

Delivery Reliability and Public Procurement: A Case Study on a Healthcare Provider

A Master Thesis for the Department of Industrial Management and Logistics at the Faculty Engineering of Lund University

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Abstract

Assuring delivery reliability is a vital part for any organisation in a supply chain, and in few cases could the consequences of a failed delivery be as dire as they would in the case of a healthcare provider. However, delivery reliability is not a well-studied subject within the context of public healthcare procurement. The aim of this thesis has been to identify the factors that affect delivery reliability with regards to the purchasing function and how these could be applied to the case organisation. The author identified five factors that affect delivery reliability with regards to purchasing. These are the purchasing process, supplier management, risk management, the power balance between the supplier and buyer and metrics. This is a multiple case-study where the author used five different procurements as cases. The data was gathered from interviews, one for each case and one interview that focused on the organisation as a whole. The cases were then compared to each other and to the established theory from a literature review, resulting in a gap analysis. From there general conclusions were drawn regarding how the case organisation could improve their work in delivery reliability with regards to purchasing. These conclusions have to do with the importance of data handling, supplier management, risk management, handling power imbalances and the purchasing process. Specifically, Region Skåne should work more with proactive expediting, evaluations, risk management, supplier management, power imbalances with their supplier, more process-oriented work in general and finally data and IT solutions. The hope is that other similar organisations can find lessons here as well.

Keywords: Delivery Reliability, Purchasing, Public Healthcare

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Christofer Sjöquist

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Introduction

The following chapter describes the background and purpose of the study as well as the case organisation, Region Skåne. The purpose is defined by the research questions and goals and limited by the delimitations. The chapter ends with an outline of the report structure.

1.1 Background

Region Skåne is the highest political administrative organisation in the Swedish region of Skåne, serving over 1 000 000 inhabitants. One of the responsibilities of Region Skåne is to manage the healthcare system of the region, but they are also responsible for the regional and local public transport and infrastructure as well as some issue regarding the environment, culture and business (Region Skåne, 2018). This thesis only focuses on the healthcare component.

According to MSB (2011), the Swedish Civil Contingencies Agency, healthcare is considered to be an important societal function. Children need their vaccines, surgeons need high quality equipment and there must be available ambulances when someone is injured or sick. If any of these things were to not be there when they are needed there is a risk than someone might become sick, injured or in the worst-case die.

The supply market for healthcare providers is heavily dominated by few or no alternative suppliers for many products and high demands on quality, delivery reliability and lead times from buyers. This leads to high costs due to warehousing and last-minute deliveries as well as high impact risks with regards to the people affected by any lack of delivery reliability (Weimarck, 2018).

1.2 Problem Formulation

Region Skåne has previously had problems with delivery reliability, notably with vaccines (TT, 2017). Region Skåne have lacking systems for demand forecasting and a need to improve continuity planning with their suppliers (Weimarck, 2018).

Their operations are heavily reliant on suppliers that have a lot of leverage in negotiations due to patent laws limiting potential competitors, the nature of their products being highly specialized and also certain inherent risks that has to do with how some products are manufactured, most notably vaccines (Weimarck, 2018).

With these circumstances in mind the purchasing department of Region Skåne wants to find a way to improve their purchasing process to improve delivery reliability. Current research on purchasing is mostly focused on large private companies and research on public healthcare providers is at least not very common. Region Skåne is therefore interested in how they can improve the delivery reliability from their suppliers. They are especially interested in how this is done in comparable private industry and, if the information is available, in public organizations/agencies with more advanced purchasing strategies (Weimarck, 2018).

1.3 Research Questions, Goals and the Purpose of the Thesis

The purpose of this thesis was to research the relationship between purchasing and delivery reliability and how that knowledge can be applied to healthcare organisations to increase delivery reliability.

The research questions were:

1. What does the research say about the relation between purchasing and delivery reliability and how can that be applied to Region Skåne?
2. How does Region Skåne work with delivery reliability and purchasing today?
3. What could Region Skåne do to improve delivery reliability?

The goals for the thesis will be as follows:

1. Discuss how the different parts of the purchasing processes affect delivery reliability.
2. Develop a framework or guidelines for how a healthcare organization can improve delivery reliability through their purchasing process.
3. Use Region Skåne as an example and implement the above-mentioned guidelines to modify or replace their current purchasing process.

1.4 Delimitations

The delimitations are partly made with regards to Region Skåne's most pressing issues.

- As previously mentioned, the thesis will have delivery reliability with regards to the purchasing process as its focus rather than the purchasing process in general.
- The gathered information and data will first and foremost come from existing sources i.e. books and journals. Interviews and internal document will be used for analytical purposes. There will only be one interview per case which lessens the empirical results reliability. However, the author trusts the interviewees motives. A supplementary interview is also conducted which partly has the role of verifying the statements in the other interviews.
- The focus of the thesis is only on the healthcare component of Region Skåne's operations.
- Any comparisons between Region Skåne and comparable private or public organisations will be based on already published material about purchasing and delivery reliability in public and private industry.

1.5 Report Structure

The report will have six chapters:

- Chapter 1 – Introduction: This chapter describes the background of the thesis project and the problem that is at the centre of the thesis.
- Chapter 2 – Methodology: This chapter describes how the author went about to conduct research for and carry-out the thesis project.
- Chapter 3 – Theory: This chapter describes the theory that forms the theoretical foundation of the thesis.
- Chapter 4 – Empirical Study: This chapter describes the empirical findings from the interviews and other means of data collection.
- Chapter 5 – Analysis: In this chapter the theoretical framework is compared to the empirical findings.
- Chapter 6 – Conclusion: This chapter summarizes the findings, draws conclusions on them and answer the research question. Finally, there is a discussion regarding these findings and suggestions for further research.

2 Method

The process for creating this thesis can roughly be divided into six steps, *the method study, the literature study, interviews, data analysis, process mapping, gap analysis* and *conclusions*, see Figure 2.1. The process draws inspiration from Yin (2018, p.1) where a research process is laid out into several iterative steps, *plan, design, prepare, collect, analyse* and *share*. The method study and the literature study fit into the plan and design phase and the interviews covers both the preparation and collection phases. The data analysis together with the process mapping and gap analysis make up the analysis phase and finally the conclusions, together with everything else, is shared in this report.



Figure 2.1: The thesis creation process.

The inspiration for the methodology choices comes from “The Research Onion” (Saunders et al., 2007, p. 102). This research onion illustrates the so called “layers” of scientific research that describes how you can work with the methodology for the project, from the fairly abstract “Research Philosophy” to the much more practically oriented “Techniques and Procedures”-layer. The author’s methodology choices are illustrated in Figure 2.2 in the form of the research onion.

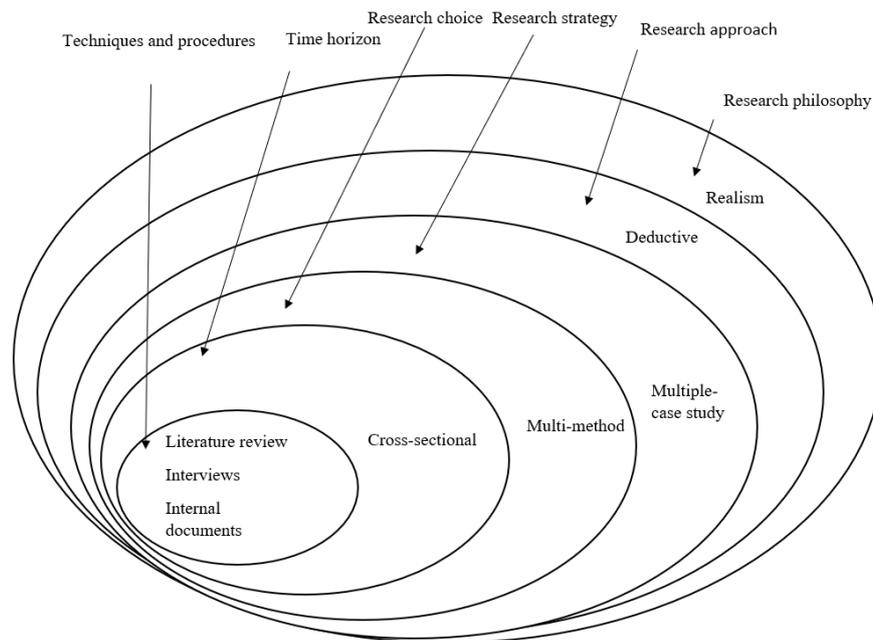


Figure 2.2: The research logic, based on the research onion (Saunders et al., 2007, p. 102)

2.1 Research Philosophy

Research philosophy relates to knowledge as a concept and how it is gathered. The three main philosophies are positivism, realism and interpretivism. Positivism is the main philosophy in the natural sciences where phenomena are measured objectively and related to the universal laws that describe how the world works. The interpretative philosophy is in a way the opposite and states that reality cannot be measured objectively since it is taken from a social context. Realism on the other hand states that there is an objective reality that does display the truth, however how this truth is

viewed depends on the views and experiences of the observing researcher (Saunders et al., 2007, pp. 102-107). The authors views lean towards realism.

2.2 Approach

The approach has to do with how clear the theory is at the start of the process and how the research is designed with regards to that. There are two main approaches which are the deductive approach and the inductive approach. The deductive approach is the dominant approach in the natural sciences. It is based on the creation of a hypothesis that is then tested in reality. It requires the hypothesis to be expressed in operational terms and then tested. The outcome is then examined, and it is determined if the hypothesis holds up. If not, the theory should be modified based on the findings. The inductive approach on the other hand where data is gathered and analysed before starting to build a theory. In other words, theory follows data (Saunders et al., 2007, pp. 117-120). For this thesis a deductive approach will be used. The base is made up of already published theory that is used and applied to the current scenario to form a set of theoretical guidelines before the empirical part of the study.

2.3 Research Strategy

The chosen method for the thesis is a case study, where the object of the study will be Region Skåne. Case studies can be very useful when answering questions such as “How” and “Why”, at least in the case when the researcher has little or no effect on the events and when it is about something contemporary and real life oriented (Ellram, 1996). Since this thesis is not about answering a quantitative question a method such as a case study that lends itself well to qualitative data and analysis seems appropriate. A multiple-case design, see Figure 2.3, is chosen since it should help produce more robust results and it will be easier to draw conclusions (Yin, 2018, p. 54).

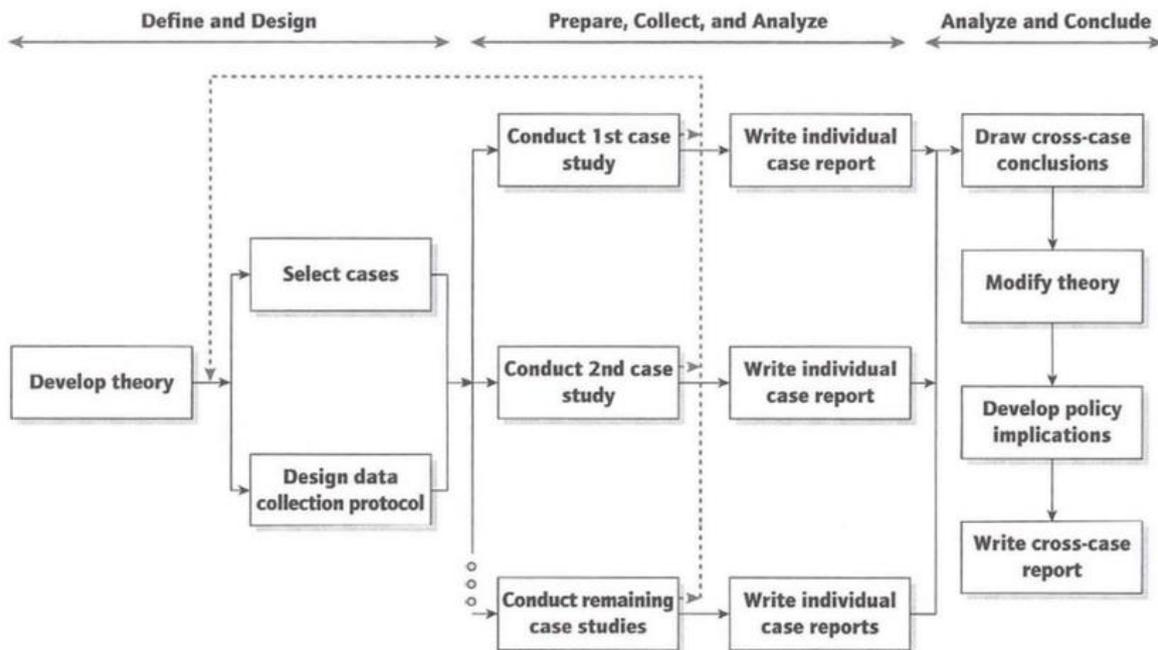


Figure 2.3: Multiple-Case Study Procedure (Yin, 2018, p. 58)

The cases studied will consist of various procurements made by Region Skåne. The selected cases are meant to be different enough to produce contrasting results, i.e. they would be considered to be theoretical replications (Yin, 2018, p. 55).

2.4 Research Choice

The nature of the thesis is qualitative and there for the plan is to use multiple qualitative methods such as “pearl growing” from a literature-review, interviews and analysis of internal documents (for more on interviews and literature reviews see 2.6 Techniques and procedures). According to the guide on the Lund University Library’s website pearl growing is “*when it comes to searching for information, the process of using one information item (like a subject term or citation) to find more information! This search strategy can be very useful when a searcher uncovers new ”pearls” about a topic. From a relevant document, you might be able to find other keywords, descriptors and themes to use in a following search*” (Lund University Library, 2018).

2.5 Time Horizons

Choosing the time horizon is a choice between studying a period of time or a snapshot of the present, also called a longitudinal or cross-sectional study respectively (Saunders et al., 2007, p. 148). The study is about Region Skåne’s processes as they are right now and not how they were in the past. Therefore, this will be a cross-sectional study.

2.6 Techniques and Procedures

The case study is carried out in several steps. These are a literature review, the creation of a theoretical base, analysing the data and finally a limited theoretical implementation of the framework on Region Skåne’s purchasing organization.

2.6.1 Literature review

The literature review serves as the base that underpins the case study. Rowley and Slack (2004) argue that the literature review can help the following:

- Identifying a research topic, question or design.
- Identifying literature that could a contribution to the research and providing context.
- Building understanding of theory and terminology in the field of research.
- Building a bibliography of sources.
- Suggesting research methods.
- Analysing and interpreting the results.

To evaluate the sources Rowley and Slack’s (2004) suggestions are followed. These include checking for articles with many citations and, how well respected the publisher is and the most relevant and updated editions of the literature. Citation pearl growing is the main method of data collection. The foundation that the pearl growing method will be used on is old thesis projects on similar topics, recommendations from the author’s thesis supervisor. To fill any gaps databases such as LUBsearch, Scopus and Google Scholar are used. A search log is used to document the process and to define keywords that give useful results. Following the literature review the findings have are compiled to form theoretical purchasing guidelines with regards to improving delivery reliability. T

2.6.2 Interviews

In case studies there are three main ways to carry out interviews, *structured*, *semi-structured* and *open-ended*. The structured interview approach is based on a pre-determined list of questions which the interviewer does not deviate from. The semi-structured approach uses a similar list as support for the interview but allows for deviations, changes in the question order and formulations depending on the situation. The open-ended approach allows for the interviewee to decide the direction of the interview. The interviewer merely steers the interview with questions and responses for the purpose of keeping the interviewee on topic (Höst, Regnell, & Runeson, 2006). The topics of the interviews are all quite specific and are carried out with the help of an interview guide, so in accordance with Bryman & Bell’s (2015, pp. 481-483) description of semi-structured interviews the semi-structured approach is chosen.

2.7 Data analysis

The nature of the thesis is qualitative and therefore the contents of the following paragraphs will be entirely about *qualitative data analysis*.

2.7.1 Qualitative data

Qualitative data is usually presented in the form of words that in turn are based on observations, interviews or documents. These data collection activities are typically carried out close to the local setting from which the data is retrieved over an extended period of time. One of the underlying issues with this type of data is that it is based on the researcher's perception and often affected by his or her values (Miles & Huberman, 1994, pp. 9-10).

2.7.2 Qualitative data analysis

Miles and Huberman (1994, p. 10) describe for activities in their data analysis model, *data reduction*, *data display* and *conclusion drawing/verification*:

- Data Reduction: This is “*the process of selecting, focusing, simplifying, abstracting and transforming the data that appear in written-up field notes or transcriptions*. It is not to be considered as separate from data analysis since it involves important decisions regarding what data to focus on, how to code it and what to discard (Miles & Huberman, 1994, pp. 10-11).
- Data display: A display is typically is an organized and condensed representation of data that enables or makes it easier to draw conclusions and analyse (Miles & Huberman, 1994, p. 11). Two of the common ways to do this are through the use of *matrices* and *networks*. Matrices are two or more crossing dimensions, representing different variables, that seeks to display how they interact with each other. Networks consist of nodes that are connected by links and are not dimensional in the same sense as matrices. Matrices lend themselves well to variable oriented analysis but can also be expanded to a more case-like analysis, whereas networks tend to lend themselves to more syntagmatic or case-oriented analysis (Miles & Huberman, 1994, p. 239).
- Conclusion drawing and verification: This is the third part of the analysis. From the start of the data collection the researcher starts to give meaning to the findings (Miles & Huberman, 1994, p. 11). That's the essence of drawing conclusions and verifying them, generating meaning from the findings in a way that's valid and avoids bias. Miles and Huberman (1994) identifies 13 different tactics for giving meaning (Miles & Huberman, 1994, pp. 245-246). Some helps to see “what goes with what” like *noting patterns and themes*, *seeing plausibility*, *clustering* and *making metaphors*. Others help to see “what's there” like *counting*. Sharpening understanding by *making contrasts/comparisons* or differentiation by *partitioning variables* are two other tactics. These tactics are more concrete but other tactics are used to see more abstract relationships like *subsuming particulars into the general*, *factoring*, *noting relations between variables* and *finding intervening variables*. There are finally two tactics for building a coherent understanding of data, *building a logical chain of evidence* and *making conceptual/theoretical coherence*.

Data reduction is used to condense the transcriptions from the interviews, the focus for displays are nodes in the form of tables and figures and conclusions are primarily drawn from noting patterns and themes, drawing comparisons between empirics and theory and generalising particulars.

2.7.3 Process mapping

Describing the process functions in order to simplify, eliminate or improve said functions is considered to be among the primary reasons for process mapping (Hunt, 1996, p. 192). The point of the author mapping out Region Skåne's purchasing process is to make comparisons to theory easier. For this purpose, a *high-level process map* should be enough. A high-level process map gives a manageable overview of the process. This includes (Hunt, 1996, p. 52):

- Where the process starts and ends
- Identifies what's included in the process
- Names the process
- The purpose of the process along with its inputs and outputs
- Identifies the products and services tied to the process.

Several activities have to be finished in order to create the process map (Hunt, 1996, p. 175):

1. Data gathering
2. Process map structuring
3. Map documentation
4. Feedback

Shortly summarized the first phase, the data gathering, includes going over internal documents, establishing separate files for the different process experts, establishing interview orders and analysing available data in order to prepare for the interviews (Hunt, 1996, p. 175). The following phase includes conducting the interviews and drawing the process map followed by iteratively redrawing the map to improve it. The third phase involves writing, editing and proofing a text based on the interviews and other data gathering and a publication version of the process map. The final phase involves reading, reacting, talking and meeting over the process map together with process experts and other reviewers/readers (Hunt, 1996, pp. 176-177).

2.7.4 Gap analysis

The purpose of the gap analysis is to compare the empirical findings from the interviews to the theoretical framework in order to identify any areas that can be improved. The process map was used to make this task easier. In order to generate meaning for the gap analysis the primary tactic used is *making contrasts/comparisons* by looking at the collected data and see how it differs from how the theory suggests delivery reliability should be worked with in the purchasing process (Miles & Huberman, 1994, p. 254).

2.8 Credibility

To ensure the credibility of the research the four tests proposed in Ellram (1996) and Yin (2018, pp. 43-47) are used. They are construct validity, internal validity, external validity and reliability.

2.8.1 Construct Validity

This step is the most challenging in a case study. Research has often been described as being too influenced by the researcher's subjectivity and criticism has been raised for perceived failures to develop sufficiently operational measures (Yin, 2018, pp. 43-44). To avoid this the author aims to provide at least two sources of information when it is possible, this being interviews by both purchasers and a manager and to some extent internal documentation such as purchasing guidelines and rules. The hope is that this produces more reliable results. The interviewees will get a chance to review the report in order to check for inaccuracies (Ellram, 1996).

2.8.2 Internal Validity

Internal validity means that there must be an established causal relationship where one condition leads to another. The aim is to avoid establishing spurious or inaccurate relationships (Yin, 2018, pp. 44-46). To avoid this the interview questions are as straight forward and clear as possible to avoid any miscommunication.

2.8.3 External Validity

External validity means that the results have to reflect the general phenomenon, i.e. can the findings be generalized. One way to remedy this is to phrase the research questions as "how" and "why" questions. This also applies to later interview questions (Yin, 2018, pp. 45-46). This is why the

research questions for this study that can be phrased in this way are phrased in this way and the interview questions are phrased in this way whenever possible.

2.8.4 Reliability

Reliability is about being transparent with regards to how the study has been carried out so that it can be replicated. This study aims to achieve this by establishing a *case study protocol* in accordance with Yin's (2018) recommendations and to properly document the work as it goes along including interview guides and data search keywords.

3 Theory

The purpose of this chapter is to examine available literature on how different factors that affect purchasing impact delivery reliability. These include the purchasing process, supplier management, metrics, risk management and power asymmetry. The author also considers segmentation to be a sixth factor but distinctly indirect in its impact compared to the others. Figure 3.1 illustrates how the author sees delivery reliability within the context of purchasing.

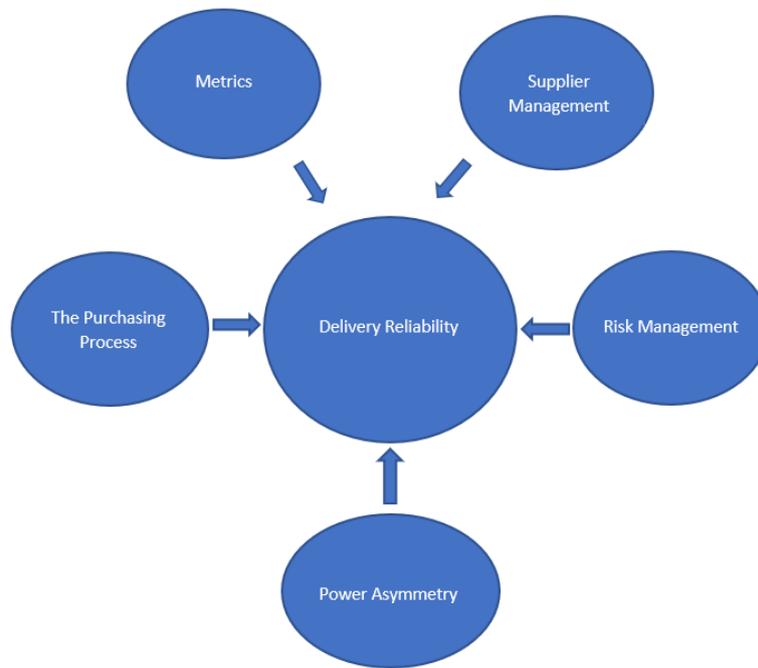


Figure 3.1: Delivery reliability and purchasing.

3.1 Introduction to the Role of Purchasing

The purchasing function, as defined by van Weele (2014, p. 3), has the role of managing the external resources an organisation needs. This includes the supply of all goods, services, capabilities and knowledge that the organisation needs and that they are assured under the most favourable conditions. Operations might be structured differently depending on what is being produced, for example (van Weele, 2014, p. 6):

- Make to stock: Refers to standard products that are being manufactured and stocked and then sold directly from inventory. These products are often produced in large batches by dedicated machinery. The material requirements are based on sales forecasts.
- Make to order: Manufacturing of the product happens after an order is received and accepted. This applies to products where there are large and customer specific product ranges or products that are expensive to stock.
- Engineer to order: Both the manufacturing, assembly and engineering of the product happens after an order is placed. This applies to products that are very customer specific.

This illustrates that purchasing activities will vary greatly between organizations and industries. Van Weele (2014, p. 6) calls this *direct purchasing*. There might also be related support activities that the purchasing function carries out with regards to the own organization/company, which is called *indirect purchasing*. These activities can also be quite varied in character and can include everything from the buying of pens for the office to the office itself. Some examples of this are the buying of (van Weele, 2014, pp. 6-7):

- laboratory equipment for R&D
- company cars for employees
- office equipment
- new IT system
- cleaning materials for housekeeping etc.

3.2 The Purchasing Process

Van Weele (2014, p.8) defines the purchasing process as including the following activities:

- Determining specifications regarding the quality and quantity of the product/s or service/s.
- Selecting the appropriate supplier and developing procedures with regards to this selection.
- Preparing and executing negotiations in order to establish an agreement signed into a legally binding contract.
- Placing an order with the selected supplier or developing efficient purchase and handling routines.
- Monitor and control the order to secure supply.
- Follow-up and evaluation activities to ensure that everything has gone to plan.

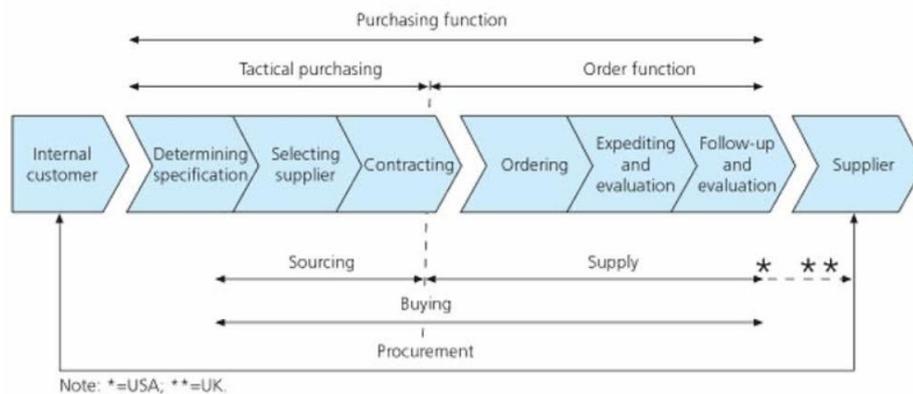


Figure 3.2: Van Weele's purchasing process model (van Weele, 2014, p. 8)

As the figure above illustrates these activities are closely interrelated. While the purchasing function is not responsible for materials planning, materials scheduling, inventory management, incoming inspections and quality control it is closely interrelated and does have an important role in supporting these other activities.

3.2.1 Determining specification

The first stage in the purchasing process according to van Weele (2014, p. 31) is the specification phase. In order for the purchasing function to know what needs to be purchased there has to be a *description* available. For standard products such descriptions could be based on a market grade or industry standard. A particular brand can be used as a description if the brand in question is perceived as carrying some kind of advantage. For other products or services a more detailed description is required. There are two types described by Monczka et al. (2016, p. 61) as *description by specification* and *description by performance characteristic*. Van Weele (2014, pp. 31-32) describes these as *technical specifications* and *functional specifications* respectively. A functional specification describes a products functionality whereas a technical specification describes technical properties and characteristics as well as the activities that the supplier is expected to perform. Functional specifications are useful when the supplier needs some room to apply their expertise. Since they do not specify any specific technologies they also allow for the use of technologies that are unknown to the supplier. Technical specifications on the other hand makes it easier to monitor the supplier in detail since there are usually detailed technical drawings and activity schedules included in them.

They are however prone to over-specification which would lead to higher costs but no greater functionality. According to van Weele (2014, pp. 31-32) these form a wider concept called *purchase order specification* that includes:

- Quality specification: Describes how the product should be delivered and the technical norms and standards that it should meet.
- Logistics specification: Describes the required quantities and the place, time and physical conditions of the delivery.
- Maintenance specification: Describes how the product should be maintained by the supplier.
- Legal and environmental specification: Describes how the product and the manufacturing process should comply with health, safety and environmental standards.
- Target budget: Describes the financial constraints that apply to the product.

Many manufacturing companies have rules that require the purchasing function's approval as well as the potential supplier's approval before the purchase order specification is sent. This is to avoid misunderstandings further down the line in the purchasing process that could be both expensive and disruptive to operations.

3.2.2 Supplier selection

The process for selecting and awarding contracts is important. In order to assure that contracts are awarded according to a fair set of principles, Monczka et al. (2016, pp. 104-105) gives a few guidelines:

- Buyer's authority to award a contract within certain financial limits
- Conditions where the competitive bid process is acceptable and where it is not
- Conditions outlining the use of competitive bids
- Process of analysing sealed competitive bids
- Conditions prompting the sourcing of an item to other than the lowest bid supplier
- Conditions prompting a rebid
- Operating guidelines that pertain to the negotiation of contracts with suppliers

The supplier selection phase is somewhat intertwined with the specification phase since many of the decisions that are made there regarding different options are already made with a few suppliers in mind. The selection phase contains several steps (van Weele, 2014, pp. 33-34):

1. Determine the method of subcontracting.
2. Preliminary qualification of suppliers and creation of a "bidders list".
3. Prepare request for quotation and analysis of the received bids.
4. Selection of supplier.

There are two kinds of subcontracting, turnkey and partial subcontracting. With turnkey subcontracting the execution of the entire assignment is the supplier's responsibility. With partial subcontracting the assignment is divided up between several suppliers and it is the buyer's responsibility to make sure that the contracts for the different suppliers are aligned. The type of contract also must be determined. Three common types are fixed cost, cost-reimbursable and unit-rate contracts (van Weele, 2014, p. 34). These contract types will be discussed further below.

Then after summing up the pre-requirements for the assignment a "bidders long list" is established containing the suppliers that might be qualified. These suppliers will all be sent a *request for information* or RFI, containing requests for qualifications and references from previous assignments. The most promising suppliers are then selected and will end up on the "bidders short list". They will then be sent a *request for quotation* or RFQ, containing the requirements and a request for a bid. Finally, the bids are analysed and with the help of, for example a ranking scheme and a *total cost of*

ownership or TCO analysis and the supplier that does best is selected. These are run jointly by users and buyers. For critical suppliers a risk analysis should also be carried out and in some cases dual or multiple sourcing might be considered (van Weele, 2014, pp. 34-35).

In order to carry-out this step of the purchasing process one first has to decide which criteria that are the most important. Monczka et al. (2016, p. 104) suggests a list of criteria that includes the following:

- Price/cost competitiveness
- Product quality
- Delivery performance
- Financial condition
- Engineering and manufacturing technical competence
- Management of its own suppliers
- Management capability
- Ability to work with the customer
- Potential for innovation

In her literature review on sourcing, Pazirandeh (2011) found a two-phase survey method for deciding on relevant criteria and then grading the importance of the criteria that are deemed relevant. In Table 3.1 and Table 3.2 the reader can find examples of the first and second phases of the survey method respectively. The L, M, H and VH in Table 3.2 stand for low, medium, high and very high respectively.

Criteria	Sub-criteria	Relevant?		
		Yes	No	
Quality		Yes	No	
	Quality control and rejection rate	Yes	No	
	Customer rejection rate	Yes	No	
Delivery		Yes	No	
	Compliance with due date	Yes	No	
	Fill rate	Yes	No	
	Delivery lead time	Yes	No	
	Flexibility	Yes	No	
		Change in delivery due date	Yes	No
		Special requests	Yes	No
	Meeting demand fluctuations	Yes	No	
Service		Yes	No	
	Reliability	Yes	No	
	Responsiveness	Yes	No	
	Empathy	Yes	No	
		Communications	Yes	No
		Access	Yes	No
		Understanding	Yes	No
		Assurance	Yes	No
		Competence	Yes	No
		Courtesy	Yes	No
	Credibility	Yes	No	
Costs		Yes	No	
	Purchase price	Yes	No	
	Logistics costs	Yes	No	
Product		Yes	No	
	Product range	Yes	No	
	New product availability	Yes	No	
	Additional features	Yes	No	
		Recycled materials	Yes	No
	Ergonomic features	Yes	No	

Table 3.1: A survey determining the relevancy of certain supplier selection criteria (Pazirandeh, 2011).

Criteria	Sub-criteria	Importance			
		L	M	H	VH
Quality		L	M	H	VH
	Quality control	L	M	H	VH
	Customer rejection rate	L	M	H	VH
Delivery		L	M	H	VH
	Delivery lead time	L	M	H	VH
	Flexibility	L	M	H	VH
	Change in delivery date	L	M	H	VH
	Special requests	L	M	H	VH
Service		L	M	H	VH
	Reliability	L	M	H	VH
	Empathy	L	M	H	VH
	Access	L	M	H	VH
	Understanding	L	M	H	VH
Costs		L	M	H	VH
	Purchase price	L	M	H	VH
	Logistics costs	L	M	H	VH

Table 3.2: A survey determining the relative importance of relevant criteria (Pazirandeh, 2011).

Table 3.1 represents a survey for the first phase where the relevant criteria are chosen and Table 3.2 represents a survey where the relevant criteria are ranked on their importance. Other methods for ranking suppliers include analytical hierarchical processes (AHP), decision tree, and mathematical programming such as multi-objective programming (MOP) and data envelopment analysis (DEA) (Pazirandeh, 2011). Order qualifier and order winner are words used by Bozarth and Handfield (2016, p.43) to describe criteria that are required to be considered for a procurement and criteria that can let a supplier “win” a procurement respectively.

3.2.3 Negotiation and contracting

The design and content of the contract will naturally vary considerably depending on the product in question. The variation could be because of commercial or legal reasons, purchasing policy, company culture and market situation (van Weele, 2014, pp. 35-36). The trend is moving toward favouring negotiated long-term contracts over competitive bidding, but competitive bidding is still quite common especially for routine products (Monczka et al., 2016, p. 105). The conditions for effective competitive bidding are the following (Monczka et al., 2016, p. 63):

- High enough volume to justify the method.
- Specifications or requirements for the item and the resulting costs of productions are clear to the seller.
- There has to be a competitive marketplace with an adequate amount of qualified and interested sellers.
- The buyers only ask for bids from technically qualified suppliers who want the contract which will lead to competitive pricing.
- Adequate time is available suppliers to evaluate the information from the buyer.
- The buyer has no preferred supplier.

Competitive bidding is preferable when price is the main criterion and when the specification or requirements for the item are straightforward. The right conditions for face-to-face negotiation on the other hand are (Monczka et al., 2016, p. 63):

- When any of the criteria for competitive bidding do not apply.
- When agreement about many different factors are required such as price, quality, delivery, risk sharing and product support.
- When the buyer requires early supplier involvement.
- When the supplier cannot determine risks and costs.

- When the supplier requires a lot of time to develop and manufacture the item meaning that estimating the cost becomes more difficult.

3.2.3.1 Prices and delivery

For the purposes of controlling costs a fixed price is preferred and this should preferably be obtained through competitive bidding or negotiations. Financial obligations should be clearly established and preferably the supplier should shoulder all risks, unless they are excluded from the contract. A few price arrangement examples are (van Weele, 2014, p. 36):

- Fixed price plus incentives contracts: Incentivises the supplier to exceed the agreed upon standard.
- Cost-plus contract: The price is the cost plus some kind of extra fee. Used when a fixed price is too big of a risk for both parties. Usually more expensive for the buyer.
- Cost-reimbursable contract: Usually based of some kind of fixed hourly rate for labour and equipment.
- Agreement with price adjustment: Usually used for long-term delivery of market sensitive materials. The price is tied and index that is based on external factors.

3.2.3.2 Terms of payment

Generally, performance-based payment is preferred. Any advance payments should be backed up by a bank guarantee where the supplier agrees to fulfil all their obligations. The guarantee should cover the whole sum and be valid for the entire period of delivery (van Weele, 2014, p. 37).

3.2.3.3 Penalties and warranties

The general purchase conditions of many large companies' state that the suppliers must deliver goods that are of good quality and completely in accordance with the requirements as they are stated in the agreement. Another important thing that has to be considered is the clause that states which legal system's jurisdiction the agreement falls under. Rules will often vary between the country of the supplier and the buyer. There should also be agreements stating a minimum guaranteed performance of the delivered goods. A penalty clause should be in place in case this performance is not met. The best option is to aim for corrective measures but if this fails then the penalty clause makes sure that the buyer can recover the resulting costs. Penalty clauses do however do nothing to solve any of the problems that have occurred. Neither do they do anything to help with circumstances where a buyer must be able to refuse deliveries. A warranty period should also be established during which the supplier is responsible for the adequate functioning of the delivered product under the specific circumstances that are agreed upon in the contract (van Weele, 2014, p. 37).

3.2.4 Ordering

Ordering can happen in two main ways. The first way is to use the contract as the purchase order. The second way is in the case of routine buying when there is a long-term contract that the buyer places orders against (van Weele, 2014, p. 40). When drafting the purchase order it is important to be very clear with the policies, details and legal conditions since it is effectively a legally binding document (Monczka et al., 2016, p. 65).

3.2.5 Expediting and evaluation

When it comes to expediting there are three different types (van Weele, 2014, p. 41):

- Exception expediting: The buyer is informed by the internal customer when a delivery is late. The buyer will then take action depending on if the late delivery will cause some disruption. This method is not recommended since it does nothing to prevent problems from happening in the first place.
- Routine status check: This is a preventative method. The buyer contacts the supplier before the delivery to confirm the delivery date.

- Advanced status check: More time intensive than the routine check. Mostly used for critical suppliers and products. It involves the buyer monitoring the progress at the supplier at regular intervals. Sometimes the buyer might even place an inspector at the supplier's location.

When the goods have been delivered they need to be checked to make sure that they meet all the requirements. This often happens in several steps. First there is an *acceptance test* at the supplier's site before delivery followed by another at the user's site after delivery. Finally, there is a final acceptance test when the equipment is put into operation (van Weele, 2014, p. 41).

3.2.6 Follow-up and evaluation

The buyer also has a role after production has started or any new installation has been put into operation. Things such as warranty claims and penalties have to be settled, excess and minor works administered, and documents and evaluations need to be finalized, filed and archived. Any excess work must be reported to the buyer in advance so that the buyer can give permission and so that the buyer can have a clear picture of the purchase cost. When it comes to investment goods the buyer needs to make sure that the supplier can substantiate their promises with regards to servicing and maintenance. It is also important to properly document the supplier's quality and delivery records as well as more qualitative information like competitiveness and innovativeness. This creates an up-to-date record of the supplier's capabilities that can be used both by the buyer and the supplier for future projects (van Weele, 2014, p. 42).

3.3 Segmentation

Segmentation can serve as a useful tool for coordinating business units within a company, differentiating purchasing strategies for different suppliers/products/services, illustrating possibilities for development, managing supplier relationships and the prioritisation of human resources in the purchasing process (Gelderman & Van Weele; Van Weele, pp.163-164). The following part of this sub-chapter describes a common method for segmentation/classification.

3.3.1 The Kraljic portfolio model

Kraljic (1983) describes a four-stage process which several European companies used to minimize their supply vulnerabilities and make the best use of their purchasing power. The phases are as follows:

1. Classification: Purchase materials are classified either as noncritical items, leverage items, bottleneck items or strategic items depending on the supply risk and profit impact of the items. The purchasing approach will depend on which category the specific item fits.
2. Market analysis: The buyers will weigh its bargaining power against that of its current or potential suppliers. The buyer reviews the availability of the materials in terms of both quality and quantity as well as the strength of the existing suppliers of said materials. The buyer will then look at its own needs and supply lines to measure its ability to reach the kind of supply terms it would want.
3. Strategic positioning: A purchasing matrix divided into three sectors called exploit, balanced and diversify based on the company's buying strength and the supply risk of the product. These three risk categories tie the products to three corresponding basic strategies. For "exploit" the buyer should use its leverage and the relatively low supply risk to get prices down and negotiate beneficial contracts while still caring for the supplier relationship. For "diversify" the buyer should focus on supply market research to find alternative sources or focus on building long-term supplier relationships to assure supply despite the high supply risk and lack of negotiation leverage the buyer might have. For "balance" an intermediate version of these two strategies should be used.
4. Action plans: Things such as volume, price, supplier selection etc. will have to be set based on the strategy that was decided in phase three. If the buyer is weaker than the supplier it

should consolidate its purchased volumes from the supplier and ensure supply in the short term, perhaps despite high prices. In the long term the buyer should look for alternatives. If the situation is reversed the buyer can exploit price advantages, spread volumes over more suppliers, increase spot purchases and reduce inventory levels. The buyer should explore many options for long-term supply and explore opportunities to exploit short-term opportunities.

Gelderman and van Weele (2005) have present a version of Kraljic's original matrix, see Figure 3.3.

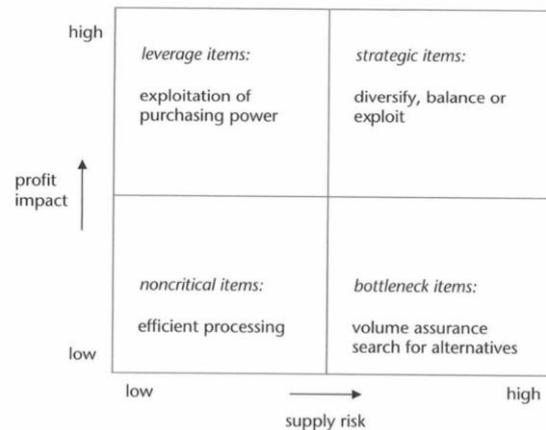


Figure 3.3: Modified version of Kraljic's matrix (Gelderman & van Weele, 2005)

The four categories are described as follows (van Weele, 2014, pp. 164-166):

- Strategic items: High-tech, high-volume products that are often supplied at customer specification. One source of supply that cannot be easily changed. These items usually make up a large share of the cost of the finished product.
- Leverage items: These are items that can be easily obtained from many suppliers at standard quality. They are bought at large volumes and represent a large portion of a products final cost. Since the price of these items will have a large impact they are usually purchased with a more aggressive strategy using a tendering process or e-auctioning to find suppliers.
- Bottleneck products: These items represent a relatively limited part of total purchase costs, but their supply is vulnerable, and they can only be obtained from one supplier. The supplier is often the stronger party in this relationship which can lead to high prices and poor service.
- Routine products: Inventory items are typical of this category. Low value per unit and there are plenty of suppliers. There is however very a large variety of these products leading them to be logistically complex to handle. The time spent on handling them is mostly disproportionately large compared to their value. They should be sourced as efficiently as possible in order to free up time to handle more important items.

The power relationship between buyer and supplier will affect the supply strategy. But in general, the strategic and leverage products should be the main focus. With regards to the bottleneck items the aim should be to move them out of that category. The aim for the routine products is to spend as little time and resources as possible to handle them.

3.4 Characteristics of Healthcare Providers

Health services are run in widely different ways depending on the country. In the United States there are publicly run options for the poor, the elderly and military veterans whereas the rest of the population get their health insurance from their employer or through various government run market places or directly from the private market. In most of the developed world there is however some kind of universal system of healthcare which can come in several different forms, such as a *national health*

service, *single-payer* or *multi-payer* system (Department for Professional Employees, 2016). In the case of Sweden three different kinds of governance can be identified for the healthcare system, the political, the administrative and the professional governance. The political governance primarily happens in the form of laws, goals, guidelines, prioritisations, resource allocations and structural changes. This sort of governance often happens at a distance, far from the actual operations. The administrative governance is often described as the process by which executives make other members of the organisation to carry out its strategies. The administrative governance also controls the administrative processes concerning budgets, personnel, accounting and more. The professional governance is central to the healthcare system. The professional governance controls the actual execution of the healthcare processes and the healthcare systems core services. These processes are carried out by professionals such as medical doctors, nurses and others (Hallin & Siverbo, 2003, pp. 63-65).

The healthcare industry has been very slow to adopt supply chain management practices. This has largely been down to lack of executive support, misaligned or conflicting incentives, need for data, lack of supply chain competencies and inconsistent relationships with supply chain partners amongst other things (McKone-Sweet, Hamilton, & Willis, 2005).

3.5 Power relationships in purchasing and the supply market

Resource dependency theory (RDT) takes the view that most organisations will not have the all the resources within themselves to conduct successful operations (Wernerfelt, 1984). Therefore, they need to establish negotiated relationships with other organisations from whom they can acquire the missing resources (Cyert & March, 1963). This causes dependencies between organisations and the power balance between two dependant parties is often skewed in one party's favour due to various interdependency characteristics and social positions. For an organisation to survive it therefore needs to be efficient in its ability to acquire and maintain resources (Pfeffer & Salancik, 1978).

Caniëls & Gelderman (2005) defines purchasing power as the relative dependance, or difference in dependance between the buyer and the supplier. The relative dependance determines to which degree one party can leverage their position to influence the other party. Pazirandeh (2012) identifies five categories for the sources of power in the buyer-supplier relationship, *substitutability*, *interconnection*, *information asymmetry*, *demand share* and *reputation*, see Table 3.3.

Source of power	Attributes	
Substitutability	Supply	Availability of product
		Number of suppliers available
		Entry barriers / market regulation
	Demand	Availability of demand substitutes
Interconnection	Importance of partner in the exchange decision	
	Duration of relationship (history)	
	Perceived importance of the exchange by the partners	
	Partner switching cost	
	Mutual trust and commitment	
Information Asymmetry	Awareness of the demand	
	Control over information / Position in the information flow	
	Knowledge of the supply market	
	Knowledge of the exchange	
Demand Share	Competition / Number of buyers available	
	Volume or value exchanged compared to total volume or value in the market	
Reputation	Legitimacy	
	Size	
	Brand	
	Financial status (cost/ price structure)	
	Technology sophistication	
	Expertise, resources and know-how	
Logistics situation		

Table 3.3: Sources of power by Pazirandeh (Pazirandeh, 2012, p. 52)

These attributes create different levels of relative dependency giving rise to different power structures between supply chain partners, see Table 3.4 (Pazirandeh, 2012, p. 53).

	Characteristics		Characteristics
Buyer dominance	High coercive power by buyers	Interdependence	Mutual high power structure
	Dependence favours the buyer		Moderate dependence on suppliers
	Low trust (especially buyer's)		High level of trust towards suppliers
	Monopsony demand markets		Collaborative relationship
			Concentrated supply markets (i.e. oligopoly)
			High products and cost differentiation
Independence	Relative low power of buyer and supplier	Supplier dominance	Buyers refrain coercive power
	Lower buyer dependence		Dependence favours the supplier
	Moderate mutual trust		Relationship perceived highly by buyers
	Highly competitive supply market		Monopoly markets
	Low entry barriers		Difficult to substitute products
	Easy product substitutability		Alternative customers
	Low product criticality		

Table 3.4: Various power structures (Pazirandeh, 2012, p. 54)

There are four basic ways to balance power asymmetry. The first is for the weaker partner to withdraw from the relationship, at least partially. This includes scenarios where a relationship is terminated or where a buyer or supplier is looking for diversification. The second option is to alter the network of the power structure by leveraging other relationships in the network. An example is when a buyer invests in the development and introduction of new suppliers in a concentrated market. The third option is for the weaker party to increase its status, primarily by increasing the reputation attributes. The fourth option is for several weaker parties to pool their resources by forming a coalition. An example of this is cooperative purchasing (Emerson, 1962).

The four power structures also have purchasing strategies that are typically associated with them, see Table 3.5. Supplier dominance means that the supplier has more power over the buyer and buyer dominance is the opposite. Independence means that the buyer and supplier are not very dependent on each other, and interdependence is the opposite.

Power structure	Example of suggested purchasing strategies
Supplier dominance	Diversification
	Formalization (detailed contracts)
	Coercive strategies
	Socialization
	Cooperative purchasing
	Pooling demand
	Increased information sharing
	Longer-term supplier relationships
Buyer dominance	Coercive strategies
	Supplier development
	Maintain supplier motivation
	Standard information sharing
	Competitive bidding
	Target or favourable pricing
Confrontational purchase	
Independence	Formalization (standard contracts)
	Pooling demand
	Spend management
	Routine ordering
Interdependence	Reverse auction
	Mutual coordination
	Supplier development
	Develop / maintain partnership
	Increase socialization

Table 3.5: Power structures and suggested purchasing strategies (Pazirandeh, 2012, p. 58)

3.6 Supplier management

Like was previously mentioned in Chapter 3.2.2, the supplier selection phase in the purchasing process is important. But it is also important to manage a supplier's performance and the organisations relationship with suppliers (Monczka et al., 2016, pp. 43,49).

3.6.1 Supplier performance management

Supplier performance management (SPM) includes four main components:

- Select competitive suppliers
- Identify and build relationships with suppliers that have potential for excellent performance
- Work to improve existing performance
- Develop new suppliers that are not competitive with current suppliers.

This all requires the purchasing function to aim for better relationships with external suppliers to establish reliable supply sources as well as challenging internal customers with regards to supplier choice (Monczka et al., 2016, pp. 43-44).

3.6.2 Supplier relationship management

Supplier relationship management (SRM) is the process of managing a supplier for the entire sourcing life-cycle. This includes the entire relationship including amongst other things (Monczka et al., 2016, p. 49):

- Day-to-day transactions
- Identification and mitigation of operational risks
- Business continuity planning
- Understanding the supplier's business challenges
- Identifying opportunities to improve value and/or reduce cost
- Improve and review progress with the help of scorecard metrics
- Contract terms and conditions
- Create value by steering the information flow to the right people and functions.

O'Brien (2015, pp. 44-45) describes a five-part model for defining the value an organisation would want to and need to realise in their supplier base. This model is called VIPER which is an acronym for *value, innovation, performance improvement, effectiveness and risk reduction*, see Figure 3.4. These five parts are structured in a hierarchy as shown below, where risk is portrayed as a *must do* whereas value is considered to be a *want to do*. The VIPER-model also looks at value at two different levels, the *macro-level* and the *supplier-level*. The macro-level deals with what types of value that the organisation as a whole needs. The supplier-level deals with specific needs from a specific supplier relationship and the related activities.

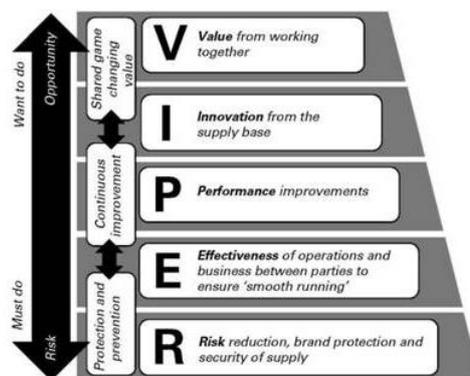


Figure 3.4: VIPER-model (O'Brien, 2015, p. 45)

The first reason to establish a relationship with the supplier is to tackle risk, which is the foundation upon which the VIPER-hierarchy rests. Risk is covered in chapter 3.8 of this thesis. The second reason to establish a relationship is to achieve effectiveness in operational activities in order ensure the “smooth running” of operations. To achieve this there needs to be a close and collaborative relationship with regards to operational questions. Thirdly there is performance improvement. They can be with regards to many different things such as quality, time and risk management. Performance improvement can come in two different forms, instructional or collaborative. Instructional performance improvement entails that the buyer tells the supplier to improve something. The collaborative approach entail that the buyer and supplier cooperate to achieve improvements. The fourth reason to establish a supplier relationship is innovation. There are four levels of supplier relationship that includes the supplier offering a new innovation that is available to all its business partners, the supplier offering a new innovation just to you, the supplier receives specific instructions to develop a new innovation and finally the supplier and buyer can cooperate to develop new innovations. The fifth reason for establishing a relationship with the supplier is value. Value can mean many things such as lower prices, lower costs and innovation amongst other things. These values can only be achieved if both parties have the will to do so (O'Brien, 2015, pp. 47-57).

There are other benefits of building relationships with suppliers as well. A relationship is a prerequisite for a buyer to become a so-called *preferred customer*. The preferred customer status is one of three constructs, together with supplier satisfaction and customer attractiveness, that determine if preferential treatment can be achieved. This preferential treatment from the supplier has to do with resource allocation, for example allocation of production capacity or human resources (Hüttinger, Schiele, & Veldman, 2012).

To achieve supplier satisfaction a cooperative relationship is deemed to be very important. It should however be noted that supplier tend to prioritise norm development and the atmosphere of the relationship whereas customers tend to prioritise performance outcomes. This mismatch could lead to an unsatisfactory relationship. Information sharing is considered to be an integral part of achieving supplier satisfaction. However, suppliers do not only value the accuracy of the shared information but also, its timeliness since this greatly affect internal planning processes. Suppliers also want to feel that the relationship is reciprocal and transparent. There are several factors that influence customer attractiveness, the first big one being the size of the customer. A customer with bigger purchasing power will have an inherent advantage. Smaller customers can compensate by leveraging other elements such as more deep and interesting ways to cooperate, technical expertise and by making a compelling case for the added value of cooperation with them. The strategy for achieving customer attractiveness for smaller buyers essentially becomes to shift the focus to more social factors rather than hard numbers. There are a number of factors that influence whether a buyer can reach preferred customer status. These include long-term contracts, focus on buying from one primary supplier, geographical proximity and investments in supplier development (Hüttinger, Schiele, & Veldman, 2012).

3.7 Delivery Reliability and Measures

According to the SCOR-model(Supply Chain Operations Reference), delivery reliability is defined as “the performance of the supply chain in delivering the correct product, to the correct place, at the correct time, in the correct condition and packaging, in the correct quantity, with the correct documentation, to the correct customer” (Cirtita & Glaser-Segura, 2012). The SCOR-model is a framework for designing or improving a supply chain. It involves standardized processes, metrics, framework of relationships and management practices amongst other things. The model includes four basic processes, *source*, *make*, *deliver* and *plan*. All of these contain three levels of process detail. For delivery reliability there are four main metrics that are in turn supported by lower level metrics and these are *delivery performance*, *fill rate*, *order fulfilment lead time* and *perfect order fulfilment* (Huan,

Sheoran, & Wang, 2004). In another article, Huang and Keskar (2006) lists 19 different measures that are tied to delivery reliability, see Table 3.6.

Reliability metrics				
No.	Metrics	Definition	Configuration	Level
1	% Orders received damage free	Number of orders received damage free divided by total number of orders processed in measurement time	MTS/MTO/ETO	A
2	% Orders received complete	Number of orders received complete divided by total number of orders processed in measurement time	MTS/MTO/ETO	A
3	% Orders received on time to commit date	Number of orders received on time to commit date divided by total number of orders processed in measurement time	MTS/MTO/ETO	A
4	% Orders received on time to required date	Number of orders received on time to required date divided by total number of orders processed in measurement time	MTS/MTO/ETO	A
5	% Orders received defect free	Number of orders received defect free divided by total number of orders processed in measurement time	MTS/MTO/ETO	A
6	% Orders received with correct shipping docs	Number of orders received with correct shipping docs divided by total number of orders processed in measurement time	MTS/MTO/ETO	A
7	% Short to manufacturing schedule	Number of orders produced exceeding the manufacturing schedule divided by total number of orders produced in measurement time	MTS/ETO	B
8	Fill rate	The percentage of ship-from-stock orders shipped within 24 h of order receipt	MTS	B
9	Ratio of actual to theoretical cycle time	Ratio of measured time required for completion of set of tasks divided by sum of the time required to complete each task based on rated efficiency of the machinery and labor operations	MTS/MTO	B
10	Scrap expenses	Expense incurred from material failing outside of specifications and processing characteristics that make rework impractical as percentage of total production cost	MTS/MTO/ETO	A
11	In process failure rate	The percentage of time work-in-process is not completed, i.e., 1 minus the percentage of completed work-in-process units	MTS/MTO/ETO	C
12	Yields during manufacturing	Ratio of usable output from a process to its input	MTS/MTO/ETO	B
13	% Errors during release of finished product	Number of errors in release of finished products divided by total number of products released during measurement period	MTS/MTO	B
14	Incoming material quality control	Quality assurance procedures, control over quality of incoming material at supplier and quality improvement perspective towards supplier's suppliers	MTS/MTO/ETO	C
15	Inventory accuracy	The absolute value of the sum of the variance between physical inventory and perpetual inventory	MTS/MTO	B
16	% Faultless installations	Number of faultless installations divided by total number of units installed	MTS/MTO/ETO	A
17	Order consolidation profile	The activities associated with filling a customer order by bringing together in one physical place all of the line items ordered by the customer	MTS/MTO/ETO	B
18	% Orders scheduled to customer request date	Percentage of orders whose delivery is scheduled within an agreed time frame of the customer's requested delivery date	MTO/ETO	A
19	Average days per engineering change	Total number of days each engineering change impacts the delivery date divided by the total number of changes	ETO	B

Table 3.6: Delivery reliability metrics (Huang & Keskar, 2007).

The configuration refers to whether it is made-to-order (MTO), made-to-stock (MTS) or engineered-to-order (ETO). The level refers to the kind of relationship the buyer has with the supplier where A is no integration, B is operational integration and C is strategic integration (Huang & Keskar, 2007).

3.8 Risk Management

The most important measures that can be taken with regards to the supplier base are those concerning supplier and supply risks. Measures that aim to avoid or prepare for crisis and catastrophe are where the greatest value can be gained from the supplier base (O'Brien, 2015, p. 47). According to Manuj and Mentzer (2008) there are several ways to define risk. One of the more objective ones is illustrated and quantified by the following formula:

$$Risk_n = P(Loss_n) \times I(Loss_n)$$

In other words, risk is defined as the probability of a loss times the impact of that loss on the organisation in an event n . A five-step process is suggested to mitigate and manage risk in a global supply chain (Manuj & Mentzer, 2008):

1. Risk identification: Classifying risks into supply, operations, demand and security risks.

2. Risk assessment and evaluation: Assessing and evaluation risks based on decision analysis, case studies or perception-based methods.
3. Select risk management strategy: Choose from avoidance, postponement, speculation, hedging, control, sharing/transferring and security.
4. Implementation of the risk management strategies: Enablers include complexity management, organisational learning, IT and performance metrics.
5. Mitigation of risks: Preparing for unforeseen risk events.

3.8.1 Risk identification

Sources of supply chain risks can be viewed either as atomistic or holistic. The atomistic sources are viewed as coming from a select or limited part of the supply chain. This approach is most appropriate for low-value, non-complex and high availability materials and components. The holistic sources are viewed as being tied to the overall supply chain and any analysis has to be comprehensive. This approach is most appropriate for high-value, complex and rare components and materials. Risks can also be classified as quantitative and qualitative. Quantitative risks include stock-outs, overstocking, obsolescence, customer discounts and non-sufficient availability of components and materials. Qualitative risks include a lack of accuracy, reliability and precision when it comes to the components and materials in the supply chain (Manuj & Mentzer, 2008).

As mentioned above supply chain risks can be classified into four different categories. Supply risks are tied to events that could affect a firm's suppliers capability to satisfy the firms demand for materials and services. These can include supply disruptions, price escalations, quality issues and more. Operational risks are tied to events that can affect the focal firm's internal capabilities to satisfy customers, like the breakdown of manufacturing processes or equipment and technology changes. Demand risks has more to do with events tied to outbound flows that might decrease the likelihood of a customer placing an order or a certain volume, such as fads, seasonality and competitors as well as things that creates chaos in the system such as the bullwhip effect. Finally, security risks refer to both physical risks such as terrorism, vandalism, sabotage and infrastructure security as well as risks tied to information systems (Manuj & Mentzer, 2008).

3.8.2 Risk assessment

Naturally different choices with regards to planning and management may lead to more or less risk. Therefore, assessing risks becomes very important in order to identify and shift to the less risky option (van Weele, 2014, p. 74). There are three categories of assessment tools, decision analysis, case study and perception-based methods. Decision analysis can be used to assess supply chain risks by quantitatively comparing different choices. The formula below is taken from Manuj and Mentzer's article (2008) and is an example of a risk/benefit assessment model for sourcing decisions.

$$I_T = P_{ds}I_{ds} + P_{pe}I_{pe} + P_{is}I_{is} + P_{ta}I_{ta} + P_qI_q$$

I_T = the total impact of the sourcing strategy

P = probability

I = impact

ds = disruption of supply risk

pe = price escalation risk

is = inventory and scheduling risk

ta = technology access risk

q = quality risk

Case studies could be used to compile a business case framework that can be used to manage and assess risks in the supply chain by analysing, prioritising and measuring the impact of risk on business initiatives. A critical step in this framework is to decide on a risk profile by preparing a risk portfolio. A risk portfolio provides a methodology for prioritizing cost and risk elements to achieve the best-cost outcome. Perception based methods are as the name suggests, methods that allow for subjective risk assessments. Examples of this are Simmons risk exposure calculator, Hallikas, Virolainen and Tuominen's dimensions of severity method and Norrman and Lindroth's cube (Manuj & Mentzer, 2008). Zsidisin & Ritchie (2008, p. 75) suggest a five-step process to assess risks in projects and processes that is shown in Figure 3.5 below.

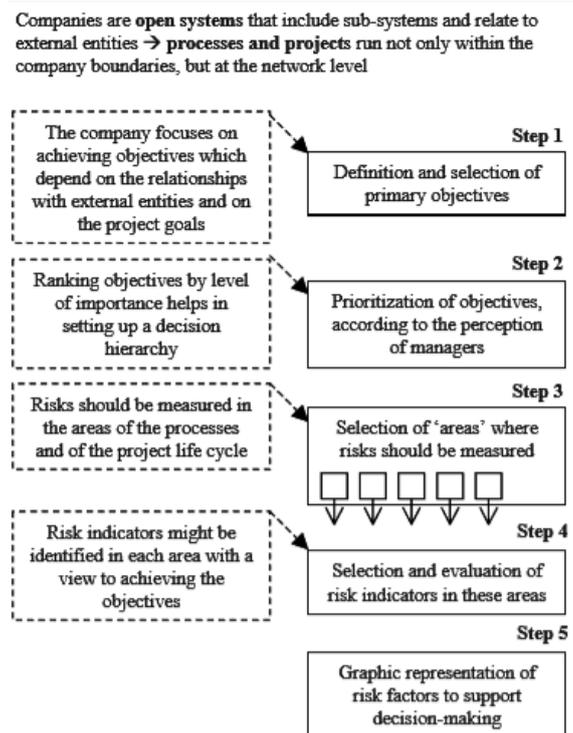


Figure 3.5: Assessment of risks in projects and processes (Zsidisin & Ritchie, 2008, p. 75)

Zsidisin & Ritchie (2008, pp. 58-59) mention that it is key to estimate the probability of an occurrence in order to assess it. Somethings can be predicted with historical data whilst one-off environmental events might be impossible to predict. Using a proactive strategy appears to be the most logical thing but it does require upfront investment. So, if the risk never appears then justifying the time and resources spent on mitigation plans, contingencies and risk management becomes harder. It therefore becomes logical to do a comparison between a scenario where an undesirable event happens, and the benefits acquired by having strategies in place to reduce that risk.

3.8.3 Selection of appropriate risk management strategies

Supply chain risk strategies can be either proactive or reactive where the reactive strategies are the ones that can be applied as the risk materialises and the proactive ones before a risk materialises (Zsidisin & Ritchie, 2008, p. 58). There are seven categories of risk management strategies suggested by Manuj & Mentzer (2008):

- **Avoidance:** This strategy is used when the risk of a certain action or event is unacceptable. When avoiding a risk, a manager is aware of the trade-offs with regards to supply and demand and operations related to the different options. Avoidance can take many forms including divestment, delay of entry or only choosing to operate in low uncertainty markets (Manuj & Mentzer, 2008).

- Postponement: Postponement means to delay the commitment of resources to get a certain flexibility when it comes to incurring costs. There are two kinds of postponement. Form postponement is to delay choices regarding labelling, manufacturing, packaging and assembly. Time postponement is when the movement of goods from the manufacturing plant is delayed until an order is received (Manuj & Mentzer, 2008).
- Speculation: This strategy is the opposite of postponement. Decisions are based on anticipated customer demand, customer-service standards and depend on the competitive environment. They are also customer driven, and supply chain resources are directed to the products that give the organisation a competitive advantage (Manuj & Mentzer, 2008).
- Hedging: There are two ways to hedge, the statistical way and the economic way. The statistical way, or insurance, is because for a large population the likely affected number can be calculated with greater accuracy. Economic hedging works for situations where the same event can affect multiple people/firms etc. at once. For example, as it is with the drops and rises in the value of currencies. In a supply chain hedging takes the form of having dispersed suppliers, customers and facilities so that a single event does not affect the whole supply chain. An example of hedging is dual sourcing, multiple contracting and flexible manufacturing plants (Manuj & Mentzer, 2008).
- Control: Control can happen in to ways, vertical and partial integration. Vertical integration can decrease the risks associated with supply and demand failures but it does make otherwise variable costs into fixed costs. Some incentives for vertical integration are opportunism, the supplier-buyer power balance and capacity constraints. This most useful for products or components with a predictable demand. For products with a more unpredictable demand there is an incentive to pass on the risk to another firm. This is partial integration and by including clauses concerning changes in the surrounding environment and the risks associated with that one can gain more flexibility and therefore more control (Manuj & Mentzer, 2008).
- Transferring/Sharing risk: The modes for transferring and/or sharing risks are outsourcing, off-shoring and contracting where outsourcing and off-shoring entails transferring risks to the supplier whereas contracting entails risk sharing between buyer and supplier (Manuj & Mentzer, 2008). Risk sharing contracts have many benefits. Making explicit purchase commitments leads can lead to better treatment by the supplier in allocation situations. With the commitments and liabilities for both parties being more visible and explicit improved decision making. The supplier also stands to gain since requirements and expected demand become more explicit (Norrman, 2008).
- Security: Strategies dealing with security risks include new technologies that can identify dangerous materials, sampling processes as well as international initiatives such as the Customs Trade Partnership Against Terrorism (CTPAT) (Manuj & Mentzer, 2008).

3.8.4 Implementation of supply chain risk management strategies

According to Zsdisin & Ritchie (2008, p. 96) some of the measures needed for a successful implementation of a risk management strategy include:

- Emergency response procedures and means
- Education and training for the involved people
- Verifying compliance to the new regulations by the way of inspections, monitoring and supervision.
- Using measures that incentivise compliance
- Safety management audit

The implementation of these strategies requires firms to align their procedures with current trends such as globalization and more customized product offerings. With supply chains becoming increasingly global, experimental and more dynamic in general they will also become more complex.

With this context in mind, making an effort to decrease the complexity of the supply chain as well as managing it becomes key. One way to manage complexity is to have more flexible supply chain that can change or react to sudden changes with as little cost in financial, time, effort or performance terms (Manuj & Mentzer, 2008).

Other important factors affecting the implementation of any strategy are organisational learning, information systems and performance metrics. Organisational learning enables the first two steps in the risk management process: the identification and assessment of risks. The risk management process is very information-intensive and therefore information technology becomes key in order to share information and find the most critical information amongst all the data. Performance measure serves the critical function of enabling structured feedback on how well a particular strategy is working. So choosing the right metrics is key to ensure that a strategy can be evaluated correctly (Manuj & Mentzer, 2008).

3.8.5 Mitigation of supply chain risks

Risk management strategies are useful for proactively address the probability of a certain risk, they can however not eliminate them (Manuj & Mentzer, 2008). This backed up by Zsdisin & Ritchie (2008, p. 58) who state that proactive supply chain risk management is preferable to reactive since it eliminates avoidable damage to the supply chain and the need to react in the cases where it is possible to avoid or mitigate certain risks. Manuj & Mentzer (2008) therefore state that risk mitigation planning is important to tackle unexpected events. The key is to identify what the losses will be in case of an unexpected event occurring. If delivery reliability is critical to the business, then a risk mitigation plan could be to identify a back-up supplier. If a firm sources from an overseas supplier and the transport is carried out by sea then a risk mitigation plan could be to identify air-freight options in case of some kind of disturbance (Manuj & Mentzer, 2008).

3.8.6 Risk Prediction

Zsidsin & Ritchie (2008, pp. 59-61) mention two types of tools that can be used for risk prediction, *data mining* and *Failure Mode Effect Analysis (FMEA)*. Data mining can find sources of risk that are otherwise hidden by looking at historical data. The two dimensions of risk are frequency and severity. Data mining is usually used for risks that lie on the high frequency and low severity of the spectrum. The risk is then lessened by identifying the controllable drivers of said risk's frequency or severity. The strategic goal of data mining is to improve prediction of key phenomenon by analysing historical data. Three common analytic approaches to achieve this are (Zsidsin & Ritchie, 2008, p. 60):

- Estimate parameters of past performance: Using means, standard deviations, correlations and associations to test hypotheses.
- Classification: Segment or cluster data in order to make the modelling process more manageable.
- Construct a function: Design a functional relationship or model with responses and explanatory variables.

For operational purposes the goal is to discover patterns in order to provide business intelligence. Some tools that can be used for this include (Zsidsin & Ritchie, 2008, pp. 60-61):

- Estimation: Useful for explanatory data analysis where the goal is to identify relevant sets of data. Common tools include Pareto analysis and various statistical and graphical tools and analysis.
- Clustering and segmentation: Using similar characteristics to group observations into manageable segments/clusters. This results in less heterogenous data which can be used as inputs when one starts to model. Common examples are K-means and Distance matrices.
- Classification/discrimination: This is the process of assigning observations into to predetermined classes where each observation in a group is as close as possible to other

observations in that group whilst the groups are as far as possible from each other. The distance between the groups are measured with specific variable(s) that are needed for predictions. Methods for this includes regression analysis, classification and regression trees and discriminant analysis among others.

- Prediction: Formal mathematical models that are built specifically to predict the occurrence of a certain phenomenon. Techniques for this include linear and non-linear regression, classification and regression trees, time-series regression models and stochastic models among others.

The two main types of data mining activities are *predictive* and *descriptive* data mining. Predictive data mining aims to use the attributes of the data to predict the future values of dependant variables. Descriptive data mining aims to find patterns in the data before trying to predict any future values. Whichever method is used it's important to have a fit between the task and the technique used as well as to make sure that the conditions used to identify any relationships are valid (Zsidisin & Ritchie, 2008, p. 61).

FMEA is a systematic group of activities that aims to recognise and evaluate potential failures in products or processes and identifying its effect and then identifying actions that could reduce or eliminate that chance of the failure happening. Documentation should happen during the whole process. The basics of FMEA are as follows (Zsidisin & Ritchie, 2008, pp. 61-62):

1. Define the scope, functional requirements and design parameters and process steps.
2. Identify failure modes i.e. various manners in which a failure could occur. A failure mode would be the loss of at least one functional requirement and the aim is to have a foresight with regards to what could cause the loss of said function(s).
3. Identify what the effect of a potential failure would have on other entities or processes.
4. Identify the severity of the effect a failure could have, usually by using some kind of discrete scale (commonly 1-10 where 1 is very low severity and 10 is very high severity).
5. Identify and investigate all potential causes for a particular failure.
6. Identify the occurrence, or the likelihood of a failure, given a certain cause. A discrete scale could be used here as well in the same way as in step 4.
7. Look at the current controls in place to identify and detect failures. The aim is to detect deficiencies and vulnerabilities as early as possible.
8. Identify the likelihood that that a failure mode could be detected. This likelihood can yet again be measured with a discrete scale.
9. A "Risk Priority Number (RPN)" should be assigned to potential failures in order to rank them for the purpose of prioritising. The RPN would be calculated as "Severity \times Occurrence \times Detection".
10. The last step is to take actions to locate and control the situation.

3.9 Theoretical findings for achieving delivery reliability

Below follow some of the authors findings regarding delivery reliability from the previously overviewed theory. These findings are put into three different categories *the purchasing process, risk and supplier management*. The author will use the SCOR-model's definition of delivery reliability as "the performance of the supply chain in delivering the correct product, to the correct place, at the correct time, in the correct condition and packaging, in the correct quantity, with the correct documentation, to the correct customer" (Cirtita & Glaser-Segura, 2012). The author identifies the purpose for delivery reliability to be the enabling of smoothly running operations and securing consistent and high-quality outputs.

3.9.1 *The purchasing process and delivery reliability*

Before the purchasing process starts a purchaser has to decide how to handle a particular product. Segmentation allows for prioritization with regards to what kinds of items purchasing operatives spend most of their time on handling. Items that are both complex to handle, easily available and generally non-essential should be handled as efficiently as possible (van Weele, 2014, pp. 166-167). This would allow an organisation to focus its time on the purchasing of more essential or difficult to source items and services which in turn provides time to focus on achieving higher delivery reliability where it is most important.

The ambition for delivery reliability is then stated in the specification through what Van Weele (2014, pp.31-32) calls the *logistics specification* and *quality specification* components of the document. Examples of what it could contain can be found in Huang & Keskar's (2007) list of reliability metrics which include some logistics and quality related measures such as *fill rate* and *% of orders received damage free*. In her survey examples Pazirandeh (2011) also identifies factors such as *delivery lead time* and *compliance with due date*. This method of using surveys is useful a way of identifying appropriate metrics that could be included in a specification. Metrics such as these have to be specified at a level that is acceptable to the organisation and makes sure that the operations of the organisation can run without undue issues. This specification will then make up the basis for any RFIs and RFQs which will inform the purchaser on what suppliers might be available and fit for purpose based on the previously mentioned criteria (van Weele, 2014, pp. 33-34, 200). When choosing a supplier or suppliers, the buyer should also keep in mind whether they want to dual source or single source the product. Single sourcing is preferable for relationship building and increasing purchasing power over a supplier, but dual sourcing can reduce supply risk (van Weele, 2014, p. 200).

The RFI and RFQ also make up the basis for any negotiated agreement that comes after adding to the importance of the initial specification (van Weele, 2014, pp. 35-37). The ability of the purchaser to gain traction for any demands, including delivery reliability, at the negotiation stage is based on the power relationship between the buyer and supplier. Pazirandeh (2012, pp.48-58) mention four sources of power that a buyer or supplier can use to gain leverage in negotiations and strengthen their position in the power relationship. These create four different power structures with associated purchasing strategies. These should be used to gain enough leverage to negotiate favourable delivery reliability terms.

The author identifies two discussions which should be had about delivery reliability. The first, which has been discussed in the paragraphs above is, "what should be done to prevent delivery reliability issues?". The other is "what should be done to minimize the delivery reliability issues that are occurring now?". In order to prevent a delayed or faulty order from causing problems the buyer first needs to know that there is a problem in advance. By conducting some kind of status check the buyer can receive information beforehand and using that information hopefully be able to avoid or at least mitigate any issues that might arise from a delayed or faulty order (van Weele, 2014, p. 41). The experience the buyer has had with the supplier together with documentation such as delivery and quality records should also make up the basis for future evaluations (van Weele, 2014, p. 42). In order to improve on delivery reliability in the future there needs to be some facts available that can serve as an objective basis for a discussion with a supplier.

Metrics have a supporting role. Whether delivery reliability is achieved can only be objectively known if it is measured. As previously mentioned, measurable criteria should make up part of the specification in order for the purchaser to check for compliance. Metrics are mentioned in theory both for the purpose of supplier management, where they can use to measure progress in areas of cooperation as well as for risk management where metrics can be used for evaluating risk strategies (Monczka et al., 2016, p. 49; Manuj & Mentzer, 2008). In these ways metrics have direct impact on

delivery reliability by supporting other activities impacting delivery reliability as well as helping define and objectively measure delivery reliability.

3.9.2 Risk management and delivery reliability

Risk thinking is central to both preventing delivery reliability issues and mitigating their impact when they occur. Manuj & Mentzer (2008) provide a five-step process for managing such risks. Managing the risks enables the purchaser to work proactively to minimize the impact and avoiding avoidable damage. This is essential since you cannot eliminate risk completely according to Manuj & Mentzer (2008).

3.9.3 Supplier management and delivery reliability

Establishing good relationships with your suppliers is a prerequisite for working together to improve performance, including performance on delivery reliability (Monczka et al., 2016, pp. 42-43). O'Brien (2015, pp. 47-57) also mentions working together on performance issues as an advantage of having a good relationship with the supplier. Together with performance improvement he also mentions other areas of cooperation, including risk which is tied together with delivery reliability. Establishing a good relationship also has the benefit of increasing the chances of becoming one of the supplier's preferred customers leading to preferential resource allocation (Hüttinger, Schiele, & Veldman, 2012). This can be useful when there is a shortage for an important product. A good relationship is also a prerequisite for working together on areas such as risk and performance improvement which are closely tied to delivery reliability.

3.9.4 Summary

In summary the author has identified four different kinds of activities that can improve delivery reliability.

Process oriented actions: These refer to actions that are tied to the purchasing process such as prioritising delivery reliability when creating the specification, the RFI and the RFQ as well as when negotiating the contract. Making these priorities from the start sets the benchmark for future levels of delivery reliability. Process oriented actions that aim to reduce harm from when issues arise and how to prevent them in the future are also important. These primarily include proactive expediting and thorough evaluations of the internal and external processes performances (van Weele, 2014, pp. 31-42). Various metrics should be employed throughout the process, both in the specification and for compliance checks later on (Huang & Keskar, 2007). Metrics should be chosen based on how the organisation chooses to define delivery reliability. Segmentation can help to make prioritisations in the process (Gelderman & van Weele, 2005).

Power oriented actions: In order to be able to make the prioritisations that are mentioned in the previous paragraph the buyer needs leverage (Caniëls & Gelderman, 2005). When this leverage does not exist, the buyer needs to try and shift the power balance between them and their supplier in their favour by employing various strategies. These strategies include pooling resources with other actors, look for product or supplier substitutes, diversification amongst others (Pazirandeh, 2012, p. 58).

Supplier management oriented actions: Another way of making a supplier agree to the buyers demands when it comes to delivery reliability is to establish a good and cooperative relationship with the supplier. A supplier will be more accommodating to the buyers needs when they can see that the buyer is accommodating to theirs. This can in turn lead to preferred customer status where the buyer receives preferential treatment when it comes to resource allocations (Hüttinger, Schiele, & Veldman, 2012). Cooperating in areas such as innovations, risks and performance improvements that affect delivery reliability could also lead to increased delivery reliability.

Risk oriented actions: Risks to delivery reliability cannot be avoided entirely but they can be mitigated. By having a process for working with risk it ensures that an organisation can work

proactively to reduce the impact of unwanted occurrences, such as delivery and quality issues (Manuj & Mentzer, 2008). Examples of strategies that can be implemented to mitigate risks are safety stocks (Zsidisin & Ritchie, 2008, p. 214) and dual sourcing (Manuj & Mentzer, 2008).

4 Empirical Study

The examined cases consist of various products and services purchased by Region Skåne. The focus has been on consumables but there is also one example of capital goods as well as one example that is a service. As explained in the methodology chapter the cases are examined through interviews with the responsible purchasing staff. There is also one interview focusing on the whole organisation which should not be considered as a separate case but rather as a means of providing context and filling in missing information. The interviewees are Måns Weimarck, the head of purchasing for IT, medical technologies and lab equipment as well as Amelie Åkesson, Lars-Olof Frid, Mattias Olsson and Angelica Birgestrand-Hellspong, all of whom are strategic purchasers at Region Skåne. The information relevant for the interview subjects is summarised in Table 4.1.

Interview subject	Procurement(s)/Interview(s)	Title
Måns Weimarck	Purchasing at Region Skåne	Head of purchasing for IT, medical technology and lab.
Amelie Åkesson	Patient meals	Strategic purchaser
Mattias Olsson	Postal services and Ambulances	Strategic purchaser
Lars-Olof Frid	Testtaking materials	Strategic purchaser
Angelica Birgestrand-Hellspong	Blood bags	Strategic purchaser

Table 4.1: Summary of the interview subjects.

The version of the Kraljic’s matrix showed to the interviewees is identical to the one seen in Figure 3.4, but with “profit impact” removed in favour of “operational importance for the organisation”. This is because profit is not a motive for a public healthcare provider. Figure 4.1 is based on the multiple-case study methodology from seen in Figure 2.3, but it is instead specific for this thesis.

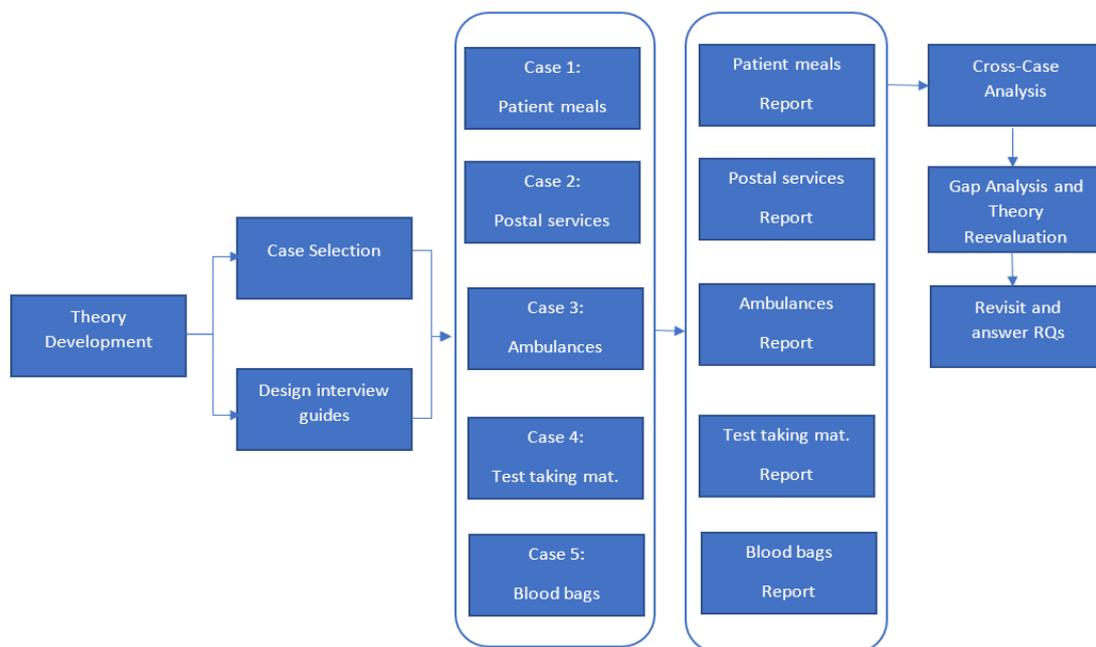


Figure 4.1: The case methodology for the thesis.

4.1 Purchasing at Region Skåne

4.1.1 Public procurement in Sweden and Skåne

Public procurement in Sweden is regulated by LOU, *Lagen om Offentlig Upphandling* or in English *The Law of Public Procurement*. Amongst other things this law stipulates that all public procurements, with some exceptions, have to happen in the form of competitive bidding where any

supplier gets a chance to make their case. If a supplier does not win the contract, there is a period of time where they can appeal the decision. Weimarck (2019) says that one of the purposes of LOU is to minimize the role of negotiations in favour of transparency and the equal treatment of potential suppliers. An exception to this is when the product or service is difficult to define or when there is little or no competition. Then the process can start with a supplier qualification phase. After that a negotiated procedure can start where there will be criteria that are non-negotiable, but some other criteria are negotiable. The suppliers then get to provide input regarding what they could accept in a specification. At a certain point the negotiated procedure stops and Region Skåne develops a final specification which is then advertised, and the qualified suppliers get to place bids on it (Weimarck, 2019).

The law also stipulates that all potential suppliers have to be treated equally, essentially meaning that Region Skåne has to conduct their purchasing process consistently the same. Politicians also have a lot of direct influence over purchasing, not just indirectly with various laws and regulations. This is especially the case when it comes to decisions regarding the purchasing of healthcare services where it is a politically sensitive issue whether they should be purchased or carried out inhouse. This can also be the case when it comes to the purchase of other services such as cleaning or facilities. In general, the political leadership tends to prioritise direct spend on healthcare services and personnel over supporting IT-systems for other parts of the organisation (Weimarck, 2019). Third party opinions on a supplier also cannot be used according to a verdict from the courts. A contract also cannot last longer than four years unless one gains an exception because the supplier needs to make major investments. This essentially means that Region Skåne cannot make commitments to a supplier that extend beyond the contractual period (Åkesson, 2019).

Region Skåne employs a strategic importance ranking for different procurements. It determines how much effort the purchaser is required to put in during the preparation, procurement and agreement phases, and goes from one to four. It is described in an internal document where there is a list of 14 parameters that Region Skåne suggests that the purchaser take into consideration when setting the ranking. This list is not exhaustive, however (Region Skåne: Avdelningen för Koncerninköp, 2016). The 14 example parameters are listed below in Table 4.2.

Example parameters
The deals affect on patient safety
The product or service's importance for Region Skåne's operations
Direct impact on the inhabitants
Risk for problems with delivery
High environmental impact
The value of the deal
The length of the contract period
Recurring deliveries
The product or service's complexity
Several parties to the deal or sub-suppliers
An untested supplier
Previous experiences with the supplier
The suppliers financial stability
Many deviations

Table 4.2: Some parameters that a purchaser at Region Skåne could consider when setting the strategic ranking of a procurement (Region Skåne: Avdelningen för Koncerninköp, 2016).

Weimarck (2019) also mentions that the ranking might change during the purchasing process.

4.1.2 *The products*

Region Skåne purchases a wide range products that are both directly and indirectly related to healthcare delivery. The purchasing department works in four different groups (Weimarck, 2019):

- ❖ *Operational purchases* or in Swedish *verksamhetsnära inköp*. These include medicines, healthcare services and healthcare related consumables.
- ❖ *IT, medical technology and lab equipment*.
- ❖ *Operational supporting purchases* or in Swedish *verksamhetsstödjande inköp*. These include everything that are considered supporting products and services such as cleaning and janitorial services, office materials, transport, food and certain consulting services.
- ❖ *Purchasing services* or in Swedish *inköpsservice*. They act as an internal “helpdesk”.

4.1.3 *Suppliers*

Suppliers of services are almost always Swedish. However, most of the manufacturers of the products are global, but with Swedish affiliates or retailers. This is because Region Skåne has to work within the framework of Swedish contract and procurement laws as well as all the contracts have to be in Swedish since the working language of the healthcare service is Swedish, leading to Swedish suppliers usually being more plausible options. In summary Region Skåne works with local actors but in a global supply chain. Region Skåne buys products and services that fit within all four of the Kraljic matrix quadrants. However, Weimarck says that there is a large segment of important products where there is supplier dominance. This is due to a lot of medicines and medical devices and equipment being either very technically complex or protected by patents leading to a monopolistic supply market. A lot of the suppliers or manufacturers of these products are also very large making Region Skåne a very small customer and Sweden a very small market limiting the potential strategies that could be used to lessen their dominance (Weimarck, 2019).

4.1.4 *The purchasing process*

The general purchasing process for Region Skåne has the following distinct parts (Weimarck, 2019):

1. Preparation: This includes creating statistics, doing a demand analysis, a market analysis and a risk analysis. The strategic importance of the procurement decides if some or all of these steps are carried out.
2. Specification: Using the inputs from various experts to develop a specification.
3. Bid evaluation: The received bids are evaluated based on if they meet the order qualifiers, price and for complex products or services some other factors as well.
4. Award the contract: The winning supplier is awarded the contract and the contract specifics are negotiated.
5. Expediting and process evaluation: The process is evaluated by comparing goals and outcomes. Expediting is done according to the judgement of the purchaser or whomever is responsible for contract management.

First Regions Skåne develops the basis for the procurement by conducting various analysis. How much work that goes into this stage depends on how the procurement is ranked according to their strategic ranking system. For example, if the procurement is ranked as a one or above a market analysis has to be carried out and the product needs to be placed in Kraljic’s matrix and if it is ranked as a three or above a risk analysis has to be done (Region Skåne: Avdelningen för Koncerninköp, Analys och strategi – nivå 1, 2018; Region Skåne: Avdelningen för Koncerninköp, Analys och strategi – nivå 4, 2018). So, it is in this stage where decisions regarding the need for backup suppliers or safety stocks are taken. The strategic ranking from one to four is set at this preparatory stage but it can be changed later in the process. Suppliers are often involved in this phase and are asked for information or asked to come and present their product. This often done for the purpose of not

developing a specification that unnecessarily excludes what would otherwise be qualified suppliers (Weimarck, 2019).

It should be noted that Region Skåne does not have a master database making the access of raw data for the purpose of creating statistics difficult. They do not have an article database either. Their “business system” retains some data but it is incomplete. Many times, when the data is not stored in the business system it can only be found in various scanned documents or if there is a contract manager, supplier manager or someone with a similar responsibility within the product or service using department they might store data related to their product or service. For certain kinds or products there are usually no one at the using organisation that has such a role and then they usually do not store any data. Sometimes they have to ask the logistics partner or supplier for data. This impairs Region Skåne’s ability to make, for example a demand analysis. Weimarck (2019) generally describes data analysis at Region Skåne as a resource intensive process. To his knowledge there is no ERP-system or similar IT solution that could help with the situation, that is applicable to healthcare providers.

In the specification phase roles are divided between the purchaser and the group of experts, usually consisting of various experienced users of the product or service. The group of experts are mainly responsible for the contents of the specification whereas the purchaser takes a more managerial role. Purchasers at Region Skåne are requested to push the experts to express the criteria in a functional way. But whether a specification is mostly technical or functional has to do with the type of product. Many products that are tied to non-flexible automation or have other restrictions that only leaves room for a more technical specification. Products that are more complex and generally more expensive tend to have more functional specifications, for example IT-systems. The specification consists of one part containing the various criteria pertaining to the product or service and another part describing the administrative provisions such as force majeure, what happens in case of war or crisis and environmental policies (Weimarck, 2019).

The bidding process and the bid evaluation is heavily regulated with regards to how Region Skåne treats the bidders and how they communicate with them. All suppliers have to receive the same information and in general be treated equally. The bid evaluation can happen in two different ways. When it comes to simple products and services the specification will state some order qualifying criteria, delivery reliability is always among these. If any of the suppliers do not meet these, they will not be awarded the contract. If multiple suppliers meet these criteria, then the one with the lowest price will win the contract. When it comes to more complex procurements then it can look a little bit different. The suppliers still have to meet the order qualifying criteria, but they can also aim to meet some order winning criteria. These order winning criteria are things that Region Skåne values enough for them to warrant accepting a higher price. Depending on how well a supplier meet these order winning criteria they will receive a “comparison number” and the supplier with the best comparison number wins the contract. Delivery reliability criteria are always order qualifiers. The evaluation process is known to the suppliers and they know how it works (Weimarck, 2019).

After the contract is awarded to the winning suppliers the suppliers that lost in the bidding process get informed that they did not get the contract and why. They then have ten days to appeal this decision. If they do not then Region Skåne can sign a contract with the winning supplier. The specification makes up the framework of the contract, but the details still need to be negotiated, especially for more complex procurements such as IT services (Weimarck, 2019). In an example regarding delivery reliability Weimarck mentions Region Skåne’s contract with their logistics partner where it is stated that the lead time for an order of any quantity is 24 hours without them having to provide any forecasts. The contracts will commonly include penalty clauses, and these have to be enforced or else Region Skåne will not be in compliance with the law. The contracts do not contain any incentives to

outperform any of the minimum demands, but this is not due to any political hostility to such arrangements or any legal issues with such practices (Weimarck, 2019).

The active role of the purchaser is typically much smaller from here on out. After that point they will usually only be involved in strategic decisions regarding the management of the contract and some other predefined follow-up activities. Expediting and more operational activities related to contract management is usually left to the internal organisation that makes use of the product or service. The purchaser will typically get involved if there are issues, i.e. reactive expediting. For some of the more important procurements the purchaser will have, for example quarterly meetings with the supplier and biannual financial reviews. The strategic ranking for the procurement decides how active the purchasing department will be. When it comes to evaluation it consists of two basic parts. The first one is an analysis and strategy document that is filled in by the purchaser at the start of the purchasing process. The second one is a mandatory document called *procurement results* in which the purchaser writes if the goals outlined in the first document were achieved or not. It is voluntary to do “lessons learned” types of documentation but it is something that Region Skåne wants to work more with in the future. There is no information sharing for the purpose of improving the performance of the supplier at the evaluation stage (Weimarck, 2019).

4.1.5 Supplier Management

The information flow between Region Skåne and their suppliers is mostly manual. Weimarck states that very little information is exchanged in general, usually only the types of statistics that might be required to be shared according to the contract. This is also the case when it comes to information that is exchanged for the purpose of enabling high delivery reliability. Orders and billing between Region Skåne and their third-party logistics partner is done digitally but ordering and billing for products and services that do not go through the logistics partner have to be set up manually with the supplier in question. Region Skåne does also use a digital procurement tool called TendSign that allows them to receive tenders from suppliers and also share documents within the organisation amongst other things. It is used for all procurements except those that are so small that they do not have to be advertised in accordance with EU rules. There are no official information channels processes pertaining to information sharing other than these. So, any information exchange that has to be established for a particular procurement that goes beyond what is mentioned above is handled on a case by case basis. Region Skåne also does not do any forecasting, instead if a supplier needs a forecast it will have to ask Region Skåne’s logistics supplier if their product goes through them or do without a forecast if the product goes directly to Region Skåne. Weimarck sees no reason why forecasting would be more difficult for healthcare providers than for any other business (Weimarck, 2019).

Region Skåne does not mandate the use of any particular metrics that are either relevant generally or for specific product categories. There is no general process for supplier development, issues are taken up with suppliers as they happen. Region Skåne will in a few selected cases work with risk, innovation, performance, efficiency and value. The assignment is then designed as a “needs description” where Region Skåne will openly listen to and evaluate the suppliers suggestions and then design the specification with those suggestions in mind. The specification will then be published as usual and the procurement will be put up for competitive bidding. There is however no established policies regarding such work with individual suppliers with whom Region Skåne already has an ongoing contract. Region Skåne tries to be an attractive customer by trying to be inclusive when designing their specifications and being open and listening to suggestions from suppliers. Region Skåne does not have any operational purchasers that work actively with supplier relationship issues. There are nurses and administrative staff that deal with operational tasks such as sub ordering but they are mostly interested in that the deliveries arrive on time. Weimarck (2019) does stress the importance of dialogue with the market in order to not lose out on potential innovation, performance improvement and in order to maintain the supply market’s confidence despite the fact that Region Skåne cannot enter into formal long-term relationships with suppliers.

4.1.6 Risk Management

A risk analysis is conducted during the preparation phase if the procurement is ranked as a three or above. This risk analysis consists of a table where the risk in question is identified and written down. Then the probability of said risk and the impact it would have are given a value from one to five each that according to Weimarck (2019) are typically derived from a qualitative judgement by the purchaser and the expert group, but sometimes statistics if they are available. The probability-value and the impact-value are then multiplied, giving a numerical value that determines if the risk is considered critical or less important based on a scale that goes from 1 to 25. An action is then decided upon and someone is named as responsible. However, who ends up being responsible is varied, the project leader or the product/service user are given as examples (Region Skåne: Avdelningen för Koncerninköp, 2018). The risks themselves are usually identified based on the experience of users and purchasers as well as benchmarking. Following up and making use of the risk analysis is up to the responsible purchaser's own judgement. It is most likely illegal to rule out a supplier based on a risk analysis of the choice between two or more potential suppliers (Weimarck, 2019).

4.2 Patient meals

4.2.1 The product

The patient meals are simply the meals that patients eat whilst they are in the hospital, elderly homes, hospice care etc. This is a product that used to be produced inhouse. Åkesson (2019), the responsible purchaser, explains that this is a customizable product which is tailored to fit a multitude of diets and diet restrictions. A strong focus has been on providing traditional meals since a large portion of the patients are elderly, as well as accommodating the diets and tastes of immigrants. There has been less focus when it comes to the potential demands and tastes of the younger patient group. Region Skåne only purchases the meals themselves and not any services that goes with the meals. The patient meals are also regulated by various food related laws. Åkesson (2019) places it as a *leverage product* in a modified Kraljic matrix. There is much money being spent, the product has a high impact on the operations of Region Skåne and there are several potential suppliers, but the supply market is not particularly complex. She also says that on Region Skåne's strategic ranking for societal importance the patient meals are a four, the highest rank.

4.2.2 Suppliers

There are about four or five suppliers that were considered but Region Skåne only uses one and its manufacturing facility is located in Skåne. Region Skåne considers themselves to be in a strong negotiating position towards their supplier in this case due to their being multiple suppliers, a lot of money being spent and the market not being particularly complex. Their focus is therefore to strengthen their cooperative relationship with the supplier instead of further strengthening their negotiating position (Åkesson, 2019).

4.2.3 The purchasing process

The purchasing process for the patient meals has the following steps:

1. Trying to figure out what needs to be purchased. There was no previous basis since the food used to be cooked inhouse.
2. Supply market analysis. Things Åkesson (2019) looks at are for example what kind of cooking system they want, what the guidelines say and what suppliers there are.
3. RFI is sent out.
4. The case is sent out on referral to experts.
5. The service board reviews the specification and provides input. The service board is a political body.
6. The procurement is advertised by putting the specification into Region Skåne's procurement system and potential get to place bids.

7. Evaluate the bids first based on the order qualifiers and then give price deductions based on fulfilled order winners. The result of the evaluation is a comparison number. The supplier with the lowest number gets the deal.
8. A period of time starts where other suppliers can appeal the decision.
9. After the appeals period is over a contract signed with the chosen supplier.
10. The last step is implementing the contents of the agreement which will then be followed by continuous evaluation of the supplier's performance during the time span set out in the agreement. Documentation occurs throughout the process.

The RFI focuses a lot on environmental demands, for example food waste and buying ecological food. However, Åkesson (2019) mentions that they try to keep the process as open as possible to different suppliers and therefore try to not internally rank different criteria. But there is a sense that delivery reliability is the most important criteria. Supplier contacts are either established or based on existing relationships, Region Skåne discovering a new supplier during the market analysis or a supplier seeking them out and sending an email.

Åkesson (2019) says the specification is primarily functional, there are no demands that specific meals are provided but rather that they meet specific nutritional requirements. The contents of the specification are primarily set by a group of experts appointed by the internal client at Region Skåne, in this case The Regional Services Office (roughly translated from the Swedish *Regionservice*). This group of experts is comprised of for example a dietician, someone with competencies related to environment issues and many others. For a larger procurement like this there is a smaller group that works closely with the purchaser and then develops a specification which is then sent around to the experts in the larger group so that they can provide input. There are various types of requirements and here are some examples:

1. Quality: Must have an adequate quality management system and meeting Swedish animal protection standards.
2. Logistics: Political requirements aimed at achieving fossil-free transports for Region Skåne's services by 2020. The supplier also has to prove that it has an adequate supply chain set up to meet Region Skåne's demands.
3. Technical: The supplier has to prove that they have the technical capabilities and capacity to supply Region Skåne.
4. Environment and sustainability: Demand on sustainable packaging.
5. Delivery reliability: Delivery accuracy demands.
6. Financial: The supplier has to be financially stable.

The potential suppliers are involved in the development of the specification. They provide input before the RFI is sent out as part of an external referral and discussions are had throughout the process (Åkesson, 2019). They are however not directly a part in the internal development of the specification, and they do not get to view the basis for the specification.

After the specification is advertised on Region Skåne's procurement system, TendSign, the potential suppliers get to place bids. A comparison number is given based on the bidding price and price reductions from any fulfilled order winners. The supplier with the lowest comparison number then wins the contract. Any suppliers that were not awarded the contract then have ten days to appeal the decision. After this a contract is signed. The contract does not contain any incentives, but it does have penalty clauses. Two examples would be the penalty clauses that deal with late deliveries and wrong deliveries (a delivery that does not match the placed order). There is also a demand on delivery reliability. The focus on penalties instead of incentives have partly to do with the difficulty that Region Skåne has with measuring delivery reliability. After the contract is signed there was an implementation phase with weekly briefings to make sure that everything is as it should be and if any corrections or changes need to be made. This began two months before the agreement went into

effect. After the implementation phase the internal client at Region Skåne becomes responsible for the operational parts of the agreement and the purchaser takes a strategic role (Åkesson, 2019).

Status checks are done on the loading bay when the delivery arrives, where it is documented if the delivery is on time. The delivery is checked again when the food carts arrive in the ward to make sure that the order is also correct. If the supplier knows that a delivery might be late then they will get in touch with Region Skåne, but Region Skåne does not conduct proactive status checks on scheduled deliveries (Åkesson, 2019).

The purchasing process is reviewed and evaluated at the end of the contractual period for the purpose of improving for the next time. There is no particular template for this step. Region Skåne goes over points in the process they deem critical like how the delivery performance has been, internal flows, volumes etc. Another evaluation happens once per year. Documentation in preparation for the evaluations and reviews occurs continuously. Quality shortcomings are shared with the supplier. There are also meetings regarding costs and volumes. The only metric used is the number of delivery deviations. But this is dependent on how much actually gets reported by The Regional Service Office and the reporting is done manually as free text answers. It is highly dependent on how much time is available (Åkesson, 2019).

4.2.4 Supplier Management

There is a continuous dialogue between Region Skåne and the supplier regarding performance improvements. They also do follow-ups roughly every other month. The supplier's employees are also invited to Region Skåne so that they can see the whole material flow. There have been conversations about cooperating on innovation, but it is not currently being worked on, partly because of the political situation where there is no demand or want for any new solutions or methods for patient meals (Åkesson, 2019).

Region Skåne works together with the supplier on risk, performance, efficiency and to find additional value. They regularly exchange information regarding volumes, quality, type of meals, organisational changes (for examples if any of the wards are closing for the summer) and the supplier shares their cost information. Surveys are also carried out on the patients for the purpose of registering their opinions about the food. This information is then made available to both Region Skåne and their supplier. Region Skåne needs to place orders at least a day in advance. Åkesson (2019) says that they do try to market Region Skåne as an attractive customer, although not on a contract level and within the framework of the contract they do work to make the supplier happy with the relationship.

4.2.5 Risk Management

There is a risk awareness. In the specification it is stated that the supplier has to have a so called "catastrophe plan". This includes scenarios like if they were to lose their access to water or electricity, or if there was a fire in their kitchen. For all these scenarios the supplier has to have a plan of action and in principal the supplier should always be able to deliver. The internal client at Region Skåne, The Regional Services Office, has a catastrophe plan as well but the purchasing department is not part of it. For example, part of Region Skåne's "plan B" in case deliveries cannot arrive for whatever reason is to keep the onsite kitchens that can be used in an emergency. The contract also stipulates that there has to be a safety stock at the hospital and the responsibility for the product does not change hands from the supplier to Region Skåne until the product reaches the loading bay. Region Skåne has identified a risk pertaining to the ordering process, that being the window of time where they can stop an order. It is very short since the patient meals are prepared beforehand. This time is short because it is difficult to predict how many patients there will be at any given time leading to there being a risk that Region Skåne orders too much or too little food.

Åkesson (2019) says that she uses experience and a worst-case scenario thinking to identify risks, there is no particular process or method to it. The risks are then evaluated by multiplying the

perceived probability and impact of a said risk as well as Region Skåne's ability to handle that impact. However, the processes for tackling these risks is the responsibility of the internal client at Region Skåne, the regional services office. The purchasing department are only contacted when there are recurring problems. Åkesson (2019) is in contact with the internal client every other week but for strictly operational issues the regional service office turn directly to the supplier. When it comes to predicting risks it is described as "ad hoc" and based on experience. However, there have not been any large incidents previously.

4.3 Postal services

4.3.1 The product

The product is postal services which Region Skåne needs to communicate with patients. The communication involves things like dates for operations and summons for appointments and check-ups. The market for postal services is heavily regulated and supervised by *The Postal and Telecommunications Board* (in Swedish PTS or *Post- och telestyrelsen*) in accordance with relevant laws. According to Region Skåne's strategic ranking postal services are considered a three (Olsson, 2019). Olsson (2019) places postal services somewhere between a bottleneck and a strategic product although leaning more towards strategic in a modified Kraljic's matrix.

4.3.2 Suppliers

There are very few suppliers of postal services. There is one supplier, PostNord, which has a social duty to provide postal services country wide. This effectively means that PostNord cannot deny Region Skåne postal services. Then there is one larger supplier and several small suppliers which are mostly local. PostNord is the only supplier with full coverage, especially outside larger cities, which makes them the only supplier that would be fit for purpose. Therefore, PostNord also has an advantageous negotiating position. PostNord is located in Sweden (Olsson, 2019).

4.3.3 The purchasing process

The purchasing process for postal services has the following steps:

1. Market analysis.
2. Risk analysis
3. Dialogue with potential suppliers.
4. Internal referral to a project group consisting of experts where the purchaser is the project leader.
5. Start developing a specification and take opinions from potential suppliers.
6. Publish the specification and let suppliers make bids.
7. Open and evaluate the bids. The bids are compared with the help of a comparison number.
8. Award the contract to the supplier with the lowest comparison number. The losing suppliers have a period of time where they can appeal. After that a contract is negotiated and will take effect.
9. The agreement is followed-up according to an established process.
10. Evaluation.

The specification is more functional than technical, but the service is also fairly standardised. This is because many of the technical aspects of delivering a postal service is already stated in laws and supervision terms set by the government and PTS. Focus was instead on quality issues and environmental concerns. The specification contains a number of different criteria (Olsson, 2019):

1. Environment and sustainability: Fossil free transport before 2020. Due to the difficulties for PostNord to acquire vehicles that would fulfil these demands there is instead a follow-up process which aims to assure Region Skåne that PostNord is trying to achieve this goal to the degree it is deemed possible. This demand has political origins.

2. Quality: Quality management systems, deviation handling, gathering times and processes for return handling which was considered to be especially important due to necessity of the letters to get through to the patients.
3. Delivery reliability: This is was the biggest issue during the procurement process and also the biggest focus since Region Skåne wanted higher set demands on delivery reliability than the minimum set by PTS. There was also a focus on the measurement of delivery reliability since letters are not traceable, making measuring delivery reliability difficult. Instead of the 85% target for day after delivery that the Swedish postal ordinance sets as a minimum Region Skåne got a 93% target. After day two it should be 96% and for day three it should be 99%.
4. Price: A lower price is meritorious.

The suppliers are involved both before and after the specification phase. There is no real RFI but rather a dialogue between Region Skåne and the potential suppliers. The criteria are set in an internal referral by experts. The criteria include price, return handling, pick up times, types of postal carts and delivery reliability, which is an order qualifier meaning that it is highly prioritised. The procurement is then advertised in a public database where suppliers are contacted for a dialogue. The suppliers are then qualitatively evaluated resulting in comparison numbers that make up the basis for the decision of which supplier to choose (Olsson, 2019).

Since PostNord has an advantageous negotiating position Region Skåne employs a few strategies to strengthen their own position. Region Skåne had to insist on their delivery reliability criteria despite the fact that PostNord thought that they were too strict. They did not exclude smaller suppliers from the process in order to create competition. They were also actively looking for substitutes to physical mail. When it comes to the contract it differs from the previous example. PostNord does not accept penalties so instead there are several exit clauses in the contract in case PostNord falters in their service delivery. Like in the previous example there are no incentive clauses (Olsson, 2019).

After the agreement comes into effect Region Skåne receives performance statistics monthly from a third party and they also have monthly meetings with PostNord. PostNord has a case management system and Region Skåne has a deviation handling system. But neither of these are purposely used for expediting and deviations from the set targets are delivered to Region Skåne manually. How many deliveries that reach their target cannot be measured completely accurately because the letters are not traceable. However, an approximate rate of accurate and timely deliveries is achieved by sending letters with transponders attached to them to test subjects. This is however an expensive way of measuring delivery reliability. Before the procurement the purchaser wrote an analysis and strategy document outlining what strategic decisions have been made and the thinking behind them. This is then used to compare the outcome at the end of the process with the intended outcome in order to find potential for improvement. This information is used for internal purposes and is not shared with PostNord (Olsson, 2019).

4.3.4 Supplier Management

There is a dialogue and close cooperation between Region Skåne and PostNord in order to achieve mutual gain. They work together on performance in the form of dialogues about delivery reliability, efficiency when looking at the flows and achieving some added value from the relationship by regularly sharing opinions and inputs for mutual gain. They are also looking into innovation in the form of printing services, which is in the interest in both Region Skåne as well as PostNord that sees the need for diversification as the amount of physical mail decreases. They regularly exchange information about deliveries, costs and environmental statistics and PostNord can ask about more or less any information they might need and count on receiving it. However, PostNord does as a rule not need all that much information. Region Skåne does both take and ask for input from PostNord regarding how they can improve their own performance when it comes to certain tasks and processes.

By being open to change in internal processes and innovation Region Skåne tries to be a good customer (Olsson, 2019).

4.3.5 Risk Management

There is a documented risk analysis that is conducted before the specification phase. Risks are identified either based on experience or just looking forward and trying to visualise what could go wrong. The severity of the risk is considered as a formula of probability times impact, but both the inputs and the output are qualitative in nature rather than quantitative and discreet. However, since PostNord is very tightly regulated and cannot go bankrupt in any normal circumstances there are many risks that are already taken care of and considered beforehand by PTS which downstream means that Region Skåne does not have to focus on them (Olsson, 2019). In general Olsson (2019) considers the procurement of postal services to be fairly low risk.

4.4 Ambulances

4.4.1 The product

The product are the ambulances that Region Skåne uses. There are no laws that specifically affect the purchasing of ambulances. There is however a political discussion that's ongoing regarding whether ambulance services should be carried out directly by the public health service or if it should be outsourced to private contractors. This affects Region Skåne's own need for ambulances. Olsson (2019) classifies this as a strategic product on a modified Kraljic matrix. Ambulances are expensive, the procurement required a lot of cooperation, large investments for the supplier and it was generally considered a high-risk procurement. On Region Skåne's strategic ranking the ambulances are classified as a three (Olsson, 2019).

4.4.2 Suppliers

There are six ambulance suppliers in Sweden. These are all small suppliers with sub-suppliers in Europe that manufacture the ambulances. The actual suppliers in located in Sweden will often just consist of one or a few sales agents. The ambulances also differ substantially between different suppliers and Olsson (2019) says only a few of them have the capacity and competencies to deliver ambulances in accordance with Region Skåne's wishes and needs. The power balance between Region Skåne and their current supplier is considered even according to Olsson (2019). The supplier is small, but it has a strong sub-supplier that manufactures the ambulances. So, in the instances where the supplier makes the decisions Region Skåne has a good negotiating position but when the decision lies with the sub-supplier, for example chassis design, the negotiating position for Region Skåne is very weak. However, some issues with the sub-supplier can be resolved with dialogue and promises of guaranteed volumes over the contractual period if the manufacturing is done according to spec. Making such promises is difficult though when considering the political situation (Olsson, 2019).

4.4.3 The purchasing process

The purchasing process for ambulance procurement has the following steps (Olsson, 2019):

1. Market analysis.
2. Dialogue with potential suppliers.
3. Internal referral to a project group consisting of experts where the purchaser is the project leader.
4. Start developing a specification and take opinions from potential suppliers.
5. Publish the specification and let suppliers make bids.
6. Open and evaluate the bids. The bids are compared with the help of a comparison number.
7. Award the contract to the supplier with the lowest comparison number. The losing suppliers have a period of time where they can appeal. After that a contract is negotiated and will take effect.
8. Meetings are held where the blue-prints of the ambulances are developed.

9. The agreement is followed-up according to an established process.
10. Evaluation.

A market analysis is conducted looking what potential suppliers exist. After having a dialogue and sending out an RFI containing questions about the suppliers and their competencies, capacity, the after-market and their sub-suppliers the specification phase is started. The specification for the ambulances is more technical than functional. It is based on a national and a European standard outlining what the minimum requirements on what there has to be in the ambulance with regards to equipment and some other factors. The Swedish motor-vehicle inspection office also has certain demands. Input was also taken from the internal client at Region Skåne and the safety representative from the union. However, the placement of the equipment within the ambulance varies. The specification contains the following criteria (Olsson, 2019):

1. Environment: Fossil free fuels.
2. Maintenance: Reparations.
3. Logistics and delivery reliability: A certain amount of delivery reliability is an order qualifier and therefore it is not a factor when choosing between suppliers. The location of service centres.
4. Financial: Cost efficiency is important due to the high costs associated with ambulances.

The case is sent as an external referral to the suppliers but other than that they are not very involved in the specification phase. There is a large focus on quality and delivery reliability in the specification. However, all the demands with regards to delivery reliability are order qualifiers and are therefore not very impactful when it comes to which supplier wins in the bidding process. The suppliers place bids via TendSign in a competitive bidding process where comparison number is given based on their bids. The supplier with the best comparison number wins the contract (Olsson, 2019).

The contracts contents are based on the specification and the winning supplier's bid. There are no incentives, but just like in the previous examples there are penalty clauses that cover for example non-conformance with the delivery reliability criteria such as lead times. Risk for the product is not handed over until it reaches Region Skåne's loading bay (Olsson, 2019).

There is proactive expediting being done on Region Skåne's part. There is both regular contact between them and the supplier during the lead time as well as visits. All expediting is handled manually, and it is mostly handled by the internal client at Region Skåne. There is a voluntary template for follow-ups which a purchaser is strongly recommended to use when it comes to a large procurement. However, Olsson (2019) admits that it might be omitted in case there is not enough resources. In this case the template was used to do a follow-up on the procurement process. They do not use any specific metrics in this case. Instead performance is evaluated through ongoing communication and follow-ups (Olsson, 2019).

4.4.4 Supplier Management

Olsson (2019) says that Region Skåne would like to be very involved with supplier development in this procurement. They aim to work together on innovation, risk, delivery performance, cost efficiency and patient safety with any future suppliers. According to Olsson (2019) it is mostly limited by the supplier's willingness to work together on these issues, but for the coming procurement process this type of cooperation is prioritised. Simply by being the third largest healthcare provider in Sweden makes Region Skåne an attractive customer for the supplier in question since it is small and local (Olsson, 2019).

When it comes to information exchange the priority is to have a dialogue with plenty of foresight with regards to issues like the political situation and how many ambulances are nearing the end of their lifecycles in the coming years. As a rule of thumb the supplier can come and ask for information at any time and there is a continuous dialogue about Region Skåne's needs with regards to volumes, new

equipment that hit the market and other similar issues. Region Skåne's ideas and input are usually well received too (Olsson, 2019).

4.4.5 Risk Management

There is a documented risk analysis that is conducted before the specification phase. The way they identify risks is to have a dialogue with the internal client at Region Skåne that actually uses the product as well taking examples from the purchasing department's past experiences. Other than that, risks are identified based on experience or other public healthcare providers in other regions of Sweden which they exchange good and bad examples with. One risk that was identified was that since the supplier might sometimes only be one person, meaning that the company is very tightly bound to this person. This could lead to problems if this person was to retire or become sick (Olsson, 2019).

The severity of the risk is considered as a formula of probability times impact, but both the inputs and the output are qualitative in nature rather than quantitative and discreet. But there is no particular process for risk management for this product, at least not on the purchasing level. Olsson mentions that the internal client at Region Skåne might have one. The way the risks are managed by the purchasing function in this case is by working proactively, having strong terms and conditions in the contract and early and continuous dialogue (Olsson, 2019).

4.5 Test taking materials

4.5.1 The product

In this case there are several products grouped together. These products are various test taking materials such as tubes for blood tests, syringes and other similar materials. Like all the other procurements LOU applies. Frid (2019) places the products in the leverage product quadrant of a modified Kraljic matrix. There are plenty of suppliers and there are large amounts of money involved. In Region Skåne's strategic ranking the products vary between two and three (Frid, 2019).

4.5.2 Suppliers

There are many suppliers for these types of products. Region Skåne uses 14 different suppliers for this procurement, one for each product. The distributors are located in Sweden but the distributors suppliers, i.e. the manufacturers, are global. Region Skåne has a fairly strong negotiating position with the distributors in Sweden since by Swedish standards they are a big buyer. However, when it comes to issues where the distributors suppliers have control that is not the case (Frid, 2019).

4.5.3 The purchasing process

The purchasing process for the testing materials has the following steps (Frid, 2019):

1. Market analysis.
2. An RFI is sent out and the potential suppliers and they are also invited to have a presentation of the product or products they want to sell.
3. Develop the specification and risk analysis.
4. Expert referral.
5. Advertise the procurement and take bids.
6. Give the suppliers a comparison number based on their bids.
7. Award the contract to the supplier with the best comparison number and start negotiating.
8. The contract comes into effect. A third-party logistics partner handles much of the operational tasks and the ordering is done by the internal client at Region Skåne.
9. Expediting and evaluation.

There is a standard RFI (can be adjusted slightly over time) which is made available to potential suppliers and they are also invited to a presentation. The contents of the RFI are developed with the help of experts and a group of experts will also attend the presentation. The specification is a functional specification where the contents remain more or less the same over time. The contents are

decided based on an expert referral. The primary criteria pertain to function, quality and logistics. Frid (2019) says that in a procurement process function and quality, which he considers delivery reliability to be part of, make up 60% of the deal whereas price make up 40%. There is a focus on delivery reliability with a 96% delivery reliability rate and a lead time of three to five days that has to be achieved. The suppliers are not very involved in the specification phase, but they do come with input when they make their presentations (Frid, 2019).

The specification is then advertised on TendSign where potential suppliers can make bids. A comparison number is given based on how well a supplier meets Region Skåne's stated order winners. After the evaluation period the suppliers that did not win the contract get a chance to view the bid of the winning supplier and appeal if they find the decision to be faulty based on the initial criteria they received when they made their bids. If there is no successful appeal the supplier that received the best comparison number will get to negotiate a contract with Region Skåne. A contract is then negotiated based on the specification and the contract template that was handed out beforehand. It is the same contract for all the test taking materials. The contract in this case contains penalty clauses, exit clauses and a commitment from the supplier to find equivalent substitutes if they cannot deliver on their commitments as well as cover the cost difference for any those substitutes. They do not employ any incentives. The risk for the products is transferred to Region Skåne at their loading bay. When the contract comes into effect the internal client will place an order to the logistics supplier via an ordering portal called "Marknadsplatsen" which will then either deliver on said order if they have the article in stock (Frid, 2019).

The purchasing process is documented but the information that is gathered is not used for the purpose of self-evaluation. When it comes to expediting it is reactive, when deliveries are late, they will have a look at it. Most of this handled by the logistics partner since they are in charge of most operational tasks after the contract comes into effect. The articles with delivery delays are reported at least once a week to Region Skåne in the form of an excel-list which the purchaser at Region Skåne might use to investigate why there are issues. It is not uncommon for Frid to contact the supplier in question and try to figure out why there is a problem and what the when the delivery could happen at the earliest. Sometimes it turns out that the issue has been the fault of the logistics partner. It also happens that someone from the internal client at Region Skåne will contact Frid directly in case they do not get their deliveries on time. This type of information about delivery delays and similar issue can come with quite short notice or even quite sometime after the fact (Frid, 2019).

4.5.4 Supplier Management

After a contract is signed and implemented most of the communication and work with the distributors is taken care of by the internal client at Region Skåne, in this case The Regional Services office, or the third-party logistics partner. The distributors can ask for any of the documented information and the internal client can also ask them for statistics. It also happens that the Frid asks the supplier directly for statistics regarding who ordered what and how much, but the contract does not guarantee that this request will be fulfilled. But for the most part the forecasting function is outsourced to the logistics supplier since they handle the operations when the contract comes into effect. The potential suppliers do receive some historical demand data from previous contract periods which they can use when they prepare their bids. Frid (2019) says that there have not been enough problems previously to warrant having any specific metrics or spending significant resources doing measurements. For this procurement Region Skåne primarily use dialogue as the way to affect their suppliers and if that does not have the intended effect, they will make use of the penalty clauses or in the worst-cases scenario, the exit clauses in the contract (Frid, 2019).

Frid (2019) brings up one example where Region Skåne cooperates with their suppliers. This is when the internal client gets to test modifications or new products. When it comes to being perceived as an attractive customer Region Skåne does hold focus meetings where they try to attract new suppliers.

But when a contract is in place, they do not take active action to be perceived as an attractive customer with their current supplier and there are no processes in place for this (Frid, 2019).

4.5.5 Risk Management

No risk analysis is performed during the specification phase, but it will probably be done in the future due to previous problems for the supplier to meet the demand during peaks, specifically during the migrant crisis of 2015. This also related to Region Skåne not being able to provide accurate forecasts. For certain test tubes which are classed as a level three on Region Skåne's strategic ranking there is also some safety stock. There are no processes in place for risk management in other parts of the procurement process (Frid, 2019).

4.6 Blood bags

4.6.1 The product

The procurement in this case handles blood bags as well as the associated machinery that separates the plasma, white blood cells and red blood cells. Like all the other procurements LOU applies to this procurement as well. Birgestrand-Hellspong (2019) places the blood bags in the bottleneck quadrant since they are restricted by the associated machinery and equipment unless they want to purchase a whole new system. In the strategic ranking the blood bags are categorised as a four, the highest level of societal importance (Birgestrand-Hellspong, 2019).

4.6.2 Suppliers

The blood bags are made specifically for the machinery they have meaning that there is only one supplier unless they want to change to a whole new system. There is also substantial difference in how other systems work and are operated with Region Skåne's current supplier providing one that is much more automated than the others. This supplier has a local branch in Sweden but is based in Europe. Region Skåne has pooled their resources together with a four other regional healthcare services in Sweden for this procurement in order to strengthen their negotiating position. With this in mind Birgestrand-Hellspong says that the power balance between them and the supplier is fairly even. She also adds that it puts pressure on the supplier to perform well since if something goes wrong, their reputation suffers not just within Region Skåne but also within multiple other regional healthcare services as well as in other places where that information might spread (Birgestrand-Hellspong, 2019).

4.6.3 The purchasing process

The purchasing process for the blood bags and the associated machines and equipment has the following steps (Birgestrand-Hellspong, 2019):

1. Risk analysis.
2. Expert referral.
3. Develop the specification.
4. Advertise the procurement and start the bidding process.
5. A negotiated procedure was started because there was only one bid.
6. Evaluate the received bids based on the specification and give out comparison numbers. The supplier with the best comparison number wins the contract.
7. Put the contract information in the purchasing portal. A third-party logistics partner will handle the ordering and most of the operational tasks.
8. Expediting.

There is no market analysis since they are quite familiar with the supply market. The specification is more technical than it is functional. The criteria are largely based on previous experience and the opinions from a group of experts and the material of the bags, sizes, ease of opening and closing certain vents and lead-times amongst others. Birgestrand-Hellspong (2019) says that around 20-25%

or the criteria are functional whereas the rest are technical. The criteria include quality, environment, logistics and various hospital and medical standard. Region Skåne gathers information from the potential suppliers before the specification is finished. When the procurement was advertised there was only one bid which meant that Region Skåne could enter a negotiation's procedure with the supplier due to insufficient competition where they could get down the prices. Normally this is not the case since LOU states that in normal circumstances there has to be a competitive bidding process. Comparison numbers are usually given to the suppliers based on how well they met the order winning criteria in the specification. After the procurement is awarded to the supplier with the best comparison number a contract is written unless some other supplier appeals the decision, which was not the case in this procurement since there was only one bidder (Birgestrand-Hellspong, 2019).

Like the other contracts it does not contain any incentives, but it does have penalty clauses. The risk for the product transfers from the supplier at Region Skåne's loading bay. After the contract comes into effect a third-party logistics partner handles much of the operational tasks. The users of the products, i.e. the internal client at Region Skåne, will place orders to the logistics partner via the purchasing portal. There is a process for expediting, however it is very manual and there is often no time to use it. They plan to invest in an IT-tool belonging to TendSign, their procurement system, which is meant to be used for expediting. They also get a list from the logistics partner where the products that the logistics partner ordered but are delayed or there are other issues. For now issues are handled reactively as they come up. There is a process for conducting evaluations, but it is not used consistently due to lack of time and resources. There is data stored in reports, but it does not exist in raw data form which makes it difficult to use for any evaluation purposes (Birgestrand-Hellspong, 2019).

4.6.4 Supplier Management

For this procurement there is no active supplier management process. The primary cited reason for this is a lack of resources. There is an active push to have the supplier follow related standards and information is exchanged, but only when a problem arises. There is no formal information exchange between the purchasing department and the supplier but there might be information exchanged directly between the internal client at Region Skåne and the supplier. There might be some information exchange from the purchaser for the purpose of opening up a dialogue about specific issues. There are no processes or action plans that are there for the purpose of assuring that the supplier is happy with the relationship they have with Region Skåne, but there is an awareness of the importance of having a good relationship and making sure that a deal is a win-win (Birgestrand-Hellspong, 2019).

4.6.5 Risk Management

A risk analysis is conducted in the beginning of the project by the purchaser. Risks are identified in a qualitative way and largely based on experience. The risk is then quantified by multiplying the probability and impact the risk and then the risk is assigned a qualitative comparison value. Then both the probability and the impact are assigned discreet numbers based on the purchaser's judgement rather than gathered data. However, the resulting reports are rarely used as a whole but the identified risks can be used as a negotiating tool during the negotiations with the supplier. However, any measures to tackle these risks would be implemented by the logistics partner. For example, the logistics partner always keeps a safety stock of blood bags due to them being very critical. Region Skåne has identified one risk in the ordering process. They do not have complete oversight over this process since it is outsourced and it happens that the logistics partner forgets to place orders for their warehouse, even if that is not a common occurrence (Birgestrand-Hellspong, 2019).

5 Analysis

This chapter contains the findings from the five case procurements. The chapter begins with a summary of cross-case findings. These cross-case findings are discussed more in detail in the following subchapters where the empirical findings are also compared to the theory. The chapter is finished with a short gap analysis.

5.1 Cross-case findings

The most notable cross-case findings are summarised in the Table 5.1. These are then described in more detail in the following text.

Procurement	Patient meals	Postal services	Ambulances	Test taking materials	Blood bags
Is delivery reliability highly prioritised in the specification and preparation phases?	Yes	Yes	Yes	Yes	Yes
Is delivery reliability an order qualifier	Yes	Yes	Yes	Yes	Yes
Is the purchaser actively involved in expediting?	No	No	Yes	No	No
Is expediting proactive?	No, checks are conducted at the loading bay and at the ward.	No	Yes, there is regular contact and visits to the supplier.	No	No
Is an evaluation conducted for the purpose of future improvement?	Yes	Yes	Yes	No	No
Are any metrics used?	Yes, the number of delivery deviations.	Yes, an approximate rate of accurate and timely deliveries.	No	No	No
Does Region Skåne and the supplier cooperate on the five areas outlined in the VIPER model?	Yes, all but innovation.	Yes. Efficiency, value and innovation are areas of cooperation.	Limited by the suppliers willingness. Region Skåne aims to cooperate on certain issues.	No	No
Does Region Skåne actively share information with the supplier apart from the most basic?	Yes, they share information regarding volumes, quality, meal types and organisational changes.	Yes. Information regarding costs, deliveries and environmental statistics.	Yes. They share information on the political situation and the lifecycle of the current vehicles.	Yes, historical demand data.	No
Is a power balancing strategy employed?	No, Region Skåne has a strong position.	No, but a substitution strategy has been discussed.	No	No	Yes, Region Skåne has pooled their resources with other healthcare providers
Does the purchaser work with risk management at some level?	Yes. A risk analysis is conducted and catastrophe plans exist.	Yes, a risk analysis is conducted.	Yes, a risk analysis is conducted.	No	Yes, but the risk analysis is not used. Safety stocks exist.

Table 5.3: Summary of important cross-case findings.

5.2 The purchasing process

Weimarck (2019) describes a five step process that corresponds well with what the purchasers for the different products and services described.



Figure 5.1: A illustration of Region Skåne's purchasing process (Weimarck, 2019).

All of the purchasers described some preparatory work including some combination of a market analysis, risk analysis and an expert referral. This was followed by the development of a specification, bids being placed by potential suppliers, the winning supplier being awarded a contract and then followed by the final part of the process consisting of expediting and evaluation, although to varying degrees. This process is also very similar to the process described in the theory by van Weele (2014, p. 8), although some steps are bunched together and some are divided in two compared to van Weele's process. Especially there is a very stark difference in the involvement of the purchaser before and after the contract comes into effect. Strictly operational purchasing tasks which make up much of the work after the contract comes into effect is either handled by the third party logistics supplier or by people working in the departments who use the purchased products. This is validated by Weimarck's comments regarding the fact that the purchaser typically has a less active role after the contract comes into effect. An interesting finding was that the cases that were capital goods and services, i.e. postal services and ambulances, tended to have more rigorous purchasing processes than consumables. This was characterised in both cases where there was more supplier involvement and in one case where expediting was much more rigorous than in the others. The exception to this is patient meals which also had a comparatively rigorous process.

The most important finding with regards to the purchasing process is how much laws and politics affect how the process is conducted. Many of the strategic choices that a purchaser would make with regards to supplier selection, negotiation and contracting are already decided beforehand. The law already stipulates that competitive bidding has to be the method for supplier selection and due to the equal treatment provisions Region Skåne cannot treat suppliers differently. In effect this means that Region Skåne needs to have one set purchasing process that is consistently applied for every procurement in order to comply with the law. These comments by Weimarck are largely validated by the cases where, for all intents and purposes, the same process is being used everytime, even though there are variations that are dependant on the individual procurement. There is also not that much room for negotiation. The specification makes up the basis for the contract and only the details of how to meet the criteria in the specification is negotiable. Any significant changes to these criteria in the negotiation stage could constitute a violation of the equal treatment provisions. So in summary, it is safe to say that Region Skåne is limited in many of the strategic choices that are described in theory due to the laws and regulations that regulate public procurement. In the patient meals case and the ambulance case politics also had more direct effects on the purchasing process. Weimarck (2019) verifies that this is often the case in large or politically sensitive procurements. These kinds of direct effects caused by a third party are not covered in the reviewed theory and stand out as a major difference.

The theory also describes segmentation as a useful tool which Region Skåne does as well, having their own strategic ranking. How a product or service is ranked affects how the purchasing process is conducted, with a low ranking requiring a less rigorous process than a higher ranking would. In essence it does not only work as an indicator for how critical the product or service is, but also as a way for Region Skåne to prioritise human resources when purchasing similarly to what is described by van Weele (van Weele, pp.163-164).

The author finds that Region Skåne does in varying degrees work with the process-oriented actions that have been identified when it comes to achieving delivery reliability. In all cases delivery reliability was described as one of the most or the most important factor when developing a specification. In all these cases delivery reliability was an order qualifier and Weimarck (2019) verifies that this is the norm. Expediting is practiced but only in the ambulance case was it proactive, along the lines of the routine status check described by van Weele (2014, p.41). There is a requirement to follow up the process, but not necessarily for the purpose of improvement, that part is voluntary. In the ambulance case and the blood bags case it was however admitted that both the mandatory and voluntary parts of the process evaluation might be skipped when there is a lack of

resources. In the test taking materials case it was not mentioned. Metrics are used sparingly in some of the cases and in some cases not at all. An identified reason for this is what Weimarck (2019) describe as resource intensive data handling. Working with metrics is more difficult when the data cannot be stored and used easily.

5.3 The supply market and power asymmetry

The author has found that Region Skåne purchases a very wide variety of products and services from test tubes and patient meals to ambulances and postal services. Therefore, they also purchase from widely different supply markets. This means that one cannot categorically say that Region Skåne generally has a strong, weak or balanced position. In the test taking materials case and the blood bags and ambulance cases the power balance is somewhat ambiguous. Region Skåne has a more leverage with regards to the local retailers and middlemen but have very little sway with the product manufactures. Using the ambulances as an example Olsson (2019) mentions that in cases where the local sales office has control Region Skåne can have a lot of sway but very little when it comes to things like core components, like chassis, which are controlled by large car manufacturers.

An example of a case where Region Skåne has a more leverage is the patient meals. There are multiple suppliers and they are not part of any larger global supply chain with very large sub-suppliers that would make the power relationship between Region Skåne and these suppliers ambiguous. The opposite is true for the procurement of postal services where Region Skåne is at a distinct disadvantage since there is only one feasible option to whom Region Skåne is not an especially large customer. However, the case is special in the sense that PostNord cannot deny service, but as can be seen in the contract this does not mean that Region Skåne has a lot of leverage. This is the only contract without and penalty clauses among the reviewed cases. Weimarck (2019) does point out that many core products such as medicines and medical devices are often protected by patents or are very high-tech and complex. This means that the supply market for these often consist of only one supplier with a lot of leverage.

Region Skåne does not have a process in place to deal with power asymmetry. However, several of the strategies outlined in the theory have been employed or have at least been considered by Region Skåne in two of the cases. For the blood bag procurement resources were pooled with other Swedish healthcare providers and substitution was considered for the postal services procurement.

5.4 Supplier management

Region Skåne does not have any processes in place for the purpose of supplier management. The main finding from the cases regarding this is that the more complex procurements tend to involve more activities that are associated with supplier management in the reviewed theory. The ambulances are a good example of this where Olsson (2019) said that they want to cooperate on all of the areas in O'Brien's VIPER model (2015, p.45) in future procurements. Olsson also mentioned that they had worked on innovation in the form of printing services with PostNord during the postal services procurement since this was in both their interests. For the patient meals procurement Åkesson (2019) mentions that they work together with the supplier on all areas in the VIPER model except for innovation. Although they have had discussions about alternative ways of providing patient meals, but there is no political demand for this. These three cases contrast with the other two where there were little or no coordinated efforts to work on any of the supplier management activities that were mentioned in the reviewed theory. The author identifies one factor that seems to lead to more buyer and supplier cooperation. In all three of these cases there was more dialogue regarding the product or service. In the case of the ambulance procurement this was because Region Skåne is already involved in the internal design of the ambulances during the blueprint meetings. In the case of the patient meals it is a very customisable product which therefore requires involvement from both parties. In the case of the postal services procurement it is a case of supplier dominance which required effort on Region Skåne's part. There are also no viable alternatives to PostNord on the market meaning that supplier

switch is not realistic in the foreseeable future. This increases the value of having a cooperative relationship with PostNord.

There is also no official process in place for information exchange between them and their suppliers other than payments and billing. The author identified the same split amongst the different cases as in the previous paragraph. The purchasers for the three cases with more supplier management also reported more information exchange than the others. It is evident from all of the cases that Region Skåne makes an effort to appear to be an attractive customer, but not on the level of individual relationship between them and a supplier. The response from the purchasers in all the cases has been that Region Skåne's size makes them attractive as well as various events where they market themselves. With regards to individual procurements there is a definite awareness that a good relationship is very important, but there are no concrete activities that are consistently carried out for the purpose of making Region Skåne appear to be an attractive customer or to establish a good relationship. There are no specific metrics that are used for the purpose of supplier performance improvements or any specific sets of metrics that are shared between Region Skåne and their suppliers. What these are, if any, seems to vary from procurement to procurement.

5.5 Risk management

As mentioned by Weimarck, Region Skåne does mandate a risk analysis if the procurement is ranked high enough, and this risk analysis is carried out in all the cases except for the test taking materials. This risk analysis mirrors the two first steps of Manuj and Mentzer's (2008) risk management process, but it is simplified. There is no mention of risk categorisation in the identification stage and the risk assessment uses Manuj and Mentzer's definition of risk to quantify the risk. Both the patient meals, some of the test taking materials and the blood bags, all of whom are ranked as a three or four in the strategic ranking, are mandated to have safety stock and Weimarck (2019) mentions that they can sometimes use backup suppliers if the risk is deemed to be high in the risk analysis. Åkesson (2019) also mentions contractual requirements on the supplier, in this case a catastrophe plan. This is in line with O'Brien's (2015, p. 47) thoughts on avoiding and mitigating catastrophes being of great importance. In the same procurement the internal client at Region Skåne also has a catastrophe plan. The formal steps for choosing a strategy and implementing it that are described in the theory are reduced to filling in a box in the risk analysis document describing the mitigating action and then deciding who is responsible for implementation. The implementation is according to Åkesson (2019) the responsibility of the internal client at Region Skåne in her case. In the case of the blood bags Birgestrand-Hellspong (2019) says that any implementation of risk management strategies is the responsibility of their logistics partner and that the risk analysis itself is seldom used. Mitigation of risk is not seen as a separate step unlike the theory. Region Skåne does not use any of the prediction methods described in the theory either (Zsidisin & Ritchie, 2008, pp. 59-61). In all the cases there is a risk awareness but there is no cohesive strategy to manage the risks and no department or individual that has a holistic responsibility for risk management.

5.6 Gap analysis summary

The gaps between what the theory suggests and how Region Skåne works is summarized in this sub-chapter.

5.6.1 The purchasing process

The main differences between the purchasing process outlined in the theory and the one Region Skåne uses is the following:

- ❖ **Third party influence:** The kind of third-party influence that the political leadership wields over Region Skåne's purchasing operations, both directly and indirectly, is not covered in the theory. The starkest examples are Region Skåne's difficulty to predict the number of

ambulances they need to political disagreements on the outsourcing of ambulance services and the fact that the patient meals procurement has to be approved by a political body.

- ❖ **Judicial differences:** The choices that purchasers at Region Skåne can make with regards to supplier selection and negotiations/contracting is limited to competitive bidding and minimal negotiating by LOU.
- ❖ **Expediting and evaluation:** There is a distinct difference in purchaser involvement before and after the contract comes into effect. In several of the cases the operational responsibility changes hands from the purchasing department after the contract comes into effect. Expediting is generally not proactive and evaluations for the purpose of future improvement are not mandatory. The most common reason for not having proactive expediting is a lack of resources or it not being the responsibility of the purchaser. A lack of resources is also the most common reason for lacking evaluations. The author identifies resource intensive data handling as part of the reason for this lack of resources.

5.6.2 Power asymmetry

The main differences between the strategies for battling negative power asymmetry outlined in the theory and the ones Region Skåne uses is the following:

- ❖ The use of these strategies seems to be fairly uncommon. The strategies that have been used include pooling resources and dual sourcing, although dual sourcing was mentioned with reference to risk mitigation. Substitution was only mentioned as a future option. Reasons given for this include that substantial parts of the markets that Region Skåne purchase from are controlled by large global companies to whom Sweden in general and Skåne in particular are small markets. That being said, the author has identified at least one successful use of a strategy to strengthen Region Skåne's negotiating position in the blood bags procurement.

5.6.3 Supplier management

The main differences between the strategies for supplier management outlined in the theory and the ones Region Skåne uses are the following:

- ❖ There is a recognition that good supplier relationships are important, but there is no clear strategy or processes in place to achieve this. The use of various areas of involvement such as innovation, risk and performance to build a mutually beneficial relationship varies greatly between the reviewed cases.
- ❖ There is a lack of processes in place to support supplier management such as information exchanges and data handling. The author has identified this and the lack of a strategy as two potential reasons for the lacking supplier management. Resource intensive data handling makes both sending and making use of received information more difficult. Not being able to make promises beyond the contract period also makes the potential gains from nurturing a relationship more limited for both parties involved.

5.6.4 Risk management

The main differences between the strategies for risk management outlined in the theory and the ones Region Skåne uses are the following:

- ❖ Region Skåne only has a process in place for identification and a rough assessment of the risks. A mitigation action is then chosen, and someone is chosen to be responsible for implementing it. There is no step for the continuing mitigation of the risks.
- ❖ No holistic management of risk. The responsibility for managing risks is spread out.

6 Conclusions

This chapter contains the conclusions of the thesis, derived from the previous chapter. The author answers the research questions and suggests topics for future research. Finally, the theoretical contributions of the thesis are explained.

6.1 RQ1: What does the research say about the relation between purchasing and delivery reliability and how can that be applied to Region Skåne?

The author has identified several purchasing related factors that could affect delivery reliability. These are the purchasing process itself, the power relationship between the supplier and buyer, supplier management, risk management, metrics and more indirectly segmentation. All of these factors are applicable to Region Skåne, but in some cases a different way than they would be for most private firms. With regards to the purchasing process Region Skåne's choices are limited by the laws for public procurements as well as the political environment. There is little choice available when it comes to method of supplier selection and the mode of negotiation. The author therefore identifies the specification as critical since there is no room for any changes later. When the specification is set, and a supplier has won the bidding process the specification more or less becomes the contract. Only the means of achieving the stated goals and aims of the specification are up for negotiation. So there needs to be a lot of care put into the development of a specification that meets all of Region Skåne's needs. After the contract comes into effect it has to be managed, and that is where expediting comes in. Proactive expediting is very important to ensure that delivery problems are detected and hopefully averted. If they cannot be averted the proactive expediting gives time to find solutions or manage to mitigate the delivery problems impact. For the purpose of achieving delivery reliability long-term the purchasing process needs to be followed up to make sure that issues are identified and rectified for the next time.

However, in order to consistently demand high delivery reliability, the buying organisation needs to have leverage to make demands. That is where the power relationship between buyer and supplier becomes important, and this applies to Region Skåne as well. If the power relationship between the buyer and supplier is in the supplier's favour the buyer needs to find a way to decrease the power gap. Theory suggests many strategies that could be applied in various power balance scenarios and Region Skåne should study these in order to identify which could be useful for them.

But there is also merit in focusing not just in the power balance between the supplier and the buyer, but also the "soft" aspects of the relationship. Having a cooperative and mutually beneficial relationship with the supplier makes both parties value it more, which in the case of the buying organisation can lead to achieving a preferred customer status. The delivery reliability can only be improved by the preferential resource allocation that it could entail, and it also opens up the possibility on cooperating on innovations, performance improvements, risk and other areas that affect delivery reliability.

When it comes to risk, a management process that encourages action from the point of identification up the process of mitigating the risk is important. If one can identify and manage a risk, then one can take action to minimize its probability and impact. There are many risks that could affect delivery reliability making risk management a something to consider for Region Skåne.

Metrics and segmentation are the last two factors and play a more supporting role. Having relevant metrics allows for the measuring and eventually the use and sharing of relevant information. They become important when following-up the purchasing process, allowing for a quantitative and more objective view of current performance which also makes it easier to compare the performance with the past and with others. They can be used in the prediction, identification, assessment and finally the mitigation of risks. They could also make up part of the information exchange between with the

supplier, enabling a cooperative relationship. Segmentation in turn could allow for the prioritisation of resources by identifying where to put the most effort into working with all the other relevant factors.

6.2 RQ2: How does Region Skåne work with delivery reliability and purchasing today?

Region Skåne has delivery reliability as one of their highest, if not the highest of their priorities. Meeting their delivery reliability requirements was a qualifying factor in all the reviewed cases, even in the case of PostNord where they were the only feasible option and thought that the requirements were too strict. So, when it comes to the initial part of the purchasing process Region Skåne clearly prioritises delivery reliability. However, when the contract comes into place the level of activity from the purchaser's side will vary between procurements. Delivery reliability strengthening activities such as proactive expediting seems to be the exception based on the five cases. There is a follow-up process, but it is not always done due to a lack of resources and the part of the follow-up process that is meant to identify what could be improved for next time is voluntary. The more operational activities that come after the contract comes into effect are often not the responsibility of the purchaser but someone else who works more closely with the product.

When it comes to risk management there is a process for risk identification and assessment but the responsibility for developing a mitigation strategy and implementing it is often not the purchasers. This means that the responsibility for handling risks, including those that are tied to delivery reliability, is often spread out. In some cases various strategies are used to increase leverage in negotiations and supplier cooperation to improve delivery reliability has been identified in some cases as well. But there is no organisation wide strategy for either of these. Metrics are also used sparingly or not at all. Region Skåne's strategic ranking effectively works as a segmenting tool for the procurements, for example deciding whether a risk analysis has to be done or not.

6.3 RQ3: What could Region Skåne do to improve delivery reliability?

Looking at the gap analysis one can draw several conclusions. The issue is not with the prioritisation of delivery reliability, it is arguably the most prioritised factor in most of the reviewed cases. But there are several factors that are lacking for Region Skåne to be able to work with delivery reliability more effectively.

The purchasing process: The author thinks that Region Skåne has worked correctly with the specification and contracting phases of the process, with regards to the existing legal and political limitations. The one addition the Region Skåne could consider with regards to the contract's contents would be incentives to achieve higher than minimum delivery reliability. With regards to the following parts of the purchasing process there is some room for improvement according to the author. Working actively with follow-ups is a prerequisite to be able to improve for the future. Proactive expediting is also necessary in order to avoid or mitigate the impact of deliveries that are in any way faulty. In the later case the author identifies the lack of a holistic management of the process after the contract comes into effect, where the responsibility for the process is either split or unclear, as a potential issue. There is no set "process owner" that has responsibility from start to finish. A clearer structure for responsibility should be established where there is one or a group of people that are responsible and active throughout the process.

Risk management: Similarly, the issue here is that the risk management process that Region Skåne does have is not managed holistically. There is not anyone that has clear responsibility from the identification of the risk to the actual mitigation of the risk. It is also important that the risk analysis is extensive enough to be meaningful. Otherwise there is a risk that it might not be used at all.

Power asymmetry: Two of the reviewed cases involved strategies to reduce supplier dominance, the postal services and the blood bags. At least in the case of the blood bags the strategy was deemed to be successful to remedy the power imbalance. The author thinks that the encouragement to pursue

these kinds of strategies when you have supplier dominance should be a natural and mandatory part of such procurements. This involves the identification of the type of power relationship that exists with the supplier. If it is a case of supplier dominance, then appropriate strategies should be explored and if a feasible strategy is found it should be implemented.

Supplier management: Two major difficulty that is hard to overcome is the limit of the contractual period as well as the implicit ban on giving preferred supplier status. However, the author still thinks that there should be a process in place to find areas of cooperation with suppliers. The areas of innovation, performance and risk are identified as especially important for delivery reliability. Exploring these should be mandatory for important procurements.

The strategic ranking that is used as a tool to segment procurements today could be used to determine when and to what degree these actions should be taken, since the lack of resources seems to be one of the key reasons as to why they are not already done today. To reduce the human resource intensiveness of many of these tasks data handling needs to be less resource intensive. Region Skåne's resource intensive data handling is identified as a problem both for exchanging information with suppliers, creating statistics, data analysis and several other tasks. The handling of data is seen by the author as a prerequisite to work more with all the identified factors that affect delivery reliability. Relevant data should be easy to handle and access. To lessen the resource intensiveness of data handling the data should be stored in a raw data form that becomes easier to access and utilise for analysis and measurement, rather than being stored as scanned documents and reports. Gathering and analysing data when it requires the manual reading of documents is much more resource intensive than analysing data that is structured in a database. The author identifies that a potential to means to reduce the workload of certain tasks would be IT solutions. Birgestrand-Hellspång already mentioned that they were considering investing in an IT-tool that they could use to make expediting less resource intensive. The author thinks this is a step in the right direction. Easier to handle data and dedicated IT-solutions could potentially automate or at least lessen the workload of working with expediting, follow-ups, information exchanges with suppliers and risk analysis as well as other tasks. This could enable purchasers to focus more on strategic issues rather than operational ones. It could be a good idea to investigate the possibility of acquiring an ERP like software, despite Weimarck not knowing of any suitable examples. This together with a more process-oriented way of working are considered by the author to be the two most important factors for better delivery reliability.

6.4 Theoretical contributions

The thesis has identified a gap in the theory for how purchasing is supposed to be done and the conditions under which public healthcare providers in Sweden operate. To the degree that Region Skåne is generalisable for other public healthcare providers there the thesis has also identified several lessons which could be useful for them as well. The author believes this to be the case, at least for other equivalent healthcare providers in Sweden. They operate under the same laws and on the same market. These lessons exist both in the form of the guidelines the author developed based on the existing literature as well as the identified deficiencies in Region Skåne's process which might well exist in other providers processes as well.

6.5 Future research

The author has identified several possible topics for future research. The author has found little research about delivery reliability and the purchasing process, it was one of the reasons for this thesis. The research that exists pertains mostly to the private sector which this thesis has concluded operate under significantly different circumstances. The author has not found much research about public procurement in the healthcare sector. With an ageing population and the size of the healthcare sector expanding this topic will certainly become more relevant in the future. Therefore, the author still thinks that it is a topic that deserves further research. Region Skåne were also interested in how other organisations work with purchasing and delivery reliability. The author did not find time to research

benchmark in this manner, but it could be an interesting to do a comparative study both between various public organisations as well as between public and private organisations. The author has also identified potential future research with regards to the gaps found between the established purchasing theory and the way Region Skåne works with purchasing. The use of data and the implementation of IT-systems in the public healthcare sector is one topic that would be interesting to research and so would how public organisations can work with supplier management.

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Appendix – Interview guides

The first of the interview guides was used to interview Måns Weimarck, the second one was used for all the others.

Intervjuguide – Organisationen i stort

Kontextuella frågor

Vad ser du som särskilda omständigheter just för er verksamhet jämfört med hur inköp hanteras generellt, särskilt med avseende på privat sektor?

Hur ser informationsflödet ut inom er verksamhet och mellan er och leverantörerna? Finns det IT-system eller sker det i hög grad manuellt?

Hur använder ni data för att understödja de beslut ni tar? Hur samlas denna data in?

Hur påverkar lagar och politik er verksamhet generellt?

Var finns era leverantörer generellt? Är de sprida eller finns det en överrepresentation av vissa länder/regioner?

Inköpsprocessen

Generellt

Kan du beskriva ungefär hur eran inköpsprocess ser ut från början till slut för? Skiljer den sig från produkt till produkt.

Specifikationer

Hur går det till när ni tar fram specifikationer för det ni köper in? Är de mer tekniska eller funktionella? Använder ni er utav standardspecifikationer eller tas de fram specifikt för en enskild produkt?

Vilka kriterier innehåller specifikationen? Exempel kvalitet, logistik, underhåll, juridik & miljö, finansiella etc. Hur mycket fokus ligger på leveranssäkerhetsfrågor i sammanhanget?

Hur inblandade är leverantörerna i specifikationsfasen?

Görs en riskanalys i förhållande till specifikationen?

Görs en marknadsanalys i specifikationsfasen?

Leverantörsväl

Hur tar ni fram RFI och RFQ (request for information och request for quotation respektive)?
Hur bestämmer ni vilka kriterier som är viktiga?

Vilka kriterier finns med i dessa? Hur högt prioriteras leveranssäkerhet här jämfört med andra kriterier?

Hur rankar ni potentiella leverantörer? Hur görs det slutgiltiga urvalet?

Görs en riskanalys i förhållande till leverantörsvalet?

Hur kommer ni i kontakt med leverantörerna och hur kommer dom i kontakt med er? Görs en marknadsanalys?

Förhandling och kontrakt

Finns det incentiv och/eller straffklausuler för att uppmuntra att leveranssäkerheten uppehålls?

Hur mycket information får leverantören om er verksamhet så att de kan jobba med leveranssäkerhet?

Förs riskperspektivet in i kontraktet?

Använder ni er av någon typ av INCO-terms för att minska er egen risk?

Lägga order

Innehåller ordern någonting om leveranssäkerhet?

Hur ser du på er egen orderläggningsprocess? Finns det potentiella risker?

Leveransbevakning och utvärdering

Görs det någon typ av leveransbevakning för att se om leveranser är i tid och att allt är som det ska?

I så fall finns det någon IT-lösning för det här?

Uppföljning, utvärdering och mätetal

Dokumenteras den slutförda inköpsprocessen i syfte att förbättra processen inför nästa gång? Tex kostnader, kvalitet, tid, volym etc. Exempel kan vara både intern prestanda och leverantörens prestanda jämfört med kontraktet.

Delar ni denna typen av information med er leverantör?

Vilka konkreta mätetal använder ni för att bedöma en leverantörsprestanda, specifikt rörande leveranssäkerhet?

Finns det någon typ utav IT-lösning för det här?

Segmentering

Finns det någon distinktion mellan produkter som ni tycker är mer kritiska för verksamheten än andra? Hur görs denna distinktionen och vilka kriterier baseras den på?

Finns det någon distinktion mellan leverantörer som ni tycker är mer kritiska för verksamheten än andra? Hur görs denna distinktionen och vilka kriterier baseras den på?

Finns det några konkreta skillnader i hur ni behandlar produkter/leverantörer baserat på viktiga ni anser dem vara för verksamheten?

Styrkeförhållande mellan inköpare och leverantör

Hur ser styrkeförhållandet mellan er och era leverantörer ut generellt? Har ni strategier för att förbättra er position ifall styrkeförhållandet är till er nackdel?

Supplier management

Supplier performance management

Vilka åtgärder vidtar ni för att förbättra leverantörernas prestanda?

Supplier relationship management

Jobbar ni tillsammans med era leverantörer för att arbeta med risk, innovation, prestanda, effektivitet eller för att hitta någon typ av mervärde som kan uppnås genom samarbete?

Vilken typ av information utbyts mellan er och era leverantörer?

Försöker ni på något sätt att framstå som en mer attraktiv kund?

Jobbar ni aktivt för att era leverantörer ska vara nöjda med relationen de har till er?

Skiljer sig hur ni arbetar med dessa frågor från leverantör till leverantör?

Risk management

Har ni någon process för att hantera risker?

Hur går ni tillväga för att identifiera risker?

Hur går ni tillväga för att utvärdera och kvantifiera dessa risker?

Hur går ni tillväga för att tackla dessa risker?

Hur implementerar ni riskåtgärder?

Har ni någon process för att förutse risker antingen kvalitativt eller kvantitativt?

Intervjuguide – Produktspecifik

Kontextuella frågor

Hur påverkar lagar och politik er specifikt med avseende på inköp av *produkt X*?

Hur ser leverantörsmarknaden ut för *produkt X*? Finns det många leverantörer eller bara några få? Är de i regel relativt likvärdiga eller är det stor skillnad från leverantör till leverantör?

Var finns leverantören/leverantörerna för *produkt X*?

Inköpsprocessen

Generellt

Hur ser inköpsprocessen ut för *produkt X*?

Specifikationer

Hur går det till när ni tar fram specifikation för *produkt X*? Är den mer teknisk eller funktionell? Använder ni er utav en standardspecifikation eller tas de fram specifikt för *produkt X*?

Vilka kriterier innehåller specifikationen för *produkt X*? Exempel kvalitet, logistik, underhåll, juridik & miljö, finansiella etc. Hur mycket fokus ligger på leveranssäkerhetsfrågor i sammanhanget?

Hur inblandade är leverantörerna i specifikationsfasen för *produkt X*?

Görs en riskanalys i förhållande till specifikationen för *produkt X*?

Görs en marknadsanalys i specifikationsfasen för *produkt X*?

Leverantörsväl

Hur tar ni fram RFI och RFQ (request for information och request for quotation respektive) för *produkt X*? Hur bestämmer ni vilka kriterier som är viktiga?

Vilka kriterier finns med i dessa? Hur högt prioriteras leveranssäkerhet här jämfört med andra kriterier?

Hur rankar ni potentiella leverantörer för *produkt X*? Hur görs det slutgiltiga urvalet?

Görs en riskanalys i förhållande till leverantörsvalet för *produkt X*?

Hur kommer ni i kontakt med leverantörerna för *produkt X* och hur kommer dom i kontakt med er? Görs en marknadsanalys?

Förhandling och kontrakt

Finns det incentiv och/eller straffklausuler för att uppmuntra att leveranssäkerheten uppehålls för *produkt X*?

Hur mycket information får leverantören om er verksamhet så att de kan jobba med leveranssäkerhet för *produkt X*?

Förs riskperspektivet in i kontraktet för *produkt X*?

Använder ni er av någon typ av INCO-terms för att minska er egen risk för *produkt X*?

Lägga order

Innehåller ordern någonting om leveranssäkerhet?

Hur ser du på er egen orderläggningsprocess för *produkt X*? Finns det potentiella risker?

Förhandling och kontrakt

Finns det incentiv och/eller straffklausuler för att uppmuntra att leveranssäkerheten uppehålls för *produkt X*?

Hur mycket information får leverantören för *produkt X* om er verksamhet så att de kan jobba med leveranssäkerhet?

Förs riskperspektivet in i kontraktet för *produkt X*?

Använder ni er av någon typ av INCO-terms för att minska er egen risk för *produkt X*?

Leveransbevakning och utvärdering

Görs det någon typ av leveransbevakning för *produkt X* för att se om leveranser är i tid och att allt är som det ska?

I så fall finns det någon IT-lösning för det här?

Uppföljning, utvärdering och mätetal

Dokumenteras den slutförda inköpsprocessen för *produkt X* i syfte att förbättra processen inför nästa gång? Tex kostnader, kvalitet, tid, volym etc. Exempel kan vara både intern prestanda och leverantörens prestanda jämfört med kontraktet.

Delar ni denna typen av information med er leverantör för *produkt X*?

Vilka konkreta mätetal använder ni för att bedöma leverantören för *produkt X* prestanda, specifikt rörande leveranssäkerhet?

Finns det någon typ utav IT-lösning för det här?

Segmentering

Var skulle du placera *produkt X* i Kraljic's matris (ta med matrisen på en A4)? Varför placeras den där? Vad är det som gör produkten kritisk och vad är riskerna?

Styrkeförhållande mellan inköpare och leverantör

För *produkt X* hur skulle du beskriva styrkeförhållandet mellan inköparen och leverantören? Om detta styrkeförhållande är till eran nackdel, vad gör ni för att förbättra er position? (visa lista över potentiella strategier om dom inte kommer på någonting).

Supplier management

Supplier performance management

Vilka åtgärder vidtar ni för att förbättra leverantören för *produkt X* prestanda?

Supplier relationship management

Jobbar ni tillsammans med leverantören för *produkt X* för att arbeta med risk, innovation, prestanda, effektivitet eller för att hitta någon typ av mervärde som kan uppnås genom samarbete?

Vilken typ av information utbyts mellan er och leverantören för *produkt X*?

Försöker ni på något sätt att framstå som en mer attraktiv kund för *produkt X* leverantör?

Jobbar ni aktivt för att leverantören för *produkt X* ska vara nöjd med relationen de har till er?

Risk management

Har ni någon process för att hantera risker för *produkt X*?

Hur går ni tillväga för att identifiera risker för *produkt X*?

Hur går ni tillväga för att utvärdera och kvantifiera dessa risker för *produkt X*?

Hur går ni tillväga för att tackla dessa risker för *produkt X*?

Hur implementerar ni riskåtgärder för *produkt X*?

Har ni någon process för att förutse risker antingen kvalitativt eller kvantitativt för *produkt X*?

Appendix – Case Study Protocol

Background

The main research question of this study is to answer the question of how purchasing relates to delivery reliability and how this can be applied on a public healthcare provider, in this case Region Skåne. Supplementing this main question are the questions of how Region Skåne works with purchasing and delivery reliability and what they can do better. The author has so far not found any previous research on the specific topic, but the topic comes up as part of other research and learning materials on the subject of purchasing.

Design

The study is a multiple-case study where the objects of the study consist of various procurements that Region Skåne has made. The objective is to find out how Region Skåne works today and how they compare to existing theory by conducting interviews.

Data Collection

Theoretical data will be collected by the way of already published works. This include two main parts, literature for the method study and purchasing literature for the theory chapter. Pearl growing will be used as a primary way of discovering sources. The basis will be old class literature and materials, other theses on similar subjects as well as suggestions from the authors supervisor as well as other academics. From there other literature will be found. This will then be complemented with searches in the Lund University library system and databases such as Scopus, LubSearch and Google Scholar. Empirical data will be collected by the way of semi-structured interviews and when relevant, internal documents. Interviews will be recorded and stored as sound files on Google Drive. As will the literature that the author can store as PDFs. Other literature will either be kept in physical forms in the shape of books or printouts and when there is neither a digital or physical copy available, hyperlinks will be kept leading to the webpage where the information can be accessed. All references used in the thesis are stored on RefWorks.

Keywords in the database search include: “purchasing process”, “reliability”, “delivery reliability”, “logistics specification”.

Analysis

All three research questions will require both the literature from the theory chapter as well as the empirical data from the interviews to be answered. The analysis consists of a comparison between the cases and theory, a comparison between the cases and finally summarized in a gap analysis.

Plan Validity

- Construct validity: Construct validity will be ensured by taking in feedback on the finished product from the interviewees and using both a manager’s and the different purchasers perspective on Region Skåne’s purchasing work. The managers view will however not encompass the individual procurements that make up the cases, but only the general purchasing and delivery reliability processes of the organisation. This will weaken the construct validity somewhat.
- Internal validity: Will make use of unambiguous interview questions.
- External validity: Use “how” and “why” questions.

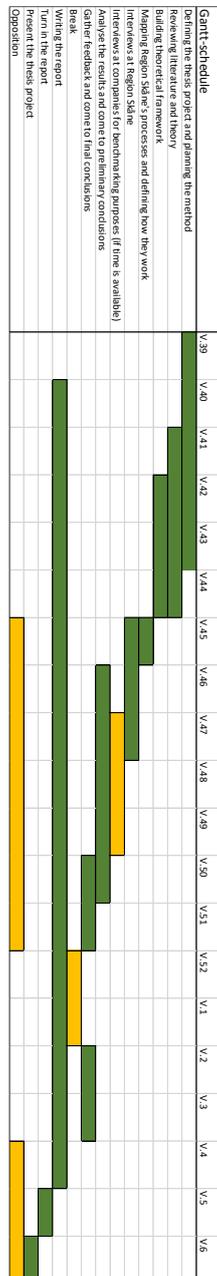
Limitations of the Study

The interviewees might be hesitant to answer truthfully due to thesis being published with their names in it.

Who is it for?

The target audience is purchasing professionals and research academics who are interested in the relationship between delivery reliability and purchasing, in particular when it comes to healthcare.

Schedule



Change record

1. The time plan changed due to the unavailability of the interview subjects.
2. The approach changed from a single-case study to a multiple-case study. This was based on a suggestion from a professor during the half-time seminar.
3. A manager will no longer review all of the data gathered from the purchasers to validate it. There will not be two sources confirming the exact same data but instead one source per procurement and one source for the whole organisation.
4. The final research question was changed from “How should Region Skåne design their contracts to achieve delivery reliability in the future” to “What should Region Skåne do to improve delivery reliability?”.

5. A gap analysis was added to the analysis to summarize the important findings.