an argument for a stronger reliance on theory than is suggested by true induction. These researchers declare that their proposition as a proper case study approach has been inspired by ‘abduction’ referring to Peirce (1931) and Kirkeby (1994) cited in Dubois and Gadde (2002, p.555). By the definitions of Dubois and Gadde (2002) for systematic combining, an abductive approach is fruitful if the research’s objective is to discover new things those are other variables and other relationships. Abductive approach is to be seen as different from a mixture of deductive and inductive approaches (Dubois & Gadde, 2002). However, the authors assert that systematic combining builds more on theory development and refinement of existing theories than on theory generation.

My strategy

To fulfil the first part of this thesis, in which the current situation of procurement and purchasing process of companies are studied, a positivistic approach with objectivism position enables me to describe these processes and test the theories in this field. Following, to investigate the next parts of the study in order to identify the issues and logics by each actor, and then explore the reality of phenomena an interpretivism
position accompany with constructionism has been taken into consideration for analysing and criticising the expressed ideas. With a qualitative strategy and systematic combining as the first approach, I try to understand the viewpoints of supply chain actors regarding the collaborative procurement which is presenting as the Alvesta collaborative purchasing project. This is an attempt to find the different opinions about the abilities of collaborative procurement in order to reduce the total cost of ownership of purchased steel for partners. To reduce the total cost of purchasing through a group purchasing, and also evaluating the influential factors to determine the form of collaboration in under-studied case, lastly adjustable form or forms of collaboration will be represented that is in accordance with suggested theoretical context. Consequently, this investigation takes more a deductive approach.

2.2 The Researcher’s role

It is argued by Tranfield and Starkey (1998 cited in Bryman & Bell 2007, p.5) that much management research has lost touch with the concerns and interests of practitioners and that management and business researchers must relearn how to be responsive to them in order for their research to retain a value and a purpose. Calder et al (1981) proposed two types of generalizability of research, in which the first type is “effects research” and the second type termed “theory research”. According to Calder et al (1981) effects research is based on a desire for knowledge about the events and relationships in a particular real-world situation. In contrast, theory research is based on a desire for scientific knowledge about events and relationships that occur in a variety of real situation. Calder et al (1981) remind that the goal of these two types is different, while the goal of effects research is to obtain findings that can be applied directly to the situation of interest. Whereas, the authors cite the goal of theory research is to identify scientific theories that provide a general understanding of the real world. Calder et al (1981) discuss that theory researches are used to test a theory by creating a context and measuring effects within that context that have the potential to disprove or refute the theory.

My role

Thanks to the above descriptions, this study can be viewed as a theory research. Therefore, by gathering the empirical data I am trying to find how the related theories are working in the real-world situation. As a researcher I try to find the potential cost reduction points along the purchasing process based on theoretical concepts and then
identify the workable form of collaboration that is in compliance with influential factors and dimensions in collaborative form determination. However, coincidentally the results of this study can provide knowledge about the current process and do an assessment about the feasibility of an intended project in a particular real-world situation.

2.3 Data collection

As shown in Figure 2.1, Stuart et al (2002) in a five stage research process model and Bryman and Bell (2007, p.405) in an outline of the main steps of qualitative research both assigned the third step to data gathering.

```
<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define the Research Question</td>
<td>Instrument Development</td>
<td>Data Gathering</td>
<td>Analyze Data</td>
<td>Disseminate</td>
</tr>
</tbody>
</table>
```

Figure 2.1: The five stage research process model
(Source: Stuart et al 2002, p.420)

“The data collection steps include setting the boundaries for the study, collecting information through unstructured or semi-structured interviews, documents, and visual materials, as well as establishing the protocol for recording information” (Creswell 2009, p.178). However, according to Stuart et al (2002) developing a case study protocol is far more than organizing the questions are going to be posed. In detail, the authors explain that the protocol consists of the principle documentation needed to provide the researchers with the necessary concentration, organizing the visits and ensure that the trail of evidence is thoroughly documented. Accordingly interviews have been divided into face-to-face, telephone, focus group, and e-mail internet interview by Creswell (2009). Bryman and Bell (2007) remind the level of analysis to business researchers that might focus on individuals, groups, organizations, and societies. Differences in the level of analysis are commonly referred to in terms of the SOGI model (societies, organizations, groups, and individuals); whereas the mixed-level research design can be applied according to Bryman and Bell (2007, p.69).

Ghauri and Gronhaug (2005) argue that the semi-structured interviews differ form both unstructured and structured in the sense that the topic and issues to be covered, sample sizes, people to be interviewed and questions to be asked have been determined beforehand. Ghauri and Gronhaug (2005) suggest that open-ended questions are a suitable model for exploratory and inductive types of study. Moreover, Bryman and
Bell (2007) argue that a list of questions on fairly specific topics is used by researcher in a semi-structured interview often referred to as an interview guide. Bryman and Bell (2007) clarify that in this interview guide may not follow on exactly in the way outlined on the schedule, and questions that are not included in the guide may asked as the interviewer picks up on things said by interviewees. But the authors notify the interviewers that basically all questions will be asked and a similar wording will be used from interviewee to interviewee. On the other hand, Bryman and Bell (2007) propose that if a researcher is doing multiple-case study, it can be found that there is need to some structure in order to ensure cross-case comparability. Structured interview that sometimes called “standardized interview” usually contains very specific questions and very often offer interviewee a fixed range of answers as explained by Bryman and Bell (2007). The goal of this style is to ensure that interviewees’ replies can be aggregated, and this can be achieved reliably only if those replies are in response to identical cues (Bryman & Bell 2007, p.210).

**My data collection**

The main data collection instrument of this study is interview. The interviews are semi-structured to access the partner’s viewpoints on cost reduction potentials. The interview questions are designed to extract the ideas of interviewees about how collaborative procurement will reduce their purchasing costs according to total cost of ownership model. The interviews set with studied companies earlier in contact with interviewees and the study outline was send to them before the interview date. Each interview lasted around thirty to sixty minutes followed on a predetermined structure (appendix 1).

However, due to the strategic perspective of this project the interviews have limited to people and informants who are involved in purchasing and logistics functions, so in fact the level of analysis in this study is individual.

In addition to interviews the organisational documents such as ISO9001 documentations, supply process map, and companies’ internet websites were used and analysed to increase the validity of results, shown in Figure 2.2.
2.4 Data recording

“Before entering the field, qualitative researchers plan their approach to data recording” (Creswell 2009, p.181). Depending on what data the researcher will record and the procedures for recording data, Creswell (2009) suggests using “observational protocol” for recording information while observing, and “interview protocol” for asking questions and recording answers during a qualitative interview, so this protocol includes the following components:

- A heading (date, place, interviewer, interviewee)
- Instructions for the interview to follow so that standard procedures are used from one interviewee to another
- The questions (typically ice-breaker question at the beginning) followed by 4-5 questions that are the sub-questions in a qualitative research plan, followed by some concluding statement or a question, such as, “Who should I visit with to learn more about my questions?”
- Probes for the 4-5 questions, to follow up and ask individuals to explain their ideas in more detail or to elaborate on what they have said
- Space between the questions to record responses
• A final thank-statement to acknowledge the time the interviewee spent during the interview

Information from interviews can be recorded by making handwritten notes, by audio-taping or by video-taping according to Creswell (2009). However, he recommends that researchers take notes, in the event that recording equipment fails.

Regarding the importance of field notes in case research, Eisenhardt (1989) discusses that a striking feature of research to build theory is the frequent overlap of data analysis with data collection and field notes are an important means of accomplishing this overlap. Field notes are an ongoing stream-of-consciousness commentary about what is happening in the research, involving both observation and analysis-preferably separated from one another (Van Maanen 1988 cited in Eisenhardt 1989, p.539). According to Eisenhardt (1989) one key to useful and successful field notes is to write down whatever impressions occur and not screen what may seem important. Then a second key is to push thinking in these notes by asking questions such as “What am I learning?” and “How does this case differ from the last?”

My data recording
All semi-structured interviews have been tape-recorded that enables me to transcribed and then analyse the responses to determine the different viewpoints of each manufacturer regarding this new inter-organizational collaboration. The applied interview protocol consists of:

• Heading (date, place, company name, interviewee and interviewer)
• Interview guide contains specific open-ended questions those are same for all cases
• Elapsed time is approximately 30 to 60 minutes per each case
• All interviews were tape-recorded in order to detailed analysis

Furthermore, field notes during the interviews have been taking in order to highlight the key issues and emphatic ideas or even the points which the interviewee has missed to elaborate.

Ultimately, I compared each interview transcript with its field notes to find any discrepancy and ambiguity, then analyse the data.
2.5 Data analysis and interpretation

“One of the main difficulties with qualitative research is that it very rapidly generates a large, cumbersome database of its reliance on prose in the form of media as field notes, interview transcripts, or documents” (Bryman & Bell 2007, p.579). To guard against being captivated by the richness of the data collected, Bryman and Bell (2007) argue that it is crucial to guard against failing to carry out a true analysis.

Creswell (2009) states data analysis is an ongoing process during research and comprises analyzing participant information. Therefore, he urges researchers to look at the qualitative analysis as steps shown in Figure 2.3. This figure suggests a linear, hierarchical approach building from the bottom to top, but according to the author this is more interactive in practice. In other words, the various stages are interrelated and not always visited in the order presented.

Creswell (2009) concludes that this figure illustrates more general steps include organizing and preparing data, an initial reading through the information, coding the data, developing from the codes a description and thematic analysis, using computer programs, representing the findings in tables, graphs, and figures, and interpreting the

Figure 2.3: Data analysis in qualitative research
(Source: Creswell 2009, p.185)
findings. These interpretations involve stating lessons learned, comparing the findings with past literature and theory, raising questions, and/or advancing an agenda for reform.

Eisenhardt (1989) emphasizes that analysing data is the heart of building theory from case studies, though it is the most difficult and the least codified part of the process according to her. Eisenhardt (1989) suggests two steps in analysis; within-case analysis, and cross-case patterns coupled with the first one. The vitality of within-case analysis is driven by one of the realities of case study research: a staggering volume of data. Eisenhardt (1989) explains that the overall idea of within-case analysis is to become intimately familiar with each case as a stand-alone entity, so it typically involves detailed case study write-ups for each site. The author continues that these write-ups are often simply pure descriptions, they are central to generation of insight because they help the researchers to cope early in the analysis process with the often enormous volume of data. On the other side, Eisenhardt (1989) points out that there is no standard format for such analysis, and in fact there are probably as many approaches as researchers. Nevertheless, the within-case analysis lets the unique patterns of each case to emerge before investigators push to generalize patterns across cases according to Eisenhardt (1989). Also, she adds that this process provides investigators a profound and rich familiarity with each case that accelerates cross-case comparison.

Eisenhardt (1989) argues people are notoriously poor processors of information, for instance they are overly influenced by the vividness or by more elite respondents, in which the danger is that investigators reach premature and even false conclusions as a result of these information-processing biases. Thus, Eisenhardt (1989) proposes that looking at the data in many divergent ways is counteracting these tendencies in a good cross-case comparison. Referring to this idea she suggests three tactics:

- One tactic is to select categories or dimensions, and then to look for within-group similarities coupled with intergroup differences. Dimensions can be suggested by the research problem of by existing literature, or the researcher, or researcher can simply choose some dimensions.

- A second tactic is to select pairs of cases and then to list the similarities and differences between each pair. This tactic forces researchers to look for the subtle similarities and differences between cases.
• A third strategy is to divide the data by data source. This tactic exploits the unique insights possible from different types of data collection. When a pattern from one data source is corroborated by the evidence from another, the finding is stronger and better grounded. When evidence conflicts, the researcher can sometimes reconcile the evidence through deeper probing of the meaning of the differences.

“Overall, the idea behind these cross-case searching tactics is to force investigators to go beyond initial impressions, especially through the use of structured and diverse lenses on the data. These tactics improve the likelihood of accurate and reliable theory, that is, a theory with a close fit with the data. Also cross-case searching tactics enhance the probability of that the investigators will capture the novel findings which may exist in the data” (Eisenhardt 1989, p.541).

**My data analysis and interpretation**

For analysing the gathered data, I took six steps comply with procedures and tactics proposed by references mentioned beforehand.

1. The recorded interviews were transcribed.
2. Each transcription has been coded to find potential purchasing cost savings by the proposed mode of horizontal collaboration based on the theoretical aspects of collaborative procurement in the past literature.
3. I conducted within-case analysis for each case to find the main saving points and also logics and reasons behind the chosen collaborative form by each interviewee.
4. With regard to Figure 2.2, coding revealed the main themes for potential cost savings in each case. Hence, I found the relationship of the main themes and interpreted the meaning of themes.
5. Referring to the second step of Eisenhardt (1989) for analyzing data, the first tactic was used; so within-group similarities and intergroup differences were indicated in order to see the divergent and convergent understandings about different parts of total cost of ownership and viewpoints on collaborative purchasing.
6. Finally, by checking the most frequent cost drivers in purchasing process, the potential cost savings in the process were identified and the most acceptable form of collaboration at the beginning of this project has been indicated.

2.6 Trustworthiness

Golafshain (2003) argues that research validity and reliability in qualitative research is different from quantitative research. Thus, according to her in quantitative research validity and credibility are referring to the research credibility while the credibility of qualitative research depends on the ability and effort of the researcher. In contrast to quantitative studies that treat reliability and validity separately, Golafshain (2003) declares that qualitative research views these terms together, in which terminology that encompasses both, such as credibility, transferability, and trustworthiness is use according to the author.

Yin (2009) innovatively proposes several tactics for dealing with four common tests when doing case studies. Figure 2.4, lists four widely used tests and the recommended case study tactics, as well as, a cross-reference to phase of research when the tactics is to be used. Each tactic is described in the related part.

<table>
<thead>
<tr>
<th>TESTS</th>
<th>Case Study Tactic</th>
<th>Phase of research in which tactic occurs</th>
</tr>
</thead>
</table>
| Construct validity | □ use multiple sources of evidence  
□ establish chain of evidence  
□ have key informants review draft case study report | Data collection  
Data collection  
Composition |
| Internal validity | □ do pattern matching  
□ do explanation building  
□ address rival explanations  
□ use logic model | Data analysis  
Data analysis  
Data analysis  
Data analysis |
| External validity | □ use theory in single-case studies  
□ use replication logic in multiple-case studies | Research design  
Research design |
| Reliability | □ use case study protocol  
□ develop case study database | Data collection  
Data collection |

Figure 2.4: Case study tactics for four design tests
(Source: Yin 2009, p.41)

2.6.1 Construct validity

“Qualitative validity means that the researcher checks for the accuracy of the findings by employing certain procedures” (Creswell 2009, p.190). Validity, on the other hand,
is one of the strengths of qualitative research according to Creswell (2009), in which the researcher determines the accuracy of findings from the standpoint of researcher, the participant, or the readers of an account. As Creswell and Miller (2000) cited in Creswell (2009) repetitious terms in the qualitative literature such as trustworthiness, authenticity, and credibility speak to the validity.

Yin (2009, p.40) define construct validity as; identifying correct operational measures for the concepts being studied. As Figure 2.4 reveals three tactics are available to increase construct validity when doing case studies.

- Establish a chain of evidence, which is also relevant during data collection (Yin 2009, p.42).

![Figure 2.5: Maintaining chain of evidence](Source: Yin 2009, p.123)

As shown in Figure 2.5, the principle is to allow an external observer – in this situation, the reader of case study – to follow the derivation of any evidence...
from initial research questions to ultimate case study conclusions (Yin 2009, p.122).

- The review of draft case study report by key informants. The corrections made through this process will enhance the accuracy of the case study, hence increasing the structure validity of the case study. The likelihood of falsely reporting an event should be reduced (Yin 2009, p.183). However, the author reminds that this process will clearly extend the period of time needed to complete the case study report that must be anticipated by the investigator.

*My construct validity*

To ensure about the construct validity of the research, multiple sources of evidence have been used. The reciprocal movement maintained during the study between research questions, data collecting protocol and observations. Furthermore, to reduce the probability of falsely reporting the result of transcribing, coding, and reporting of interviews, they were sent back to key informants in the studied companies in order to review and confirm the accuracy.

**2.6.2 Internal validity**

Yin (2009, p.40) define internal validity (for explanatory or causal studies only and not for descriptive or exploratory studies) as; seeking to establish a causal relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships.

Another definition for internal validity asks whether or not there is a good match between researchers’ observations and the theoretical ideas they develop ((Bryman & Bell 2007, p.410).

“Note that this logic is inapplicable to descriptive or exploratory studies (whether the studies are case studies, surveys, or experiments), which are not concerned with this kind of causal situation” (Yin 2009, p.42-3).

*My internal validity*

This investigation is an exploratory study for discovering potential cost savings and workable form of collaboration, based on the characteristics of the case, so internal validity has not been considered.
2.6.3 External validity

This measure defines the domain to which a study’s findings can be generalized (Yin 2009). Case studies (as with experiments) rely on analytic generalization, thus it differs from survey research that relies on statistical generalization according to Yin (2009). In analytical generalization, the investigator is striving to generalize a particular set of results to some broader theory (Yin 2009). As shown in Figure 2.4, Yin (2009) suggests using replication logic in multiple-case studies. This logic is analogous to that used in multiple experiments referring to Yin (2009). Johnson (1997, p.290) explains the Yin’s replication logic as; the more times a research findings is shown to be true with different sets of people, the more confidence we can place in the findings generalises beyond the people in the original research study. In other words, according to replication logic, the more times a theory or a research finding is replicated with other people, the greater the support for the theory or research finding (Johnson 1997, p.291)

Johnson (1997) argues despite of the weaknesses of qualitative research on generalizing across population providing the following kinds of information helps readers of a research report know when they can generalize.

- The number and kinds of people in the study.
- How they were selected to be in the study.
- Contextual information.
- The nature of the researcher’s relationship with the participants.
- Information about any informants who provided information.
- The methods of data collection used.
- Data analysis techniques used.

My external validity

The result of this study can be generalised to the similar cases considering the specific type of industry and specific characteristics of this case like number of companies being studied, geographical scope and size. The study participants are managers and purchasers of the selected cases who make decision regarding procurement, purchasing and logistics issues. The selection of participants was completely restricted by the type of industry and the region being studied, and thus the contextual framework relates to steel-based manufacturing in a particular geographic region. As a researcher I tried to analyse the procurement process of cases and find the potential cost savings through
collaborative purchasing, which is consistent with presented theoretical framework in the next chapter. The data collection and analysis are same as what is described in previous sections. Therefore, the findings of this study could be generalise and transfer to similar cases only through the replication of research in a same context.

2.6.4 Reliability
Yin (2009, p.40) define reliability as; demonstrating that the operation of a study- such as data collection procedure- can be repeated, with the same results. Minimization of errors and biases in a study is the goal of reliability according to Yin (2009). Figure 2.4, indicates two specific tactics to overcome shortcomings like poorly documented of past case study research procedures, which are:

1. The use of a case study protocol to deal with the documentation problem in detail that should have following sections (Yin 2009, p. 45):
   - An overview of the case study project (case study objectives, issues, and relevant readings about the studied topic).
   - Filed procedures (procedural reminders, presentation of credentials, access to sites, sources of data, and language pertaining to the protection of human subjects).
   - Case study questions.
   - A guide for the case study report (outline, data format, use and presentation of other documentation, and bibliographical information).


Another definition says; “Reliability is the examination of stability or consistency of responses” (Creswell 2009, p.190). Although, Creswell (2009) also believes that qualitative validity, reliability, and generalizability do not carry the same connotations as they do in quantitative research. Gibbs (2007) cited in Creswell (2009, p.190) describes that qualitative reliability indicates that the researcher’s approach is consistent across different researchers and different projects. Gibbs (2007) cited in Creswell (2009, p.190) suggests several reliability procedures:
• Check transcripts to make sure that they do not contain obvious mistakes made during transcription.

• Make sure there is not a drift in the definition of codes, a shift in the meaning of the codes during the process of coding. This can be accomplished by constantly comparing data with the codes and by writing memos about the codes and their definitions.

• For team research, coordinate the communication among the coders by regular documented meetings and by sharing the analysis.

• Cross-check codes developed by different researchers by comparing results that are independently derived.

**My reliability**

To obtain a reliable result from the study, the collected data have been analysing through the processes of data gathering. The transcripts were checked to find the errors and missed points thoroughly referring to the theoretical framework. The specification of studied cases, sites and data sources are harmonized through all companies in order to test the credential issues. Moreover, the codification process is based on the confrontation of observation with theories that guarantees the meaningfulness of codes, albeit the codes were checking with key informants during analysis phase to meet the consistency of them with the research context.
2.7 Summary of method

Figure 2.6 summarises the methodological choices of this thesis.

<table>
<thead>
<tr>
<th>Research Method</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Strategy</td>
<td>Multiple-case study</td>
</tr>
<tr>
<td>Research Approach</td>
<td>Systematic combining</td>
</tr>
<tr>
<td>Data Collection Instrument</td>
<td>Interview &amp; documents</td>
</tr>
<tr>
<td>Scientific criteria</td>
<td>Construct and External Validity, Reliability</td>
</tr>
</tbody>
</table>

**Details of Scientific criteria**

- **Construct Validity:**
  1. Use multiple sources of evidence such as: interview, ISO9001 documents, internet
  2. Checking the transcription, codes and report of interviews by the informants.

- **External validity:**
  The findings of this investigation cannot be easily generalised at this stage, unless otherwise the similar results will be obtained in a same context that relies on replication logic.

- **Reliability:**
  1. Analysis through data gathering, controlling the transcripts thoroughly referring to the theoretical framework,
  2. Using the same questions and procedure of data gathering in all cases, codification based on selected theories,
  3. Checking the codes with informants to meet the consistency of them with research context.

**Figure 2.6: Summary of my methodological choices**
Chapter 3 Theory

In this chapter relevant theories in procurement and purchasing, also total cost of ownership are presented. Regarding the collaborative procurement the concepts of motives to join a purchasing group, different forms of collaboration and the influential factors on form of collaboration are coming accordingly.

Figure 3.1 illustrates the coincidence of selected theories with each research question. To find the plausible and suitable answer of all three research questions, the selected theories are in compliance with the context of research questions.

**Research questions**

- **RQ 1.** What are the main steps in the procurement process of Alvesta case-companies?
- **RQ 2.** What type of purchasing costs might be reduced or eliminated through collaborative purchasing among the steel-based products manufacturers in Alvesta?
- **RQ 3.** What form of collaborative purchasing can be workable for Alvesta case considering the extant characteristics and motives?

**Theoretical framework**

### 3.1 Procurement

- **3.1.1 Procurement and purchasing process**
- **3.1.2 Total cost of ownership**

### 3.2 Collaborative Procurement

- **3.2.1 Motives behind collaborative purchasing**
- **3.2.2 Different forms of collaborative purchasing**

Figure 3.1: The consistency of selected Theories with Research questions

### 3.1 Procurement

#### 3.1.1 Procurement and purchasing process

Procurement is introduced as one of the support activities in the value chain proposed by Porter (1985) cited in van Weele (2010). Porter, as cited by van Weele (2010) differentiates between “primary activities”; those which are directed at the physical transformation and handling the final products and “support activities”; those enable and support the primary activities. “Procurement includes all activities required in order to get the product from the supplier to its final destination. It encompasses the
purchasing function, stores, traffic and transportation, incoming inspection, and quality control and assurance, allowing companies to make supplier selection decisions based on total cost of ownership (TCO) rather than price. Procurement is used when relating to buying based on total cost of ownership in a project environment” (van Weele 2010, p.6).

van Weele (2010, p.3) define purchasing as “the management of the company’s external resources in such a way that the supply of all goods, services capabilities and knowledge which are necessary for running, maintaining and managing the company’s primary and support activities is secured under the most favourable conditions”. Purchasing management thus stresses on structuring and continuously improving purchasing processes within the organization and between the organization and its suppliers, which reveals that this type of management has an internal aspect and an external aspect (van Weele 2010, p.11).

van Weele (2010, pp.8-9) explicates that the purchasing function in this definition covers specifically activities aimed at:

- Determining the purchasing specifications (both required quality and quantity) of the goods and services that need to be bought
- Selecting the best possible supplier and developing procedures and routines to be able to this
- Preparing and conducting negotiations with the supplier in order to establish an agreement and to write up the legal contract
- Placing the order with selected supplier or to develop efficient purchase order and handling routines
- Monitoring and control of the order to secure supply (expediting)
- Follow-up and evaluation (settling claims, keeping product, and supplier files up-to-date, supplier rating and supplier ranking)

van Weele (2010) notifies that materials requirements planning, materials scheduling, inventory management, incoming inspection, and quality control are not included in purchasing function. However, in this author’s opinion keeping a close relationship and communication between purchasing and all these functions are vital.
In another vein, Nahmias (2005) cites that forecasting plays a central role in the operations function of a firm and forecasts are the basement of all business planning. Sales of existing and new products, requirements and availabilities of raw materials, changing skills of workers, interest rates, capacity requirements, and international politics are only few of the factors likely to affect the future success of a firm (Nahmias 2005, p.53). The author classifies forecasting methods as either “subjective” or “objective”. Nahmias (2005) defines subjective forecasting as methods that measure either individual or group opinion and essentially a subjective forecasting method is based on human judgment. The better known subjective forecasting methods, which considered by Nahmis (2005, pp. 55-56) are:

- **Sales force composite.** In forecasting product demand, a good source of subjective information is the company sales force.
- **Customer surveys.** Customer surveys can signal future trends and shifting preference patterns.
- **Jury of executive opinion.** When there is no past history, as with new products, expert opinion may be the only source of information for preparing forecasts.
- **The Delphi method.** This method, like the jury of executive opinion method, is based on soliciting the opinions of experts. The difference lies in the manner in which individual opinions are combined.

Objective forecasting methods are based on past history, in other words, the forecast is derived from an analysis of data (Nahmias 2005). As a brief description, Nahmias (2005) describes that “time series” forecasting uses only the past history of the series to be forecasted, while “regression models” often incorporate the past history of other series.
Figure 3.2, purchasing process model, schematically illustrates the main activities within purchasing function that also shows these activities are closely interrelated.

Figure 3.2: Purchasing process model and some related concepts
(Source: van Weele 2010, p.9)

Regarding distinct purchase categories, Lambert et al (1998) presented six major purchase categories which are in most companies. While, these may be routine, ongoing purchases or non-routine purchases that may require special attention because they represent a new buy, as infrequent purchase, a major acquisition or if there are problems of major strategic or cost savings opportunities associated with the buy (Lambert et al 1998, p.352). These major categories are:

1. component part,
2. raw materials,
3. operating supplies,
4. support equipment,
5. process equipment, and
6. services

“The standard statement of the overall objectives of the purchasing function is that it should obtain the right materials (meeting quality requirements), in the right quantity, for delivery at the right time and right place from the right source (a supplier who is reliable and will meet its commitment in a timely fashion), with the right service (both before and after the sale), and at the right price in the short and long term (Leenders et al 2002, p.40).
Leenders et al (2002, pp. 40-43) propose a more specific statement of the overall goals of purchasing that includes the following nine goals:

1. Provide an uninterrupted flow of materials, supplies, and services required to operate the organisation.
2. Keep inventory investment and loss at a minimum.
3. Maintain and provide quality.
4. Find or develop competent suppliers.
5. Standardized, where possible, the items bought.
6. Purchase required items and services at lowest total cost.
7. Achieve harmonious, productive working relationships with other functional areas within the organisation.
8. Accomplish the purchasing objectives at the lowest possible level of administrative costs.
9. Improve the organisation’s competitive position.

Two goals of the statement are cost-related issues. First, according to Leenders et al (2002) although the price is the basis of compare competing proposals from suppliers, the purchasing is responsible to obtain the needed goods and services at lowest total cost of ownership that means other factors such as quality levels, warranty costs, inventory and spare parts requirements, downtime must be considered. Leenders et al (2002) state that consideration of other factors in the long term might have a greater cost impact on the organisation than the original purchase price. Second, purchasing administrative costs determine the efficiency of purchasing procedures according to Leenders et al (2002). Salaries, communications expenses, supplies, travel costs, computer costs, and accompanying overhead are suggested resources to operate the purchasing department by Leenders et al (2002), while the authors express if purchasing procedures are not efficient these costs will be excessive. The objectives of purchasing should be achieved as efficiently and economically as possible (Leenders et al 2002, p.73).

Van Weele (2005) emphasises on purchasing performance measurement and asks what should be measured? To answer this question the author points out that basically
purchasing performance is considered to be the result of two elements: purchasing effectiveness and purchasing efficiency according to van Weele (2005, p.254).

- “Purchasing effectiveness is defined as the extent to which, by choosing a certain course of action, a previously established goal or standard is being met. It is important to recognise that effectiveness essentially refers to the relationship between actual and planned performance of any human activity. Purchasing effectiveness relates to the degree to which previously established goals and objectives have been met. A strategy or activity is either effective or not: a goal is reached or not. However, the goal can be expressed in terms of aspiration levels; the strategy or action that realises a higher level may then be considered as more effective than another (van Weele 2005, p.254).”

- “Purchasing efficiency is defined as the relationship between planned and actual sacrifices made in order to be able to realise a goal previously agreed upon. Purchasing efficiency is related to the resources which are required to realise the previously established goals and objectives and their related activities. Essentially it refers to the relationship between planned and actual costs (van Weele 2005, p.254).”

3.1.2 Total cost of ownership

“Total cost of ownership (TCO) is a purchasing tool and philosophy which is aimed at understanding the true cost of buying a particular good or service from a particular supplier” (Ellram 1995, p.4). Ellram (1995) notifies that TCO may include such elements as order placement, research and qualification of suppliers, transportation, receiving, inspection, rejection, replacement, downtime caused by failure, disposal costs and so on. Furthermore, Enarsson (2006) explains that TCO is used for the control and reduction of purchasing-related costs, and for securing suppliers to the lowest costs for purchased items. The author asserts that TCO has two key components; direct material costs and indirect material costs related to the handling of that material like inspections, material handling, administration and material spill, while the buyer has to attempt to prevent and control indirect costs from arising, to at least to reduce them. Ellram and Siferd (1993) cited in Ellram and Maltz (1995, p.57) suggest total cost “wheel”, illustrated in Figure 3.3, which recommends major categories to analyse in understanding the total cost of ownership of purchased items. The six categories
identified relate to management, delivery, service, communications, price and quality. For better understanding of which costs come into play at each step along the way Ellram and Siferd propose the use of a process flow diagram that covers all activities from order inception to closure, and even the cost of returns, reworks, and rejects (Ellram & Maltz 1995, p.57). Ellram and Maltz (1995, p.57) assert that those performing the analysis should review each of the six cost categories suggested by Ellram and Siferd, for each process step, in order to ensure that no critical steps have been overlooked, nor have the costs associated with those steps been overlooked, while all these are to make sure that the “true” total cost of ownership is considered.

Figure 3.3: Purchasing activities contributing to the total cost of ownership
(Source: Ellram & Maltz 1995, p.58)

For “analysing the costs of third party materials management”, Ellram and Maltz (1995) in their case study observed that case organisation would be able to eliminate many...
internal steps by using third parties. According to these researchers; the key in comparing the current and proposed alternatives was to examine:

1. What current cost will be eliminated?
2. What additional costs will be added?
3. What current costs will be added?

Ellram and Maltz (1995) found that TCO analysis has been used by their under studied case in number of ways:

- To consider make-buy decisions related to services,
- Shifting internal work/process to suppliers,
- Setting up a process to have suppliers manage their own ordering and inventory,
- New product development

“Firms investigating the outsourcing alternatives should begin by constructing process flow diagrams for both the current system and the prospective alternative. These diagrams allow an orderly, comprehensive, approach to cost evaluation, because any changes are highlighted, where these process changes may result in cost reductions or increases, further analysis is probably warranted” (Ellram & Maltz 1995, p.64).
In the field of total cost modelling and reducing TCO, Leenders et al (2002) point out to Ellram (1993) proposition, in which one way of analysing cost elements refers to three cost components: (1) pre-transaction, (2) transaction, (3) post-transaction shown in Figure 3.4.

**Figure 3.4: Major categories for the components of total cost of ownership**  
*(Source: Leenders et al 2002, p.377)*

Leenders et al (2002) explain that acquisition price is broken down into the individual cost elements from which the price is derived. The authors complement and remind that each cost element can be analysed by the buyer for areas of reduction or avoidance. However, cost elements are both tangible and intangible, meaning that many are difficult to estimate according to Leenders et al (2002, p.376).

Cousins et al (2008, p.169) summarized that developing a TCO model enables managers to make clearer purchasing decisions, such as outsourcing components, third party logistics (3PL), and evaluating different suppliers or supply contracts.

In another vein and specifically in purchasing cost management, Lambert et al (1998) explain cost savings opportunities in purchasing, in which purchasing can use a number
of methods to reduce administrative costs, purchase prices and inventory carrying costs, but the most prevalent are purchase cost reduction programs, price change management programs, volume leverage (time or quantity) contracts, systems contracts and stockless purchasing, and establishing long-term relationship with suppliers. These authors argue further that purchasing savings have the same sort of profit leverage effect as logistics cost savings, and if for instance management calls for a set percentage of cost reduction in all areas of spending, due to purchasing spends such a large percentage of a firm’s revenue, so the potential impact of reduction in purchase expenditures is much greater than reduction in other areas like labor or overhead expenses (ibid, pp.365-6). However, an effective cost-reduction program requires top management definition of goals, visibility of savings to top management, measurement of savings, reporting on the process and its results, and incorporation of cost-reduction goals in the individual performance appraisal process (Lambert et al 1998).

3.2 Collaborative procurement

3.2.1 Motives behind collaborative purchasing

The results of different researches on reasons for companies to join a group purchasing and consortia indicate two main reasons (Nollet and Beaulieu 2005; Tella and Virolainen 2005):

1. Expected cost savings through cost reductions.

2. Obtain additional power for negotiation with suppliers thanks to the collection of information on the supply markets.

Tella and Virolainen (2005) in their empirical study found the motives of the member companies for joining the purchasing consortium.

- Information that would be obtained of suppliers and price levels was the central motive of members. In detailed, the supply market information attained through the consortium was valuable even in case the cooperation would not continue.

- Cost saving possibilities was often mentioned as an important reason for participation by every member company. The researchers point out that although at the early stage of the case consortium it seemed that the cost
savings would not be very high, most of the members expected cost savings to occur in the long run.

- The quality of purchased products and supplier management were assumed to be better as a consequence of the combined volume of the members in the consortium.

Nollet and Beaulieu (2005) recall that looking for more advantageous contractual conditions as the most frequent reason for joining to purchasing group that is proposed by Vigoroso (1998).

In their study, Nollet and Beaulieu (2005) introduce strategic questioning to help managers make the decision whether to join a purchasing group. They developed five key questions based mostly on their analysis of the Quebec and the American purchasing groups. Although there is no definitive answer to any of these questions, Nollet and Beaulieu (2005) believe that the analysis of the potential impacts of their answers to each question should help managers in case of decision making to join a purchasing group. These five key questions are:

1. What are the benefits of a purchasing group?
2. How do purchasing groups impact the supply market in the long run?
3. What should the size of a purchasing group be?
4. What are the characteristics of the members?
5. Who really benefits from those savings?

The five key questions related to the decision to be part of a purchasing group fit well within an analytical and systematic framework of procurement activities (Nollet & Beaulieu 2005, p.15). Thereafter, the above researchers transformed their questions into key variables provides a useful approach to analyse the potential of outsourcing elements of purchasing to a purchasing group. Meanwhile, Nollet and Beaulieu (2005) strongly contend that there is an interesting relationship between the decision to join a purchasing group and the decision to outsource. Therefore, an outsourcing-insourcing analysis should be made before a decision is taken about joining a purchasing group (Nollet & Beaulieu 2005, p.15).
Figure 3.5, summarizes the discussion on five key questions, and in which also advantages and drawbacks of each variable is provided.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Advantages</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benefits</strong></td>
<td>- Price reduction</td>
<td>- Focus on prices rather than other components when selecting suppliers</td>
</tr>
<tr>
<td></td>
<td>- Purchasing administrative costs reduction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Easy access to knowledgeable personnel in procurement</td>
<td></td>
</tr>
<tr>
<td><strong>Supply market</strong></td>
<td>- Recurrent savings or lower price increases</td>
<td>- Potential development of oligopolies by suppliers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reduction in services provided by suppliers</td>
</tr>
<tr>
<td><strong>Group size</strong></td>
<td>- Increased negotiating power</td>
<td>- Costs to maintain the cohesion among group members</td>
</tr>
<tr>
<td><strong>Membership</strong></td>
<td>- Communication among members about common preoccupations</td>
<td>- Strategic information might be available to competitors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Determination of common objectives among members</td>
</tr>
<tr>
<td><strong>Beneficiaries</strong></td>
<td>- Known beneficiaries clarify which objectives to aim for</td>
<td>- Unclear beneficiaries might increase tension between a purchasing group and its members</td>
</tr>
</tbody>
</table>

**Figure 3.5: Key variables to determine whether to join a purchasing group**
(Source: Nollet & Beaulieu 2005, p.15)

McLaren et al (2002) in a conceptual model of alternatives for investigating the collaborative supply chain management (SCM) systems reveal that the overall cost of the system is the sum of the total cost of ownership and the opportunity cost of inflexibility. These researchers presume that the net benefit of the collaborative SCM system is thus the benefit resulting from enhanced market responsiveness and reduction of supply chain costs less the cost of ownership and opportunity costs.

### 3.2.2 Different forms of collaborative purchasing

Nollet and Beaulieu (2003, pp.5-6) determined six critical factors that appeared to explain the dynamic of purchasing group development the most. Structure, is the one that discusses about the form of purchasing group and according to the authors the appropriate structure should be put in place in order to be able to implement a procurement strategy properly. Nollet and Beaulieu (2003) observed two major types of structures:

- **Superstructure**: a separate and autonomous entity manages the group’s contract (costly)
- **Confederation**: the negotiated contracts shared among members (difficult relationship management)
The researchers also add two other dimensions in a structure:

1. **Geographical scope**: regional or national. A regional scope makes it easier to maintain close relationships between the purchasing group and members.

2. **The nature of the relations between the purchasing group and its members.**

Schotanus and Telgen (2007) focus on developing a typology of different forms of cooperative purchasing. As it is discussed earlier in problem discussion, Schotanus and Telgen (2007) identified main dimensions of typology; (1) extent of the costs and gains for the members, (2) influence by all members on the activities of the group, (3) number of different activities for the group, (4) organisational structure of the group, (5) member characteristics, (6) size of the group, and (7) life span of the group. “A well-organised purchasing group should be cost-effective for all its members. In an ideal situation, this cost-effectiveness should attract members without enforcing them to cooperate” (Schotanus & Telgen 2007, p.54). These researchers, based on the main dimensions explained above, describe five organisational forms of cooperative purchasing, which are:

1. **Piggy-backing groups**: are informal purchasing groups and focus on keeping the cooperation as simple as possible. In some cases, it involves the sharing of purchasing information and knowledge with other organisations in a large network. But most of the times, it involves a relatively large organisation which establishes a contract on its own specifications. This contract may be used by some smaller organisations under (almost) the same contract conditions. However, for the hosting organisation, there is no direct incentive to allow others to piggy back on its contracts. Therefore, to make a piggy-backing group work on the long term, the host should preferably receive some compensation. An analogy for piggy backing is “hitchhiking” (Schotanus & Telgen 2007, p.57).

2. **Third-party groups**: is a for-profit organisation or a non-profit organisation and may be owned by the members of the group. The purchasing activities are based on the (expected) aggregate purchasing volume and are carried out with the specific expertise of the external party. The members only have to have a formal relationship with the hosting organisation or third party, so they do not have to form a high involvement relationship, nor do they have to discuss the
purchasing specifications. An analogy for a third-party group is a bus service. A disadvantage of third-party groups is that the members usually have hardly any control over the purchasing process (Schotanus & Telgen 2007, p.58).

3. **Lead buying groups**: it consists of outsourcing purchasing activities to one of other members of the group, while each item is purchased by the most suitable organisation or external party according to their expertise, resources or purchasing volume. This concept enables the members of a group to specialise in purchasing typical items. An analogy of lead buying is carpooling. That is, sometimes one organisation drives the group members to certain destination, and another time, another organisation provides the car and the driver. The advantages and disadvantages of lead buying are similar to the advantages and disadvantages of outsourcing purchasing activities in general (Schotanus & Telgen 2007, p.58).

4. **Project groups**: are intensive forms of cooperative purchasing. Typically, it is a one-time purchasing group for a shared purchasing project. The members of the group bundle their forces for one time and together, focus on a shared problem and try to learn from each other, share supply risks and knowledge, the organisational structure is quit simple due to the purchasing group is a one-time event and also the number of different cooperative activities for the group is limited. The group usually breaks up after the projects ends, but if the project is successful and members share more purchasing needs, then the project group could be continued as a lead buying group or a program group. An analogy of a project group is a convoy on the road, in which a convoy is defined as a unique combination of independent trucks. Project groups do involve a lot of consultation between the members to achieve a rather complete consensus. It can be difficult to work together with members who do not know each other very well. Particularly in a project group, one should prevent potential free-riding problems or at least try to limit its effects (Schotanus & Telgen 2007, p.59).

5. **Program groups**: as the intensive cooperative purchasing groups, often involve representative of the management teams of the cooperating organisations meeting regularly in a steering committee to discuss cooperative projects and members have high involvement relationships with each other. Program groups
and lead buying groups often have a similar organizational structure. Intensive forms of cooperation are structured formally or informally. Formal groups can be separate legal entities owned by their members and/or highly structured groups without legal entities. Criteria for formality are regular organised meetings and the use of several procedures and rules, such as joining and leaving rules, duties and rights, etc. on the other hand, usually the more trust, commitment, need, experience, or knowledge on how to work together is available, the less formality is necessary. An analogy of a program group is an F1 team. That is, both program group and F1 are intensive forms of cooperation and every one involved plays an important role. A typical difficulty for program groups in the private sector is the sharing of confidential information. Typical difficulties for all program groups are communication problem and the allocation of savings. The allocation of savings can be difficult when the members differ in several aspects, such as organisational size or purchasing skills. It is discussed that allocating the costs and workloads equally is usually fairer and more stable on the long run (Schotanus & Telgen 2007, pp. 59-60).

Bakker et al (2006) present an initial conceptual framework in organising for collaborative procurement. They recognized two distinct structural forms of collaboration in the procurement literature as shown in Figure 3.6:

- Member-owned, informal and virtual organisations
- Formal separate third party organisation

![Figure 3.6: Two main forms of collaborative procurement initiative as new organisational forms](Source: Bakker et al 2006, p.18)
The above researchers cite that these extreme types can also be recognised in evolutionary models, but they found that even when more than two forms are mentioned, such as by Aylesworth (2003) and Schotanus and Telgen (2005) cited in Bakker et al (2006), these two extremes are hidden in or form the core of the others. In other words, Bakker et al (2006) believe only slight variations are added to the extreme forms.

For providing guidance on which collaborative procurement forms are appropriate in which situations, Bakker et al (2006) identified factors of collaborative procurement that influence form that are listed as:

1. **Size in number of members and age of the collaborative initiative.** Apparently a higher number of members, a separate organisation with central direction is more appropriate. Considering the evolutionary collaborative procurement models, collaborative forms tend to start small as voluntary informal, virtual organizations, and when growing larger evolve into separate, more structured organizations (ibid, p.20).

2. **Size disparity between members.** In the case of low size disparity (equal organizations) a separate organization can do all the contracting, or lead buying is possible (ibid, pp. 20-21).

3. **Geographical spread of members.** The smaller the geographical scope of the collaboration, the easier it is to maintain close relationships as it is easier to have face-to-face contact when necessary, whereas the larger the geographical scope, the more reliance there will be on communication technologies (ibid, p.21).

4. **Homogeneity of member’s requirements and procurement maturity.** The more homogeneous the buying needs of potential collaborators are, the more centralization is possible. However, if the buying needs are complex and dynamic, requiring users to be involved in a flexible way, a decentralized, self-managed virtual form of collaboration would be appropriate (ibid, p.21).

5. **Intensity of collaboration and number of shared activities.** According to the above authors it is not clear in which situations intense cooperation and sharing of a large number of activities are appropriate (ibid, p.22).
3.3 Summary of theory

Figure 3.7 reveals the main theme and content of selected theories in this study. Each theory has a consistency with considered research questions and follow the same order, in which procurement and purchasing theory covers the first research question, total cost of ownership answers the second one, and collaborative procurement suggested theories are comply with the third research question.

Figure 3.7: Summary of theoretical framework
Chapter 4 Empirical data

In this chapter the collected data from studied cases are presented. These data has been gathered through data gathering process in each single case. The designed questions are derived from selected theories and are incorporated to research questions.

Figure 4.1, shows schematically the consistency of proposed interview questions with research questions and selected theories.

Research questions

RQ 1. What are the main steps in the procurement process of Alvesta case-companies?

RQ 2. What type of purchasing costs might be reduced or eliminated through collaborative purchasing among the steel-based products manufacturers in Alvesta?

RQ 3. What form of collaborative purchasing can be workable for Alvesta case considering the extant characteristics and motives?

Theoretical framework

3.1 Procurement

3.1.1 Procurement and purchasing process

3.1.2 Total cost of ownership

3.2 Collaborative Procurement

3.2.1 Motives behind collaborative purchasing

3.2.2 Different forms of collaborative purchasing

Interview questions

PROCUREMENT & PURCHASING PROCESS:

Appendix 1, questions 1 to 3

TOTAL COST OF OWNERSHIP:

Appendix 1, questions 4 to 7

COLLABORATIVE PURCHASING:

Appendix 1, questions 8 to 11

Figure 4.1: Operationalisation of theory in interview guide

4.1 Hyllteknik AB

4.1.1 Company presentation

Hyllteknik were founded 1957 by Harald and Leif Hedlund with the ambition to develop and produce Sweden's strongest and most flexible shelving system. Today Leif's son, Peter, have kept this tradition alive by developing Hyllteknik into a modern, highly technical and rational company. From the very beginning 1957 they have always made the majority of the production tooling to ensure that their production
is as efficient as possible. The company considers a flexible approach as the core of its philosophy including the product range, service and production facilities. Hyllteknik offers a wide range of products in shelving industry, which are made up of steel and wood (www.hyllteknik.se). The annual steel purchasing of the company is around 1000 tones which is supplied by the number of suppliers. This company buys its required steel from the suppliers inside Sweden and also suppliers in other European countries.

4.1.2 Procurement and purchasing process

4.1.2.1 Procurement steps in Hyllteknik

**Purchasing** - The first step in the procurement of Hyllteknik is stock level check, in which they have determined a stock level that they are not allowed to go under for each type of tube, flat, and other kinds of steel. The information flow starts from production section as when the stock level reaches this break point the steel buyer is notified and gets the information about the requirements. The buyer also check how much they have sold last year or half year on the computer afterwards, then they decide frequently if they are going to buy same as last time or maybe more/less than that amount. Now the ordering amount is determined, thus they can keep up at least half a year for each sort of steel. This company buy a part of requirements from Germany.

**Traffic and transportation** - Hyllteknik always asks for prices free at its warehouse door that freight is included and there are no traffic and transportation activities in their procurement.

**Incoming inspection and quality control** - According to incoming inspection this company has a person in charge to do a visual check and adopt the delivered materials with purchasing documents sent by the seller. It is emphasised that this inspection is just a visual check and not a technical quality control such as test in laboratory, which effects during the discharge operation from lorry, however in case of any rust, bend, or crash on delivered steels the responsible person makes note on transportation papers and the truck-man must sign to confirm the defected items at the delivery time, otherwise it's very difficult to claim to the seller and ask for compensation afterwards.

**Stores** - Warehousing and storage process is handling by the company itself and raw materials warehouse is located in its plant site. For Hyllteknik, keeping the steel has its own special storage condition that necessitate to prepare a suitable temperature around 20°C to 22°C as a safe condition due to that is naked steel and if they keep it outside it
will be completely red, therefore it is taken directly from the lorry into the house that is very important in the storage process.

4.1.2.2 Purchasing process model
The buyer, after determining the target amount, asks two or three suppliers for the best prices and also best delivery time. Of course the buyer tries to arrange the buying amount to fill a full truck to deliver at warehouse door, in which he gets the best freight price as the freight price is very expensive for instance from Germany to Sweden. The dimension and quality of needed steel types are fixed and always the same in purchasing, so in this case the production time and the price are the main concerns in purchasing process. This is the normal procedure of purchasing in Hyllteknik and steel supply management, but this takes almost three days of buyer’s time that he is checking suppliers through the phone to find the best price that he believes he devotes too much time in purchasing.

As the company is not ISO certified yet, although it is in process, there is no formal document for purchasing to follow and all the steps are taken by the individual business knowledge and experience.

4.1.2.3 Purchasing objectives
Finally is to know; what is the main objective in purchasing function of the company. The steel buyer believes he puts too much time on this because price chasing takes time, however in his opinion if he would find good suppliers with low prices and good quality, then it can be paid back but in current situation it is at the breakeven point according to Peter Hedlund. He thinks about a faster and more effective purchasing process than it is today. Therefore he summarises the purchasing objectives in Hyllteknik as:

- On-time delivery
- Price

4.1.3 Total cost of ownership
Process time in purchasing is costly for the company. The steel buyer needs to devote time for call, mail, and generally follow ups. Meanwhile, one cost section which is not calculated so much now and maybe should be calculated is; the way of handling the arrived steel at the warehouse. As described in previous section the person in charge must take delivered steel of the lorry, take them into the warehouse, and make notice on
each bundle that is a time taking process maybe around one to one and half hour per lorry according to the buyer’s declaration, but they do not calculate this time. For the company the stock is also in-buying process that they need to have the stock, the place for steel, and heat the factory up which these are costs.

**Management**- Hyllteknik has no cost related to management today such as training of purchasing personnel. However, due to its big turnover they believe there is need to speed up their purchasing process in the near future. Now the purchasing organisation consists of three people; one buyer is buying steel, one buyer is buying wood and one buyer who is in the production site is buying parts like wheels, rubber and similar items.

**Delivery**- As it is mentioned beforehand the activities related to delivery of purchased steel is very important and costly for the company.

**Service**- the Company has not any activity related to service by the supplier therefore there is no cost in this field.

**Communications**- Activities related to communications are highly significant and costly in terms of time taking activities for the company as it is stressed in previous parts.

**Price**- Regarding the importance of price, it depends on which customer and contract they are working on. If, for instance, they work on a special project that is huge one and the delivery time is three to four months, in that case the price is the most important problem in purchasing for Hyllteknik. The buyer has enough time to fix and buy steel, thus they try to find the best price since their customer focuses so much on price and looks for really cheap final price. In contrast, if for example they work in their sector, shelving system, not only the price is important but also getting the steel at a right time is very important. This high importance is due to Hyllteknik does not want to have double stock in its warehouse that means when they take the last bundle out of the twenty bundles as an example, then they want to receive the new purchased steel, otherwise they block so much money if the steel arrives too early at their site.

**Quality**- Hyllteknik feels lucky about activities related to quality and its associated costs because the main supplier of the company has normally taken the cost of low quality delivered steel. Nevertheless, this is always a long process as the seller investigates the claim through a system, in which the supplier asks for pictures, documentations, measurements of defects and also sample to cut and send seller. In fact, because of this
long-lasting process and hard work to compensate, so Hyllteknik ignored to claim and get the money back last time.

**Others**- Peter Hedlund once bought very cheap tube and he declares that was a big mistake, so he believes the cheapest is not the best and he gets what he pays for. Those tubes were so dirty and poor quality that they could not use them in production process. By Hyllteknik’s experience, steel can be purchased from suppliers who have not already clear quality like its supplier, if they work several months before to accept that quality and take some limitation and tight specifications in doing business with those types of sellers.

4.1.3.1 Purchasing cost priorities
First is the cost of time devoting to purchasing steps such as discussion with suppliers that instead can assign to the more important stuff. Second, the space of stock keeping can be added to production facilities. Finally, quality is always important but it does not cost for Hyllteknik.

4.1.3.2 Purchasing cost reduction
- The first question is; which cost items can be reduced?

Hyllteknik believes that the total time of purchasing can be reduced. In summary this company thinks that price, communication time such as negotiation with supplier, and administration cost are three most tangible costs for getting reduction.

- The next question is; how these reduction and savings can be obtained?

Hyllteknik strongly believes that through a group purchasing (service centre or steel centre) the total time of purchasing and logistics steps like ordering, argumentation with supplier, communication, logistics and receiving will be reduced and make big savings for companies. In detail, Peter explains that by aggregating the wish lists of companies for flat steel, tube, stainless steel, and whatever the service centre can go with all these needs together to a supplier and then they have best prices, best delivery time, and best service thanks to a collaborative purchasing.
4.1.4 Collaborative procurement approach

4.1.4.1 Company size
In terms of steel volume that Hyllteknik is purchasing today, they introduce themselves as a medium size company.

4.1.4.2 Similarity of required steel
There is a quite much similarity between Hyllteknik’s steel requirements and other companies in the region. For instance there are a number of companies which use different size of flat steel but the same quality and the same thickness, so flat steel is one of the shared raw materials among many companies here in the region. The same situation is also for tubes which are used by Hyllteknik. That is, a large number of companies are purchasing a same kind of tube just with a little difference.

4.1.4.3 Motives and expectations in group purchasing
According to Peter the process time, discussion time, and of course the price will be reduced in case of collaborative purchasing.

4.1.4.4 Form and organisation of collaboration
A service centre for buying steel to serve the companies in the region is the favourite form of collaboration for Hyllteknik. It is expected to establish this service centre with a major financial support of the government as a loan and investment by interested companies in the region to join into this centre. Furthermore, as Peter point outs by using rail transportation this project will save the environment a lot, so maybe there is an opportunity to get financial support from European government. Hyllteknik proposes that three to four really expert and professional buyers who will work in this service centre and they will be paid by the members. Consequently, these people will have a salary but they are not putting any percent on what they are buying, so their in-buying price will go directly to the members and in fact the members will get the benefit of low prices. Hyllteknik suggests that this service centre will have open books and open service to all the companies who join to this group and pay the salary, hence whenever they would like they can go there and see how much the service centre bought an item and then how much do they sell, which means the open book trust. Peter summarised that he preferred a service centre which is under a full control of members who are paying the salaries but without the member’s ownership of service centre.
4.2 BK Produkter AB

4.2.1 Company presentation
BK Produkter was founded in Alvesta by Börje Klasson in 1985. The company has complete machinery for the manufacturing of sheet metal products; Laser cutting, punching, bending, welding, assembly, and its own powder coating. The company is also ISO 9001 certified (www.bkprodukter.se). The annual steel purchasing of the company is around 517 tones which is supplied by five suppliers. All the suppliers are inside Sweden and the company has no buying from other countries by itself.

4.2.2 Procurement and purchasing process

4.2.2.1 Procurement steps in BK Produkter

**Purchasing**- The first step in the procurement of BK Produkter is the evaluation of needs for a year and check the last year to see how much must be purchased. Thereafter, they take offer from supplier once in third month, so they have a price for third month and then they negotiate with supplier. This company has five suppliers which after negotiation with them, based on the offers in third month of the year, they choose the best supplier.

**Traffic and transportation**- The supplier handles all the transportation and logistics operations to deliver the purchased steel to BK Produkter. The price is free at BK Produkter’s site, in which the freight charge is in the price.

**Incoming inspection and quality control**- In BK Produkter and at the time of steel delivery, they sign the delivery document so they look at the material when it is delivered to them, but they do not open it before using it that is just a visual check. During the milling or cutting process for using the material, if they see a bad quality in machine they do reclamation and send it back to the supplier.

**Stores**- BK Produkter buys its required steel only from suppliers inside Sweden. The delivery time is five days when BK Produkter places order, so the stock level is replenished quickly after ordering. However, they keep the steel stock in the company’s warehouse at the production site. Furthermore, there is possibility to buy small quantity that the supplier delivers it in five days, so there is no need to keep the steel in warehouse by BK Produkter with a huge amount.
4.2.2.2 Purchasing process model
They take price and that price goes three months, also they have a list of suppliers which BK Produkter buys steel from one of those who offer the best price. BK Produkter is an ISO 9001 certified company; therefore the purchases manual shows the purchasing process. In addition, BK Produkter has a computer program, it is called “Monitor”, in which they can see if they should buy material or not. It is declared that this program is MPS; master production schedule.

4.2.2.3 Purchasing objectives
The first objective in purchasing is price, and the second is quality for BK Produkter. Although the time is also important for this company, but most of their suppliers have very short delivery time and that is five days.

4.2.3 Total cost of ownership

Management- BK Produkter has no management cost.

Delivery- There is no cost of delivery, transportation, and expedition for this company. According to them the only cost is the cost of buyer who orders and purchase steel.

Service- BK Produkter has no service cost especially in steel purchasing.

Communications- same as delivery, again the only communications cost is the personnel cost of buyer for the company.

Price- BK Produkter declares that the price includes cost of material, packaging and sometimes transportation. Transportation is included in price and has no cost when they buy very much, so the most important for this company is just the price of steel.

Quality- BK Produkter’s management believes that quality has no cost for them and it is in steel. The only cost of quality they have is the time they use to call and tell the supplier that delivered steel is bad. Then the supplier picks that steel up and delivers new material to BK Produkter free of charge. However, they believe they do not have any cost of quality in reality.

Others- Regarding quality, the only cost for BK Produkter is when they lift and send back the poor quality steel to supplier and transportation, but it is very small.
4.2.3.1 Purchasing cost priorities
The most important cost for BK Produkter is price. Quality and delivery time are also important costs, but they declared if they take the delivery and the quality, all their suppliers are very good, so they do not have any big problem with that.

4.2.3.2 Purchasing cost reduction
- The first question is; which cost items can be reduced?
In their opinion, the price is the only cost of purchasing which can be reduced.
- The next question is; how these reductions and savings can be obtained?
The only way is to buy more for reducing the price according to BK Produkter’s management. Again they believe along the purchasing process the price is the sole cost that can be reduced and there is no other reduction possibility in other steps.

4.2.4 Collaborative procurement approach
4.2.4.1 Company size
In terms of steel volume that BK Produkter is purchasing today, they introduce themselves as a small size company.

4.2.4.2 Similarity of required steel
There is a quite much similarity between BK Produkter’s steel requirements and some other companies in the region. The only differences are in thickness and dimension, but these differences are in a closed range, for instance the thickness of flat used steel is between 0.7 micron and 20 micron within a group of manufacturers in the region.

4.2.4.3 Motives and expectations in group purchasing
BK Produkter expects low price and fast delivery as if they have a storage they can pick up the material the same day from joining to a group purchasing in the region.

4.2.4.4 Form and organisation of collaboration
At this time BK Produkter management has no idea about the form and organisation of collaboration. Meanwhile, they think if there is a large factory then they should take so much material and there is a cost in that factory which needs to have a person to buy and sell, factory and trucks. Thus, there is a cost and it is not clear that how many companies should invest in this project. They suggest if there are thirty companies then maybe it will have lower price for materials, but there will be ten or fifteen or twenty. Totally BK Produkter is not sure about the benefit of collaboration as they believe in
case of a large group of members then it will work for members, but with ten members the cost of service centre will be too high.

4.3 Svets & Mekano AB

4.3.1 Company presentation

Svets & Mekanogruppen AB is the group of four companies which are:

1. Svets & Mekano AB in Vislanda. The speciality of this Company is within small and medium gauged sheet metal.

2. Malmstens Verkstad AB in Ljungby. The speciality of this Company is in larger and heavier welded and machine worked products.

3. Finmec AS situated outside Tallinn, Estonia. The main function of this company consists of complex welding and the fabrication of large and heavy duty steel constructions.

4. Vislanda Plåtslageri AB. Sub-contractors within the building construction of sheet metal working and detailed work stainless steel, aluminium and copper sheet metal. They are specialists in the suspended systems and ventilation systems and undertake willingly any variety of work within sheet metal, nibbling, edge pressing, welding, metal work or assembly work.

Svets & Mekano AB is one of the studied cases of this thesis. Presently, the company has 50 employees and generates an annual business turnover of 75 million SEK. The company can manufacture products in sheet metal from 2mm up to 30mm. Volumes are around 3-15 mm. Component parts can be from one basic section up to 10-1500 parts annually. This group of companies are ISO 9001 and 14001 certified. In the company's factory laser cutting, plasma cutting, edge pressing machine, cutting/roller bending machines, eccentric machinery, cutting machinery, forming/drilling/threading machinery, welding, assembling and surface treatment are the machineries in the production line.

Today, this company buys 2000 to 2500 tones all types of steel, in which 85% to 90% of this amount is flat steel (sheet) annually, these are routinely supplied by two or three major suppliers. Totally this company has five to ten suppliers just for steel, but five of these ten are selling requirements regularly and the others are being asked for some occasions during a year.
The products of this company can be found in, for instance, forklift trucks, various types of controlling equipment, hydraulic systems, large electrical motors and recycling systems (www.svetsmek.se and company catalogues).

4.3.2 Procurement and purchasing process

4.3.2.1 Procurement steps in Svets & Mekano

**Purchasing**- Purchasing initiates from two points in Svets & Mekano; it could be an order from a customer, or an inquiry from a customer who asks about the price and the products that in this case Svets & Mekano sends an offer for that customer. The company purchases the requirements from two or three suppliers who are known based on different considerations for different products. Peter Takacs, the buyer in Svets & Mekano asks the price, delivery time and other questions from the suppliers. However, for the new part that he does not have any supplier he must log into and search for the needed parts in e-markets or just search on internet and send them an inquiry. For routine purchasing, the buyer asks the supplier who is the perfect one for each part or material, but usually he asks two or three suppliers to get the price difference. The company buys some material from Estonia.

**Traffic and transportation**- Svets & Mekano purchases flat steel as the raw material that is 85% to 90% of its total steel purchasing, in which the supplier handle the transportation so the price is for both the materials and freight. In addition, this company buys different component parts from the suppliers that to transport these parts Svets & Mekano has contract with some logistics companies (expeditors) who receive the parts from suppliers and deliver them to Svets & Mekano. Therefore, this company has no traffic and transportation activities directly by itself.

**Incoming inspection and quality control**- Every incoming delivery should have some sort of inspection. They inspect some parts by visual check to control the appearance of the cargo and some parts must be checked with drawings and also measuring them, albeit, the incoming inspection for steel is just visual check. The buyer in this company believes that the incoming inspection and quality control are the same process.

**Stores**- The raw materials warehouse is in the factory and located beside the production. The buyer pointed out that they have weekly delivery for the raw materials and thus stock level is at one or two weeks need and usually they receive raw materials one or two times every week so they do not have more than their need.
4.3.2.2 Purchasing process model

Purchasing process originates from sending an offer in reply to an inquiry received by sell department, or an order from a customer for production.

If it is just an offer from Svets & Mekano to a customer, the buyer gives the price to the sell department, thereafter the sell department gives the price to the customer that may or may not be an order after while.

If this is an order, to supply the needed material, the buyer contacts the suppliers for routine buying and he orders to the best supplier considering the material or parts quality and specifications, price, and delivery, however, if they have two suppliers those look almost the same then the payment terms will be a criterion to choose the supplier.

On the other side, for the new parts after sourcing through e-markets and internet search tools the buyer finds the supplier, asks them and if they are agreed on all dimensions of purchasing they will sign a contract. Svets & Mekano does not make parts for selling; because they manufacture the parts based on the drawings from customers, thus they make products for their customers and not for themselves. The customers may also give them a delivery schedule in their contract for a specific period, in which made products are stored in the company’s stock and deliver based on the schedule. Generally, the purchasing in this company is based on the customer’s order; however the buyer in Svets & Mekano declares that in case of getting the delivery schedule from their customer then he would be able to estimate the need for the whole year, so it highly depends on that schedule for weekly or yearly deliveries, the number of units in each delivery, and also the unit of orders to produce, while each unit needs some component parts and materials to make.

Due to the ISO requirements, the buyer must follow up the supplier performance and conduct the supplier evaluation to determine the good and bad suppliers those are in different levels.

4.3.2.3 Purchasing objectives

Peter Takacs in Svets & Mekano believes the objective is the best price for the best quality. In other words, he thinks there must be a balance between quality and price. The other objective is the safest and best delivery time.
4.3.3 Total cost of ownership

Management - Svets & Mekano has no management cost.

Delivery - The delivery cost is pertaining to transportation cost of components, assemblies and everything except raw material by some logistics companies, which is a little part of delivery in the company. Meanwhile, sometimes transportation cost can be two or three times higher than the cost of purchased part when that is one or few items.

Service - Svets & Mekano has no service cost especially in steel purchasing.

Communications - There is no cost for communications in the company.

Price - Svets & Mekano declares that the price includes cost of material and transportation for raw materials, because the suppliers have their own trucks to deliver the materials but not for a little amount of material. As it is mentioned formerly, in purchasing of the parts and assemblies, the transportation cost is not included in the price, so the buyer arranges the transportation with a logistics company.

Quality - Quality has cost according to Peter. In addition to incoming inspection of all deliveries to the company, he says there must be a balance between the price and quality, so they pay different prices associated with needed quality.

Others - Keeping something for a long time in the stock has cost for Svets & Mekano. This is true for the parts, but not for the raw materials which suppliers have weekly delivery in this regard.

4.3.3.1 Purchasing cost priorities

Price and quality cost have the same priority for Svets & Mekano and they believe the best price for the best quality go hand in hand. Second priority in purchasing cost is delivery costs. So the transportation costs is at the next rank. Third, the relationship between the price and quantity is also important, in which some parts have multiple-prices for different quantities, but purchasing much more than need for a lower price and keeping them for a long period in the stock has cost, hence Peter believes the cost is hand in hand with how much they buy for the year.
4.3.3.2 Purchasing cost reduction

- The first question is; which cost items can be reduced?

In Peter’s opinion, the specific price for the products, delivery cost, and also the cost of keeping unnecessary purchased quantities in the stock for a long time, all can be reduced.

- The next question is; how these reductions and savings can be obtained?

Finding other sources, other products, similar products and discuss with present suppliers can reduce the specific price for products. Although Peter believes if the quality is poor they must buy some other products for the better quality so in that case the total price will be cheaper. However, by purchasing a higher quality material the total price may not be always cheaper, but their customer find their products good and satisfactory, so those customers send more orders to Svets & Mekano instead of other companies.

In order to reduce the delivery cost he suggests they buy several parts and send them together, that means purchasing several parts with the same delivery can reduce the parts delivery cost.

Moreover, multiple prices can reduce the purchasing cost but he must look into how much he must buy for the exact price and how long the purchased quantity will stand in the stock.

4.3.4 Collaborative procurement approach

4.3.4.1 Company size

Today Svets & Mekano is purchasing between 2000 to 2500 tones all types of steel per year, in which 85% to 90% of this amount is flat steel. This amount is lesser than 2008 and before “economic crisis” that was 3500 tones per year. However, Peter can not specify the size of the company in terms of steel purchasing volume in comparison with other companies, because he believes based on the production technology each company has different working time and Svets & Mekano has much raw materials and less working time, thus for specifying the company size he proposes a comparison with similar companies like them.
4.3.4.2 Similarity of required steel
Svets & Mekano uses flat steel in its production process that is somehow special as it is chemical clean sheet and without any oil on its surface. Usually there is an oil to protect the steel from oxidation and rust, but this company uses dry steel that is easier to work on and no need to wash the oil out before welding or any other process. But in terms of quality and specification, this steel is similar to what other companies in the region use for their production.

4.3.4.3 Motives and expectations in group purchasing
Svets & Mekano is hopeful to reduce the price on the products and just a little reduction in the raw material stock by joining to a group purchasing in the region. Today, they have one or two times delivery every week and they must get material just one day after the ordering to the supplier, therefore Peter thinks they can not have much lesser than they have now.

4.3.4.4 Form and organisation of collaboration
Peter suggests a price agreement for several companies in the region to the same supplier for the form of collaboration. He thinks as Svets & Mekano uses the special steel and there are not many companies who are interested in that material, thus having a centralised stock in the region can not be so much cheaper for them, for this reason he thinks virtual model of collaboration will be the best.

Even though, he states that they are looking for the best price and the best product so if establishment a formal third party company for the collaborative purchasing will be able to present them the best price and products then there is no problem.

4.4 Finnveden Powertrain AB
4.4.1 Company presentation
Finnveden Powertrain develops and manufactures complex precision components and subsystems on assignments from the automotive industry. The focus is on products for engines and power transmission.

The single largest product area is components and subsystems for diesel engines, such as valve actuation and connecting rods. Other products include precision parts, components and subsystems for fuel-injection systems, transmission and brake systems. The business area’s customers are mainly active in the automotive industry, primarily among producers of diesel engines for trucks, buses and construction equipment. Major
customers include Volvo Powertrain, Scania, Ford, DaimlerChrysler, Bosch, Caterpillar and Haldex.

Finnveden Powertrain development know-how and comprehensive knowledge of industrial production and logistics enable it to offer customers within the international automotive industry the total value sequence from development to manufacture and delivery. Through its role as a development partner to the automotive industry, Finnveden can shorten the time from product development to delivery-ready product, thereby creating the conditions for highly competitive production. Optimal quality and delivery precision are crucial success factors for Finnveden Powertrain.

Finnveden Powertrain regards its suppliers as natural cooperation partners and works actively to promote close, long-term relations. Supplier development and professional cooperation at all levels benefits all parties.

Finnveden Powertrain states that the same high demands that our customers place on our operations, obviously, must also apply to our suppliers. Powertrain always strives to achieve the lowest possible total cost, and focuses constantly on quality and delivery performance. Supplier performance standard are measured continuously, and priority areas include cost efficiency, quality development and environmental commitment. (www.finnvedenpowertrain.com/cikado/tmt/public.nsf)

4.4.2 Procurement and purchasing process

4.4.2.1 Procurement steps in Finnveden Powertrain

**Purchasing**- Today Finnveden Powertrain has a centralised purchasing, which is located in Gothenburg and do all the purchasing work. In most of the cases, this company works with automotive business, so the customers tell Finnveden Powertrain which supplier they should buy from and what materials they should use, thus this company is not looking for so many different suppliers since the customers have already determined supplier for them. Moreover, in some cases the customer also fixes the price with the supplier and Finnveden Powertrain just sends the orders to that supplier. Central purchasing office starts to the normal purchasing function after an agreement with customers by the purchasers in Gothenburg. From now, the entire group have this new agreement in the business system and they can see when they need to get more material and see once an order entered into the system and forward it to the supplier, then they are waiting for delivery from supplier. Most of the purchases are in Sweden.

Potential cost improvements and workable form of collaboration in Alvesta steel collaborative procurement project   Page 64
and they buy some material especially from Germany and the supplier delivers the materials itself in Sweden.

**Traffic and transportation**- The Company always buys materials landed cost at its warehouse. Ola Holgersson, the Logistics manager in Finnveden Powertrain, declares that for some reasons in this type of business the supplier would like to take the transportation cost and they have their own trucks. Therefore, they can not go, for instance, to a supplier and buy materials but handle the transportation by themselves, which means it is almost unacceptable by that supplier and in this case the transportation cost is included in the material price.

**Incoming inspection and quality control**- All incoming materials are checked at the time of delivery more or less. The scope and depth of the inspection is dependent on the customer and varies from customer to customer. In detail, for one customer they have to analyse the material, so they cut a part and analyse it to see the structure, however, for some others it is just physical and visual check the diameter and other specifications of steel bars and also control the delivery with its documents to check if it is all the ordered materials that received. Raw material quality control and incoming inspection are in the same line according to Ola. If something is not correct then they call back the supplier to solve the problem, and in the worst case they send the material back.

Stores- Finnveden Powertrain has its own raw materials warehouse in the factory and next to the production facilities. Controlling the humidity level inside this warehouse is the only special storage condition, in which the humidity must not go higher than 70% approximately. This limit necessitates measuring the humidity to keep it at an acceptable level, otherwise it may cause rust on steel.

4.4.2.2 Purchasing process model
As it is explained formerly purchasing process has been centralised in Finnveden Powertrain, so Ola is not sure whether they have purchasing function in their procurement process because it is operating by the central purchasing office.

Despite the centralised purchasing, other steps of procurement and logistics activities are considered by logistics management in Finnveden Powertrain. First, based on the customer order the material stock level is checked, however, they have also an order point and keep the safety stock that is a little higher for very important customer but Ola points out that this safety stock is for around a couple of days because they produce to
out-delivery day. Second, is forecasting and trigger the required material to acquire and then check with production to have enough capacity to produce the new order. Third, at this step if everything is ready they confirm the order for the customer, and afterward they send an order to the supplier to receive the material. Fourth, after delivery they control the incoming material, which is based on the customer demand and also if they will have problem with some materials they can put some extra checks. The extra checks are lasting maybe for a couple of months to see if the materials condition is getting better or worse.

Ola reminds that some of their customers tell them which supplier must be used, so they are not allowed to use any other supplier. For instance, one of their customers allows them to work with three suppliers, or another customer allows them to buy the materials from just one supplier and the customer indicated that other suppliers are not certified by them. Therefore, purchasing in these types of contracts is very difficult, thus they do not have so much materials to choose in working with the big customer. Consequently, if Finnveden Powertrain finds exactly the same material with exactly the same structure from another supplier with 25% cheaper price and propose it to the customer then they have to analyse it, do the engine test, produce the part, and then put the parts in the engine to test. Thereafter, they have to run the engine with parts made from new materials and test them in a couple of months to see the results and how it affects all the other parts in the engine, in which Ola guesses that two years later they can get an answer. However, he adds that this limitation is more just for “bus”, because bus is critical for the customers in what parts they get, so the customers are very afraid of getting anything that is unknown in the engine. If we look at other products that they purchase materials for them, they are much free to work such as choose the best supplier and the best price.

In order to conduct the supplier evaluation after delivery, this company measures the supplier’s delivery performance, in which the monthly evaluation enables them to see how the suppliers work with them and if they can get better work. Other fields of evaluation and follow up are; quality, price, and payment terms that is popular in the current situation for postponing the payment. However, Ola emphasizes that delivery situation is more important for them, that is right on time and right quantity as per the order in each delivery.
In Finnveden Powertrain low stock level for raw materials is preferable, so on time delivery is really important measure there. Ola declares that the reason of this preference is less capital tied up by the stock and instead using the money in production department like new machines. On the other hand, in some cases when they have a very long distance, for example when they buy materials from southern part of Germany, if we consider the transportation costs, then different prices for different volume are offered by the supplier and higher volume is cheaper, they hence prefer to buy for two weeks instead of buying two times each week so they buy every second week. He concludes that in this situation they have a higher stock level for materials, but the total price is lower and they save money in every purchasing price.

4.4.2.3 Purchasing objectives
Again due to centralised purchasing Ola is not working with purchasing objectives completely and this can be answered by their purchasers in Gothenburg. However, he thinks referring to their policy in keeping so low stock level without facing any shortages, on-time-delivery (OTD) is the main objective in their purchasing to secure that they get the material on time in Finnveden Powertrain. Ola is purchasing some requirements for machines out of the centralisation.

4.4.3 Total cost of ownership
Management- Finnveden Powertrain has not the management cost in the system. Although, Ola believes they have management cost but it is not high compare to the total cost.

Delivery- The delivery cost is a little amount as most of the suppliers deliver the cargo.

Service- There is no service cost for steel.

Communications- As the company tries to maintain a lower stock level, so there is a sensitivity to work with supplier that means they have to be in regular contact with supplier. Therefore, communications cost is the time of people especially production planner for contacting with supplier. Ola guesses production planner spends 20% of time to deal with raw materials because they also have to work with the system and updating it, in which the fresh and right information is sent to suppliers and it is quite much work with this kind of issues.

Price- This is not cost for Ola in Finnveden Powertrain. Price can be checked with central purchasing office in Gothenburg but not locally.
Quality- Quality has cost according to Ola, especially if they receive bad quality. Under this circumstance they have to contact with supplier or really bad luck they have to stop the machines and sort the produced parts. Often, they can retake this cost from the supplier, but it is costly and people must devote a time to do that, as they need to send that materials back and sometimes order new materials, while maybe they reschedule the production or even in the worst condition they have to inform the customer and postpone the delivery for a couple of days.

Ola remarks that this sort of problems may arise one time each month or every second delivery in a severe form that can not be solved internally by themselves, but when it happens it takes quite many people infected. On the other hand, express this cost in terms of money is difficult but undoubtedly it bears a cost for the company.

Others- Finnveden Powertrain receives its purchased material in wooden boxes in order to protect the material. The rest of these packaging materials generate quite much garbage in the factory area after use. Ola has tried to sell them but nobody buy them, so he named it as “used packaging cost” and also they occupies quite much space.

4.4.3.1 Purchasing cost priorities
Ola thinks if we ask central purchasing office in Gothenburg they probably say something different from his opinions in this regard. However, as they are in daily contact with suppliers the communication time is the most important for logistics department. Ola indicates quality as the second important cost for them due to it could be quite costly when it appears. Third is the cost of space occupied by used packaging, in the other words, used packaging cost.

Meanwhile, they are receiving ordered materials in a daily-base over production, but as they are moving now another factory into their factory, thus there is not much space left and they are trying everyday to track the whole little space left there. In summary Ola says it is a struggling for square meter, so it is better to put machines instead of used packaging material.

4.4.3.2 Purchasing cost reduction
- The first question is; which cost items can be reduced?

In Ola’s opinion, all purchasing costs can be reduced if they work with them. In Finnveden Powertrain; price, used packaging cost and quality cost can be reduced.

- The next question is; how these reductions and savings can be obtained?
He proposes that price reduction takes time because they must work with the customer a lot, although some of the customers take longer time but finally it is obtainable. Ola believes if they order higher volume then they get more importance as a customer from suppliers and maybe there will be no longer need to contact the supplier every day because by increasing the purchasing volume they are the number one customer.

To reduce the used packaging cost and occupied space, Ola considers another type of packaging material, but he also thinks if they use cheaper packaging material that is not so efficient some quality problems hence may arise, which is more costly. Therefore, he suggests that before changing the packaging material they must assess what will defect the quality, however, in his mind it is not out of reach.

To reduce the cost of quality he believes if they buy higher volume, maybe they can ask for more checking at the supplier side, because today this quality checking is very expensive for a little amount like a tone of steel.

In addition, Ola talks about the set up time in production that is in direct relationship with the purchasing volume both for them and supplier. He thinks setup time is the biggest part of production time so if they get higher volume they probably have lower prices per each kilo of material or any other measure. Also, if they order more for each delivery to the supplier then the production cost per kilo will decrease, nevertheless the transportation cost will increase for delivering higher volume.

Ola summarised his ideas that regarding communication cost if they become an important customer for supplier by ordering so much higher volume then they can gain a little more benefit from supplier but make more trust in on-time-delivery for sent orders, they hence get reduction in costs of delivery and operation cost in the factory and also spending less time for incoming inspection.

4.4.4 Collaborative procurement approach

4.4.4.1 Company size

Today Finnveden Powertrain is purchasing between 45 to 50 tones steel bar per week, or more than 2000 tones annually. This amount is lesser than before 2009 when they were purchasing 70 tones weekly. Considering this purchasing volume and in comparison with other companies in this market Ola introduce their company as a large company and even one of the largest turning companies in Sweden.
4.4.4.2 Similarity of required steel

Ola guesses there must be a number of companies in the region who are using the same machinery and production method like Finnveden Powertrain, so they must do something similar to each other and also so similar materials in terms of type and other technical specifications even they are purchasing from the same suppliers. Ola believes there are many companies which use the steel bar same as what they use, because sometimes other manufacturers in the region call him and ask if he can lend steel bars to them.

Ola augments that they have both specialised and also generalised materials, but quite big part of their material is generalised among the companies in the region.

4.4.4.3 Motives and expectations in group purchasing

Ola assumes the collaboration as a transit point that will have some benefits for the members. First, if they have a big amount of order then they get a higher priority from supplier so they may lower communication cost with supplier. Second, by receiving more materials on the machine between the setup times they will be able to get qualities in a better way. Third, they can get better prices as the order is now much higher than an individual order. Fourth, providing daily deliveries into the factories through a regional stock, which helps them to use the space for production machines and reducing the cost of storing space. Fifth, if they work with other companies they can learn more from each other something like a give and take between companies, and Ola introduces this process as the “business knowledge learning” among members.

He highlighted all these benefits from group purchasing, whereas, again the problem is selecting the supplier by their own major customers who restricted them. However, it is possible to find the supplier by Finnveden Powertrain itself, but it takes a long time, maybe two years, for getting an approval from those customers who are afraid of an engine failure that certainly causes loss of goodwill just for a small saving, for example 10% price reduction for one part, and against a lot of works and technical tests.

4.4.4.4 Form and organisation of collaboration

In Ola’s opinion a third party company is the best to implement the group purchasing in this region. On the other side, he discusses about virtual collaboration, in which working together by email and other communication tools make problems for them and also the partners need to be in contact with each other instead of supplier then.
4.5 **Summary of empirical data**

Figures 4.2 to 4.5 illustrate the summary of collected data from four studied cases. The empirical overview for each company provides a comprehensive picture of procurement and purchasing process situation, total cost of ownership structure, and the approach of the studied company towards the collaborative procurement. By maintaining a same format for all companies here, the comparison between cases regarding the dimensions of this investigation is prepared.

<table>
<thead>
<tr>
<th>Procurement and purchasing process</th>
<th>Total cost of ownership</th>
<th>Collaborative procurement approach</th>
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</thead>
<tbody>
<tr>
<td><strong>Procurement steps:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>➢ Purchasing: stock level check and last year selling</td>
<td>☑ Management: no cost</td>
<td>✓ Company size: medium</td>
</tr>
<tr>
<td>➢ Traffic &amp; transportation: no and prices are free at buyer’s site</td>
<td>☑ Delivery: very costly</td>
<td>✓ Similarity of required steel: quite much similar to other companies in the region</td>
</tr>
<tr>
<td>➢ Incoming inspection &amp; quality control: just visual check at the time of delivery</td>
<td>☑ Service: no cost</td>
<td>✓ Motives and expectations in group purchasing: process time, discussion time, and of course the price will be reduced by collaborative purchasing</td>
</tr>
<tr>
<td>➢ Stores: special storage condition to protect the naked steel</td>
<td>☑ Communications: very costly especially in terms of purchasing process time</td>
<td>✓ Form and organisation of collaboration: a service centre with professional buyers which will be established by the government financial support and investment partly by the members. Members will pay the salary, get the benefit of low price and they will be able to check the service centre through open-books</td>
</tr>
<tr>
<td><strong>Purchasing process model:</strong></td>
<td>☑ Price: typically it depends on the contract and the company’s market segment</td>
<td></td>
</tr>
<tr>
<td>➢ Determine the target amount and adjust it to full truck load</td>
<td>☑ Quality: a little cost but long-lasting process to get the compensation.</td>
<td></td>
</tr>
<tr>
<td>➢ Ask two or three suppliers</td>
<td>☑ Others: sometimes low price burdens such a cost due to a poor quality</td>
<td></td>
</tr>
<tr>
<td>➢ Negotiate with supplier about production time and price (required quality and dimension is constant)</td>
<td></td>
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<tr>
<td><strong>Purchasing objectives:</strong></td>
<td><strong>Purchasing cost priorities:</strong></td>
<td></td>
</tr>
<tr>
<td>➢ On-time delivery</td>
<td>☑ Cost of time devoting to purchasing steps</td>
<td></td>
</tr>
<tr>
<td>➢ Price</td>
<td>☑ Space for stock keeping</td>
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</tbody>
</table>

**Figure 4.2: Empirical overview, Hyllteknik**
<table>
<thead>
<tr>
<th>Procurement and purchasing process</th>
<th>Total cost of ownership</th>
<th>Collaborative procurement approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Procurement steps:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>➢ Purchasing: evaluating the annual need and last year selling</td>
<td>❑ Management: no cost</td>
<td>• Company size: small</td>
</tr>
<tr>
<td>➢ Traffic &amp; transportation: no and prices are free at buyer’s site</td>
<td>❑ Delivery: just personnel cost</td>
<td>• Similarity of required steel: quite much similar to other companies in the region</td>
</tr>
<tr>
<td>➢ Incoming inspection &amp; quality control: just visual check at the time of delivery</td>
<td>❑ Service: no cost</td>
<td>• Motives and expectations in group purchasing: low price and fast delivery by having a storage close to the factory for receiving the material the same day</td>
</tr>
<tr>
<td>➢ Stores: short delivery time so no large stock keeping</td>
<td>❑ Communications: just personnel cost</td>
<td>• Form and organisation of collaboration: no idea about the form. It will be very costly if there will be less than thirty companies</td>
</tr>
<tr>
<td><strong>Purchasing process model:</strong></td>
<td>❑ Price</td>
<td></td>
</tr>
<tr>
<td>➢ Determine required amount to buy in the third month of the year or through MPS stock level control</td>
<td>❑ Delivery</td>
<td></td>
</tr>
<tr>
<td>➢ Ask five suppliers in the list</td>
<td>❑ Purchasing cost priorities:</td>
<td></td>
</tr>
<tr>
<td>➢ Negotiate with supplier</td>
<td>❑ Price</td>
<td>• Price</td>
</tr>
<tr>
<td><strong>Purchasing objectives:</strong></td>
<td>❑ Delivery</td>
<td>• Delivery</td>
</tr>
<tr>
<td>➢ Price</td>
<td>❑ Purchasing cost reduction:</td>
<td>• Purchasing cost reduction:</td>
</tr>
<tr>
<td>➢ On-time delivery &amp; quality</td>
<td>❑ Which costs: price</td>
<td>• Which costs: price</td>
</tr>
<tr>
<td></td>
<td>❑ How: by buying more</td>
<td>• How: by buying more</td>
</tr>
</tbody>
</table>

Figure 4.3: Empirical overview, BK Produkter
### Procurement and purchasing process

**Procurement steps:**
- **Purchasing:** based on the customer orders and customer’s delivery schedule
- **Traffic & transportation:** not for steel (the logistics companies deliver only the purchased parts & assemblies)
- **Incoming inspection & quality control:** just visual check at the time of delivery
- **Stores:** weekly delivery so no large stock keeping

**Purchasing process model:**
- Receive an order and delivery schedule from the customer
- Ask three known suppliers
- Choose the best supplier
- Supplier evaluation

**Purchasing objectives:**
- Price & quality
- On-time delivery

<table>
<thead>
<tr>
<th>Total cost of ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Management: no cost</td>
</tr>
<tr>
<td>- Delivery: transportation cost for parts</td>
</tr>
<tr>
<td>- Service: no cost</td>
</tr>
<tr>
<td>- Communication: no cost</td>
</tr>
<tr>
<td>- Price: steel price included transportation</td>
</tr>
<tr>
<td>- Quality: best price for the best quality</td>
</tr>
<tr>
<td>- Others: cost of keeping purchased parts in the stock for a long time</td>
</tr>
</tbody>
</table>

**Purchasing cost priorities:**
- Price & quality
- Delivery cost
- Multiple-prices and stock keeping the extra quantities

**Purchasing cost reduction:**
- **Which costs:** price/ delivery cost/ cost of keeping extra quantities
- **How:** other sources, products, similar products and discuss with current suppliers/ sending several parts with the same delivery/ keep the balance between quantity of multiple prices and needed items

<table>
<thead>
<tr>
<th>Collaborative procurement approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Company size: ----</td>
</tr>
<tr>
<td>✓ Similarity of required steel: similar type, quality, and specifications but dry without oil on it for oxidation protection</td>
</tr>
<tr>
<td>✓ Motives and expectations in group purchasing: reduce the price on the products and just a little reduction in the raw material stock</td>
</tr>
<tr>
<td>✓ Form and organisation of collaboration: the best is price agreement for several companies to the same supplier, but formal third party company is also acceptable</td>
</tr>
</tbody>
</table>

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Figure 4.4: Empirical overview, Svets & Mekano
**Figure 4.5: Empirical overview, Finnveden Powertrain**

<table>
<thead>
<tr>
<th>Procurement and purchasing process</th>
<th>Total cost of ownership</th>
<th>Collaborative procurement approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Procurement steps:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>➢ <strong>Purchasing:</strong> doing by Central Purchasing office</td>
<td>➢ <strong>Management:</strong> a little cost</td>
<td>✓ <strong>Company size:</strong> large</td>
</tr>
<tr>
<td>➢ <strong>Traffic &amp; transportation:</strong> suppliers deliver the material</td>
<td>➢ <strong>Delivery:</strong> a little cost</td>
<td>✓ <strong>Similarity of required steel:</strong> similar type, quality, and specifications</td>
</tr>
<tr>
<td>➢ <strong>Incoming inspection &amp; quality control:</strong> as per customer demand from just visual check to analysing the material and even extra check</td>
<td>➢ <strong>Service:</strong> no cost</td>
<td>✓ <strong>Motives and expectations in group purchasing:</strong> become an important customer for supplier, improved production process between two setup times, better price, free the stocking space and assign it to production thanks to the regional stock, business knowledge learning from each other</td>
</tr>
<tr>
<td>➢ <strong>Stores:</strong> daily-base delivery so no large stock keeping</td>
<td>➢ <strong>Communications:</strong> high time cost</td>
<td>✓ <strong>Form and organisation of collaboration:</strong> the best is formal third party company with quite skilled personnel and equipment</td>
</tr>
<tr>
<td><strong>Purchasing process model:</strong></td>
<td>➢ <strong>Price:</strong> steel price included transportation</td>
<td></td>
</tr>
<tr>
<td>➢ <strong>Receive an order from customer</strong></td>
<td>➢ <strong>Quality:</strong> indirect cost but significant</td>
<td></td>
</tr>
<tr>
<td>➢ <strong>Make an agreement with supplier by the central purchasing office</strong></td>
<td>➢ <strong>Others:</strong> used packaging material</td>
<td></td>
</tr>
<tr>
<td>➢ <strong>Sending the orders through the system to supplier</strong></td>
<td><strong>Purchasing cost priorities:</strong> Must be answered by central office but for logistics these are:</td>
<td></td>
</tr>
<tr>
<td>➢ <strong>Supplier evaluation especially for delivery performance</strong></td>
<td>➢ <strong>Communication time</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Purchasing objectives:</strong></td>
<td>➢ <strong>Quality cost</strong></td>
<td></td>
</tr>
<tr>
<td>➢ <strong>Used packaging material</strong></td>
<td>➢ <strong>Purchasing cost reduction:</strong></td>
<td></td>
</tr>
<tr>
<td>➢ <strong>Must be answered by central office but On-time delivery is the main objective for logistics</strong></td>
<td>➢ <strong>Which costs:</strong> price/ quality cost / used packaging material</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➢ <strong>How:</strong> higher purchasing volume/ ask for inspection at the supplier’s site thanks to the higher purchasing volume/ using another type of packaging material albeit with maintaining the quality</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Finnveden Powertrain is so restricted to work with suppliers who are not certified by its major customer for their contracts*
Chapter 5 Analysis

*This chapter contains the analysis and interpretation of presented empirical data in accordance with theories. The analysis is built upon within-case analysis that analyses each individual case which involves detailed case study write-ups for each company, also cross-case analysis to see the differences and similarities across the studied cases.*

As shown by Figure 5.1, now the gathered data from each case is going to be analysed and reviewed according to the theoretical dimensions of this investigation, which is aimed at generating more insight for each site. Next, the cross-case analysis searches for within-group similarities coupled with intergroup differences considering selected theoretical dimensions.

Figure 5.1: Analytic model
5.1 Within case analysis

5.1.1 Hyllteknik

5.1.1.1 Procurement and purchasing process

5.1.1.1.1 Procurement steps in Hyllteknik

Hyllteknik is passing through four steps in procurement those are:

- Purchasing
- Incoming inspection
- Quality control
- Stores

Purchasing in Hyllteknik is started by production function as the internal customer. Production itself depends on a predetermined reorder point for keeping the stock level of steel at a safe level. In addition, since the company also orders steel considering last year sell, then it shows they are using two indicators for begin to buy the steel:

1. Historical data of previous selling as the base to forecast the long time requirement such as yearly forecasting. This subjective forecasting makes the foundation of estimated annual purchasing volume, in which the purchaser sees the whole picture of approximate needed steel for coming year.

2. By defining a re-order point that is being checked with production department, the company is breaking down the above mentioned annual need to smaller orders during a year. That is, they try to avoid keeping a big amount of steel, and at a same time keep a safety stock for the probable late deliveries.

Incoming inspection is operated at the time of steel delivery by the company’s recipient at the buyer’s warehouse and is a completely formal step in procurement, while in case of observing any defect and shortage on the cargo it must be registered and confirmed by the truck man, who shipped the cargo, on the delivery note and other documents. Thus, it obviously is a time taking activity in the total procurement process. It seems necessary to inspect purchased steel, as they are naked and naturally in contact with air and oxygen they get rust on the surface. The other situation which is inspected by the
recipient is the appearance conditions of steel to see any scratch or bend on it. However, considering the types of purchasing steel and the products made of those types, in which there is no need to furnish a specific or standard analytical structure for steel, the visual and physical check of cargo appearance and facial health of that is sufficient. In addition, checking the delivery with shipping documents at the time of delivery is another form of control by the recipient that is more paperwork and related to below functions:

- Financial aspect of transaction for payment based on actual delivery
- Warehousing and material management aspects to report the usable and actual available inventory

Quality control in its complete form such as checking the steel chemical and physical specifications in the laboratory is not implemented in Hyllteknik. Logically and as it is mentioned in incoming inspection process, this company does not need to check the quality profoundly and just a visual check fulfils the quality control objectives for incoming materials. In a scrutiny manner, quality control is excluded from the procurement process in this company based on the type of products and raw materials, so what they are doing according to the quality of purchased materials is only incoming inspection with visual and physical check.

Steel storage area is located inside the factory of Hyllteknik, which is on one hand, close to production facilities that reduces the transportation between production site and warehouse due to the short distance between two units; on the other hand it has occupied some space from the total space available in the factory. Although, it occupies an area but it secures the production logistics by making the material available for production and guarding the production process against any type of delivery problem both in terms of time and quality. The special storage condition for steel in this company needs to control the temperature inside the warehouse and then using energy to heat up there till a suitable level. However, it is not clear why steel that is a solid metal with a high melting point needs to be in a warm place, in which impose an energy cost to the company to keep there warm.

The only absent step in the company’s procurement is traffic and transportation, however this is due to the agreed delivery terms between this company and its suppliers for delivery at buyer’s warehouse. Hyllteknik prefers delivery at its warehouse, so in
this case, the payable price is actually landed cost which both material cost and freight charge are included in quoted price. Some of the main reasons to purchase with delivery can be listed as:

- The purchasing volume that is around twenty tones per week so it is easier to arrange delivery by the seller
- Avoidance from keeping a large amount of steel in the warehouse
- Difficulties in handling the transportation and logistics of purchased materials because of not having more than one buyer
- Difficulties in working with third party logistics companies

5.1.1.1.2 Purchasing process model

Purchasing steel in Hyllteknik is the routine ongoing purchase and in the category of raw materials. Consequently, for this routine purchasing, the step of determining the specification is only determining the order quantity, and thus specifying the required dimension and quality is eliminated from the process as supplier knows them. Hence, purchasing starts from setting the order quantity.

At the supplier selection step, among two or three offers proposed by main suppliers the best one in terms of price and delivery time is chosen by the steel purchaser.

Afterward, the purchaser places the order directly to the selected supplier while there is no contracting at least for every purchasing. This company tries to order equal to the full truck load scale to get the most benefit of payable freight charge, so it reveals that when they are placing an order except the needed quantity the “economic order quantity associated with freight charge” has a key role.

Follow-up and evaluation of supplier performance is limited to claim on poor quality or defected steel and ask for compensation, whereas occurrence a quality problem is costly and time-taking event for Hyllteknik. Recording the supplier evaluation after each delivery and updating the suppliers evaluation file is an implicit process, therefore supplier selection for next orders is almost based on offered price, lead time and some experimental judgements about supplier performance but not on a systematic method.

The irregular supplier evaluation and only react to poor quality deliveries might be the result of not having the ISO 9001 certificate and particularly certified purchasing
process. Figure 5.2 illustrates the Hyllteknik’s purchasing process model, in which since contracting is not the usual step of the process, it seems pale.

**Figure 5.2: Hyllteknik purchasing process model**

### 5.1.1.1.3 Purchasing objectives

Purchasing steel is a time-taking process that is not effective enough for Hyllteknik. The root of this ineffectiveness of purchasing is low gaining from all attempts to get the lowest price with an on time delivery. The low gaining is due to the disproportion of the time devoted to price tracking and negotiation with the order quantities, in other words, the company expects more productivity form all purchasing activities that is much higher than the actual gaining. Seemingly, this problem is because of the time and energy put in purchasing is greater than purchasing volume of the company. Therefore, dividing the purchasing outcomes (e.g. saving from the lower price, on time delivery, and minimising the quality problems) as the output, by the total cost of ownership and purchasing resources as the input of purchasing system, the result equals to unsatisfactory and less than expected purchasing effectiveness.

From this view, when Hyllteknik considers:

1. On-time-delivery and
2. Price

as its purchasing objectives, it can be concluded that any on-time-delivery with the best possible price can not compensate the devoted purchasing resources. However, by introducing these two objectives, Hyllteknik emphasises more on “right time” and “right price” among the seven objectives in “the standard statement of the overall objectives of the purchasing function”.

Potential cost improvements and workable form of collaboration in Alvesta steel collaborative procurement project
5.1.1.2 Hyllteknik total cost of ownership

The cost of time for procurement activities is the main concern in Hyllteknik. Similar to previously discussed problem in an ineffective purchasing function, material handling time at the point of delivery is another problem for this company. The materials handling process time at the materials arrival time in company’s warehouse includes:

- steel discharging time from truck
- steel stocking time into warehouse
- steel tallying time

According to the total cost of ownership model, Hyllteknik presents its own individual model, in which some items are extant and some not.

Management- in this part, Hyllteknik has no cost regarding purchasing personnel such as hire, evaluate, train, promote, and fire, also today there is no cost related to professional development. The reason of not having these sort of costs is that just one person is buying steel who is also the CEO of the company, thus obviously the purchasing organisation for steel has a small size without any work division and specialisation, which needs purchasing personnel management. However, some other management costs are extant in Hyllteknik’s total cost of ownership those are determination of purchasing strategy in conjunction with corporate strategy, coordinate with other functions, and ongoing procedure changes.

Delivery- as it is reflected in the company’s purchasing process model and also the location of raw materials warehouse, which is inside the factory, some cost components in delivery can be recognised. Accept delivery, expedite late orders, arrange for correction of incorrect orders, and maybe sometimes accept partial shipment, are these components.

Service- to purchase steel as an ongoing routine purchasing and also classifying steel in raw materials category, there is no service cost.

Communications- as discussed in purchasing objectives of Hyllteknik and the high importance of different process times in company’s procurement, thus the communications cost is a significant cost issue in the total cost of ownership for this company. Furthermore, as communications is mostly in form of spent time and
therefore it is not tangible to quantify, it is so difficult for the company to calculate this time and show it as a cost specifically in terms of Kronor.

**Price**- price is also an important part in the total cost of ownership of Hyllteknik. The price sensitivity in buying the steel highly depends on the type of contract between the company and its customer. In detail, the agreed delivery time between Hyllteknik and its customer indicates a lead time for Hyllteknik to prepare the order, so in this case if the lead time is long enough to search for a supplier with the lowest possible price then the price is the only measure for cost. Whereas, if the specified lead time is short due to the type of contract and competitive situation for that product, now the on-time-delivery gets a higher value and the price hence is not the only criterion to purchase, which means the price here includes quantity, quality, freight costs, and delivery terms. For the second type of contracts Hyllteknik attempts to make a balance between the price itself and delivery time of purchased material, because the company wants to keep its goodwill in the contract with its customer by delivering the products on time as per their agreement. Consequently, through the customer satisfaction the total profit will increase in a long run and the competitive position will be improved simultaneously.

**Quality**- the quality is another part of total cost of ownership in Hyllteknik. One activity that company would have considered before ordering to new supplier is approving the quality of material and qualifying that supplier, since in one case they faced with a serious problem in the quality of purchased tubes because the only criterion to buy was very low price and not approving the quality of new material before ordering. Another cost in this part is claim and acquire new material instead of poor quality in a delivery. However, the major steel supplier of Hyllteknik accepts the rejected materials for poor quality and reimburses quality problems, but still this is a long lasting process with so many activities, particularly if the purchased material has been imported from abroad. Figure 5.3 shows the purchasing activities contributing the total cost of ownership in Hyllteknik. The starred activities have been found special and unique in each part, so in this case, desired level of heat in order to protect steel against rust as a special storage condition in quality part of TCO wheel seems unique.
5.1.1.2.1 Purchasing cost priorities

Hyllteknik ranks the activities contributing purchasing costs as:

1. Purchasing process time
2. Occupied space by stock
3. Quality

As discussed earlier in purchasing objectives, the purchasing process in this company is not effective and process time of this function can be assigned to other functions with higher productivity. From this, Hyllteknik ranks this time as the first important cost in purchasing, in which it is an intangible cost that can yield better in other functions.

The occupied space by steel inventory is the second important cost for this company, but this is not within purchasing costs actually. Again, this cost can be seen as an intangible cost that can be expended for developing the production facilities instead and
upgrading the production capacity. However, making decision for substitution of production with warehouse area must be analysed with respect to the current warehouse size that indicates how much space will be released and is it worth to do or not, is there any need for more production capacity, and how much is the risk of downsizing or even eliminating the steel warehouse, while currently the company tries to keep a low stock level and relies more on on-time-delivery.

Referring to costs of quality, although the interviewer expressed that it has not cost for the company, but all activities related to the quality of purchased materials such as equipments for special storage conditions and disposing the defected steel are some of instances that bear cost related to quality.

5.1.1.2.2 Purchasing cost reduction

Three areas of cost reduction among all others have the higher potentiality to get significant reduction in this company.

1. Price
2. Purchasing time
3. Administrative costs

Based on the arguments up to here, Hyllteknik has not an effective purchasing function, especially considering the time of purchaser’s involvement and the results of his activities that mostly reflects in purchasing price and administrative costs of purchasing projects. All these support the idea of collaborative procurement, proposed by Hyllteknik as a solution to improve the purchasing effectiveness. This company would like to reduce its purchasing cost by price reduction through bulk-purchasing in collaborative purchasing. Afterward, through professional purchasers in the group purchasing the process time will be reduced as they are doing only this function and at a very higher level. Finally, it is expected that centralising for purchasing steel will reduce the administrative costs as the process will conduct collectively and all steps can be taken for many companies and therefore because of the much higher quantity the results will be effective. As a whole, Hyllteknik thinks about using the combined volume of the members in the group in order to reduce price, purchasing process time, and administrative costs.
5.1.1.3 Hyllteknik collaborative procurement approach

5.1.1.3.1 Company size in a regional comparison and similarity of required steel
This company identifies itself as a medium enterprise based on the required steel in comparison with other manufacturers in Alvesta region.

Considering the steel requirements of Hyllteknik, there is a similarity in terms of type, quality, and dimensions between this company and some others. Therefore, homogeneity can be observed in the company’s required steel with other companies, according to the buyer’s information.

5.1.1.3.2 Motives and expectations in group purchasing
Hyllteknik’s both implicit and explicit motives to join into the group purchasing reveals the benefits that it is looking for, which are:

1. Price reduction
2. Time saving in purchasing process
3. Purchasing administrative cost reduction
4. Access to knowledgeable and professional personnel in procurement

In addition, this company has realised that by outsourcing the purchasing function some of its resources will be released and can be applied for another function effectively.

5.1.1.3.2 Suggested form and organisation of collaboration by Hyllteknik
Hyllteknik proposes a formal third party company as the organisation of group purchasing. To finance this regional purchasing office it is expected to absorb the fund from members who will join to the group and asking for investment in form of loan from Sweden government as it seems that there will be not enough investment to start this company. Also by stressing on green benefits of centralising the purchasing, in which the transportation will be shifted to railway instead of trucks due to the high volume of orders, some financial aids in form of loan or investment can be requested from European government.

Meanwhile, according to the administration of this centre Hyllteknik votes to non-profit organisation that will be controlled by the members of the group. The purchasing activities are based on the (expected) aggregate purchasing volume and are carried out with the purchasing expertise of the external party, as Hyllteknik assumes this centre with professional buyers who are expert in purchasing skills to meet the overall goals of
purchasing. The members will have free access to accounting system of the centre to check the purchased prices and the way of transferring of the benefits to the members.

### 5.1.2 BK Produkter

**5.1.2.1 Procurement and purchasing process**

**5.1.2.1.1 Procurement steps in BK Produkter**

BK Produkter takes four steps in procurement those are:

- Purchasing
- Incoming inspection
- Quality control
- Stores

Purchasing in BK Produkter begins from checking the annual need and compare it with last year purchased quantity, to determine whether the need in coming year is equal to the last year or something different from that. Form this, it can be seen that this company starts to purchase the required raw materials based on subjective forecasting method. Next, once at the beginning of each year they ask for suppliers offers, in which they negotiate with suppliers to select the best offer especially for the best offered price.

Incoming inspection in BK Produkter’s procurement is visual checking of delivered materials to the warehouse. There is no distinct and definite quality control for materials and is just limited to see any problem in production process and at the time of consumption, which then can lead to reject the material and afterward claim to supplier for replacement new material with defected one.

The steel warehouse is in the factory area of BK Produkter, however, due to a fast delivery provided by most of their suppliers, around five days lead time after ordering, they don’t need to keep a significant volume of steel in the warehouse. Moreover, apparently the required steel in BK Produkter does not need a special storage condition, so there is not any specific activity for such this purpose.

BK Produkter has no operation for traffic and transportation in procurement. This situation shows that suppliers handle the delivery service and the freight cots are included in selling price in order to delivery at buyer’s warehouse.
5.1.2.1.2 Purchasing process model

The purchasing process in BK Produkter starts from determining only the order quantity as quality and specification of needed steel are usually constant because it is an ongoing routine purchasing that is in raw materials category. While, the order quantity is derived from annual sell forecast. Thereafter, this company asks its suppliers who are registered in the company’s system (Called Monitor) for their offers. Meanwhile, qualified suppliers for this company are those who can deliver a product in compliance with its customer’s demands and expectations, which for new suppliers the ability of fulfilling the BK Produkter’s quality criteria has to be evaluated and categorised in a relevant category before any ordering. Then, among the received offers the best one is selected for placing the order. Again, at this step, supplier selection relies on assessing the supplier according to purchasing policy of company’s ISO 9001 certificate, which indicates that supplier selection is based on assessing below criteria:

- Assortment
- Delivery performance
- Quality
- Environment
- Rates
- Competitive situation

The accepted supplier who has been accepted in this pre-selection assessment will receive the order, but this agreement will be broken down to some smaller orders like weekly deliveries during a specified period. Supplier evaluation is the final step in purchasing process. This post-delivery evaluation aims to upgrading the list of registered suppliers, in which the company reassesses the supplier selection criteria for evaluating supplier performance and behaviour after transaction, in the fields of:

- Range of products
- Pricing
- Service (for steel is just delivery)
- Quality
- Environment issues
The company is monitoring the supplier performance from mentioned dimensions continuously during the year, which can lead to maintaining the acceptable supplier in the list, changing out the low performance supplier, or developing cooperation with high performance supplier. Figure 5.4 illustrates the purchasing process in this company with different steps within the process.

Figure 5.4: BK Produkter purchasing process model

5.1.2.1.3 Purchasing objectives

Supplier assessment and selection criteria for both supplier selection and then evaluation steps in purchasing process vividly reflect the formal purchasing objectives as they are documented in the company’s purchasing policy by ISO 9001 certificate. These formal objectives in purchasing of steel are: range of products, price, delivery performance, quality, environment issues, secured supply, and supplier customer relationship. However, based on the collected data through the interview with this company, the most important actual objectives out of all formal objectives are:

- Price
- Quality

This does not mean that other objectives are not important, even all of them are at the acceptable level, for instance the delivery time and performance are important, but there is no problem because the registered suppliers provide short delivery time. Therefore, price and quality are the variables, which need more attention and control in order to get the most out of purchasing process in BK Produkter.
5.1.2.2 BK Produkter total cost of ownership

Management- BK Produkter has one purchaser who is the responsible for purchasing of all requirements. Although the management of this company believes that they do not have management cost in their total cost of ownership, but at least the personnel cost of that purchaser, coordination with other functions, and initial orientation can be considered as the elements of this part.

Delivery- by receiving the delivery at the warehouse, this company has some cost components in delivery. However, there are few items as the delivery time is five day from ordering and BK Produkter prefers weekly delivery schedule instead of stock keeping. Some of these costs are: accept delivery and often expedite late orders and also arrange for correction of incorrect orders.

Service- BK Produkter has certainly no service cost in purchasing of steel, due to it is an ongoing routine purchasing. Also, steel is in the category of raw materials for this company.

Communications- the BK Produkter’s management states that the single cost in communication part is the personnel cost of purchaser. However, if we look at it more carefully it is clear that the purchaser job content and responsibilities in order to achieve the overall goals of purchasing cover almost all activities related to communications.

Price- referring to the procurement steps in this company, in which there is no activity in traffic and transportation by the buyer itself, because supplier delivers the sold material at buyer’s warehouse, the price includes cost of material, packaging, and transportation cost. However, providing order a big quantity the delivery is free of charge and is on supplier, here thus the price of steel itself plays a very important role in calculating the total cost of ownership of purchased steel.

Quality- in case of any quality problem the supplier takes the responsibility of replacement with new materials and resolving it, and as all suppliers of this company are in Sweden, hence the only activity by BK Produkter in this part is time to call and inform the supplier. It seems continuous supplier assessment and evaluation at different stages from entering a new supplier into the registered suppliers of Monitor (company purchasing information system), then supplier performance evaluation, and again consider the assessment criteria in supplier selection all are helping to minimise the costs of this sort of problems, where the company believes in reality there is not any
cost of quality in its total cost of ownership. However, this system itself covers the activities related to quality that is a part of company’s total cost of ownership.

Figure 5.5 presents the components of BK Pordukter’s total cost of ownership model that looks like the original model.

5.1.2.2.1 Purchasing cost priorities

Bk Produkter ranks its purchasing costs as:

- Price
- Quality
- Delivery time

However, quality and delivery time are smooth and easy going parts in purchasing, as previously discussed the supplier evaluation is done precisely and almost all suppliers
have delivery service to customers within a short time. The high importance of price as the top ranked cost is approved by two other evidences:

1. Price is the second criterion in supplier evaluation part of ISO 9001 purchasing policy, in which the first one is assortment, but since for steel the range of products is not so extended, the price hence is the first item.

2. In the purchasing objectives declared by the management of the company price and quality are the variables in this area. Repeatedly, quality is a controllable variable; therefore price is still the first item.

5.1.2.2 Purchasing cost reduction
While the price is the most important purchasing objective and at the same time the most preferred cost amongst others, it is quite logical to pick the price as the only cost of purchasing that can be reduced by BK Produkter.

As BK Produkter indicated previously in price part, they can receive materials without delivery cost providing they order big quantity of steel. Consequently, BK Produkter suggests bulk-purchasing and increasing the order quantity is the only way to reduce the price.

5.1.2.3 BK Produkter collaborative procurement approach

5.1.2.3.1 Company size in a regional comparison and similarity of required steel
In terms of the company size, this company identify itself as a small enterprise based on the required steel in comparison with other manufacturers in the Alvesta region.

Considering the used steel of BK Produkter, there is a similarity in terms of type and quality. A little difference in thickness of used steel sheet is between this company and some others, but still it is in the usual range of thickness amongst companies in this region. Therefore, homogeneity can be observed in the company’s required steel with other companies based on the BK Produkter’s information from them.

5.1.2.3.2 Motives and expectations in group purchasing

BK Produkter believes group purchasing can be beneficial in:

- Price reduction
- Delivery time reduction
It is completely predictable to here reducing the “price” from BK Produkter as the top priority motive and expectation in joining to a group purchasing. For this company the price is the most important concern in:

1. Purchasing objectives
2. Purchasing cost priorities
3. Purchasing cost reduction

The second motive to join for BK Produkter is fast delivery; however, today the delivery lead time is less than a week but they expect to reduce it into one day, in other words it seems since this company works at a low stock level for steel they expect to receive the needed steel in a daily-base delivery and feed the production directly from a regional steel warehouse. Therefore, it can be interpreted that this company is thinking about “outsourcing its material management” implicitly as third motive to receive material through a purchasing group.

5.1.2.3.2 Suggested form and organisation of collaboration by BK Produkter

This company has no suggestion for the form and organisation of the group purchasing. Furthermore, for two reasons they are reluctant in this collaboration those are:

- Estimating a very high construction cost of regional purchasing centre
- A few number of interested companies to join that may impose a considerable portion of construction cost to each member companies

These ambiguities regarding the cost of construction hinder to find an interest to join for BK Pordukter.

5.1.3 Svets & Mekano

5.1.3.1 Procurement and purchasing process

5.1.3.1.1 Procurement steps in Svets & Mekano

As a whole, procurement process in this company has five phases:

- Purchasing
- Traffic for transportation (not for steel)
- Incoming inspection
- Quality control
Purchasing process begins to work from receiving an order from a customer who has confirmed the Svets & Mekano’s offer. Afterward, this order enters into the production schedule in order to produce the products. From this point the type of needs are specified by production. Then, the stock level of requested materials is checked and if the material is the new item it goes directly without checking the stock to ask new supplier for sending an offer. Next, the buyer sends the purchase order to approved and selected suppliers, but supplier selection is choosing a supplier among the qualified suppliers who are in the list of company’s existing suppliers and have fulfilled the supplier assessment criteria in the company’s ISO 9001 documents.

Due to the delivery conditions in the steel supply market the delivery and transportation is handling by supplier and the freight cost is therefore included in total selling price. However, despite handling the transportation by supplier and deliver the material at buyer’s warehouse, since the major proportion of purchasing in this company belongs to steel, thus the buyer needs to be in regular contact with suppliers and attempts to receive the orders as per the agreed delivery schedule by the supplier. Therefore, it seems activities related to delivery are in the Svets & Mekano’s procurement process. Svets & Mekano is managing the transportation of purchased parts and assemblies through few third party logistics company, because in purchasing of these items suppliers do not provide any delivery and transportation services.

At the delivery time, the received materials are inspected and controlled, and if it is approved it goes to production and its information is recorded in the system (MPS). But if the quality is not acceptable the problem solving procedure helps to resolve it shown in the company’s purchasing process flowchart. The precision of this inspection is at visual check and conformity with asked specifications.

Although, Svets & Mekano considers incoming inspection and quality control as one activity but the quality of incoming material is assured by systematic supplier assessment and evaluation as set in ISO 9001 purchasing policy. In the company’s supplier evaluation process the existing suppliers must meet the assessment criteria to be in the list of suppliers, otherwise they will be rejected and replaced with a better option. Also, for new suppliers there are different stages of assessment and evaluation for entering into the list of existing suppliers, which is comply with continuous
improvement philosophy that Svets & Mekano follows. Moreover, as described in incoming inspection part if the received quality is poor they needs to solve the problem, which is also an activity related to quality. Consequently, this company has a significant number of activities according to quality.

The steel warehouse is located inside Svets & Mekano factory. However, through a weekly delivery schedule there is no need to keep a high quantity of raw materials in the warehouse. From this material management policy it can be inferred that Svets & Mekano tends to apply the basic concept of just in time purchasing and reduce the inventory to the lowest possible level.

**5.1.3.1.2 Purchasing process model**

Based on the ISO 9001 purchasing policy in Svets & Mekano, the procurement and purchasing process is implementing completely. The purchasing starts from production schedule to produce and prepare customer’s order. If the needed material is a routine purchasing and registered item in the system, then the buyer checks its stock level to determine the order quantity. The purchase order is forwarded to the best supplier who is qualified and in existing suppliers list, while sometimes there is a contract especially with new suppliers. In case of need to purchase a new item that has not been registered yet in the system, the buyer has to send inquiries into new approved supplier and asking them for offers, in which the best supplier with best offer will be chosen and after registration in the system that supplier will receive the purchase order to proceed. After ordering the selected supplier delivers the order to Svets & Mekano, and in the next step there are two simultaneous activities:

- Entering the received order into the system and delivery performance evaluation, which the feedback is going to supplier.
- Inspecting the incoming material and check the quality to see whether that is a good material or not.

After determining the material acceptance or rejection, the good material goes to production but the rejected material must wait for decision made by problem solving procedure. Figure 5.6, shows the purchasing process in Svets & Mekano but as contracting is just for some orders, it seems pale.
As this company produces just for the customer’s order and that customer give Svets & Mekano a delivery schedule, if they receive all orders, for instance, at the beginning of the year then the buyer would have been able to prepare a purchasing plan for the whole year, otherwise they need to wait for each order and customer’s delivery schedule to find the required order quantity and also on time supplier delivery. As an inference this company works in “make to order production system” and this is a reason for taking an approach in purchasing similar to just in time.

5.1.3.1.3 Purchasing objectives

This company takes two main purchasing objectives into consideration, as:

1. Price + Quality
2. Safe on-time-delivery

However, here is a question that asks; why they put price and quality together as the first objective? The reason of introducing price and quality as one combined objective is the intense and direct relationship between the paid value for a material and its quality in Svets & Mekano’s opinion. In other words, this company thinks for each desirable level of quality the proportional price must be paid and “the best quality for the best price” is the presence of this proportion. In addition, referring to the company’s purchasing policy, maintaining quality is strongly emphasised by precise and continuous supplier evaluation, thus as an interpretation price is not the first objective alone and is absolutely correlated to the quality of purchased items. Another consideration about the combination of price and quality is; Svets & Mekano assumes by purchasing cheap material that has not an acceptable level of quality the total cost will increase as they need some reworks, material replacement, and loss of goodwill.
The second objective reveals the importance of supplier performance delivery, in which the delivery performance must have two characteristics:

1. On time delivery. Its importance is due to receiving the material right on-time as per agreed lead time that provides an uninterrupted flow of materials and accordingly no interruption will happen in production process.

2. Safe delivery. It is also substantial to receive a quantity equal and same to the planned order both in quantity and needed type, which fills up the stock level without any shortcoming and incorrectness.

5.1.3.2 Svets & Mekano total cost of ownership

*Management*- it is expressed that there is no activity related to management of purchasing in Svets & Mekano, whereas, with a scrutiny it is quite clear that in order to supply the requirements the company has to pay enough attention at least to below activities in purchasing:

- Determine purchasing strategy associated with corporate strategy
- Coordinate with other functions such as production and selling
- Ongoing procedure changes
- Purchasing personnel affairs like promotion and evaluation

*Delivery*- as it is marked in purchasing objectives Svets & Mekano looks into an on-time and safe delivery that clarifies there are different activities in this regard such as:

- Accepting and receiving the delivered materials
- Expedite late deliveries and meet the delivery schedules
- Arrange for filling up the delivery shortcomings and correction of incorrect orders

*Service*- similar to previous companies here, buying steel is an ongoing routine purchasing and this item is in the category of raw materials. In addition, since the main focus here is on purchasing process of steel and its total cost of ownership, this part of TCO model is not extant and valid.

*Communications*- apparently there is no cost for activities related to communications, however, with a careful investigation Svets & Mekano’s purchaser is communicating in:
- Prepare and send inquiries and then purchase orders to selected supplier
- Work with MPS and try to keep it updated especially in its materials part
- Post-transaction activities like match purchase orders with receipts as they are looking for the safest delivery in purchasing, make invoice adjustment and also maintain inventory records

**Price**- for steel the price is the total value of cost of material, freight costs, and desirable quality. Here is an interesting point about purchase discounts, in which in case of purchasing more than a definite level the supplier will consider an ascending discount but the problem is stagnation of extra units in the warehouse, and hence a capital tied up by these extras occurs that is also a cost may be more than its obtained benefit in from of purchase discount.

**Quality**- in addition to incoming inspection for all deliveries, keep a balance between price and quality that is supposed different prices are for different qualities is another activity in this part. However, two other activities are distinctly observable which are:

- Select and approve new suppliers as indicated in purchasing policy of company’s ISO 9001 documents
- Current supplier performance assessment and annual supplier evaluation those are also indicated in Svets & Mekano’s purchasing policy.

Figure 5.7, reflects the the purchasing activities contributing the total cost of ownership in Svets & Mekano. The starred activities have been found special and unique in each part of TCO model, so in this company, keep a balance between price and quality in quality part, and the problem of purchase discounts and capital tied up by extra quantities in price part, both seems unique here.
5.1.3.2.1 Purchasing cost priorities

Svets & Mekano ranks its purchasing costs as:

1. Price-quality
2. Delivery costs
3. Capital tied up in extra units from purchase discounts

The top rank is assigned to the cost of price-quality combination that is same as the first purchasing objective in this company. From this, it is clear that this company prefers to pay the best price for the desirable and needed quality in order to reduce the total cost. Another inference from this prioritising can be that this company assumes “a direct complete correlation” between the price and quality that means higher price yields better quality, while as another assumption between the cost of price and cost of quality
there is “a divers complete correlation” which by reducing the cost of price the cost of quality will increase and finally the total cost will increase.

The second important cost in purchasing for this company is delivery cost, which like the first cost is comply with second objective in purchasing. This is because of expensive freight costs for transportation of small parts or assemblies. However, it is not valid for steel delivery, which is delivered by the supplier.

The third cost in purchasing is the cost of capital tied up by the stagnation of units those are excess than need and keeping them in the warehouse for a long time.

5.1.3.2.2 Purchasing cost reduction

Svets & Mekano sees the potentiality in reducing all three most important purchasing costs in the company. Interestingly, there is conformity between purchasing objectives, purchasing cost priorities and also purchasing cost reduction potentials, which can be reviewed as:

- **Price.** The price can be reduced if the company find other suppliers and in fact develop the multiple-sourcing strategy. Also, try to get lower price through negotiation and bargaining with existing suppliers can reduce the price. However, as the combination of price-quality is the first priority of this company, both as purchasing objective and purchasing costs; they strongly believe in maintaining the quality against price reduction, because by sacrificing the quality for cheaper material the total cost will increase since probably there is need to better material replacement and reworks. Meanwhile, in addition to increased total cost because of using poor quality materials, protect the company’s goodwill and reputation in exchange of higher quality is quite acceptable, even though the total price will not be reduced.

- **Delivery cost.** It is to remind that this cost is just for parts and assemblies and not for steel as material. However, the suggestion to reduce this cost is aggregated shipments, in which the logistics company can collect different purchased parts and deliver them together all at once and also with one carrier.

- **Capital tied up in Inventory.** Although purchase discounts for different volumes of purchasing can cause a cost reduction, but in order to get a discount the company should buy an exact volume which maybe is higher than its need.
Thus, the extra quantities those are stagnant and unused in the warehouse impose two costs to the company:

1. Capital tied up by the extra purchased quantities
2. Warehousing cost of extra purchased quantities

This way, it seems that Svets & Mekano compares the benefits of discount with required quantity and cost of keeping the extra units as a stagnant inventory in order to reduce this type of purchasing cost.

5.1.3.3 Svets & Mekano collaborative procurement approach

5.1.3.3.1 Company size in a regional comparison and similarity of required steel

In comparison with other manufacturers and Svets & Mekano’s rivals in the region, the size can not be specified by the company itself. During the interview it was found that for determining the company size, based on the amount of used steel, there is need to look at different production methods in each company and identify the working time and the volume of used steel. In detail, each production technology in this industry indicates the required volume of steel, as for instance cutting steel with CNC machines takes longer working time and so lesser material, conversely Laser cut takes shorter working time and much material than CNC cutting. Consequently, it seems there is a proportional relationship between working time of each technology and its used steel, which makes difficult the comparison of different companies in order to find their sizes.

Homogeneity of steel requirements can be observed in form of same type, dimensions and quality. Although this company prefers to buy the steel sheet without oil and chemical compounds on its surface that is popular to protect steel against corrosion, but homogeneity of company’s requirements to other companies in the region is considerable.

5.1.3.3.2 Motives and expectations in group purchasing

There are two motives in group purchasing for Svets & Mekano:

1. Price reduction
2. A slight reduction in stock level

This company expects to get lower price by ordering bigger quantities than today thanks to joining into a group purchasing. Hence, it can be understood that taking the benefit of
aggregated ordering and using the purchase discounts for high order quantities in form of lower prices is the first motive for joining to such this group.

The second expectation is a slight reduction in steel stock level. However, it is emphasised by the company that it will be just a little reduction than present level, and it refers back to the regular weekly delivery by supplier that enables Svets & Mekano to keep the steel inventory at the minimum possible level.

5.1.3.3.2 Suggested form and organisation of collaboration by Svets & Mekano

The principle proposal of this company for the form of collaboration is “price agreement”. It can be inferred that this company tends to make an informal virtual purchasing group for some reasons, which purchasing the special type of steel by this company is the clearer one. However, as it is previously discussed in similarity of required steel, by the special type of steel the company means that they use the similar steel to other users in the region, just without usual surface protection oil and chemicals.

Generally, from the evidences in this case it appears that Svets & Mekano is looking for the best gaining from joining into a purchasing group and thinks beyond a definite form and organisation as their favourite, while if this best result is obtainable by a formal third party organisation there is no reason for disagreement with that or even reluctant to join.

5.1.4 Finnveden Powertrain

5.1.4.1 Procurement and purchasing process

At the beginning of analysis of this company it is to remind that purchasing process in this company is managing and operating by the central purchasing office (CPO) located in Gothenburg, Sweden.

5.1.4.1.1 Procurement steps in Finnveden Powertrain

Procurement process of Finnveden Powertrain consists of three steps as:

- Incoming inspection
- Quality control (just for components)
- Stores

By centralised purchasing, Finnveden powertrain has not a real and independent purchasing process by itself, thus the procurement process is started by incoming
inspection and not purchasing as a usual form. The main process of supply in this company is production logistics. In other words, there is no activity in terms of the management of the company’s external resources. As it is shown by the Finnveden powertrain’s “material supply process map”, the only step within purchasing process is “ordering”.

Indeed, the procurement process in this company has its own specific steps which are:

1. Customer’s order
2. Production capacity check
3. Supply material planning
4. Ordering through system to selected supplier by central purchasing office
5. Accept delivery
6. Incoming inspection for steel as materials
7. Keep the record of stock

All incoming materials are checked and logistics department is in charge of this inspection at the time of delivery. The precision and profoundness of this inspection varies from customer to customer as Finnveden Powertrain produces the customer’s orders and in most cases those customers select the material’s supplier. Thus it can be observed that incoming inspection is an interval with two extremes, those are:

- Visual check. This is the minimum level of inspection, in which the physical condition of received cargo is checked in order to match purchase orders with receipts.
- Quality control. Implicitly, this is the maximum level of inspection. This control is operated by quality department and they are controlling the quality of received components but not materials like steel.

Therefore, for steel there is just incoming inspection and no quality control.

Regarding storage, the logistics department in this company performs the inventory management that can be divided into three below sequential activities:

1. The accepted incoming materials are transferred into the materials warehouse and located into assigned place for each type.
2. Afterward, the amount of incoming materials is added to inventory records.

3. Monitoring and controlling the humidity level inside the steel warehouse is the third activity of the inventory management functions that needs pay enough attention in order to maintain the materials quality.

5.1.4.1.2 Purchasing process model

As formerly discussed in Finnveden Powertrain’s procurement steps, only purchasing is absent among all other procurement steps.

In spite of centralised purchasing in this company, the materials supply process can be reviewed considering logistics operations, which separately are:

1. Receiving customer’s order/suborder. This is the beginning of procurement process in Finnveden Powertrain.

2. Two checks: the production capacity and material stock level. As schematically shown by material supply process map (MSPM), the received order is first checked with production for availability of production capacity. Second is stock level check. This is a checking by logistics manager to control the on-hand inventory to produce the confirmed order, however, this step is not indicated by the company’s MSPM, but logistics manager needs to do it before confirming the order for customer and materials planning stage accordingly. In order to backup the production, there is a re-order point and thus safety stock in the company’s inventory management system. This safety stock is a little higher for very important customer, but since this company is producing to out-delivery day and no make to stock, the safety stock is just for few days. At the end of this step, the order confirmation in case of availability of production capacity and enough on-hand stock to start production is sent to the customer.

3. Planning. At this stage the logistics is forecasting the required materials and planning how to acquire that. Actually, at this point by knowing the on-hand inventory, the materials order in relation with the order quantity and also delivery time is prepared for sending to the supplier.

4. Ordering. The order is forwarded to supplier through system. Notice, this not a “purchase order”, because before sending the order to supplier by Finnveden Powertrain, the central purchasing office (CPO) has selected and contracted with the supplier, which usually the Finnveden Powertrain’s customer itself had
introduced the supplier for its prior certified quality. Therefore, the logistics
manager in this company places “delivery order” for contract items particularly
for required steel.

5. Delivery. Supplier handles all traffic and transportation activities, which reveals
that the freight cost is included in selling price and delivery is landed at buyer’s
store.

6. Delivery control. This stage has two branches. First, incoming inspection that is
operated by logistics department and as discussed earlier, in part of procurement
steps, it is only check the appearance of materials. Second, is components
control that is controlled by quality department, however, this type of control is
so rare for steel.

7. Warehousing. This is the storing process that contains; stowing the material in
the warehouse, maintaining the favourable storage condition inside the
warehouse, and keep the inventory records in order to update the real stock
level.

8. Supplier evaluation and follow-up. There is no activity in the MSPM of
Finnveden Powertrain. However, practically the logistics department evaluates
the supplier performance after delivery. They are implementing the monthly
supplier evaluation in quality and delivery performance situation, specifically
for on-time-delivery and right quantity as per the delivery order. Logically, the
price and payment conditions must be evaluated and controlled by the central
purchasing office.

Figure 5.8, illustrates the purchasing process in Finnveden Powertrain. Although,
considering the fact of doing some steps of purchasing and buying by the central
purchasing office, this model can be renamed to the “supply process model” which is
unique to this company and more or less looks like the company’s MSPM. The paled
steps in purchasing function, tactical purchasing, sourcing, and buying are indicating the
stages of the whole process those are done by central purchasing office, which are not
within the procurement process of Finnveden Powertrain directly.
5.1.4.1.3 Purchasing objectives

In reality, central purchasing office works on the overall goals of purchasing. However, in Finnveden Powertrain, based on the corporate strategy in material supply, which is “keep so low stock level without facing any shortages”, the logistics department focuses on two objectives particularly in order function and supply part of their purchasing process model as:

1. Keep minimum safe inventory
2. On-time-delivery

As an inference, the second objective is to fulfil and support the first one, in which in order to lowering inventory to its possible minimum level, this company looks into an uninterrupted flow of materials from supplier side, otherwise they need to keep more volume of materials in their stock that increases the capital tied up by steel inventory.

5.1.4.2 Finnveden Powertrain total cost of ownership

Management- this part of total cost does not directly exist in the company’s system. However, as almost all logistics and procurement steps are operating by logistics department, some activities related to management are acted. The more precise and expanded analysis and also control of this type of costs might be done by the central purchasing office.

Delivery- apparently, there is no cost according to these types of operations since the supplier delivers the material at the buyer’s site. But, in practice the logistics department in Finnveden Powertrain is responsible for accept delivery, accept partial shipment, expedite late orders, and arrange for correction of incorrect orders.
*Service*- completely similar to other three companies here, buying steel is an ongoing routine purchasing and this item is in the category of raw materials. In addition, as the main focus is on supply process of steel, and also its total cost of ownership, this part of TCO model does not exist and valid.

*Communications*- regarding the first objective of purchasing, which is; keep a possible lowest stock level, this company needs to be in a regular intensive communications with supplier. In this part, the time and work of production planners for preparing and sending the delivery orders to supplier, updating the materials information system, and then forwarding the updated and right information to supplier are the significant activities related to communications.

*Price*- when the central purchasing office is implementing and managing the major part of purchasing function for Finnveden Powertrain, identifying the activities related to price is not easy. However, based on the current logistics functions and company’s MSPM, it seems few activities in materials area such as quantity, quality, delivery schedule, and degree of coordination and cooperation can be assigned to price part of Finnveden Powertrain’s total cost of ownership model, but not freight costs and discounts.

*Quality*- for this company the cost of activities related to quality incurs when they receive poor quality. The incurred costs are:

1. Time to resolve the problem in contact with supplier
2. Sorting the produced parts
3. Production downtime
4. Production rescheduling
5. Customer delivery postponement
6. Return rejected material
7. Material replacement

Although, often this type of cost is reimbursed by the seller, but loss of goodwill and reputation of firm due to late customer’s order seems critical and irretrievable. Some usual activities in this field can also be observed here, which are:

- Assess supplier performance
- Maintain supplier relations
- Inspect incoming materials
- Dispose of scrap

Meanwhile, since the important customers of this company proposed their certified suppliers, so activities like select and approve supplies and understand supplier’s process are excluded form quality activities of Finnveden Powertrain.

Another issue that can be classified as a quality activity, is the mass of steel packaging materials after usage, those are wooden boxes in order to prevent any defect or scratch on materials and can not be recycled or sold to somebody else easily. Therefore, this is a problem, because they “occupy a space” that might have been used by production area instead, especially when the company needs more space to install new machineries for its expansion plans or even some facilities replacement. To get rid of these used materials and free the occupied space by them, the company needs to dispose them, which bears handling charges.

Figure 5.9, shows the company’s total cost of ownership model, which looks more different and exclusive because of centralised purchasing and its special supplier selection procedure, also the high sensitivity of products quality for the company’ customers can be another reason. The starred activities have been found special and unique in each part, so in this company, five activities in the quality part of the model are in accordance with receiving poor quality material those are necessary to resolve the problem. Still in quality part, a controlled level of humidity as a special storage condition for steel, and then so uniquely dispose used incoming packaging materials are exclusive. In management part of company’s TCO, the activities related to logistics personnel affairs instead of purchasing personnel affairs highlights another uniqueness of Finnveden Powertrain TCO wheel.
As shown by this unique TCO model, the major part of total cost of ownership in this company belongs to quality activities, which implies on the necessity of maintaining a high quality level in produced parts that significantly emphasised and requested by the customers.

5.1.4.2.1 Purchasing cost priorities

The most distinguished costs in the company’s supply process are communications time, quality costs, and occupied space by used incoming packaging materials.

Surprisingly, some elegant rational relationships between these preferred costs with the purchasing objectives at supply level and the company’s TCO wheel is observable, which are:

- The first and second supply objectives for this company are “Keep minimum safe inventory” and “on-time-delivery”, which to achieve these two the
logistics department needs to have a continuous communications with suppliers. Coincidently, communications time has a significant portion in the company’s TCO model that shows the company is communicating with supplier to secure an uninterrupt flow of materials that is the second objective, which enables them to meet the first supply objective for lowering the stock level. Thus, these frequent communications, to backup and guaranty the achievement of two purchasing (supply) objectives, spend a lot of time that is a cost for company and even the most important indeed.

The second important cost is quality cost, which complies with the contribution of activities related to quality in the Finnveden Powertrain’s TCO wheel that takes a biggest portion of wheel, but no compliance with purchasing or supply objectives since quality is not targeted there.

As discussed beforehand in total cost of ownership of Finnveden Powertrain, the cost of used incoming packaging materials can be related to quality activities. Therefore, the prioritised purchasing or supply costs of this company can be inferred and summarised as:

1. Communications time
2. Quality costs

5.1.4.2.2 Purchasing cost reduction

As a whole there are some possibilities to reduce all purchasing costs, however, for Finnveden Powertrain in below areas cost reduction is more probable:

- Price
- Used incoming packaging materials
- Quality cost

Again, if we look at company’s purchasing objectives, total cost of ownership model, and also prioritised purchasing costs, price as one of the areas for reducing the cost does not exist in any previous discussions. The second and third proposed areas are in the group of quality activities since the current incoming packaging materials, as interpreted beforehand, are to protect the quality of steel and thus that is a part of quality costs.

Due to the difficulties in changing the certified materials for some customers, reducing price through change of supplier takes a lot of time to convince and get the quality
approval from customer on the new source. Seemingly, the only simple way to reduce the price is bulk purchasing, in which by ordering higher quantities they obtain an outstanding position as a customer for supplier that may cause a reduction in communications and order follow up and also access to more reliable and assured on time delivery schedule.

To empty the space occupied by used incoming packaging materials, changing the packaging type is one suggestion. Albeit, before going through such this decision the company must analyse the probable costs and benefits of that, because perhaps by using another packaging some defects and problems will arise that imposes more quality costs than gained reduction in occupied space by those wooden boxes.

In addition to reducing price by purchasing more quantities, the quality cost also will reduce, because when the order quantity is considerable the pre-shipment inspection is cheaper, which can reduce the costs of resolving post-delivery quality problems. In other words, the pre-shipment inspection thanks to bulk-purchasing can prevent the delivery of poor qualities and then reduce below post-delivery quality costs:

- Time to resolve the problem in contact with supplier
- Sorting the produced parts
- Production downtime
- Production rescheduling
- Customer delivery postponement
- Return rejected material
- Material replacement

Another benefit of bulk-purchasing is reduction of total production time through reducing the production setup time for both supplier and customer. In detail, by ordering more quantities the produced units in each production time increase, so the cost and then the price per unit decrease, which is due to producing more units per each production setup time that is the major part of total production time. However, this is not true in all production systems, for instance if there is a standard limit for production in each production time, ordering more is neutral and may not reduce the price.
Briefly, there are two parts for this company to reduce the purchasing (supply) costs which are:

1. Price
2. Quality costs

Bulk-purchasing is proposed as the best tool to get this reduction, in which by ordering more reduction in these two parts will be gained through below improvements:

- Get a higher position in supply market as one of the important customers
- Provide a stable on-time-delivery service by the supplier to its major customer
- Implementing the pre-shipment inspection for a cheaper charge per purchased unit
- In some cases reduce the price per unit by producing more products in each production time

5.1.4.3 Finnveden Powertrain collaborative procurement approach
5.1.4.3.1 Company size in a regional comparison and similarity of required steel

Considering the weekly used steel and in compare with other companies who are producing products from steel in Alvesta region, Finnveden Powertrain stands at the large size company.

In terms of the homogeneity of requirements, the company’s required steel is homogenous to some other factories in this region. In addition to homogeneity of requirements there are some other clues to find the similarity between companies, those are:

- Same production machineries
- Similar products
- Same supplier

These three evidences prove that there is homogeneity of requirements between this company and some other companies in the region. However, by dividing the requirements into specialised and generalised materials, the similarity is in general materials that are a quite big volume of whole used materials in this company.
5.1.4.3.2 Motives and expectations in group purchasing

For Finveden Powertrain, group purchasing is such a transit and change in the supply chain of member companies. Some motives for joining into a purchasing group for this company are:

1. Get a higher position in supply market as one of the important customers thanks to order bigger amounts

2. Improve quality by increased on-hand inventory between production setup times that means reaching to an extended production time between two setup times thanks to receive bigger amounts, which as a result improve the productivity and quality of production time and reduce the setup cost per unit of production

3. Purchase discounts and lower prices for higher quantities

4. Daily delivery from a regional stock (depot) to factories and thus adding the materials warehouse space into production

5. Upgrading the business knowledge of members especially supply market information thanks to collaborative purchasing

Except the last motive, the others are rather same as the suggested possible ways to reduce purchasing costs through bulk purchasing. The fifth motive explicitly shows that the supply market information attained through the group purchasing is a motivation to join for this company.

As a summary two principle motives or expectations for this company in order to join into a purchasing group are:

- Bulk-purchasing for cost reduction through less communication, optimised production, lower prices, on-time delivery
- Supply market information attainment

5.1.4.3.2 Suggested form and organisation of collaboration by Finnveden Powertrain

The best form of collaborative procurement for this company is third party, formal separate organisation, since in their opinion if they will purchase steel through a virtual organisation then they need to communicate with their partners instead of supplier, so in that case the communications level will not be reduced. The reason of this preference refers back to one of the motives for joining to a group purchasing that is less communication and coordination time by becoming to a very important customer.
5.2 Cross-case analysis

All four empirical overview figures provided in chapter four (Figures 4.2 to 4.4) are now extracted in Figure 5.10, in order to have a comparison centre. The figure reveals within-group similarities coupled with intergroup differences. The foundation of cross-case analysis is within-case analysis that enhances the possibility of search for patterns.
<table>
<thead>
<tr>
<th>Dimensions of Investigation</th>
<th>Hylitekenik</th>
<th>BK Produkter</th>
<th>Svets &amp; Mekano</th>
<th>Finnveden Powertrain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>→ Procurement and purchasing process</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>** ✓ Procurement steps:**</td>
<td></td>
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</tr>
<tr>
<td>1- Purchasing</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2- Traffic &amp; transportation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3- Incoming inspection</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4- Quality control</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>5- Stores</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>→ Purchasing process model (PPM) / Material supply process map (MSM)</strong></td>
<td>PPM</td>
<td>PPM</td>
<td>PPM</td>
<td>MSPM</td>
</tr>
<tr>
<td><strong>→ Purchasing objectives</strong></td>
<td>1- OTD</td>
<td>1- Price</td>
<td>1- Price + Quality</td>
<td>1- Keep minimum safe inventory</td>
</tr>
<tr>
<td>2- Price</td>
<td>2- Quality</td>
<td>2- OTD</td>
<td>2- OTD</td>
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<tr>
<td>OTD= on-time delivery</td>
<td></td>
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<tr>
<td><strong>→ Total Cost of ownership</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>** → Cost parts**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Delivery</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Service</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Communication</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Price</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Quality</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>→ Purchasing cost priorities</strong></td>
<td>1- Process time</td>
<td>1- Price</td>
<td>1- Price + Quality</td>
<td>1- Communications time</td>
</tr>
<tr>
<td>2- Storage space</td>
<td>2- Quality</td>
<td>2- Capital tied up by extra purchased units</td>
<td>2- Quality</td>
<td></td>
</tr>
<tr>
<td>3- Quality</td>
<td>3- Delivery time</td>
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<tr>
<td><strong>→ Purchasing cost reduction</strong></td>
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<tr>
<td><em>Price</em></td>
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<tr>
<td><em>Communication time</em></td>
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<tr>
<td><em>Administrative costs</em></td>
<td></td>
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<tr>
<td>Group purchasing</td>
<td>Bull-purchasing</td>
<td></td>
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<tr>
<td><strong>→ Collaborative procurement views:</strong></td>
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<td></td>
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<tr>
<td>** → Company size disparity with others in the region**</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
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<td>Alvesta</td>
<td>Alvesta</td>
<td>Vislanda</td>
<td>Alvesta</td>
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<td><strong>→ Homogeneity of needs</strong></td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>→ Motives &amp; expectations</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>** → Reduction**</td>
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<td>1- Price</td>
<td>1- Price</td>
<td>1- Become a major customer for suppliers</td>
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<tr>
<td>** → Gain**</td>
<td>2- Process time</td>
<td>2- Delivery time</td>
<td>2- Stock level</td>
<td>2- Production optimisation</td>
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<tr>
<td>3- Administrative costs</td>
<td>3- Material management outsourcing</td>
<td></td>
<td></td>
<td>3- Freeing up store space</td>
</tr>
<tr>
<td>4- Expert buyers</td>
<td></td>
<td></td>
<td></td>
<td>4- Within group information exchange</td>
</tr>
<tr>
<td><strong>→ Proposed collaboration form &amp; organisation</strong></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Note: ✓-YES  ☒-NO

Figure 5.10: Within-group similarities coupled with intergroup differences
5.2.1 Within-group similarities

From a comparison of all studied sites (see Figure 5.10) some similarities coupled with differences associated with selected dimensions to investigate are found in:

Procurement and purchasing process

1. There is a high similarity in procurement steps in three of studied companies. Referring to within-case analysis for each site; the purchasing process models in Hyllteknik, BK Pordukter, and Svets & Mekano comprise more or less same steps.

2. Following to the previous similarity the purchasing process model (PPM) in all cases looks the same with shared activities. Furthermore, purchasing process models in these three companies are congruence with the reference model.

3. Price, on-time-delivery, and quality are the most analogous purchasing objectives across the cases, though; there are different ranking and grading of these three.

Total cost of ownership

1. All four cases have similar total cost of ownership models. This resemblance of total cost structure can be seen as one of the traits of the industry. All activities those make the company’s total cost of ownership more or less are performed in studied companies, while this work focuses on steel procurement and purchasing process, thus there is no activity related to service provided by seller as a post-transaction cost.

2. Price is the most plausible saving and cost reduction for all sites since they chose it as the first item.

3. Hyllteknik, BK Produkter, and Finnveden Powertrain suggest bulk-purchasing or buy large quantities as the solution for price reduction. But Hyllteknik sees bulk-purchasing collaboratively with other companies instead of individually.

Collaborative procurement approach

1. With excluding Finnveden Powetrain, other cases have not outstanding size disparity with other companies present in the region.
2. The geographical distance among each plant is not that much far. Three of those are very close in Alvesta region, but just Svets & Mekano is in Vislanda zone that is thirty kilometre far from others.

3. In terms of homogeneity of requirements, all the companies use the same types of still as other companies in the region.

4. Price is among the motives of joining to a purchasing group for Hyllteknik, BK Produkter, and Svets & Mekano.

5. Hyllteknik and Finnveden Powertrain have a similar suggestion for the form and organisation of collaborative procurement and group purchasing.

5.2.2 Intergroup differences
Joint with similarities there are some differences between cases (see Figure 5.10).

Procurement and purchasing process
1. The procurement process in Finnveden Power train has no purchasing process since central purchasing office purchases the required material for this company.

2. In accordance with Finnveden powertrain’s different procurement, the company has material supply process model (MSPM) unlike other studied sites here. While, due to centralised purchasing the only part of purchasing process model is supply and order function.

3. Finnveden Powertrain considers two purchasing objectives, in which the first one is rather unique for minimising the inventory level up to safe level. This also could originate from its distinct supply process.

Total cost of ownership
1. Heterogeneous costs and even miscellaneous ranks for some shared costs are considered by each case to the prioritised costs in purchasing.

2. In purchasing cost reduction, except price every company sees different potentials for reducing the total cost.

3. Following to the different purchasing costs which considered for reduction, Svets & Mekano introduces different ways. Finnveden Powertrain also has two different solutions to reduce its quality costs.
Collaborative procurement approach

1. In terms of company size in a regional comparison, Finnveden Powertrain has size disparity with some other companies.

2. Except price, each company has its own individual motives to join a group purchasing. Some of the expectations from collaborative procurement are reducing different parts of purchasing costs. On the other side, some others are about obtaining an ability, capability or accessibility. Finnveden Powertrain is looking for some special gains from this collaboration those are different from other’s expectations.

3. BK Produkter and Svets & Mekano have different ideas about the form and organisation of collaboration. Indeed, BK Produkter has no suggestion for the form of purchasing group since it seems a costly project for them.
Chapter 6 Conclusion

Final chapter provides the found answers to proposed research questions which guided me along the whole study. Theoretical contributions are presenting some findings associated with theoretical framework that I came up with in this investigation. Following, practical contributions are the practical suggestions to studied companies. Afterward, generalisation of findings and critiques of my study are discussed. Finally, there are some suggestions for future research in collaborative procurement, specially in Alvesta case.

6.1 Answers of research questions

6.1.1 What are the main steps in the procurement process of Alvesta case-companies?

Procurement and purchasing process- All under-studied companies in this case are going through the complete process of procurement and purchasing suggested by theoretical framework, though each of them based on their corporate strategy and own sell market in some stages of the whole process may have a little emphasis or in some others a little compromise. Amongst, Finnveden Powertrain is an exceptional case by centralised purchasing that can be a good instance of every company who has central purchasing office and local offices in plant. However, order function and supply activities of logistics department, who also works as the local office in this company, surprisingly is pretty comply with purchasing process model that used as the reference model in this study. The procurement process in these companies can be summarised as (see Figure 5.10):

1. Purchasing (Hyllteknik AB, BK Produkter AB, Svets & Mekano AB)
2. Traffic and transpiration (none of them)
3. Incoming inspection (all four companies)
4. Quality control (none of them)
5. Stores (all four companies)

Respectively, Figure 6.1 reflects briefly the current purchasing process situation in each site.
Purchasing objectives- Apart from a little difference in each of the purchasing processes, almost all companies set same objectives for their purchasing as:

- Best price (Hyllteknik AB, BK Produkter AB, Svets & Mekano AB)
- On-time-delivery (Hyllteknik AB, Svets & Mekano AB, Finnveden Powertrain AB)
- Quality (BK Produkter AB, Svets & Mekano AB)
- Minimum inventory (Finnveden Powertrain AB)

6.1.2 What type of purchasing costs might be reduced or eliminated through collaborative purchasing among the steel-based products manufacturers in Alvesta?

Total cost of ownership- TCO wheel played a role such an “answer key” to find the relative cost position of firms in this investigation. Answer key is a metaphor for TCO model here, which helped to find the purchasing and ownership costs in each site. The model showed the cost structures in different companies also helped to find some hidden costs which are not clear even for the companies. The total cost of ownership in studied cases contains the activities related to (see Figure 5.10):

1. Management (all four companies)
2. Delivery (all four companies)
3. Communication (all four companies)
4. Price (all four companies)

5. Quality (all four companies)

There was no cost related to service activities for purchasing of steel. Except Finnveden Powertrain all other companies do not pay enough attention to every activity in their procurement, for instance, according to TCO wheel management activities contains operations in purchasing management and therefore when a company purchases the materials itself, it operates activities in management such as purchasing personnel affairs and determination of purchasing strategy in conjunction with corporate strategy. Through a more careful and thoughtful assessment of purchasing process the company would be able to identify rather all activities done to take the ownership of requirements.

**Purchasing cost priorities** - Among the total cost elements the most important costs for each of the investigated companies were pointed out as (see Figure 5.10):

- Price (BK Produkter AB, Svets & Mekano AB)
- Time of process and communications (Hyllteknik AB, Finnveden Powertrain AB)
- Quality (all four companies)
- Delivery time and costs (BK Produkter AB)
- Capital tied up by inventory (Svets & Mekano AB)
- Occupied space by store (Hyllteknik AB)

**Purchasing cost reduction** - Furthermore, during the interviews the potential costs reductions which are similar to the most important costs for the companies were recognised as (see Figure 5.10):

1. Price (all four companies)
2. Communications time (Hyllteknik AB)
3. Administrative costs (Hyllteknik AB)
4. Quality (Finnveden Powertrain AB)
5. Capital tied up by purchased units (Svets & Mekano AB)
Proposed strategy for cost reduction- The top priority was assigned to “price” both for the most important cost and most plausible to reduce. Respectively, each company proposed some strategies which are:

- “Bulk-purchasing” by BK Produkter AB and Finnveden Powertrain AB
- “Group purchasing” by Hylltechnik AB,
- “Multiple sourcing & economic order quantities” by Svets & Mekano AB

6.1.3 What form of collaborative purchasing can be workable for the Alvesta case considering the extant characteristics and motives?

Motives and expectations behind collaborative purchasing- Almost all popular motives for joining a purchasing group, which have been founded by researchers in collaborative procurement were declared repeatedly by the interviewees with localising and contingency elements. The motives can be divided into two categories, first are reductions and savings:

1. Price
2. Process time
3. Administrative costs
4. Delivery time
5. Stock level

Second are gains and achievements through collaboration:

1. Expert buyers
2. Material management outsourcing
3. Become a major customer for suppliers
4. Production optimisation
5. Freeing up store space
6. Within group information exchange

Forms of collaboration- Regarding the organisational form of collaborative procurement it is quite acceptable that it highly depends on the willingness of the companies both in collaboration, essentially, and then in which form. With respect to
the factors influencing the form of collaboration below factors indicated that there is a possibility for group purchasing through a third party formal organisation:

1. A low size disparity between companies in the region (Hyllteknik AB, BK Produkter AB, Svets & Mekano AB)
2. Small geographical scope (all four companies)
3. Homogeneity of companies requirements and procurement maturity (all four companies)
4. No competition between companies (all four companies)
5. Homogeneity of supply sources and rather same suppliers (all four companies)

Ultimately, there is a possibility for collaborative procurement among steel-based manufacturer in Alvesta region. Each studied company has its own selection and opinion for suitable form of collaborative purchasing those are classified into:

1. Third party, formal, separated organisation (Hyllteknik AB, and Finnveden Powertrain AB are agree with this form)
2. Informal, virtual organisation (Svets & Mekano AB is agree with this form)
3. Reluctant (BK Produkter AB)

6.2 Theoretical contributions

6.2.1 Procurement and purchasing process
The purchasing process model depicts the sequential steps, which are determining specification, selecting supplier, contracting, ordering, expediting and evaluation, in purchasing function and its related sub-processes. This model can be flexible and compatible to different purchasing organisations. For example, for the companies who centralised their purchasing function, this model can illustrate the steps taken by central office and the steps by local office, Finnveden Powertrain AB (Figure 5.8) is a good instance for this case.

Indeed, there are special purchasing process models for the companies those outsource their purchasing process or any other sub-processes in their procurement, such as buying, sourcing, supply and order function, or tactical purchasing. Respectively, in each case and based on keeping any sub-process in-house, from the whole purchasing process model, by the company and outsourcing the other sub-process (Figure 3.2) this
model would be renamed to that sub-process or part of purchasing process which has been kept in-house in order to better conveying the current process in the company. These models are suggested as:

- **Supply (order function) process model** - in outsourcing tactical purchasing and sourcing to a third party business service provider or central purchasing office (e.g. Finnveden Powertrain AB).
- **Buying process model** - in outsourcing the sourcing function to the third party business service providers like an international sourcing agency.
- **Tactical purchasing process model** - in outsourcing the supply function to the third party logistics companies.

### 6.2.2 Total cost of ownership

According to the gathered data from studied sites in this investigation, three activities those are not in TCO were observed, which are:

1. Special storage conditions
2. Dispose used packaging of incoming materials
3. Capital tied up by extra units of purchase discounts

Logically, first and second issues are aimed at maintaining the quality of purchased items, thus they can be added to activities related to quality part of TCO wheel.

Alternatively, if some other activities have been founded somewhere else, which are specifically related to the warehousing and storage of incoming materials, another part for storage and material warehousing management activities for better understanding real costs can be added to this model and develop TCO to a wheel with seven categories, in which the seventh will be “warehousing” with some basic activities like:

- Hire, evaluate, promote, fire warehousing personnel
- Training warehousing personnel
- Special storage conditions
- Special material handling procedures and equipments

The third issue can be considered in price part of TCO wheel to show that purchase discounts for different levels of order (multiple-prices) also impose cost by buying and
keeping more than need quantities, so there must be a balance between the required quantity and discount levels.

### 6.2.3 Collaborative procurement

In addition to benefits and motives to join a purchasing group indicated by scholars in this field, some other expectations from join a group purchasing were founded, those are:

- Freeing up warehouse space to substitute and expand production area
- Process time reduction both purchasing and delivery lead times due to professionalism and aggregation
- Outsourcing material management
- Production optimisation by continuous flow between setup times
- Reducing stock level

Moreover, few human factors were also found influential to join and choose an organisational form such as:

- Willingness to collaborate with other companies in the region
- Trust level in functionality and profit of group purchasing and stay trustful to it

A rather new form of group purchasing is proposed by Svets & Mekano AB. That is:

- **Price agreement.** This form is classified in group of informal, virtual organisation, which seems as an aggregated ordering to a supplier for different buying companies those are completely separate and without any communications with each other. In this form, each company operates all the functions in purchasing individually without any collaboration or outsourcing to the third party, so the only mutual and shared activity among members is buying from same supplier to get the benefit of quantity discount.

### 6.3 Practical contributions

Below are some suggestions derived from the results and experiences of this study under practical contributions.

1. A shared popular approach among four companies is on-time-delivery (OTD) in order to reduce the materials inventory into the minimum safe level.
Although, they are working in this direction, but to achieve a better situation in this field it can be suggested to move towards JIT concept especially focus more on:

- Sourcing
- Supplier evaluation methodologies (Humphreys et al 1998)

2. In conclusion, collaborative procurement can reduce all five costs of ownership (TCO wheel), since it covers bulk-purchasing, multiple-sourcing and economic order quantity, which proposed separately by each company and these are different names by each company for just one entity.

3. It seems beneficial for all studied cases here to consider the TCO wheel for better understanding of all direct material costs and indirect material costs. Also this model would be helpful to find some hidden activities in each five (no service part) categories of TCO wheel, which they already exist in their process but because of being overlapped by major activities they are not taken into account for total cost of ownership.

4. Considering the special market condition for steel as a metal that has a price fluctuation in different circumstances another benefit which can motivate more companies to join is:

- “Price hedging” by future contracts that will be one of the outcomes of combined purchase order of the members in the group
- By access to overseas markets more competitive supply offers will be obtained

5. This investigation shows that the required elements and basements to establish a central purchasing office, at least as a feasible project based on the physical and geographical indicators, exist there. Hereinafter, there is need to measure and evaluate the acceptance level of centralised form of collaboration and the number of interested companies to join, or maybe there is a willingness to collaborate through decentralised self-managed forms.

**6.4 Critiques of my study**

In case of choosing a larger sample than now this results could have been able to portrait a better picture of current situation in purchasing process and total cost of
ownership for more companies in Alvesta region. But the lack of time hindered achievement this target.

6.5 Suggestion for further research

Future research can go further by choosing a larger sample to have a better view about procurement and purchasing process in the manufacturers in this region.

A deeper analysis needs to perform for identifying:

- What additional costs will be added by group purchasing?
- What current costs will be added by group purchasing?

In addition, through more interviews the motives or hinders of join to a group purchasing can be found clearer, which then some efforts to resolve the barriers and individual reasons to refuse the idea of collaboration can be made to facilitate and pave the path for collaborative procurement, providing it will be a profitable change for the members.

Meanwhile, a further investigation will be able to analyse the different production systems, material handling systems, customer relationship management systems, and even some other business processes used by different companies in this region. Certainly, the outcomes of this profound study can provide a wider view for starting a group purchasing which is more compatible with members’ systems and comprise higher fitness of various dimensions, which finally will be a good guideline to find a better organisational form of collaboration.
Reference list

Methodology literature


**Articles**


**Books**


**Internet sources**

- [www.hyllteknik.se](http://www.hyllteknik.se) [accessed 10 April 2010]
- [www.bkprodukter.se](http://www.bkprodukter.se) [accessed 12 April 2010]
- [www.svetsmek.se](http://www.svetsmek.se) [accessed 26 April 2010]
Appendix 1

Interview Guide

Interviewer:                                                Interviewee:
Company:                                                   Date & place:
Elapsed time:

PROCUREMENT & PURCHASING PROCESS:
1. What are your procurement steps? (☐Purchasing, ☐Stores, ☐Traffic & transportation,
☐Incoming inspection, ☐Quality control & assurance, ☐Others...)

2. What is your purchasing process model? (Do you have any manual or document for that?)

3. What is your main objective in purchasing function?

TOTAL COST OF OWNERSHIP:
4. What are your cost categories in purchasing?
☐ Management: ☐ Delivery: ☐ Service: ☐ Communication: ☐ Price: ☐ Quality:
☐ Others...

5. Considering the above categorisation and based on the most important costs for you, what is your ranking and prioritising on purchasing cost?

6. Which category/is of purchasing costs can be reduced?

7. How such a reduction in purchasing costs can be obtained? (In which step of process)

COLLABORATIVE PURCHASING:
8. Considering to the purchasing volume of steel what is your company size?

9. How much similar your purchasing steel is to other companies in the region?

10. What category/is of purchasing costs will be reduced if you join a purchasing group?

11. What is your suggestion for the form of collaboration? (Implicit question asked during interviews)