How to improve the inbound flow of a manufacturing company

Analyzing and refining the Customer-driven Purchasing method

Master Thesis in Business Administration

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Eric Hedén       Fredrik Tiedemann
Summary

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Title: How to improve the inbound flow of an manufacturing company: Analyzing and refining the Customer-driven Purchasing method

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Purpose

The purpose of this research is to analyze the CDP-method in order to develop and refine the method. The method is developed and presented in Bäckstrand (2012), with the aim to strengthen the competitiveness of manufacturing companies. Someone outside of the development context has never, until now and to the researchers knowledge, refined the method.

Methodology

A multiple case study with four companies where used. The empirical data collected within the study where used to evaluate the CDP-method and to refine the method. The presented improvement is based on the empirical data and conceptual models developed from theory.

Findings

Three improvements were developed. The first of them changed step 8 of the method, the second can’t be tied to a single step and is therefore an overall suggestion, whereas the third provides a new type of analysis within step 6 of the method.

Research limitations

The research was conducted at companies where the CDP-method was already implemented. An implementation at a new company could possibly reveal another type of empirical data, which could be interpreted in a different way. The researchers have also detected areas that couldn’t be investigated within this research, these are identified and left for further research.

Theoretical implications

Results from this thesis connect the classification of supply risk by Kraljic (1983) with supply chain strategy by Fisher (1997) to enable a new type of analysis. Furthermore, theory within the standardization and over-specification (e.g. Burt, Petcavage & Pinkerton, 2010; Geldeman & van Weele, 2002) is introduced and incorporated in the CDP-method. A third implication is a reinforced focus on strategy in combination with the CDP-method, which is based on theory regarding strategic alignment (e.g. Gattorna & Walter, 1996; Hines, 2004).

Managerial implications

The new analysis should, together with the CDP-method as a whole, strengthen adopting companies supply chain and improve internal and external communication.

Originality/value

This thesis provides a new set of analysis in the CDP-method that could benefit practitioners.
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I  Introduction

This chapter starts by describing the background for this research. The background will build up to the issues under investigation, which are expressed in the problem statement. The specification of the problem will then lead to the formulation and presentation of the purpose. Lastly will the boundaries of the investigation be stated together with the disposition of the thesis.

1.1  Background

This thesis takes off in the growing competition that companies, or more precisely their supply chains, faces in the modern business environment (Christopher, Peck & Towill, 2006; Lyons, Mondragon, Piller & Poler, 2012). The competition has led to a higher strategic relevance for functions such as purchasing and manufacturing and their connections to related functions. This enhances the importance of alignment of functional strategies (Lyons et al., 2012; Porter, 1996).

The scope and role of logistics have changed dramatically over the years (Chapman, Soosay & Kandampully, 2003). It has evolved from being seen as a supportive role and a cost-absorbing function (Chapman et al., 2003; Christopher, 1993) to be recognized as a strategic factor that provides a unique competitive advantage (Chapman et al, 2003; Gadde & Hulten, 2009) in the intensified global competition (Christopher, 2011; Cui & Hertz, 2011; Datar, Kekre, Mukhopadyay & Svaan, 1991).

Competition among industrial firms, in modern business, is therefore no longer conducted between individual firms, but rather between their supply chains (Christopher, 2011; Christopher et al., 2006; Lambert & Cooper, 2000), which puts more emphasis on managing the business relations (Lambert & Cooper, 2000). One of the reasons for the heightened competition is that outsourcing and global sourcing has been more prevalent (Nagurney & Li, 2013). Today it’s common practice to outsource production processes or source globally (Nassimbeni & Sartor, 2006; Wang, Niu & Guo, 2013). One of the arguments for outsourcing and global sourcing is cost reduction, derived from the fact that other organizations may have better knowledge or resources (Kroes & Ghosh, 2010). Furthermore, by outsourcing a company can reduce excess production capacity and focus on its core competitive competences (Nagurney & Li, 2013). This leads to a situation were an external actor performs activities that has traditionally been performed internally (Lambert & Cooper, 2000).

The trend of outsourcing and sourcing globally has lead to longer supply chains, as firms increasingly move production offshore or source from more distant locations (Christopher, 2011). A drawback from this might be that the customer order decoupling point1 (CODP) is transferred from the manufacturer (internal) to the supplier (external) (Bäckstrand, 2012; Wikner & Bäckstrand, 2011). The position of the CODP, in regard to the supply chain, has received much attention by other scholars (e.g. Borgström and Hertz, 2011; Lamming, Johnsen, Zheng & Harland, 2000; Mason-Jones and Towill, 1999; Rudberg and Wikner, 2002). Bäckstrand (2012) targets her research on how the supplier interaction should be

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1 The CODP separates the part of the supply chain focused on satisfying the customer and the part of the supply chain based on planning (Hoekstra and Romme, 1992). This means that the CODP is the point in the flow of goods that separates forecast driven production (speculation) from customer order driven production (Giesberts & van den Tang, 1992).
handled with regard to the position of the CODP. Furthermore, since the CODP might be located outside of the manufacturer, the firms manufacturing strategy must be extended and also include the supplier interaction (Bäckstrand, 2012). This identifies a need for strategic alignment and knowledge transfer between manufacturing and purchasing functions, also highlighted by other scholars (e.g. Rebolledo & Jobin, 2013; Soni & Kodali, 2011).

To reduce these problems and provide guidance for manufacturing companies who experience them, Bäckstrand (2012) developed a method for ‘Customer-driven Purchasing’ (the CDP-method). The method was developed together with six companies in a project called ‘KOPeration’, and then implemented on four of them. The aim of the method is to investigate how the customer requirements should impact the supplier interactions and how the requirements can be incorporated in the purchasing strategy. This method is interesting since it contributes to improved interaction with suppliers as well as improved internal communication and integration (Bäckstrand et al., 2013), which has proven to be a competitive advantage by other scholars (e.g. Huo, 2012; Pagell, 2004). Since the method uses a triadic perspective, including the suppliers, the manufacturer and the customer, it takes on a supply chain approach. Given the current situation with competition between supply chains, the approach by the CDP-method reduces the risk of sub-optimizations in the supply chain. Considering the reasoning above, the importance of such a method cannot be neglected since it will increase the competitiveness of manufacturing companies, and their supply chains.

1.2 Problem statement

Research within supply chain management is mainly devoted to theory building, such as the development of the CDP-method, with little attention on verifying the theories (Soni & Kodali, 2011). Development of existing theories within operations management has been lacking. One reason for this is that they are seldom developed in a format or depth that enable refinement or supporting of the theories presented (Schroeder, 2008). The CDP-method is based on a doctoral dissertation that, according to the researchers, fulfills aforementioned criteria’s and therefore could be refined and supported. The CDP-method has never, to the researchers knowledge, been supported, verified or refined after its release in year 2012. This reveals an area that the researcher can contribute to, namely theory refinement of the CDP-method. Furthermore, it is stated in Bäckstrand (2012) that subsequent work with the method is needed in order to provide even more competitiveness for companies that chooses to adopt it. These facts form the core of this research problem statement and purpose.

1.3 Purpose

From the reasoning above the following research purpose is derived:

The purpose of this research is to analyze the CDP-method in order to develop and refine the method.

To be able to fulfill this purpose, an analysis of the CDP-method as well as the context where it has been implemented needs to be conducted. This analysis needs to be based both on theoretical data, that is how the method should be used, and empirical data, how the method is used. When this analysis is done, further developments can be proposed.
1.4 Delimitations

The CDP-method, as described by Bäckstrand (2012), contains 12 steps divided into 3 phases. This study focus on step 1-5 (phase 1) and step 6-9 (phase 2) of the method. The result from the first two phases are which products or suppliers to further investigate. The third phase involves evaluation of the present relationship with the suppliers and the desired future state and is not included in this study. Non of the case companies have implemented step 10-12 (phase 3) and therefore can no empirical data can be collected. These steps are therefore considered to be outside the scope of this thesis. For more information regarding the third phase please see Appendix 1.

1.5 Key terms

'Efficiency focus' and 'Responsiveness focus' are two important terms that are used throughout this thesis. These terms are hereunder defined, by the researchers, in order to clarify for the readers.

1.5.1 Efficiency focus

In relation to purchasing situations and this thesis, the term 'efficiency focus' is referred to as:

*Purchasing items with the minimum amount of manual intervention as possible, and/or by the most cost effective order quantities as well as similar efforts. This is done with the purpose of reducing the total cost.*

1.5.2 Responsiveness focus

In relation to purchasing situations and this thesis, the term 'responsiveness focus' is referred to as:

*Purchasing items with a short supply lead-time for replenishment, enabled through long-term supplier relations and/or aggressive investments as well as similar efforts. This is done with the purpose of being able to respond quickly and be flexible to customer demand.*

1.6 Disposition

Chapter 1: The Introduction chapter presents the background to the research and why this area is important to study. Here are also the purpose and key terms stated.

Chapter 2: Methodology explains and clarifies how the research has been conducted. This chapter describes how and what information that has been collected as well as the process of analyzing the data. The chapter is ended with a discussion around the trustworthiness of the research and the ethical considerations that’s been taken in mind.

Chapter 3: The Theoretical framework accounts for the theories that have been used within this research. Here under are phase 1 and 2 of the CDP-method presented as well as the theories thats been used for development of the method.

2 This definition is based on Fisher (1997), Gerlderman and Semeijn (2006), Kraljic (1983) and Olsen and Ellram (1997).

3 This definition is based on Christopher et al. (2006), Fisher (1997), Gerlderman and Semeijn (2006), Kraljic (1983) and Olsen and Ellram (1997).
Chapter 4: Presentation of empirical data starts off by presenting the four case companies where the empirical data were gathered. The collected data are then presented for each and every company in the same order as the companies where presented.

Chapter 5: Refinement of the CDP-method presents the analyze that’s been made regarding the research purpose. The analysis is presented as a discussion, connecting the theories presented under chapter 3 with the empirical findings in chapter 4. The analysis and discussion are presented as three improvements, each under their own subheading. Each of the three discussions is ended with a summarization, presenting one part of the fulfillment to the research purpose.

Chapter 6: Conclusion and discussion is the final chapter of this thesis. Here under are theoretical and managerial implications discussed. A discussion regarding fulfillment of the research purpose is also conducted. The chapter is ended with final reflections from the researchers as well as suggestions for further research.
2 Methodology

In this chapter is the research methodology presented. Firstly, a brief overlook of the research process is presented. The following part has a structure based on Saunders, Lewis and Thornhills (2012) research 'onion' approach and starts by presenting the undertaken research approach. Next, the research design is presented, followed by the methods and techniques used for data collect and data analysis. A discussion regarding the quality of the research and the ethical considerations finalizes the chapter.

2.1 Research process

The research process started when the authors found an interesting topic and formulated the research’s purpose. This was then transformed into a research proposal as presented in Figure 2.1. The right side of the figure also reveals the progress of how the thesis was written. Theory behind the CDP-method and its surrounding theories were studied parallel during this process. However, the researchers studied scientific research theory at an early stage in order to decide how the research should be conducted.

![Figure 2.1 Research process.](image-url)

Studies of the CDP-method and the surrounding theories resulted in the theoretical framework and were used to analyze the data. Before visiting the case companies a workshop was conducted together with all the companies within this research. The empirical da-
ta gathered in this stage was then analyzed in order to see which areas of the method that the companies thought could be further developed. The next step in the process was to visit the case companies in order to gather more detailed empirical data. Analysis of both empirical and theoretical data started simultaneously as the empirical data were collected from the first case company. This analysis then formed the conclusions of the research.

2.2 Research approach

The purpose with this research was to analyze the CDP-method, by Bäckstrand (2012). Its theories and surrounding theories was studied before empirical data were collected and analyzed. The result of the theoretical study of the CDP-method and its surrounding theories resulted in theoretical concepts of how the method could be refined, the concept of development of conceptual analytical models is described by Wacker (1998). This approach was therefore characterized by tests of general principles and existing theories, which is described as deductive by O’Leary (2010) and Saunders et al. (2012). The initial concepts where then discussed with the case companies, at a workshop, regarding viability before going to the case companies for data collection.

2.2.1 Methodological choice

During this approach a number of data collection techniques were used, (i.e. observations, document studies and interviews). These techniques allowed the researchers to interpret spoken and written words in depth and the chosen methodology can therefore be described as a qualitative multi-method design (Saunders et al., 2012). This choice is, according to Saunders et al. (2012), favored over mono-method due to the richer data collection, analysis and interpretation.

Ellram (1996) state that quantitative research is the norm for research within this field, but that qualitative research is gaining in acceptance and is seen as a valuable alternative to quantitative research, especially within fields such as: purchasing, logistics and operations management, which where the fields in focus for this research.

2.2.2 Case Study

The researchers have deployed a case study to collect empirical data. The case study involved both joint workshops and case company visits. The purpose with the case study was to collect empirical data in order to refine the study conducted by Bäckstrand (2012). This is a common application for a case study (Ellram, 1996) together with extension of theory (Voss, Tsikriktsis & Frohlich, 2002).

The same issues were treated at the four case companies, which can be seen as a multiple case study design, according to Yin’s (2009) definition. The benefits of using a multiple-case design, compared to a single-case study, are the analytical benefits and the robustness (Yin, 2009). Näslund (2002) states that quantitative surveys yield limited benefits for practitioners. Hence a qualitative case study would provide more useful knowledge for practitioners.

Four companies were selected for this research. These companies were used in the study by Bäckstrand (2012), which influenced the selection as these companies have implemented the CDP-method. The selected companies were: Ericsson AB in Borås, Fagerhult Belysning AB in Habo, Parker Hannifin AB in Trollhättan and Siemens Industrial Turbomachinery AB in Finspång. Worth mentioning is that these companies constitutes the total population of companies that have adopted the CDP-method, to the researchers
knowledge. Therefore no sampling were required since the total population (the census) could be researched (Saunders et al., 2012).

2.3 Data collection

The information needed to answer the research objectives where gathered through interviews, document studies and observations. In addition, in situations were something had to be clarified after the company visit were completed, e-mails have been used between the respondents and researchers. All these data collection techniques are qualitative according to Saunders et al., (2012). Multiple sources of evidence and techniques are typically used within a case study due to the fact that no single source or technique has the complete advantage over all the others (Yin, 2009).

The aim of the data collection was to gather data about how the case companies used the CDP-method, their thought about it as well as to test the viability of the suggested refinements of the method. The techniques to achieve this were influenced by the research purpose, which is recommended by Creswell (2003).

2.3.1 Observations

Observations where conducted at all the case companies in order to gain richer information and better understanding of the companies business as well as the way they have used the CDP-method. The data sought were therefore of more qualitative nature, meaning that the researcher were more interested in what was happening rather than how often it happened. According to Saunders et al. (2012) this is what describes a participant observation, which can be compared to what Yin (2009) refers to as direct observations. All observations where conducted in form of, what Saunders et al. (2012) and Williamson (2002) call, ‘observer-as-participant’.

2.3.2 Interviews

The material sought was sensitive and the questions where open ended, all in line with Gillhams (2000) description of when interviews are appropriate to use. All interviews where conducted face-to-face due to the fact that the information given is more likely to be of higher importance (Saunders et al., 2012) and the respondent is more likely to disclose information during a face-to-face interview (Gillham, 2000). Furthermore, all interviews have been audio-recorded and notes have been taken as backup, if the recording equipment were to fail. These recordings have then been compressed into short summaries and can be seen as what Saunders et al. (2012) refers to ‘transcript summaries’. In order to minimize the risk of losing information, the transcript summaries have been written shortly after respective interview, as suggested by Saunders et al. (2012).

![Figure 2.2 The dimensions of interviews and the one used in this research (Gillham, 2000, p. 60)\(^4\)](image)

\(^4\) The figure is modified by the researchers.
The interview techniques used during this research can be described as unstructured to semi-structured, according to Gilliam’s (2000) definitions. The four different techniques used were verbal observations, ‘natural’ conversations, open-ended interviews as well as semi-structured interviews. The use of the different techniques is described more thoroughly below and more information about them can be seen within the dashed marking in Figure 2.2.

The researchers used verbal observations as well as ‘natural conversation’ to get a better understanding of the topic during the workshops conducted within this study. The reason for the use of this technique was to ask questions when the opportunity naturally arose as well as to get to know the settings, the people and to establish credibility, all in line with Gillham (2000). During the company visits a mix of open-ended and semi-structured interviews where conducted. The researchers had a few open questions together with a couple of closed questions. The open-ended interviews (elite interviews) where used to get a better and more comprehensive grasp of what was researched. The semi-structured interviews yielded the richest single source of data during the case study, which is normal within a case study (Gillham, 2000). The researchers had a short list of open-ended key questions to be answered and used probing questions to follow up on leads provided by the respondent (Creswell, 2003; Stake, 2010; Williamson, 2002). The questions used where based on information from both the CDP-method and the opening workshop. For more information regarding the questions used, see Appendix 2.

### Table 2.1 Summary of interviews, duration and type

<table>
<thead>
<tr>
<th>Place for visit</th>
<th>Respondents</th>
<th>Type of interview</th>
<th>Duration of interviews (hours/minutes)</th>
<th>Duration of the visit (hours/minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop, with all case companies (Jönköping 2014-03-13)</td>
<td>Representatives from all case companies as well as Jönköpings university of engineering and Combitech</td>
<td>Verbal observation; Natural conversation</td>
<td>6 hr</td>
<td>7 hr</td>
</tr>
<tr>
<td>Siemens Industrial Turbomachinery AB (Tromsø 2014-03-25)</td>
<td>Logistics Development Manager; Strategic Logistics Developer; Senior Project Manager, Global Sourcing</td>
<td>Open-ended interviews; Semi-structured interviews</td>
<td>3 hr 20 min</td>
<td>4 hr 30 min</td>
</tr>
<tr>
<td>Fagerhults Belysnings AB (Halo 2014-03-27)</td>
<td>Production Logistics Manager</td>
<td>Open-ended interviews; Semi-structured interviews</td>
<td>2 hr</td>
<td>1 hr</td>
</tr>
<tr>
<td>Workshop at Fagerhults Belysnings AB (Halo 2014-03-27)</td>
<td>Representatives from Product Development, Purchasing, Production and Sales</td>
<td>Verbal observation; Natural conversation</td>
<td>3 hr</td>
<td>6 hr 30 min</td>
</tr>
<tr>
<td>Parker Hannifin Manufacturing Sweden AB (Fredriks 2014-03-28)</td>
<td>Inbound/Outbound Manager</td>
<td>Open-ended interviews; Semi-structured interviews</td>
<td>2 hr</td>
<td>3 hr</td>
</tr>
<tr>
<td>Ericsson AB (Bolvi 2014-03-31)</td>
<td>Senior Supplier Developer</td>
<td>Open-ended interviews; Semi-structured interviews</td>
<td>2 hr</td>
<td>2 hr 35 min</td>
</tr>
</tbody>
</table>

All interviews were conducted at the premises of the case companies and with employees within the areas of purchasing, production and logistics. The duration of all the interviews as well as the place and title of the respondents can be seen in Table 2.1.

### 2.3.3 Documentation studies

The documents used, in this research, consisted of internal information regarding the companies businesses as well as their webpages. As suggested by Yin (2009), prior to the field visits, Internet searches were made regarding the companies’ background, products and organizational structure. This information gave the researchers a better background to the case companies and helped to establish credibility during the interviews.
With some exceptions, documentary information is likely to be used in every case study (Yin, 2009). This type of data can take many forms (Yin, 2009), especially due to the technological developments that have been made, such as the Internet (Patel & Davidson, 2011).

2.4 Analysis of data

The aim of the data analysis is to describe, explain and then interpret the studied subject (Denscombe, 2010) in order to enable the researchers to answer their research purpose (Merriam, 2009).

To be able to make the analysis needed to fulfill the purpose, both the empirical data and theoretical data have been used. The two types of data was first analyzed separately and then compared to each other, as can be seen in Figure 2.3. The empirical data has been analyzed alongside the collection, which is a common practice within qualitative research (Denscombe, 2010). In fact, Merriam (2009) says that this is a way of gaining more trustworthy data. The cases have been analyzed individually and then compared to each other, which can be seen as what Merriam (2009) defines as ‘within-case analysis’ respectively ‘cross-case analysis’.

The researchers intended to use the analysis to find out how the method can be refined. This means that the refinement is based on theoretical data that also is supported by empirical data

2.4.1 Triangulation

The collected empirical data has been triangulated, both between different collection methods but also between different companies and respondents. The data collected, through different data collection techniques, have therefore been compared with the data from the other data collection techniques within the same case company e.g. that statements from respondent is in line with documentation or if the facts provided by documentations could be observed in reality. The data from the different case companies have also been compared to each other in order to check for consistency between the different companies. The reason for doing this is to distinguish between company specific answers and answers that applies for all companies.

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The figure is modified by the researchers.
These are the two major types of triangulation according to Williamson (2002), method triangulation and source triangulation. The former type checks the consistency in the findings between methods, uniform results reveals a ‘true picture’ (Gillham, 2000). The latter type involves testing the consistency in information given by different people and/or on different occasions (Williamson, 2002).

2.4.2 Pattern matching

This research started by studying the CDP-method as well as literature on topics related to the method. These studies resulted in analytically developed conceptual models as described by Wacker (1998). The models are then compared to how the case companies worked with issues tied to the concept in order to illustrate them with empirical data. Therefore, the concepts can be seen as an expected outcome, a pattern, of how the case companies should work according to theory and empirical data as a mean to prove the concepts as observable or not.

This can be compared to the deductive pattern matching technique, according to the description from Saunders et al. (2012) and is one of the most desired data analysis techniques in a case study research, according to Yin (2009).

2.5 Trustworthiness

To measure the quality of the conducted research it should be evaluated against certain criteria’s. Saunders et al. (2012) say that qualitative researchers can use the criteria dependability instead of reliability, credibility instead of internal validity and transferability instead of external validity.

The employed research design is described in this chapter, this is, together with an assessment the research designs effectiveness two ways to increase dependability according to Shenton (2004). The effectiveness of the design is not discussed in this part of the thesis, but instead this is discussed in the conclusion and discussion chapter of the thesis. Merriam (2009) states that a qualitative study conducted twice will not lead to the same results. Dependability is therefore not a measurement on whether the study can be replicated by others, but rather a measurement on whether others can see that the results makes sense given the data collected (Merriam, 2009). To facilitate this, the researchers present the collected data and the questions asked during the interview, Appendix 2, to enable the reader to understand how and why the empirical data was interpreted in the way it is. In order for the research to be credible and taken seriously it should fulfill the criteria of dependability (O’Leary, 2010).

During the research the description of case companies and the presented empirical data was sent to the corresponding respondent in order for them to provide comments. This was also done with results from the data analysis as well as the results. This helps to reduce the risk of researchers bias and misunderstandings and can be seen as an example of member checking in accordance to the definition from Carlson (2010). Guba and Lincoln (1989) describe this as the most important way of achieving credibility. The researchers have audio-recorded the interviews and made transcript summaries so that the data can be reviewed several times, which according to Saunders et al. (2012) helps to reduce bias. Triangulation, both between method and sources, and pattern matching were used as previously described. These data analysis technique ensures credibility (Merriam, 2009; Shenton, 2004), even tough results from triangulation can be overestimated (Denscombe, 2010) and non-existing patterns claimed (Yin, 2009). Furthermore, the respondents were enlightened
that participating was voluntarily, which helps to ensure credibility (Shanton, 2004). The criteria of credibility therefore regards whether the researchers have “accurately recorded the phenomena under scrutiny” (Shenton, 2004, p. 64).

To enable the reader to see whether the presented result is applicable in their situation, an extensive description of both the methods used, and the context of the investigation is presented. This is in line with suggestions from Guba and Lincoln (1989). They state that it is up to the reader to decide if the results are applicable to other contexts or not, in other words, the transferability of the research (Shenton, 2004). Furthermore, by using a multiple case study design the transferability of the research are enhanced (Ellram, 1996).

2.6 Ethical considerations

The researchers consider it important to discuss ethical considerations in a qualitative research, an opinion shared by Creswell (2003).

The researchers have no former experience or connection to the companies or the respondents within this research. However, the researchers have connection to Bäckstrand, author of Bäckstrand (2012) and developer of the CDP-method, in the sense that they are former students to her. This situation was a concern in early parts of the research since the presented result might point out flaws in the CDP-method. This has afterwards been seen as less of a problem as Bäckstrand welcomes critics and appreciates every chance to strengthen the method.

All respondents have been informed that they can be anonymous if they prefer and that participation is voluntary. The respondents have given the researchers their permission to use company specific information. However, some respondents have requested not to be referred to by name and therefore the company’s names are stated, but the respondents are referred to their title within the company. Furthermore, all interviews have been audio-recorded in consent with the respondent. Afterwards has the respondents been given a chance to edit out information before the publishing of this thesis, which is in line with Saunders et al. (2012) definition of informed consent.
3 Theoretical framework

This chapter begins with a short presentation of how the theoretical framework was constructed. This is followed by a description of the CDP-method. The reason is to offer the reader a chance to grasp and get a better understanding of the method, since it constitutes the core of this thesis. For a full description, the readers are referred to Bäckstrand (2012). This is followed by theories that are related to the CDP-method or will be used in the development of the CDP-method. These theories help the readers to understand the theories that the CDP-method derives from and how the method can be further developed.

3.1 Literature review

The literature review helped the research to make sure that the proposed research purpose had not been answered already, which is one of the goals with a literature review according to Knopf (2006). The search for literature has furthermore followed the suggestion by Knopf (2006), where the conducted literature review can be seen as two circles, illustrated in Figure 3.1.

![Figure 3.1 The theoretical framework and its structure.](image)

In the first circle there are studies and sources that directly address the research purpose, namely the CDP-method, presented by Bäckstrand (2012). The second circle is broader and considers studies and sources that are relevant or overlap with the research purpose. The second circle in this research where used to build up the understanding and argumentation for the presented conclusions. As can be seen in Figure 3.1 the second circle consist of theories regarding strategy, how to match strategies with different types of products, portfolio purchasing, standardization and over-specification.
3.2 The method for customer-driven purchasing

The CDP-method, by Bäckstrand (2012) consists of twelve steps divided into three phases. In line with the research purpose and delimitation, only the two first phases will be declared here, as can be seen by the square in Figure 3.2. For more information regarding phase three (step 10-12), see Appendix 1.

The first phase consists of five steps and focuses on identifying and mapping the current situation for a product or product family. The first four steps focuses on the product and the items that it consist of while the supplier is included in the fifth step. The second phase consists of four steps and focuses on analyzing the information gathered throughout phase one. The purpose of the second phase is to identify supplier relationships to focus on and further analyze in phase three (Bäckstrand, 2012).

3.2.1 Step 1 – Identifying product structure and ‘Bill of material’

In this step a product family or product group is identified and selected for analyze (Bäckstrand et al., 2013). The product selected should be purchased continually and also be customizable in order to best benefit from the CDP-method (Bäckstrand, 2012).

Table 3.1 Example of layout of the BOM table (Bäckstrand, 2012, p. 221)

<table>
<thead>
<tr>
<th>Item ID</th>
<th>Item name</th>
<th>Supplier(s)</th>
<th>Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>End product</td>
<td>Internal</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Sub-assembly</td>
<td>Internal</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Sub-assembly</td>
<td>Internal</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Purchased item</td>
<td>Supplier W</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Purchased item</td>
<td>Supplier X</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Manufactured item</td>
<td>Internal</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Purchased item</td>
<td>Supplier Y</td>
<td>Supplier Z</td>
</tr>
</tbody>
</table>

Furthermore the product structure should be identified to reveal the order of manufacturing or assembling. The main purpose of the product structure is to provide a comprehensive illustration of the product. Here it is recommended to use the ‘Bill of material’ (BOM)

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6 The figure is modified by the researchers.

7 The figure is modified by the researchers.

8 ‘Bill of material’ is another word for product structure (Mattsson, 2004) and specifies how a product is built from raw materials and components, through manufacturing parts and semi-finished products to final manufacture or assembly of a product (Jonsson & Mattsson, 2005).
since it can provide more detailed information regarding the product. As indicated by the example of a BOM in Table 3.1 the last level of the BOM indicates a purchased item. Observe that an item can be sourced from multiple suppliers and that all suppliers should be listed (Bäckstrand, 2012).

3.2.2 **Step 2 – Identify Supply lead-time for each item**

The purpose of this step is to identify the lead-times for sourcing and manufacturing for the different items in the product (Bäckstrand, 2012). The BOM table from step one is now complemented with the manufacturing lead-time or purchasing lead-time, depending on whether the item is a make or buy item (Bäckstrand et al., 2013). This is made on item level for all the items that makes up the product (Bäckstrand, 2012). As can be seen in Table 3.2 four new columns are added from the first step.

Table 3.2 Example of layout of the lead-time table (Bäckstrand, 2012, p. 222)

<table>
<thead>
<tr>
<th>Item ID</th>
<th>Item name</th>
<th>External lead time [time unit]</th>
<th>Internal lead time [time unit]</th>
<th>Additional lead time [time unit]</th>
<th>Supply lead time [time unit]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>End product</td>
<td>2</td>
<td></td>
<td></td>
<td>2_a</td>
</tr>
<tr>
<td>B</td>
<td>Sub-assembly</td>
<td>3</td>
<td></td>
<td></td>
<td>5_b (2_a + 3)</td>
</tr>
<tr>
<td>C</td>
<td>Sub-assembly</td>
<td>1</td>
<td></td>
<td></td>
<td>6_c (5_b + 1)</td>
</tr>
<tr>
<td>E</td>
<td>Purchased item</td>
<td>3</td>
<td></td>
<td></td>
<td>9_e (6_c + 3)</td>
</tr>
<tr>
<td>F</td>
<td>Purchased item</td>
<td>5</td>
<td></td>
<td></td>
<td>11_f (6_c + 5)</td>
</tr>
<tr>
<td>D</td>
<td>Manufactured item</td>
<td>4</td>
<td></td>
<td></td>
<td>9_o (5_e + 4)</td>
</tr>
<tr>
<td>G</td>
<td>Purchased item</td>
<td>4</td>
<td></td>
<td></td>
<td>13_g (9_o + 4)</td>
</tr>
</tbody>
</table>

Regarding supply lead-time, the time used for planning is the one that should be employed. If there is any safety lead-time or time for quality control etc., this should be included under the column ‘additional lead-time’ (Bäckstrand, 2012).

Table 3.3 Example of the layout for the supply lead-time compilation table (Bäckstrand, 2012, p. 223)

<table>
<thead>
<tr>
<th>Lead time [time unit]</th>
<th>Item ID</th>
<th>long</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item ID</td>
<td>G</td>
<td>F</td>
<td>D, E</td>
<td>C</td>
<td>B</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The items lead-times are then calculated by adding up the internal and external lead-time throughout the product structure. To increase the understanding a time phased product structure can be created. This step ends by creating a ‘supply lead-time compilation table’, where all the items are compiled and sorted in consecutive order based on their total lead-time (Bäckstrand, 2012). An example of a layout for the supply lead-time compilation table can be seen in Table 3.3.

3.2.3 **Step 3 – Differentiate forecast- from customer-order-driven items**

In the beginning of this step the demand lead-time is identified. The demand lead-time might not been fixed, so in order to determine the lead-time historical data regarding customer’s required delivery times should be gathered (Bäckstrand, 2012).

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9 The figure is modified by the researchers.
10 The figure is modified by the researchers.
Table 3.4 Example of the supply lead-time compilation table, with the CODP (Bäckstrand, 2012, p. 224)\(^ {11}\)

<table>
<thead>
<tr>
<th>Lead time [time unit]</th>
<th>long</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item ID</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Driver</td>
<td></td>
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<td></td>
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</tbody>
</table>

The supply lead-time compilation table can than be updated with the CODP that divides forecast driven from customer order driven items (Bäckstrand, 2012), as exemplified in Table 3.4.

### 3.2.4 Step 4 – Differentiate generic from unique items

All items in the product structure, from a focal actors perspective, are now separated into customer-generics (CG), customer-unique (CU) and customer-order-unique (CoU) items. An CG item is included in products sold to several different customers whereas an CU item are included in products sold to one customer but quite frequently. Item used for a specific customer order are denoted CoU, these are considered to be used only in this particularly customer order. This means that the concept of uniqueness derives from a customer perspective in the sense that a product can range from a generic (standard) to a specialized product, unique for a particular customer order (Wikner & Bäckstrand, 2012).

Table 3.5 Example of supply lead-time compilation table, with CU and CoU (Bäckstrand, 2012, p. 226)\(^ {12}\)

<table>
<thead>
<tr>
<th>Lead time [time unit]</th>
<th>long</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item ID</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Driver</td>
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<td></td>
</tr>
</tbody>
</table>

The product structure from step one and the supply lead-time compilation table from step three are used once again and updated by highlighting CU and CoU items (Bäckstrand, 2012). An example of this can be seen in Table 3.5.

### 3.2.5 Step 5 – Differentiate make from buy items

Next step is to identify the purchased items, i.e. where there is an interaction with a supplier or not. Pure make items will be excluded from further analysis in the CDP-method due to the lack of supplier interaction. Before there is any purchasing at all, the companies must decide on whether to make or buy the items. In this analysis all sub-assemblies and items that there is an opportunity to purchase or manufacture in-house is included. This information is then gathered in a make-or-buy table (Bäckstrand, 2012). Thereby is phase 1 of the CDP-method completed. The step presented next will start the second phase of the method.

### 3.2.6 Step 6 – Analyze items in the customization-perspective framework

In this step the supplier’s level of customization is taken into consideration, which already were done in step four for the focal firm. With this information in mind, all the purchased items can be positioned within the customization-perspective framework, see Figure 3.3. By doing this the items can be classified as having a logic or counter-logic flow for level of customization. A counter-logic flow is when the supplier has a higher level of customiza-

\(^{11}\) The figure is modified by the researchers.

\(^{12}\) The figure is modified by the researchers.
tion compared to the focal firm. On the other hand, in a logic flow, the uniqueness should increase, or be the same, from the beginning to the end of the supply chain (Wikner & Bäckstrand, 2012). A counter-logic flow thus implies that the supplier is exposed to a higher degree of risk, regarding speculation. This risk is most likely to impact the price of the item as well as the supplier’s willingness of keeping the item in safety stock (Bäckstrand, 2012). The indication is therefore that, when there is a difference in the perception of uniqueness, the actor who experiences the lowest level of customization should be the one keeping the item in stock (Bäckstrand et al., 2013).

![Figure 3.3 The customization-perspective framework (Bäckstrand, 2012, p. 228)](image)

CG items are marked by green in the framework, CU items by yellow and the CoU by red. The level of customization at the supplier actor is marked on the left part of the cell, followed by the focal actors level of customization on the right part of the cell. The three cells with a counter-logic flow are positioned up in the left corner of the framework (Bäckstrand 2012). To increase the readability these scenario have been referred to as 1:1, 1:2 and 2:1 and are marked by a thick black line in Figure 3.3.

### 3.2.7 Step 7 – Analyze items in the certainty-customization framework

In this step all the purchased items are positioned in the certainty-customization framework. The purpose is to identify the level of certainty and the level of customization, from the focal actors perspective. The lead-times (identified in step 2) as well as the demand lead-time (identified in step 3) are used in this step. This information helps positioning the CODP in order to differentiate forecast driven items from customer-order driven items. Furthermore, information regarding the focal actors level of customization (identified in step 4) is used to identify the level of customization, i.e. CG, CU and CoU (Bäckstrand, 2012). The certainty-customization framework can be seen in Figure 3.4.

![Figure 3.4 The certainty-customization framework (Bäckstrand, 2012, p. 229).](image)

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13 The figure is modified by the researchers.
3.2.8 Step 8 – Analyzing items in the CAP matrix

After the classification of level of customization (i.e. CG, CU and CoU) and level of certainty (i.e. forecast or customer order driven) in step seven, the analysis is extended in step 8. In this step of the CDP-method, different order winners are assumed to appear pre-CODP and post-CODP. Items purchased on forecast (pre-CODP) are analyzed with efficiency focus in order to reduce cost, comparable to Kraljic (1983), according to Bäckstrand (2012). Items purchased on an customer order (post-CODP) should instead be analyzed with responsiveness focus (Bäckstrand, 2012). The presumed order winners impact on efficiency and responsiveness focus are illustrated in Figure 3.5.

This analysis is done in the ‘Competitive advantage based purchasing matrix’ (the CAP matrix). The CDP-method only regards FD-CG, as can be seen in Figure 3.6, other scenarios are not investigated in the CDP-method.

Figure 3.5 Focus in the CAP matrix (Bäckstrand, 2012, p. 125).

Figure 3.6 Appropriate CAP matrix in different positions in the certainty-customization framework (Bäckstrand, 2012, p. 230).
3.2.9 Step 9 – Select supplier relationships to analyze

In this step a more qualitative approach is needed in order to select suppliers and supplier relations to further analyze. This step combine the data collected throughout the previous steps with expert knowledge regarding the supplier and the items. Aspects to consider are for example order volume, order frequency and current supplier performance (Bäckstrand, 2012).

If an item has been found in a counter-logic scenario, in the customization-perspective framework (step 6), the supplier of that item should be considered as a candidate for further analysis (Bäckstrand, 2012).

Based on the certainty-customization framework (step 7), if an item is positioned within the forecast driven CoU area, this supplier need immediate attention. If items are found in the forecast driven CU area and have a leveled demand pattern, these can be treated as a forecast driven CG items. If the demand pattern fluctuates they should be treated as a forecast driven CoU items, in other words in need of immediate attention. If there are any items with exceptional long lead-time (e.g. long supply lead-time in contrast to short demand lead-time) within the forecast driven CG area, the corresponding suppliers should be selected for further analyze. Furthermore a qualitative assessment needs to be carried out for suppliers of strategic items or bottleneck items that are purchased on forecast. Within the two customer order driven areas where unique items are located (i.e. CoD-CU and CoD-CoU), the suppliers of items with an exceptional long lead-time can be selected for analysis. These items have a risk of becoming forecast driven if the supply lead-times are enlarged which constitutes a risk since CoU and CU items should not be purchased on forecast. Furthermore, if there are items in the CoD-CG area that currently have a safety stock, investigations can be made if safety time would be more beneficial (Bäckstrand, 2012).

The suppliers selected for further analysis are then compiled in a supplier selection table. If the suppliers selected also supply other items to the focal firm, these are noted in the table as well (Bäckstrand, 2012).

3.3 Strategy

Strategies can have either internal or external focus (Mazzucato, 2002), were external describes what services the organization can perform compered to competitors or which they can perform in a more efficient way. Internal focus brings out another perspective, namely information flow within the own organization and how new knowledge is created (Mazzucato, 2002; Hines, 2004). The definition of strategy is, according to Gattorna and Walters (1996, p. 165), “a formula or a plan to compete efficiently in a marketplace”. This can be seen as including both internal and external focus.

3.3.1 Levels of strategy

There are three principal levels of strategy (Lyons et al., 2012; Lysons & Farrington, 2012; Saunders, 1997), which are; ‘corporate’, ‘business’ and ‘functional’ strategies.

The corporate strategy is often formulated through vision and mission statements with the aim of addressing the long-term direction of the organization (Barnes, 2008). For organizations with one business unit, the corporate strategy will be the same as the business strategy (Barnes, 2008; Lyons et al., 2012; Lysons & Farrington, 2012).
The business strategy derives from the corporate strategy and should be developed to appropriate business-level before implemented on the different business units (Hines, 2004). Porters view on business strategy is that companies can compete with cost leadership, differentiation or focus (Porter, 1985). If a focus strategy is used and a niche market identified, cost leadership or differentiation strategies are probably used within this niche market (Hines, 2004; Porter, 1985).

Functional strategies derive from the business strategy and tend to focus on products and markets. They constitute of broad policies and plans for supporting of the long-term competitive strategy (Hines, 2004).

![Figure 3.7 Framework for strategic alignment](image_url)

Many supply chain strategies falls into the category of functional strategies (Hines, 2004). Given modern definitions of supply chain management (e.g. Mentzer, DeWitt, Keebler, Min, Nix, Smith & Zacharia, 2001) one can comprehend that the supply chain strategy has influence on functions within the organization, such as purchasing, manufacturing and logistics. A visual framework for the different levels of strategy as well as how they should be aligned is presented in Figure 3.7.

### 3.3.2 Alignment of strategies

Several scholars highlight the importance of aligning the companies overall business strategy to the functional strategies (e.g. Gattorna & Walters, 1996; Shavarini, Salimian, Nazemi & Alborzi, 2013). Porter (1996) also highlights this by stating that alignment of strategies protects the competitiveness of the companies’ capabilities. Alignment makes all functions work in the same directions and towards the same objectives. This makes it harder for ri-

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14 The figure is modified by the researchers.
vals to copy the strategy and thereby makes it more sustainable, which ultimately brings success for the company. Teece, Pisano and Shuen (1997) share Porters view and sees complementing activities as one way of protecting activities and routines form being replicated or imitated.

Hines (2004) presents an example of misalignment of strategies. He says that a company can pursue a sourcing strategy that focuses on global sourcing and at the same time have a corporate strategy that focus on local sourcing. This can provide problems since infrastructure is built for local sourcing and that carrying out global sourcing on the operational level might be hard to accomplish. Kaplan and Norton (2004) provide an explanation of why misalignment occurs. They state that managers often look at their own function in isolation to other functions in the organization, this lack of a holistic view may lead to misalignment between strategies.

Gattorna and Walters (1996) produce yet another reason for the importance of strategic alignment. They start their argumentation by a top-down approach, by aligning the business strategy to customer requirement. This strategy needs to be broken down to functional strategies in accordance to the business strategy. If this alignment fails, the functional strategy that drives organizational behavior would not provide the output that customer’s want.

To summarize where strategic alignment must exist is; between customer requirements and corporate/business level strategy (Gattorna & Walters, 1996; Hines 2004; Lysons et al., 2012), corporate/business level and functional level (Hines 2004; Porter 1996), between, and among, the functional level strategies as well as between organization and strategy (Gattorna & Walters, 1996; Lysons et al., 2012).

3.4 Matching supply chain strategies with product type

The first step, according to Fisher (1997), in formulating a supply chain strategy is to consider the nature of the demand for the products supplied by the company. The products can be classified as either primarily functional or primarily innovative. Functional products satisfy basic needs, have a stable demand and long life cycles. The margins are low and therefore it is important to minimize costs. In comparison innovative products satisfy a higher need, have an unstable demand and a short life cycle. The margins are high and therefore companies should focus on maximizing its profits. Because of the unstable demand it is important to respond quickly to unpredictable changes in demand in order to minimize stockouts, markdowns or obsolete inventory (Fisher, 1997).

Having determined the nature of the demand, for the company’s products, the next step is to decide whether or not company’s supply chain is physically efficient or market responsive. The main purpose for an efficient supply chain is to achieve lowest possible cost through efficiency, whereas the main purpose for a responsive supply chain is to respond quickly to avoid stockouts (Fisher, 1997). The lead-time focus for an efficient supply chain is to reduce them as long as it doesn’t increase costs. For a responsive supply chain, lead-times should be reduced through aggressive investments. Supplier selection in an efficient supply chain should be based on cost and quality criteria’s. However, for a responsive supply chain speed, flexibility and quality should be the criteria’s. If the products are functional the company’s supply chain should be efficient. In contrary, if the products are innovative, the supply chain should be responsive (Fisher, 1997).
Chopra and Meindl (2007) gives two rules regarding supply chain strategies, where the first is that there is no right supply chain strategy for all situations. However, the other rule says that there is a right supply chain strategy for any given business strategy. Hines (2004) states that Porter’s (1985) cost leadership strategy includes Lean purchasing and Lean production to achieve efficiency. Differentiation, another of Porters business strategies, would include agile production to enhance flexibility. This reveal a connection between Porters (1996) view on business strategy and Fischer’s (1997) view on supply chain strategy.

Borgström and Hertz (2011) state that the conclusion that can be drawn from Fisher’s (1997) model is that a strategy is only right for the supply chain if it matches the product characteristics. One criticism that’s been made about Fisher's model is that most products cannot be classified as either innovative or functional (Borgström & Hertz, 2011). Chopra and Meindl (2007) instead see these two as extremes of a continuum where the demand is more or less easy to predict. If the uncertainty from customer demand increases, then the responsiveness of the supply chain needs to increase as well. This is done in order to stay in the zone of strategic fit, illustrated in Figure 3.8.

### 3.4.1 Impact of the customer order decoupling point

A frequently used concept for capturing the operations strategy is the CODP that divides the supply chain operations into two parts (Wikner & Rudberg, 2005a). The positioning of the CODP is vital for to the decision when designing a supply chain (Yang & Burns, 2003) and should be used strategically since operations upstream and downstream of the CODP shows different characteristics (Olhager, 2003).

Hoekstra and Romme (1992) defines the CODP as the separation of the part of the supply chain focused on satisfying the customer and the part of the supply chain based on planning. Another common definition of the CODP is the point in the flow of goods that sep-
arates forecast driven production (speculation) from customer order driven production (Giesberts & van den Tang, 1992), as can be seen in Figure 3.9. The further upstream the CODP is positioned, in the supply chain, the more activities can be carried out against customer orders (higher certainty). Vice versa the further downstream the CODP is positioned the more activities have to be carried out under forecast (uncertainty) (Rudberg & Wikner, 2004; Wikner & Rudberg, 2005a). By moving the CODP downstream, closer to the customer, the risk of both stock-outs and holding excess stock is reduced (Davies, 1993).

The CODP is mainly used as a tool for analyzing the material flows as well as the activities associated with production (Wikner & Rudberg, 2005a). One of the reasons for the CODPs important is that the upstream activities can be optimized, based on the forecast, and are therefore independent of the irregularities in demand. Another reason for the CODPs importance is its positioned at the main stock point, from which deliveries to customers are made (van Donk, 2001; Mason-Jones, Naylor & Towill, 2000a). In line with this, Wikner and Rudberg (2005b) state that the CODP can only be positioned at a buffer between processes or activities.

### 3.4.2 Supply chain strategy paradigms

Lean and agile strategies are often referred to as two opposite paradigms. However, they share the common objective of meeting the customers demand at the least total cost (Goldsbysby, Griffis & Roath, 2006). Combining leanness (efficient) and agility (effective) in a supply chain via the strategic use of a decoupling point has been termed leagility (Naylor, Naim & Berry, 1999), and is a hybrid supply chain strategy (Christopher, 2000; Christopher & Towill, 2000; Huang, Uppal & Shi, 2002).

As mentioned earlier the CODP divides the supply chain into two parts (Wikner & Rudberg, 2005a). The downstream part of the CODP shows highly variable demand with a large variety of products, whilst the upstream part is smoothed with a reduced variety. It can therefore be argued that a lean paradigm can be applied to the upstream supply chain as products are standard and the demand is more predictable. After the CODP an agile paradigm should be used due to the fact that the product variety has increased and the demand is unpredictable (Huang et al., 2002; Mason-Jones et al., 2000a; Naylor et al., 1999). The CODP acts as a buffer between the fluctuating demand for a wide variety of products and the leveled production schedule for a smaller variety of components (Naylor et al., 1999). A firm should therefore try to postpone the point of product differentiation until the last possible moment in the supply chain (Huang et al., 2002).

The leagile supply chain strategy enables a company to have a cost-effective supply chain upstream of the CODP and a high service level, providing exactly what the customer demands, downstream the CODP (Mason-Jones, Naylor & Towill, 2000b). In that sense, the leagile paradigm helps companies leverage the powers of each paradigm (Mason-Jones et al., 2000b), thus bringing together the best of both paradigms (Christopher & Towill, 2000).

Christopher et al. (2006) states that companies replenishment lead-times have a critical impact on their responsiveness to demand. Moreover the products (standard or special) and the demand (stable or volatile) are important dimensions. The two latter dimensions will tend to be related and are therefore merged together as one dimension. The two axis of the matrix are therefore; ‘supply characteristics’ (Short or long lead-time) and ‘Demand Characteristics’ (Predictable or Unpredictable). The matrix proposed by Christopher et al. (2006) is illustrated in Figure 3.10 and defines four suggested supply chain strategies.
The models presented by Fisher (1997), Mason-Jones et al. (2000a) and Christopher et al. (2006) emphasizes that one should select a supply chain strategy that best matches both the supply characteristics (Efficiency, responsiveness and lead-time) as well as the demand characteristics (type of product, volume, variety, variability and requested lead-time) (Hillthofth, 2012).

3.5 Portfolio purchasing

All the items and material purchased by a company are not the same. Some are more important and critical to the firm’s survival than others. Hence different procurement strategies, tactics and resources are to be used for different items (Coyle, Langley, Novack & Gibson, 2013). The quadrant techniques, matrix or portfolio model’s in purchasing provides useful inputs for supply management decision makers. There has been much published research on portfolio models within purchasing (e.g. Bensaou, 1999; Olsen & Ellram, 1997 and Turnbull, 1990) (Nellore & Söderquist, 2000). However, the model by Kraljic (1983) is considered to be the first description of strategic purchasing (Beer, 2006) and a major part of the development of purchasing and supply chain management (Gelderman & van Weele, 2002).

In 1983 Kraljic (1983) published a simple but yet effective framework for collecting marketing and corporate data, forecasting future supply scenarios and identifying available purchasing options as well as for developing individual supply chain strategies for critical items and materials. This purchasing model aims at minimizing the supply risk and to make the most out of the company’s buying power (Kraljic, 1983).

According to Kraljic (1983) a company’s need for supply chain strategy depends on two factors; Importance of purchasing and complexity of supply market. By using both these factors a matrix can be formed, as illustrated in Figure 3.11. The aim of this matrix is to identify which suppliers to develop a long-term relation with and which suppliers to keep at arm’s length (Beer, 2006).

The profit impact of a given item is defined in terms of the volume purchased, percentage of the total purchase cost, impact on product quality or impact on business growth. Supply risks is than assessed by availability, number of suppliers, competitive demand, make-or-
buy opportunities, storage risk and substitution possibilities. By using these criteria, a company can sort all their purchased items into four categories; leverage, strategic, non-critical and bottleneck, as can be seen in Figure 3.11. Each of these categories needs a distinct purchasing approach. All these approaches differ regarding decision level as well as information required and main tasks assigned to them (Kraljic, 1983). Olsen and Ellram (1997) as well as Gelderman and Semeijn (2006) has investigated the same type of classification and provides information on how companies should handle the items.

Figure 3.11 The Kraljic-matrix (Kraljic, 1983, p. 111).

Leverage items should be purchased by optimized order volume, companies should strive to exploit their full purchasing power for these kind of items (Kraljic, 1983). The focus, according to Olsen and Ellram (1997) should be to consolidate the volumes over several product families and obtain a good price for these items. Gelderman and Semeijn (2006) state that cost savings is perused for this kind of item and that suppliers should be evaluated against this criteria.

Strategic items and their suppliers should be given higher attention and the aim is to build long-term relationships with these suppliers (Kraljic, 1983; Olsen & Ellram, 1997). However, Gelderman and Semeijn (2006) mentions that is can be hard to accomplish a strategic partnership with these suppliers given the suppliers often prevailing upper hand in the power balance.

Non-critical items should be purchased through efficient buying and optimized order volume. This is done to find the most economic order quantity (Kraljic, 1983). For non-critical items Olsen and Ellram (1997) state that the buying company should strive towards supplier relationships that basically handle themselves. Gelderman and Semeijn (2006) has a similar suggestion, namely to implement e-procurement for these types of items. Olsen and Ellram (1997) as well as Gelderman and Semeijn (2006) state that the companies should use these examples to reduce administrative costs.

Bottleneck items should be handled with the main focus of securing supply of material, gaining a lower price for these items is not the focus in purchasing situations (Gerlderman & Semeijn, 2006; Kraljic, 1983). These items are described by low strategic value and are at the same time difficult to manage (Olsen & Ellram, 1997). This is not a favorable situation and should therefore be avoided. An example of how to move from this situation is to work towards standardization (Geldermann & van Weele, 2002; Olsen & Ellram, 1997).
3.6 Standardization

The design teams should design new products to the specifications and requirements from the customer, not necessarily to the state of the art. Despite this, many engineers are eager to incorporate the latest technology (Burt, Petcavage & Pinkerton, 2010), especially in a technical environment (Gelderman & van Weele, 2002). The selection of technologies is a complex issue due to the cost/benefit tradeoffs that comes from the choice of using either standard and proven technology or new and innovative technology (Burt et al., 2010). By using standard available components a firm can be more cost-efficient, but this may inhibit ideas (Royal collage of art, 1999). Even so, Olsen and Ellram (1997) state that companies should strive for standardization, especially in the case of non-critical items. Burt et al. (2010) say that standardization of products and components provides an important part in staying competitive in the global business environment, due to lower cost or higher quality. By evaluate the specifications that are necessary and investigate possibilities for standardization an end product can be made less complex (Gelderman & van Weele, 2002).

Standardization can also assist in resolving internal design conflicts between functions such as purchasing, manufacturing, engineering and marketing (Burt et al., 2010). Furthermore, Burt et al. (2010) mentions that by reducing the number of parts by standardization, the inventory levels will decrease, a logical consequence would be lower total costs. Therefore, during designing of a product a firm should strive for reducing the number of components, range of materials and try to use standard available components (Royal collage of art, 1999). The use of standard materials, production processes and methods will shorten the design time and lower the cost of designing and producing an item, hence streamlining the organizations operations. Standardization also reduces the quality problems with incoming materials, inventories, administrative expenses, inspection and handling expenses while achieving lower unit costs (Burt et al., 2010).

3.7 Over-specification

Van Weele (2002) defines over-specification as a situation where the technical requirements, imposed on a supplier is not necessary for the product’s functionality. This can be seen as the waste of processing itself (over processing), namely to perform more than the customer is willing to pay for (Liker, 2009; Petersson, Johansson, Broman, Blücher & Alsterman, 2008).

As a consequence to the highly functional structure of European companies, concepts such as ‘concurrent engineering’ and ‘early supplier involvement’ are hardly developed (van Weele, 2002). Technical specifications are therefore normally defined by research and development (R&D) without any considerations or contact with purchasing specialist or suppliers. This will, in most cases, lead to an over-specification of a product or component and a loss of supplier knowledge for improving and simplifying a product design. This will in turn leads to an unnecessary expensive product (Burt et al., 2010; Gelderman & van Weele, 2002; Nellore, 2001; van Weele, 2002) and kill innovation (Gadde & Snehota, 2000). Therefore it would be beneficial to work in cross-functional teams with supplier involvement when a new product is developed (Burt et al., 2010; van Weele, 2002). Design collaboration with the supplier can lead to reduced costs, improved quality and decreased time to market (Chopra & Meindl, 2013).

As the technical specification gets higher, one consequence can be that fewer suppliers are available for sourcing. Higher specifications will also, in some cases, lead to a monopoly situation were the buyer is dependent on a single supplier. The result is limited opportuni-
ties for competitive bidding among suppliers and therefore unnecessary expensive products (van Weele, 2002). A way to reduce the dependence to the supplier is by broaden the specifications (Gelderman & van Weele, 2002).
4 Presentation of empirical data

This chapter will present the empirical findings that have been gathered through interviews, observations and document studies. The first part will introduce the reader to the four case companies by providing a short, but elaborative presentation of them. The second and last part will present the empirical data gathered at the companies. All data that are published in this chapter is approved and verified by the companies.

4.1 Description of case companies

This section will present the four case companies and provide the reader with the context of where the results derived from. Hence, this will enable the fulfillment of the transferability criteria, as stated by Guba and Lincoln (1989).

4.1.1 Siemens Industrial Turbomachinery AB

Siemens Industrial Turbomachinery AB is a part of Siemens AG and produces gas turbines. This research has focused on Siemens Industrial Turbomachinery AB in Finspång and will henceforth be referred to as Siemens. The products that Siemens produce are used to generate electricity in power plants or as a power source to operate pumps and compressors (Siemens, 2014a). Finspång is Siemens biggest site in Sweden (Siemens, 2014a) and employed approximately 2 700 people in 2013 (Amadeus, n.d.a) with a turnover of 1 263 million EUR and an EBIT of 214 million EUR (Amadeus, n.d.a).

Siemens’ customers are usually countries, states, independent power producers, hospitals or heavy industries (Bäckstrand, 2012). Approximately 99% of the manufactured turbines are exported (Logistics Development Manager (LDM)) and today the company has turbines that are operational in over 100 countries (Siemens, 2014b). The company has total market share of about 20% (Bäckstrand, 2012) and manufactures approximately 50 turbines per year with customers usually requesting delivery within approximately one year from order. The lead-time for producing a gas turbine is longer than the demand lead-time and some parts therefore have to be built on speculation (Bäckstrand, 2012).

4.1.2 Fagerhult Group

Fagerhult Group employed nearly 2 200 people worldwide and had a turnover of 363 million EUR as well as an EBIT of 29,3 million EUR in 2012 (Amadeus, n.d.b). Fagerhults Belysning AB is a part of Fagerhult Group and produce professional lighting solutions for public environments. This case study has been carried out at Fagerhult Belysning AB in Habo and will henceforth be referred to as Fagerhult. The company’s products are divided into four application areas, namely; 'Indoor', 'Outdoor', 'Retail' as well as 'Health and Care' (Fagerhult, 2014). Fagerhult offers standard products, standard products with some modifications, as well as fully customized products. The demand lead-time for a standard item is the next day, except for standard products with an uneven demand pattern or a small yearly demand. These products as well as modified products have a delivery lead-time of 14 days. There are no guidelines regarding the delivery time for customized products since it is dependent on the design of the requested product.

Fagerhults’ customers are typically architects and therefore form a business-to-business relation, but private consumers are also handled within some products lines (Bäckstrand, 2012). The domestic market (Sweden) represents 35% of the volume sold and is thereby their biggest market (Bäckstrand, 2012).
4.1.3  Parker Hannifin Manufacturing Sweden AB

Parker Hannifin Manufacturing Sweden AB employed nearly 1 100 people in Sweden and had a turnover of 133 million EUR as well as an EBIT of 9,4 million EUR in 2012 (Amadeus, n.d.c). Parker Hannifin Manufacturing Sweden AB is part of Parker Hannifin Corporation and this research has focused on the manufacturing site in Trollhättan and will henceforth be refereed to as Parker. At this site Parker produces hydraulic pumps and motors for the global market. The lead-time for the products are described as short by Bäckstrand (2012), and one way of attracting customers is Parker’s ability to deliver these items with customer adaptations, according their ‘Inbound and Outbound manager’.

Parker’s customers consist of other manufacturing companies (Bäckstrand, 2012) and are therefore a business-to-business relationship. Approximately 85% of their products are exported (Bäckstrand, 2012) and around 50% of Parkers items and components are sourced from suppliers in Sweden. Parker Hannifin Corporation currently operates a worldwide company directive to source 5% from low cost countries. Parker has chosen to purchase this volume from Eastern Europe (Bäckstrand, 2012).

4.1.4  Ericsson AB

Ericsson AB is a part of Telefonaktiebolaget L. M. Ericsson. This case study has been carried out at Ericsson AB in Borås and will henceforth be referred to as Ericsson. The company produce radio communication equipment for transferring of voice and data. The demand lead-time is highly variable and ranges from 5 to 50 days (Bäckstrand, 2012). Ericsson is faced with a situation were customers desires shorter delivery times at the same time as supply lead-times are getting longer (Bäckstrand, 2012).

More than half of Ericssons’ customers are government owned telecom operators (Bäckstrand, 2012), and are therefore a business-to-business relationship. Approximately 70% of their manufactured products are exported and Ericsson has customers in more than 180 countries all over the world (Ericsson, 2014a). In year 2012 Ericsson had just over 19 800 employees and generated a turnover of 13 256 million EUR and hade an EBIT of -253 million EUR (Amadeus, n.d.d).

4.2  Empirical findings

The section below presents the empirical data gathered during this study and where collected during the spring of 2014. The questions asked during the interviews can be found in appendix 2. Some of the questions where used in order to get a background and better understanding of how the CDP-method have been implemented and used by the case companies. This information has not been used directly in answering the research purpose. Nevertheless, this data were valuable for the research and is therefore presented in appendix 3.

4.2.1  Siemens

Siemens have, through their participation in the KOPeration project, speeded up the work to separate between their order- and forecast driven purchasing activities. Purchases have traditionally been handled within each project, i.e. that all items that are required for manufacturing one gas turbine are bought especially for that turbine. Siemens has recently shifted from demand driven to consumption driven stock replenishment for items with low annual dollar volume. This means that they purchase these items based on the consumption rather than what they know will be demanded in the future. The shift towards consump-
tion driven stock replenishment, rather than demand driven, provides the opportunity to purchase generic low annual dollar volume items for more than one project at the time. Furthermore, the KOPerations project has increased Siemens focus on reducing the supply lead-time for strategic items (according to the Kraljic-matrix) that has a long supply lead-time and must be purchased on forecast. Reducing the supply lead-time is not always an easy and straightforward task.

“You have to get to know our suppliers and their supply chain. Then one can discuss whether they can have more raw materials in storage ... We can take responsibility and say that we will purchase this items in X number of months”. (Senior Project Manager, Global Sourcing (SPMGS)).

Another approach that Siemens discusses with a few suppliers is implementation of consignment inventories for the items with long supply lead-times.

“Setting up consignment stock for expensive items with long delivery times will reduce the lead-time [supply lead-time], secure delivery and reduce tied-up capital” (SPMGS).

There are also initiatives to changes regarding stock replenishment responsibility. The aim is to let suppliers be in charge for replenishment of items that are characterized with a low value. It should be noted that these two changes are not a direct consequence from the CDP-method, but still, it is occurring.

“… for inexpensive items that we purchase in a sporadic manner, we have a concept to let them [the suppliers] replenish our storages, it is nothing strange. We have this solution on indirect materials today and want to implement it on direct materials as well” (LDM).

Theses shifts can be summarized by an increased focus on efficiency for non-critical items, purchasing larger volumes less frequently and increased focus on responsiveness for strategic items, reducing supply lead-times. However, purchasing based on demand is not always better than basing the purchase on consumption.

“We always work to reduce our lead-times from the suppliers, as these are generally long. However, we do not need to purchase everything based on a customer order as this creates poorer opportunities for our purchasing department. Instead, it is better to work with items that are included in many products and thus stabilize the flow through forecasts to our suppliers and give them better conditions ... There is no intrinsic value in purchasing items based on a customer order ... The stabilized flow, and better communication with suppliers, can therefore reduce the supply lead-time” (Strategic Logistics Developer (SLD)).

The transition into purchasing items on forecast is somewhat dependent on the use of standardized items. Since standardization can be seen as purchasing generic items, used within several projects, the risk of storing them can be reduced. The ambition is therefore to use standard items as far as possible. However, one example when standard items cannot be used follow from specifications that are so high that only a few suppliers, on the global market, are qualified to fulfill them. Another example is when items are developed together with the suppliers. The outcome of these two examples might be situations were Siemens is dependent on this single supplier. The CDP-method could probable be of great use when it comes to these problems.

“It would be very interesting to have it [step 6 of the CDP-method] at hand in a supplier selection decision and in the development of new products, to include these aspects [of step 6 of the CDP-method] in the decision” (LDM).

As a mean to increase the use of standards and to reduce dependence on suppliers, two strategies were discovered at Siemens. The first example regards products that are co-
developed with suppliers. This is not an unusual situation for Siemens due to the fact that they develop, and sell, high-tech products. Hence, Siemens cannot have all competences within their internal organization. Siemens strive to buy the rights of the drawings of those items, which enable them to purchase the item from another supplier. The second strategy is to use cross-functional teams in product development. This could be illustrated by involvement of people from purchasing and manufacturing departments in early stages of product development.

Since Siemens customers request a function rather than exact specifications for the product and the items it consists of, it is the internal order engineering function that determines the specifications for the items.

“The first step for us to increase the number of standard items is to influence the order engineering function”. (LDM).

“The CDP-method makes it easier to communicate possibilities for improvement, both to order engineering, purchasing and production ... they get a picture over the product structure ... I think this is a big advantage and something that we can make use of” (SLD).

This has, in some cases, led to reconstruction of items to enable the same item to be used in two different products. The communication between functions were based on analysis in phase 1 and facilitated by a Gantt chart presented in MS Excel with information derived from the ERP system. A positive effect of this is that fewer items needed to be handled in the computer system and kept in storage.

“We had a discussion with the help of a Gantt chart and reached consensus ... They [the order engineering function] redesigned Article X [the article is anonymised in this thesis] which eliminated the need to store double sets of components” (LDM).

Regarding the cooperation among departments, the LDM at Siemens states that the alignment of functional strategies is not always completed.

“These [functional strategies] are not really in sync, they are separated today. These [functional strategies] are derived top-down from the business strategy, sourcing has one strategy, production and logistics have one strategy. These [functional strategies] are not fully synchronized, we have an organization structure that is a year old so we have not had time to do this ... we do not know if they are connected ... the perception is that they are not connected ... the risk is that it develops sub-optimizations between functions” (LDM).

4.2.2 Fagerhult

Fagerhult has recently started to work in a slightly new way with non-critical items, as by the classification of the Kraljic-matrix. Non-critical items, such as screws, had historically been purchased on a customer order if the supply lead-times allowed purchasing and manufacturing within the requested delivery lead-time. A new way of working has been to purchase these items, with low value and low supply risk, on forecast rather than customer orders. This has resulted in a situation were less time is spent on ordering material, but with higher inventory levels since the days of supplies in inventory has increased. The time saved from doing this can now be used, by the purchaser, to strengthened the relationships with the suppliers. Fagerhult is working on reducing the supply lead-times for all of their purchased items, which is especially important for the strategic- and bottleneck items. This is to enable Fagerhult to purchase the items downstream of the CODP.

"we have to work with them [strategic and bottleneck items] in order to push them downstream of the CODP." (Production Logistics Manager).
This can be done by either reducing the lead-times or by having buffer stocks at different strategic locations in the supply chain.

The suspension wires, used to install the products at the end customers’ ceiling, illustrate one example regarding the use of standard items at Fagerhult. Fagerhult has established certain standard lengths of theses wires, but still customers can request whichever length they desire. If customers order a unique length, Fagerhult needs to purchase the ordered length resulting in a longer delivery time for the customer. But if the customer can use a standard length they can have a faster delivery since the standard lengths are in stock. Customers seldom know the exact length needed since the height of which the lighting is suspended depends on a number of factors related to the interior design of the room. This means that the wire is almost always too long when the product is delivered and therefore needs to be cut to proper length when installed. Therefore, the use of a generic length, that is longer then the customer request, can be utilized and a longer part of the wire cut off. Asking the customer if they accept a standard length, instead of a unique length, can be seen as a way of using delivery lead-times to regulate the degree of uniqueness of the item. This is due to the fact that customers in general want faster deliveries.

The researcher had an opportunity to attend a workshop were the companies’ future work with the CDP-method was presented for the employees. During this workshop, the researchers were able to capture the employees’ initial comments on the method. This workshop reviled that the employees of Fagerhult thinks that alignment of KPIs among functions is important. However, the employees felt that the different departments did not always work towards the same objectives, and that an alignment between strategies therefore would be important.

4.2.3 Parker

Parker have invested an considerably amount of work and time to reduce the supply lead-time for one of the company’s strategic items. This item had previously a longer supply lead-time then demand lead-time, and had to be purchased on forecast. The change involved a transition from purchasing a CG item into purchasing a CU or CoU item instead. By reducing the lead-time for this item Parker could instead buy the item against a customer order. In this way, the company reduced the risk by purchasing the item against a customer order rather than on forecast.

For non-critical items and leverage items the company have instead reduced the time spent on purchasing them. This has been achieved by releasing and transferring control to there suppliers in different ways.

For a third type of item Parker hade two different variants. The two variants had different specification attached to them and where therefore handled as two separately items in a purchasing situation. Both of these items had specifications that made them Parker unique, from their suppliers point of view. Meaning that only Parker bought these particular items from this particular supplier. Furthermore, both the package and the actual item looked similar, which increased the risk of a mix up. In order to solve this, the company has replaced the two previous items by one new. The new item has even higher specification than both the others but is seen as a standard item from the suppliers point of view, and are even included in the suppliers catalog. The benefits of doing so were increased volumes for that particularly item, less stock keeping items, easier demand planning, as well as a reduced risk of a mix up happening, which can be seen as a quality assurance. The statement below further emphasizes this;
"…there is no room for errors… quality insurance is important!" (Inbound/Outbound Manager (IOM)).

The IOM at Parker recommend that the steps within the CDP-method should be used in the given order, as it is presented in Bäckstrand (2012). However, one exception from when the structure should be used is in development of new products. The IOM then thinks that step 9 should be used in an earlier stage, somewhere before step 3 or 4. This should be done in order to involve supplier relations at an earlier stage.

4.2.4 Ericsson

To evaluate Ericsson’s most strategic suppliers, they use a matrix called *Supply risk matrix*, illustrated in Figure 4.1. The Senior Supplier Developer (SSD) says that this matrix has similarities to the Kraljic-matrix, by Kraljic (1983). However, these two should not be confused with each other as Ericsson also uses the Kraljic-matrix. The difference between them is that the supply risk matrix is used with a product perspective while the Kraljic-matrix is used with a supplier perspective. The suppliers that are analyzed further in the Kraljic-matrix are the ones with high supply risk. This is done in general, but of course there are some exceptions. The long-term goal is then to move the suppliers from the right side of the Kraljic-matrix to the left side, by reducing the supply risk. The use of the supply risk matrix differs from the Kraljic-matrix in the sense that the supply risk matrix tells how the items should be handled depending on the supply risk, while the use of the Kraljic-matrix aims of reducing the supply risk.

![Supply risk matrix](image)

Figure 4.1 Supply risk matrix (Ericsson, 2014b, p. 7).

Even though the ambition is to not have any materials with high supply risk, this is not the reality for Ericsson. This is due to the fact that the supply risk constitutes of forecast deviations and demand and lead-time variations as well as variant proliferation, which makes it hard to reduce the supply risk. Therefore, the ambition is to handle the materials in different ways depending on their location within the supply risk matrix. The matrix has two axes, namely, ‘volume value impact’ and ‘Supply risk’. In some way it also uses a third axis, in form of how frequent Ericsson uses the item.
As mentioned before, depending on where the items are found in the supply risk matrix you would like to use different approaches in order to develop the supply chain. The SSD explained Ericsson’s view of efficiency, and why they want to reduce the risk, as:

“Efficiency focus for us is all about having a supply chain as simple as possible. Preferable with suppliers that has a low supply risk, due to the fact that we want all the materials to move forward without any problems” (SSD).

The items in the lower left corner of the supply risk matrix are typically screw and nut materials. These have a low supply risk and a low volume value. These items can be seen as non-critical and should be purchased with a cost efficiency focus. Therefore Ericsson wants to have a cost-optimized supply chain for these items. This can further be seen by the SSDs statements below:

“...Purchase this [non-critical items] as efficiently as you possibly can... Find the economical order quantity, work with the Wilson-formula and similar formulas... especially, use as little manual intervention as possible” (SSD).

Ericsson therefore wants to purchase items that can be seen as non-critical on forecast rather than against a customer order, which can be seen from the statement below:

“If you have identified the item as a low-risk item, why don’t move it to an efficiency focus?... For me it feels rather obvious” (SSD).

This means that even though Ericsson has the option of purchasing these items against a customer order, they purchase them more efficiently by the use of different methods such as the Wilson-formula and system buying15.

The items that are found in the upper left corner of the supply risk matrix can be seen as leverage items. For these items you should also use as little manual intervention as possible, preferable by the use of system buying. The purchasing department should try to lower the cost for these items, as this will increase the contribution margin.

The two types of items that are found within the lower right corner, in Figure 4.1, are quite similar in that sense that they are associated with a high supply risk and a relative low volume value. Even so, they have very different characters regarding purchasing frequency, and Ericsson would therefore lower the risk in different ways. Therefore, Ericsson use strategic buffers on items that have a low value and are purchased with high frequency, in order to reduce the supply risk. On the other hand, the ones with low frequency and high value they would not like to keep in a buffer stock. This latter type can be items with many different variants. Therefore it would be better to try and reduce the supply lead-times on these items. This way the lead-time can hopeful be reduced so much that Ericsson can buy the items against a customer order instead of forecast.

The items in the upper right corner of the supply risk matrix can be seen as strategic items. For this items Ericsson’s focus is to reduce supply lead-time. This applies to all strategic items, but especially to the ones purchased on forecast.

The SSD emphasize that the CDP-method is thorough, easy to use and provide a good supply chain analysis. This analyze provide a good decision support. Furthermore, the SSD

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15 The term system buying, used by Ericsson, is here compared to automatic replenishment programs (ARP), by the researchers.
see potential in using the CDP-method for product development project, since they think that the CDP-method has the ability of providing decision support and thereby helping the users make the right decisions early in the development phase. If this could be done one could see which items that should be used in the product as well as which items that should be purchased and which should be manufactured in-house. This can be seen from the statements below:

“I think the CDP-method would be extremely useful there (in a product development phase). Because I find it relatively easy to work with and the different steps are sufficiently structured” (SSD).

“If you had done this analysis (Step 6) from the start, when developing the product, than you would have won all this. You will save an enormous amount work... then we would have saved ourselves much of the work that we do here in the supplier development…” (SSD).

It is harder to make any changes to an item within a existing product. It would therefore be harder to move within the customization perspective framework (step 6) and make changes to an existing product. Especially for purchasing, as this department does not have any insight to market or product development. Therefore, the purchasing department more or less have to presume that the stated specifications are made for a reason. However, this can also been questioned, as can be seen by the statements below:

“We have identified this material as unique, but does it really need to be?” (SSD).

“Why not use such a method to identify what’s unique and cost a lot of money... ask the question, does this need to be unique?” (SSD).

“If we from the beginning see that one of our articles have an extremely long lead-time, and that we have a variant proliferation which takes place early in the supply chain... dose the product then have to look like this? This one might wonder” (SSD).

These questions can hopefully enable changes that want affect the customer. You could always count the costs and see what it would cost if the material wasn’t unique. Than a decision can be made based on hard facts. By doing so you will also have something to present to the ones that will take the decision. Visual aids always help to get trough to the ones you present the information to.

The SSD further say that companies can cut and optimize as much as they like, but it’s when they remove materials, that causes problems in the supply chain, then they start to save money. By modularize, consolidate and reduce the amount of components used in a company, you can save money. The fewer items you have on the inbound side the easier it is to control, due to the aggregated volume etc. You can then use this items and materials to produce company unique products. Therefore, from a supply point of view, Ericsson see benefits of using standard items for their products. It can somewhat be said that it’s the supply department that is driving the change for standardization or reduction of items used, within there products. However, in the end it’s product development that has the final decision. The product developer don’t always have a sufficient logistics focus and therefore it would be beneficial if the supply department where to be involved in the decision-making. The collaboration and sharing of information between the two departments in Ericsson have become better, but this can always be developed further.

On the other hand, there is of course a risk of taking it to the extreme and optimize the supply chain so far that you no longer meet the customers needs. Ericsson brand is associated with world-leading technology and has traditionally been seen as a company in the
forefront of technological development. This means that there is a conflict of using standard and proven items and at the same time offer state of the art products. One example, of when the use of unstandardized items causes problems for Ericsson, regards an item that they purchase from the same supplier as their competitors. The item Ericsson purchase has slightly stricter specifications than their competitors but is used to fulfill the same function. This leads to longer supply lead-times for Ericsson than for their competitors, due to the longer time it takes for the supplier to meet Ericsson’s specifications. This in turn leads to an Ericsson unique item at the supplier. Therefore, Ericsson buys a customer unique item instead of a generic item, as their competitors.

To end this presentation of empirical findings, the SSD says that Ericsson’s aim is to translate customer demands into requirements that the supply side of the company can contribute to. This can be seen in the statement below:

"Align inbound and outbound so that we actually work in the same direction" (SSD).
5 Refinement of the CDP-method

The aim of this chapter is to present the analysis of the empirical findings. This will be done under three subheadings, each targeting a refinement of the CDP-method. The empirical data will be combined with the theories presented in the theoretical framework, by using the methods presented in the methodology chapter.

5.1 Improvement 1 - Step 8 of the CDP-method

Firstly the eight step of the CDP-method, described in section 3.2.8, are discussed. In its current state, the aim is to investigate FD - CG items with an efficiency focus and CoD - CG with a responsiveness focus. Bäckstrand (2012) says that analysis with ‘efficiency focus’ is comparable with the original Kraljic-matrix.

The literature states that one of the aims for purchases of items with low supply risk was to reduce the manual intervention in purchasing situations (Gelderman & Semeijn, 2006; Olsen & Ellram, 1997). The supplier relationships should be easy to manage with reduced administration costs. Furthermore, Kraljic (1983) state that the order volumes should be optimized, both for non-critical and leverage items. Parker has reduced the time spent on purchasing non-critical items and leverage items. This is also done by Ericsson, which uses as little manual work as possible to purchase leverage items. Furthermore, Ericsson purchases non-critical items with an efficiency focus, e.g. by the Wilson-formula lot-sizing technique. Fagerhult has also started to purchase non-critical items with an efficiency focus rather than responsiveness focus, which is reflected by larger volumes purchased with lower frequency. This notion is also supported by Siemens’ aim to transfer responsibility for stock replenishment to their suppliers, which is a way for them to reduce the time spent on purchasing non-critical items. Furthermore, letting the supplier be in charge of stock replenishment could be seen as a way to optimize the order volumes as the supplier can optimize their production in combination to distribution. The description from Olsen and Ellram (1997) as well as Gelderman and Semeijn (2006), together with Fisher’s (1997) description of an efficient supply chain, summarizes the term ‘efficiency focus’ used within this research. This definition is further stated in section 1.5.1. The presented empirical illustrations of the case companies, in section 4.2, also supports that the companies work in this manner.

Olsen and Ellram (1997) as well as Kraljic (1983) state that the relationship with the supplier should be long-term for strategic items. Reducing the price for bottleneck items is not the main priority (Gelderman & Semeijn, 2006; Kraljic, 1983). The empirical investigation showed that the case companies worked with responsiveness focus for strategic items. Siemens initiative to implement a consignment stock to reduce supply lead-time is showing this. Also Parker, Ericsson and Fagerhult had this focus for strategic items. Ericsson attempt to reduce lead-time for bottleneck items if they purchase them with low frequency and the item also has a high value. However, if the bottleneck item has low value and purchased with a high frequency, the focus is not to reduce the supply lead-time. In those cases, Ericsson instead uses strategic buffers. Responsiveness focus for bottleneck items was also found at Fagerhult, due to them striving to reduce supply lead-times for all items with high supply risk, including bottleneck items. The description from Olsen and Ellram (1997), Kraljic (1983) as well as Gelderman and Semeijn (2006), together with the thoughts from Christopher et al. (2006) regarding an agile and responsive supply chain and Fisher’s (1997) description of an responsive supply chain summarizes the term ‘responsiveness focus’ used within this research. This definition is further stated in section 1.5.2. The presented empirical illustrations of the case companies, in section 4.2, also supports that compa-
nies work in this manner. The case study therefore gave empirical proof that the companies worked with a responsiveness focus for bottleneck and strategic items and with an efficiency focus for non-critical and leverage items. Furthermore, step 9 of the CDP-method also suggests that strategic and bottleneck items should be assessed if they are purchased on forecast (Bäckstrand, 2012).

The eight step of the CDP-method has similarities to the Leagile strategy as previously presented. The analysis presented in this research still builds on these thoughts, efficiency upstream of the CODP and responsiveness downstream of the CODP, in line with the description of legality by Naylor et al. (1999). This focus is also shown in Figure 3.8, which emphasizes that uncertain demand should be met with a responsive supply chain and certain demand with an efficient supply chain. However, this analysis incorporates the supply risk as defined in the Kraljic-matrix (1983) to a greater extent and show that this factor divides the focus regarding efficiency or responsiveness rather than solely the CODP. This means that companies should aim to use responsiveness focus to cut supply lead-times and push the items with high supply risk upstream of the CODP. In contrary, items with low supply risk should instead be purchased with an efficiency focus. This does not automatically move them upstream of the CODP, but it is not seen as problematic if that would be the consequence. This is illustrated in Figure 5.1. Furthermore, this analysis treats leverage and non-critical items as functional products as described by Fishers (1997) and standard products according to Christopher et al. (2006). Moreover, strategic and bottleneck items are treated as innovative products, as described by Fisher (1997) and special products according to Christopher et al. (2006). This analysis incorporates both supply and demand characteristics, which is in line with Hilletofths (2012) suggestion regarding selection of supply chain strategy.

The improvement is therefore that FD - CG items that are positioned upstream of the CODP and have a high supply risk according to the Kraljic-matrix, should be analyzed through a responsiveness focus. This is in contrast to Bäckstrand (2012), which suggest efficiency focus for all types of items upstream of the CODP. These items should be given more attention in purchasing situation than the current efficiency focus suggests. Furthermore, the empirical investigation showed that there was a prerequisite to know the supplier’s supply chain in order to reduce the supply lead-time. This could be seen as a link between the supplier interactions, for strategic items, and responsiveness focus. The red box to the left and the upper arrow of Figure 5.2 illustrates this transition.
Furthermore, this improvement regards CoD - CG items positioned downstream of the CODP. These items have not yet been investigated by or integrated in the CDP-method (Bäckstrand, 2012). The suggested improvement in this research is that items that imply low supply risk, according to the Kraljic-matrix should be purchased with an efficiency focus instead of a responsiveness focus. This is in contrast to Bäckstrand (2012), which suggest responsiveness focus for all types of items upstream of the CODP. An example of this improvement can be illustrated by screws and nuts that are located downstream the CODP, they could therefore be purchased on an actual customer order. Even tough this is possible it will still consume too much time, focus too much attention and create an unnecessary amount of work for the purchasing function. Companies should strive to reduce the workload for the employees and the associated administrative costs, e.g. through system buying or optimize the order volumes by the use of the Wilson-formula or similar formulas. This can lead to a situation were the items are stored until the point of consumption. The red box to the right and the lower arrow in Figure 5.2 illustrate this.

![Figure 5.2 Sourcing focus based on the level of certainty combined with the CODP](Based on Bäckstrand, 2012, p. 125)

Empirical data from Siemens is somewhat contradictory to this result due to their increased focus on efficiency for all generic items. Their transition to consumption based stock replenishment of this kind of items is in line with the meaning of efficiency focus used within this research. On the other hand, there is also an initiative to implement consignment inventory for high value items with long supply lead-time. This could be seen as an example of reducing the supply lead-time for strategic items, which would be in line with this result. Furthermore, for the non-critical items there are initiatives to let the suppliers be in charge for stock replenishment. This is interpreted as striving for a more efficient supply chain rather than a more responsive supply chain. But still, Siemens sees no direct value of purchasing strategic and bottleneck items based on a customer order rather than forecast, which is contradicting to this result.

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16 The figure is modified by the researchers.
5.2 Improvement 2 - Strengthen alignment of strategies

A part of the purpose with the CDP-method is to align manufacturing and purchasing strategies and to facilitate knowledge transfer between the different functions. This is also proven and presented together with the method in Bäckstrand (2012).

The theoretical framework reveals that alignment of strategies is important (e.g. Gattorna and Walters, 1996; Porter, 1996). Aligned functional strategies make the different functions work in the same direction, which makes the strategy harder to copy (Porter, 1996; Teece et al., 1997). If these are derived and aligned from the business strategy, this drives appropriate behavior that will gain the organization as a whole (Gattorna & Walters, 1996). Kaplan and Norton (2004) presents one reason to why alignments failes, namely that managers lacked a holistic view of the company.

The analysis of how the CDP-method was used within the case companies showed that it improved the internal communication. This could be seen as an example of the internal focus of the subject of strategy, as mentioned by Mazzucato (2002) and Hines (2004). However, the empirical investigation showed that Ericsson, Siemens and Fagerhult felt that alignment of functional strategies could be done to a greater extent. This fact, together with the importance of alignment presented in the theoretical framework, underlies the suggestion presented in this section.

![Diagram of vertical and horizontal alignment](Based on Lambert, 2006; Lyons et al., 2012, p. 5; Lysons and Farrington, 2012)\(^\text{17}\)

The aim of this suggestion is to check the alignment of strategies. Four types of strategic alignments were introduced in section 3.3.2, between: customer requirements and corporate/business strategy, corporate/business strategy and functional strategy, among functional strategies, and finally, between organization and strategy. This proposition involves

\(^{17}\) The figure is modified by the researchers.
checking the alignment between one of these types, namely between and among different functional strategies.

At first, a review of the functional strategies needs to be conducted at the companies that implement the CDP-method. This should then be followed by an analysis of their alignment. This analysis might be complicated to perform on a qualitative basis, e.g. interpret and compare wordings and their resemblance. It is assumed to be simpler to conduct a more quantitative analysis, namely to check the KPIs for the different functions. In practice, this can be seen as checking whether the different functions are measured in a manner that drives inappropriate behavior and leads to sub-optimization or not. The idea to use KPIs as an indicator was derived from the workshop at Fagerhult.

This suggestion does not imply a new step in the CDP-method, nor does it impose a new way of working with the current steps of the CDP-method. It is therefore a general suggestion to companies that adopt the method since the method evokes these kinds of questions anyhow, e.g. that management gains a holistic overview. Hence, it would be a natural extension to the work with the method to analyze and align the functional strategies and thereby strengthen their competitiveness even more. This can be seen as a horizontal alignment (i.e. between functional strategies) in Figure 5.3. However, the alignment should also be performed against the corporate and business level, a vertical alignment (i.e. between corporate, business and functional strategies). This is another type of alignment presented in the theoretical framework. However, the empirical investigation did not provide any proof that this was necessary in these cases, but the literature made it clear that this type of alignment is important as well. The suggestion to use KPIs to perform horizontal alignment and the idea to also control vertical alignment will, according to the researchers, bring out more of the potential in the CDP-method.

### 5.3 Improvement 3 - Reducing the variation of unique items

This improvement adds on to step 6 of the CDP-method, described in section 3.2.6. Step 6, as described by Bäckstrand (2012) investigates three counter-logic scenarios, namely scenario 1:1, 1:2 and 2:1, marked by a thick black line in Figure 5.4. In order to leverage these scenarios Bäckstrand (2012) purpose different action plans. These are considered useful and therefore no further development suggestions will be made. However, the other scenarios have not yet been given an action plan thus giving room for further development.

![Figure 5.4 The customization perspective framework (Based on Bäckstrand, 2012, p. 228)\(^{18}\)](image)

\(^{18}\) The figure is modified by the researchers.
Siemens and Ericsson have both showed an interest in having step 6 used during new product development projects. Step 6, analyzing items in the customization perspective framework, is today used on existing products. With some smaller changes this tool could be more dynamic and also work for products during their development phase. This would help during the supplier selection process. By doing so Ericsson say that they can make the right decision from the start and save themselves much work and time later on in supplier development projects. The CDP-method has already made it easier for Siemens to communicate possibilities for improvement of existing products and they see big advantages with the method when it comes to develop new products.

When doing the analysis during step 6 different items can be found unique for the supplier, the focal firm or both. For an already developed product, it can be hard to move the item within the customization perspective framework, Figure 5.4. This is manly due to the fact that the product already exists and that companies not always want to spend time and effort in changing the structure or specification of the product. However, as the SSD at Ericsson said, if you already have made the analysis and identified what’s unique and cost a lot of money, why not ask the question whether or not the item must be unique? You could always pose the question to R&D or the supplier if the specific item needs to be unique, or if there even is another solution. The analysis will then function as a good visual foundation for discussion. Visually demonstrating what effects the items uniqueness has on the company’s supply chain. An example of this was when Siemens discussed an item with the order engineering function in order to reduce the variants of that item. This resulted in a reconstruction of the item and enabled it to be used in two different products.

During the design phase of a product, or reengineering of an existing one, a company should therefore strive to reduce the number of items and try to use standard available items (Royal collage of art, 1999). In order to do so, specifications for the product should be evaluated and possibilities for standardizations investigated (Gelderman & van Weele, 2002). Normally R&D decides on technical specifications without consulting purchasing specialist (Burt et al., 2010; van Weele, 2002), which were the case at Ericsson. This may lead to over-specifications of the product (Burt et al., 2010; van Weele, 2002). To reduce this risk Siemens have started to work in cross-functional development teams, which are supported by the theories of Burt et al. (2010) and van Weele (2002). The design team should design the products to the specifications and requirements of the customer, not necessarily to the state of the art (Burt et al., 2010).

It can be argued that it is good to use standard items as far as possible, in order for a company to be more cost efficient (Royal collage of art, 1999). The SSD at Ericsson even said that you can cut and optimize as much as you like, but it is first when you remove materials, that causes problem in the system, you start to save money. A company can save money by modularizing, consolidate and reducing the amount of components used in the company. Fewer items also lead to a higher aggregated volume on the inbound side of the company, which leads to an easier and more controllable inbound flow. Therefore, all case companies see benefits of purchasing standard items and then perform most of the value adding activities in-house. Siemens see it as a lower risk of buying generic or standard items due to the fact that the item can be used for different customers. This is not the fact if an item is CU or even CoU.

Scenario 3:1, 3:2 and 3:3 involves purchasing standard items that are more or less processed in order to add value to the customer. These scenarios can therefore be associated with a lower risk as well as being more cost efficient than the other scenarios. Furthermore, it can be argued that scenario 3:2 and 3:3 adds more value to the customer, than scenario
3:1, as the company purchases generic items and produce a CU or CoU product. By doing so a company might get a higher contribution margin for that product, as most of the processing is done in-house. This is in line with Huang et al. (2002) argument that a company should try and postpone the point of product differentiation and that you should try and be efficient on item level. However, in scenario 1:3, 2:2 and 2:3 the company instead purchases CU or CoU items in order to manufacture CU or CoU products. This is associated with a higher risk as well as a lower cost efficiency. If these items could be substituted by a generic item, or changed in any way to be less CU or CoU, the company could instead purchase generics and themselves process the items to meet customer’s requirements. This would be a way of postponing the point of differentiation.

In the case of Fagerhult a generic suspension wire where sometimes ordered with specific customer requirements that made it a CoU item. For this item, Fagerhult have standard lengths stocked in inventory. But if a customer wants a specific length, which is not stocked by Fagerhult, the lead-time for that order will be extended. This is due to the fact that Fagerhult has to purchase this against an order and their supplier needs to produce this specific length for Fagerhult. Customers seldom know the exact length needed, since the height of the lighting depends on a number of factors related to the interior design of the room. Usually the customer orders a length that they find appropriate, and when installed they have to cut away a part of the wire in order to fit the luminaire into the surroundings. The problem with the different length of the suspension wire could be resolved by asking the customers if they would prefer having a longer suspension wire, instead of the specific length that they have ordered. By doing so Fagerhult could still have some standard length in stock and the customer could themselves cut the wire in an appropriate length when installed. By having generic wires, in standard lengths, the delivery lead-time could be shortened for CU and CoU products, since these would be considered generic afterwards. This would symbolize a move from scenario 1:3 or 2:2 to 3:1, as can be seen by the two black arrows in Figure 5.5. Another way of doing this would be to purchase the wire and that Fagerhult themselves cut it in the requested length when a customer order is received. This would symbolize a move from scenario 1:3 to 3:3 or 2:2 to 3:2, as can be seen by the grey arrows in Figure 5.5.

![Figure 5.5 Moving downwards in the customization perspective framework (Based on Bäckstrand, 2012, p. 228)](image)

Furthermore, Parker formally purchased two different items that looked the same, but had different specifications. Both these items where unique for Parker in the way that only Parker bought them from the supplier. After some investigation Parker decided to buy one
new item that would replace the two previous ones. This new item has higher specifications than the two previous ones, but is seen as a standard from the supplier’s point of view. By doing this Parker went from purchasing CU items into purchasing CG items. The benefit of doing so where; less numbers of stocked items, higher volumes for the new item which also resulted in a more stable demand and that the item where easier to forecast as well as the same item for all products, acting as a quality assurance.

Parker therefore went from two scenarios of purchasing a Parker unique item, that where considered as a generic item at Parker, and instead purchased one item, that where considered generic at both the supplier as well as Parker. This can bee seen as moving from Scenario 2:1 to 3:1 in the customization perspective framework and is illustrated by the yellow arrow in Figure 5.5.

However, Parker has devoted a considerable amount of work on reducing the supply lead-time for one of the company’s strategic items. This particularly item was generic and purchased on forecast. The item had to be processed on forecast due to the fact that the delivery lead-time was longer than the demand lead-time. In order to reduce the supply lead-time, the company instead had to purchase items that where CU or even CoU from their suppliers. This resulted in a shorter supply lead-time and that the company could purchase the item against a customer order. However, by doing so Parker went from purchasing a generic item, to purchasing a CU or even CoU item. This can be seen as moving from scenario 3:1 to 2:2 or even 1:3, in the customization perspective framework and is illustrated by the two black arrows in Figure 5.6. Thus meaning that the company chose to move higher up and to the right in the customization perspective framework.

![Figure 5.6 Moving upwards in the customization perspective framework](Based on Bäckstrand, 2012, p. 228)\(^\text{20}\).

Olsen and Ellram (1997) state that you should always strive for standardization. However, Ericsson says that there always is a risk of optimizing the supply chain to far, so that you no longer meet the customer’s needs. The use of standard available items may also inhibit ideas (Royal collage of art, 1999) and new innovative technologies can be overseen (Burt et al., 2010). Ericsson have traditionally been seen as a company in the forefront of technology development and associated with world-leading technology. Therefore Ericsson always has to make a tradeoff between using either proven technology or new and innovative technology, as described by Burt et al. (2010). Ericsson even has an example of where their competitors purchase a similar item from the same supplier, but do not have the same strict specifications as Ericsson. This results in longer lead-times for Ericsson, compared to

\(^{20}\) The figure is modified by the researchers.
their competitors, due to the fact that the supplier considers this as an Ericsson unique item. If the customer does not consider the higher specifications as important for the final end product, then this can be seen as an over-specification, as defined by van Weele (2002). By evaluating the specifications that are necessary and investigating possibilities for standardization, the end product can be made less complex (Gerlderman & van Weele, 2002).

Furthermore, van Weele (2002) states that as specifications get higher and where the items are developed together with the supplier, there is a risk of having fewer suppliers available for sourcing. This may lead to monopolistic situations where the buyer is dependent on the supplier and can result in unnecessarily expensive products (van Weele, 2002). Siemens have some examples where standards or generic items isn’t an option, due to the fact that the specifications are so high that only one or a couple of suppliers are able to supply this item. This can also be the fact when the item is developed together with the supplier. By broadening the specifications the dependence on the supplier can be reduced (Gelderman & van Weele, 2002) together with the price (Burt et al., 2010).

The researchers therefore propose that step 6 of the CDP-method should be used for both existing products as well as in new product development projects. However, when it comes to development of a new product, the customization perspective framework should be used in an earlier stage of the method. It is further suggested that the framework should be used to study the different items in order to try and standardize them and use a modularization perspective. By doing so a company can reduce the unique and order unique items and instead purchase generic items that can be used to produce CU or even CoU products.

However, a company can never lose focus of the customer and always need to make a tradeoff between purchasing proven or new and innovative technology. Furthermore, a company can choose to purchase a unique or order unique item instead of a generic one, if this brings other benefits such as reduced lead-times. For every given scenario a company therefore need to make a decision, based on the information at hand, that will be most beneficial for the company as a whole. However, with an equal or better lead-time the researchers propose that a company should try and move downwards in the customization perspective framework and purchase generic items in order to reduce risk and generate more profit through cost-efficiency.
6 Conclusion and Discussion

This chapter will start by a presentation of the theoretical implications of the thesis, followed by the managerial implications. After this will the researchers present their opinion of the conducted research together with some suggestions of further research regarding the CDP-method.

6.1 Theoretical implications

This section presents the theoretical implications of the research, which can be seen as the theoretical contribution of this thesis.

The first improvement provides a new type of analysis in step 8 of the method. By analyzing how the adopted companies actually worked with the CDP-method, a correction of this step is suggested. The new way of working with this step is a combination of Kraljic (1983) portfolio analysis and Fisher (1997) supply chain design strategies. Items with high supply risk according to the Kraljic-matrix (bottleneck and strategic) are treated as innovative products according to Fishers classification and standard products according to Christopher et al. (2006). Low risk items (non-critical and leverage) are treated as functional products according to Fisher (1997) and special product according to Christopher et al. (2006). This means that low risk items should be purchased through an efficient supply chain and high-risk items through a responsive supply chain.

The second improvement is not tied to a step of the CDP-method. It is rather a general advice to combine the work with the CDP-method to work with strategy alignment. Since the CDP-method opens up for communication between different functions, the work with strategic alignment is already initiated. This suggestion is partly based on literature, which highlight strategic alignment as important (e.g. Gattorna and Walters, 1996; Porter, 1996), and partly by empirical proof, which showed that alignment between functional strategies not always was done within the adopting companies.

The third improvement regards step 6 of the CDP-method. The theories of standardization (e.g. Burt et al., 2010; Gelderman & van Weele, 2002) and over-specification (e.g. Gelderman & van Weele, 2002; van Weele, 2002) are here introduced to the customization perspective framework, presented by Bäckstrand (2012). This presents a new way of analyzing items within the framework as well as expanding the framework to include situations that are not further analyzed in the current state of the CDP-method. This step could now also be used within product development projects, which is proposed as a further development by Bäckstrand (2012).

6.2 Managerial implications

The first improvement will guide practitioners to strengthen their inbound supply chain. It shows which focus, efficiency or responsiveness, that should be employed in purchasing situations depending on what type of item that is purchased.

By incorporating the second improvement the adopting company will strengthen their competitiveness, due to alignment of functional strategies through the use of KPIs as a tool. Aligned functional strategies enable the different functions to work in the same direction, which makes the strategy harder to copy. If these are derived from and aligned to the business strategy, the action will be unified, and taken in the right direction. This will benefit the organization as a whole.
The third and last improvement regards step 6 of the method. This improvement presents a new way of analyzing the items within the customization perspective framework. The analysis can help and increase a company’s understanding of its products and what makes them unique or even order unique. This analyze can further be carried out for items within existing products or for items in product development projects. The new way of working with the customization perspective framework can help companies to increase their modularization perspective and thereby, to a higher extent, purchase generic items and become more cost-efficient.

6.3 Fulfilment of purpose

The purpose of this research was to analyze the CDP-method in order to develop and refine the method. To fulfill this purpose, theoretical and empirical investigations has been made. There are three improvements presented in this thesis. Two of them contribute to refining the method whiles the third develop it. These improvements provide new ways of working with the CDP-method and are supported by theory and empirical data. The theoretical support is based on theories found in the second circle of the literature review, in other word theories related to the CDP-method. Support from empirical data consists of positive comments regarding the improvements from the case companies. Given these three improvements, the researchers consider the purpose as fulfilled.

6.4 Final reflection and suggestions for future research

The researchers are aware of the limitations of this study. One thing worth mentioning regarding the creditability of the study is the limited number of respondent for the interviews. There have been one respondent from three out of four companies and three respondents from the fourth company. Hence, there is a risk that the collected empirical data can be biased from this specific respondent. This issue has been neutralized through triangulation among data collection techniques as well as cross case comparisons. Furthermore, all interviews have been audio-recorded and transcript summaries have been made shortly after every interview in order to minimize bias (Saunders et al., 2012). The researchers believe that the audio-recording had no constraining effect on the respondent as they adapted quickly to the use of the recorder. This leads to the conclusion that it is the researchers ability, rather than the research methodology, that is to blame in a situation of doubts.

One thing worth mentioning is the relative homogeneity among the case companies. These are large companies belonging to big company groups. It would therefore be interesting to include a couple of SMEs in the research.

One alternative design for this study could be to implement the CDP-method in a new context through an implementation at a new company. This could be done with preserved purpose. The alternative approach was discussed in the initially phases of the research proses. However, it was hard to persuade companies to consent to this approach. It would also require the researchers to first teach and explain the method to the new company, then implement it and finally draw conclusion from the actual implementation. The low interest from industrial companies to take the opportunity to implement the method in combination with the prolonged timeframe resulted in the presented research design. The researchers assume that the results and conclusion obtained through an alternative design is similar to the results and conclusions presented with the used design.
The researcher looked for a similar method as the CDP-method but did not find any. If a similar method were to be found, this could have led to an interesting comparison and analysis.

The researchers have found a few areas suitable for future research. The first area could be to investigate the segmentation within the CAP matrix (step 8). The researchers see a shift of focus for non-critical and strategic items as more evident than leverage and bottleneck items. Especially bottleneck items would be interesting to further investigate, due to Ericsson's two-folded focus for items within this class.

Empirical illustration of how alignment of strategies could be performed in practice is not included in this thesis. This is something that would benefit the CDP-method, especially from a practitioner's point of view e.g. by research conducted through applied research, as defined by Saunders et al. (2012).

Both the case companies and the researchers think that the customization perspective framework (step 6) could be useful in new product development projects. However, there are no investigations conducted regarding in which stage of product development or between which steps in the CDP-method it should be included. Furthermore, the new way of analyzing the items within the framework have not yet been tested and that is the reason why it is important to empirically test these theories in order to validate them.

The customization perspective framework (step 6) only considers items in its current state, not products. During the research process, the researchers felt that it would benefit and simplify the analysis if the framework were extended to also include products. Perhaps a separation of forecast and order driven activities through an incorporation of the CODP provide a more constructive analysis.
References


Appendices

The purpose of these appendices is to present information that is not necessary, but complementary, to the information needed to answering the research purpose. The first appendix presents the phase three in the CDP-method and is followed by the interview guide used during the case study. The last appendix presents a summary of the empirical findings regarding the case companies opinion about the CDP-method. This will show potential advantages and drawbacks, with the CDP-method, and results from implementing the method.

Appendix 1 - Phase 3 of the CDP-method

Phase 3 – Analyze supplier interaction

The two former phases have laid the foundation for the evaluation and implementation of proper supplier interaction. This third phase consist of three steps (step 10 to 12) and starts of by analyzing the chosen suppliers in the ‘interaction framework’ (Bäckstrand, 2012). Next step is to analyze the level of controllability and defining practical guidelines for appropriate level of supplier interaction in order to have a customer-driven purchasing (Bäckstrand, 2012). This phase end by implementing customer-driven purchasing.

Step 10 – Analyze supplier relation in the Interaction framework

The purpose of this step is to identify if the current supplier relationship is suitable for the item purchased. The suppliers selected, for further analysis, in step 9 is now evaluated in the ‘Interaction framework’. This framework can and should be adapted to fit the focal actors prerequisites before used. By using the information gathered during step 2 to 5 the framework can be adapted to the level of certainty, level of customization and level of controllability, as can be seen in Figure 1. The level of certainty determines if forecast driven or customer order driven factors should be included in the interaction framework. The level of customization determines if generics or unique items are to be included and the level of controllability determines where make or buy factors are to be included (Bäckstrand, 2012).

![Figure 1. The CDP-method in relation to the adapted Interaction framework (Bäckstrand, 2012, p. 234).](image-url)
Step 11 – Analyze controllability in the supplier interface

The supplier interface can have different levels of controllability, from a focal actors perspective. This interface can be seen in Figure 2 and is regarded as controllable or uncontrollable (Bäckstrand, 2012).

![Figure 2. The focal actor triad with the supplier interface indicated by a red line (Bäckstrand, 2012, p. 235).](image)

Usually the supplier actor is uncontrollable while the internal actions are controllable. In some cases the supplier actor even controls some activates at the focal firm, for instant by having a Vendor managed inventory (VMI). But in some other cases the focal actor might have increased it’s controllability by vertical integration (Bäckstrand, 2012).

The information gathered throughout the different steps is used as input to determine whether the current level of controllability is appropriate for the selected supplier in step 9. This information is then compiled in a level of controllability table (Bäckstrand, 2012). An example of such a table can be seen in Table 1.

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Certainty-customization classification</th>
<th>Level of supply risk</th>
<th>Level of interaction</th>
<th>Corresponding scenario</th>
<th>Current scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier X</td>
<td>FD-CG</td>
<td>Low</td>
<td>Low</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Supplier Y</td>
<td>FD-CG</td>
<td>High</td>
<td>Low</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Supplier Z</td>
<td>FD-CG</td>
<td>High</td>
<td>High</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

1 From step seven
2 For FD-CG items, from step 8
3 From step 10
4 From the CAP matrix regarding level of controllability
5 From Supplier interaction interface scenarios

The information in column one to three is gathered from step 7, 8 and 10. The information regarding column four and five, in the table, comes from the CAP matrix regarding level of controllability as well as supplier interaction interface scenarios. Based on the information gathered throughout the process together with the information given below a current scenario as well as a corresponding scenario can be stated (Bäckstrand, 2012).
Based on the customer order decoupling point (CODP) and the purchasing order decoupling point (PODP) the supply chain can be forecast-driven or customer-order driven as well as uncontrollable or controllable. These four building blocks make up nine possible interaction scenarios, as can be seen in Figure 3. However, the scenarios with the CODP in between the supplier actor and the focal actor (scenario 4, 5 and 6) are henceforth treated equally with the forecast-driven scenarios (scenarios 1, 2 and 3) (Bäckstrand, 2012). The remaining scenarios are 1, 2, 3, 7, 8 and 9.

Figure 3. Nine supplier interaction scenarios based on the positioning of CODP and PODP (Bäckstrand, 2012, p. 151).

The supplier interaction regards manufacturing, planning and scheduling activities. In scenario 2 and 8, in Figure 3, the activities are conducted at the supplier actor or the focal actor, not both, thus representing a low level of interaction. However, in scenario 1, 3, 7 and 9 the activities start at the supplier and continue to the focal actor (Bäckstrand, 2012). These scenarios hence illustrate interfaces with a high level of interaction; see Figure 4 for an illustration.

Figure 4. Appropriate level of controllability in regard to supply risk (Bäckstrand, 2012, p. 156).
If there are any differences between the current level of controllability and theoretically best, this should be indicated in the level of controllability table and taken into consideration in the next step (Bäckstrand, 2012).

**Step 12 – Implementing customer-driven purchasing**

This step is basically the implementing of the customer-driven purchasing and is based on the information gathered throughout the process as well as the analysis made. Therefore it is time to make a decision regarding individual supplier relationships.

What reactive actions should be made to improve the current situation and what proactive actions can be made to improve future purchasing activates (Bäckstrand, 2012).
Appendix 2 – Interview guide

Overall questions

We would like to know what kind of information that can be used and published in the thesis? The information given should be used to give the reader a better understanding of your company and your business. The reader can then decide on their own if the findings in the thesis are transferable or not.

The information we would like to publish is:

- Full company name.
- Type of business and products.
- Financial ratios, such as turnover and yearly result.
- Number of employees.
- Organizational structure.

Questions regarding the CDP-method

Following questions are broad in nature. These questions should more be seen as areas that we would like to discuss with you in order to get a broader understanding of how you see the CDP-method and how it’s used today. Therefore probing questions will be used when found necessary. If you have any practical or actual examples, please elaborate on them.

- Which steps, from the CDP-method, have you implemented?
- Do you follow the proposed order of the steps?
- Why have you implemented the steps that you have and why haven’t you implemented the others? Do the different steps bring any benefits in them self’s or do they need to be implemented all together and in the same order?
- What benefits and drawbacks do you see with the different steps, and why?
- Have the different steps helped you in any way? What type of secondary effects can you see from using the different steps?
- Have you in any way developed the CDP-method or made company adjustments to the CDP-method? If so, which steps and how do they look today?
- If you haven’t started to use the method. Are there any changes to be done, before using the method or are there other reasons for not using the method?
- Have your suppliers or customer noticed your work with the CDP-method and if so, in what way?

Preliminary results

- How do your company work with the Kraljic matrix’s?
  - How does this matrix look like, have you made any changes to it?
  - How would you prefer to work with the different items? Fore example do you shorten the lead-times, try to reduce price or minimize the time spent sourcing the different items?
  - Is there a difference in how you source the products depending on if its before or after the customer order decoupling point (CODP)?
• Do your company work actively to reduce customer unique (CU) or customer order unique (CoU) items?
  - Are there any examples on this from:
    - R&D?
    - Sales?
    - The company as a whole?
  - Are there any alternatives to CU or CoU items/products where you have an option to raise or lower the specifications in order to standardize or buy generics?

• What business and sourcing strategies does the company have?
  - How are the different departments divided in your organization? Are there different departments for example procurement, manufacturing and distribution, or is there a Supply chain department?
  - What type of functional strategies can be found in your company? Do you have a drawing on the business structure and how the departments are divided?
  - Can you find the different functional strategies for me?
  - Do the different strategies align with the business and corporate strategy?
  - Do the functional strategies counteract against each other or are they inline with each other?
  - Does the company live by these strategies or are there any examples on when they are working against each other?

Thank you for your time and cooperation. You are welcome to read and edit out any information before publishing.
Appendix 3 - Analysis of the CDP-method

The case studies showed that the companies are in different stages when it comes to implementing and adapting the CDP-method. Fagerhult have for instance not spread the CDP-method to their employees. On the other hand, the company has increased their awareness of the CODP and the affect it has on the internal lead-times and delivery lead-times, just by studying the CDP-method. Consequently, Fagerhult have been able to reduce these lead-times for many of their products simply by implementing a strategically located buffer stock.

Fagerhult says that just by drawing up the time-phased product structure in step 2, companies can get a better and more holistic overview of the product under study. This makes it easier to see where actions have to be made. The results from the use of the CDP-method, during the KOPeration project, revealed that one of Fagerhult’s suppliers long lead-times caused problems for the company. This was something that was not known by the company beforehand, but became clear after the use of the method. This shows that the use of the model can bring problems up to the surface, which may not be known by the company beforehand. For Siemens, the work with the KOPeration project helped them speed up the differentiation between order- and forecast driven purchasing activities.

The case companies have showed an interest in having a computerized or built-in system support to quicken the use of the method. If the CDP-method could be made as a computer program and derive the information needed, directly form the company’s ERP system, then the method could be more user-friendly. This would probably also increase the use of the results derived from employing the method, as these can be saved on the local hard drive and retrieved by the different departments within the company. Siemens have themselves written a program in MS Excel that can convert data from their ERP system and present the information in coherence with phase 1 (step 1-5) of the CDP-method. Fagerhult have started to do this as well, but have run in to some problems on the way. This shows that a computer-aided system, of the CDP-method, could be beneficial but not always compatible with the company’s different computer systems.

All the case companies state that the tools presented in the CDP-method have helped them increase their understanding of their different product families. Parker and Ericsson had actually used some of the tools before, but by following the steps presented in the CDP-method, it became clearer and better structured. Parker therefore recommends that companies follow the given order presented in the CDP-method. By doing so the risk of taking information for granted can be reduced and the work will be completed in a orderly fashion. Ericsson even emphasize that the method is thorough, easy to use and provides a good analysis of the supply chain. However, Ericsson have used the CDP-method in a different way, than the other case companies, and incorporated it into their work with supplier development. This shows that the different tools could, if desired, be used separately and be incorporated into an existing way of working. The method therefore does not need to be static, even though the recommendations by Parker is to follow the steps in the given order. With that said, Parker further state that this is also the case for an existing product. If the CDP-method where to be used in a product development project, step 9, of the CDP-method, should come in at an earlier stage. This should be done in order to involve the supplier relations at an earlier stage.

The most prevailing opinion of the CDP-method is that it provides a good and visual foundation for discussion. This has helped the companies to increase their internal communication and also to visually demonstrate how and what problems that are caused by
various decisions, taken by different departments within the same company. The external communication can also be increased due to the involvement of the supplier, as pointed out by Ericsson.

Both Ericsson and Siemens see great benefits in incorporating step 6, of the CDP-method, in product development projects. By doing so, the company could easily see if the materials and items used are considered generics or unique by the suppliers. This could be used as background information in a make or buy decision. This will then save the company both time and money by making the right decision from the beginning. The SSD at Ericsson even state that much of their work with supplier development would be saved if a proper analysis was completed from the beginning.

**Strengths and results from implementation**

The different tools presented in the CDP-method can help companies to get a better understanding of their product families. The method also provides a well-structured and clear way of how you can work with supplier development. The different tools can even be used by themselves and do not necessarily need to be done in the order presented in the CDP-method. However, it is recommended that the steps are followed in order to get a better structure. The method also helps to increase the internal as well as the external communication.

By studying or implementing the CDP-method, a company can increase their understanding of the CODP and the effect it has on the supply chain. By doing so a company gets a better understanding of what is performed on forecast and what is customer driven in their supply chain. A company can thereby get a better understanding of how the different purchased items and their lead-times impact the supply chain as a whole. This can then be used as a decision support when working for lead-time reduction. The use of the method thereby can bring up problems to the surface, which is not known by the company beforehand.

**Weaknesses**

The companies have showed an interest in having a computerized or built in system support to quicken the use of the method. This is a drawback of the method. Even though the CDP-method is easy to use the process could be speeded up and made more efficient if the method where to be developed into a computer-aided system. However, there is always a problem with the compatibility of the company’s ERP system and other programs.