# Delivery Performance

## -How to define & measure delivery performance in a triadic relationship

School of Management and Economics

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Master Thesis

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Växjö:          Spring 2006

## *PREFACE*

The last ten weeks have involved hard work, but also given us new insights and knowledge about delivery performance and the importance of measure delivery performance. We have also gained knowledge how complex it could be to measure delivery performance when acting in a triadic relationship. We have learned that everything takes a lot longer than one imagines and that good spirits is a prerequisite for collaboration.

We are grateful towards our case company SCA Packaging, through which participation have made this study possible to conduct. We would therefore like to address a special gratitude to Niclas Strand, Siwe Persson and everyone else at SCA Packaging that helped us make this master thesis possible. We will also give a special gratitude towards all the customers that helped us by responding the questionnaire and the people at Green Cargo for all the answers.

We would also like to thank our tutor Åsa Gustafsson for her insightful tips and our examiner Helena Forslund that have by the different seminars given us suggestions to essential improvements. We also would like to thank our opponents, Sebastian Kinder, Carolin Marstall and Hauke Santel that have given us many good advices to make this master thesis better.

Last but not least we would like to thank each other for a good triadic collaboration and inspiration we have given each other throughout this master thesis and our four years at Växjö University.

Växjö 16th of May 2006

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# Abstract

***Problem discussion:***
When different companies join into triadic relationships it is important that the relationships are managed properly. Findings have indicated that components for a successful relationship are high level of trust and commitment, risk/reward sharing, joint planning. To improve a triadic relationship, the actors have to measure the overall performance. In the triadic relationship that we have investigated there is obvious problems with information sharing and measure the same variables regarding delivery performance.

***Research Question:***
How can delivery performance be measured in order to adapt it to a triadic relationship?

***Objective:***
Our objective is to describe delivery performance as well as explain and adapt it to a triadic relationship.

***Conclusions:***

*Delivery performance*
Almost every customer in our questionnaire thinks it is important to measure delivery performance. We claim it is of great importance for a triad to create a common method to measure delivery performance, where every actor knows when, where and how to measure. The criterion for effective KPIs are to measure the overall supply chain performance rather than the performance of an individual chain member. That is why we claim the best way of getting better information about how the 3PL provider perform should be integrated in the measurement of the overall delivery performance of the triad. The most efficient way to measure the 3PL providers' performance is the 3PL provider uses a scanning system and reports the measurements to SCA. The actors within the triad must also measure the delivery performance in financial and non financial terms. It is important for the triad to have the same perceptions regarding split deliveries, delivery window, dependability and flexibility. If the actors use the same method to measure delivery performance, the measurements will be reliable and useful for all actors within the triad.

*Triadic Relationship*
We claim that information sharing is very important. The studied triadic relationships show that if a supplier should measure what is important they have to know what is important for their customers. Another important aspect for the supplier is to have information about how the customers perceive the delivery performance.

To be able to have a good service quality all service gaps should be analysed and closed. To be able to close the service gaps regarding delivery performance in a triadic relationship, information sharing is the key. There have to be collaboration between the different actors of the triad. Important tools to use if this should be possible are connected computer systems and shared information between all actors.

Figure list

## Table list

## Abbreviations

| | |
|---|---|
| 3PL | Third Party Logistics |
| 10p | Following page (10 & 11) |
| 10pp | Following pages (10 > ...) |
| AB | Aktie Bolag in English: Limited |
| e.g | For example |
| et al. | and others |
| KPI | Key Performance Indicator |
| No. | Number |
| OTIF | On Time In Full |
| p. | Page |
| SCA | Svenska Cellulosa Aktiebolaget |
| Vol. | Volume |

# 1 Introduction

*I*n chapter one we wish to introduce the reader to our master thesis and at the same time create an interest for the subject. Further on, we will discuss the problems regarding delivery performance and triadic relationships, which derive into a research question and objectives.

## 1.1 Background

During the past years, companies have had problems with increasing their market share by just making products. The focus has moved from the physical product, to creating value for the customers. This value can be created by; marketing, increased customer service or higher quality on products and services.[1] The globalization has affected and increased the competition on today's markets. Companies have to perform better results, in time, money and customer satisfaction with less resources. To be successful on a global market, companies have to be more effective and focus should be on continuous improvement.[2]

Companies should consider the whole supply chain as one process; where every process starts with a need and end when the need is fulfilled.[3] A supply chain can be defined as a *"system of suppliers, manufacturers, distributors, retailers and customers where material, financial and information flows connect participants in both directions."*[4] In order to succeed with a supply chain there are some key factors that must be taken into consideration. These are; understanding, communication, participation and management. It is important that these key factors are applied both internally and on the relationships with suppliers and customers.[5]

During the past years there has been a change in the relationship between the supplier and the customer. It is common that suppliers' outsource a part of the logistics activities to a third party logistics provider (3PL). Companies have outsourced logistics activities for many years. The big difference between the previous kinds of outsourced logistics activities and using a 3PL provider is that collaboration with 3PL providers' focus on long-term relationships

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[1] Bjørnland et al., 2003, p. 56
[2] Ljungberg & Larsson, 2001, p. 11
[3] Ibid., p. 64
[4] Fiala, 2005, p. 419
[5] Ibid., p. 320p

between the 3PL provider and their customers (supplier and customer).[6] 3PL can be defined as follows: *"A relationship between a shipper and third party which, compared with basic services, has more customized offerings, encompasses a broader number of service functions and is characterized by a longer-term, more mutually beneficial relationship."*[7]

A relationship between a 3PL provider and a seller (supplier) and a buyer (customer) can be seen as three separate dyadic relationships, but when they are integrated it can be called a triadic supply chain relationship. Most researches have involved the relationship in a dyadic perspective between the seller and buyer, seller and 3PL provider or buyer and 3PL provider. A triadic relationship can be seen as a relationship where all actors are covered.[8] A definition of a triadic relationship in a supply chain is: *"relationships between interfaces in the supply chains and third-party logistics providers, where logistics services are offered, from basic to customized ones, in a shorter or longer-term relationship, with the aim of effectiveness and efficiency"*[9] This relationship can be seen in figure 1.1.
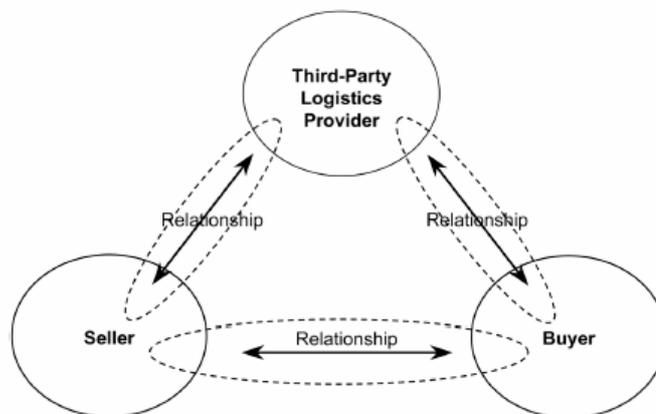


*Figur 1:1 Three dyadic relationships among seller, buyer and third-party logistics provider (source: Bask, 2001, p. 473)*

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[6] Murphy & Poist, 2000, p. 121
[7] Ibid., p. 121
[8] Bask, 2001, p. 473
[9] Ibid., p. 473

**1.2 Problem discussion**

When different companies join into triadic relationships is it important that the relationships are managed properly. Everyone in the collaboration should be able to answer the questions who, when and how much.[10] Findings have indicated that components for a successful relationship is high level of trust and commitment, risk/reward sharing, joint planning and only using contracts for legal purposes.[11] Collaborations as triadic relationships need rules and standards but also a way of monitoring that the rules are obeyed. Rules and standards should deal with long-term relationships, information sharing and interactions.[12] An important challenge when monitoring triadic relationships is to overcome the lack of information sharing and visibility. It is common that companies only have access to orders placed by customers. This type of information gives only a distorted picture on the end customer's demand and the information is delayed. This leads to companies, which do not know what actually happens in the market and the distortion tends to increase upstream in the supply chain. This uncertainty make the demand seem to be variable and unpredictable even when the demand at the end customer is stable.[13] It seems strange that companies do not share information but there are reasons. E.g. when suppliers and customer in the supply chain decides to outsource activities to a 3PL provider, sensitive information has to be shared if it is going to work in an effective way.[14]

It is important that the actors within the triadic relationship trust each other and measure the performance. To be able to measure the performance in a efficient way the different actors of a triadic relationship have to share information. When actors within a triadic relationship start to measure the performance, it creates a common language between the actors and they start to understand each other.[15] Several experts claim that the chances of creating a functioning system for measuring between different actors are low. This due to the difficulties of measuring the supply chain performance and quantifying it. Another reason why it is difficult to collaborate is that the objectives between the companies are not identical. Companies are

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[10] Daugherty et al., 2006, p. 66
[11] Logan, 2000, p. 22pp
[12] Daugherty et al., 2006, p. 66 p.
[13] Småros et al., 2003, p. 1 pp.
[14] Skjøtt-Larsen, 1999, p. 96
[15] Ljungberg & Larsson, 2001, p. 221 pp.

usually involved in several supply chains, which makes the risk of conflicting objectives between the different supply chains obvious.[16]

An issue with increased importance is to measure how companies achieve with their delivery performance and in what way this measurement is feasible. When companies measure delivery performance, different service elements can be used to measure the process of serve the customers. An important factor is to identify the different elements to measure and check if they will be suited to the present relationship with the customer. The actors must ask their self a number of questions, what/how to measure and what/how to improve.[17] One way to answer these questions is to use Key performance indicators. A definition of key performance indicators is: *"Key Performance Indicators (KPI) are financial and non-financial metrics used to quantify objectives to reflect the strategic performance of an organisation."*[18] One key factor when companies developing KPIs are to differentiate the strategy driven metrics from the "usual" metrics.[19] In 2002 a survey showed that barely half of the studied Swedish companies measured on time delivery. The most common KPIs are; inventory stock and the total amount of logistic costs.[20] These KPIs are not the best way to measure delivery performance and do not match with the most important service dimensions.[21] There are several different service dimensions and the most important is dependability.[22] To implement KPIs that focus on customers needs and expectations are necessary to improve the delivery performance.[23]

According to presented literature there are problems related to measuring the delivery performance, especially when companies acting in a triadic relationship. Companies' measure, but do they measure what the customers' think are important? As discussed earlier, actors within a triad must ask themselves what to measure? Sometimes companies' measure their delivery performance when their products leave their plant and not when the products arrive at their customer. This can lead to different opinions in the triad regarding delivery

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[16] Holmberg, 2000, p. 8 p.
[17] Theodoras et al., 2005, p. 353
[18] http://en.wikipedia.org/wiki/Key_performance_indicators, 2006-04-24
[19] Bauer, 2004, p. 42
[20] Aronsson, 2002, p. 52
[21] Ljungberg & Larsson, 2001, p. 242
[22] Bergman & Klevsjö, 2001, p. 317
[23] Ljungberg & Larsson, 2001, p. 242

performance between the actors. This problem occurs because the 3PL provider leaves the products to the customer and not the supplier. When the 3PL provider handles the transports, the supplier might lose information about the deliveries. Another issue according to delivery performance is split deliveries; if the supplier can not deliver a complete order and the customer accepts a split delivery, will this be counted as delivery delay or will the customer's acceptance do that the order is correct? On the other side, what happens if the customer can not accept the delivery and ask for the delivery to be postponed, will this be counted as delivery delay according to earlier order entry or as a correct delivery according to the new order entry? Agreed date and split deliveries also affect the 3PL provider, because they are the actor that delivers the goods to the suppliers' customer. This offers information sharing and collaboration between the actors in the triad. The above discussion leads to following research question and objective of this master thesis.

## 1.3 Research question

How can delivery performance be measured in order to adapt it to a triadic relationship?

## 1.4 Objective

Our objective is to describe delivery performance as well as explain and adapt it to a triadic relationship.

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## 2 Methodology

*I*n this chapter we will describe the different theories behind the methodology. We will also describe our methodological choices that we have chosen for our research. The areas we describe are; **scientific approach, angle of approach, collaborative companies, research method, case study, data collection and the value of the study**. In the end we will show a summery of our methodological choices.

### 2.1 Empirical information gathering

To make the reading process easier we have chosen to present figure 2.1. We present this because when we discuss our methodology choices we talk about the interviews and questionnaires with supplier, 3PL provider and customers.

Supplier        ⟶        Interview

3PL provider        ⟶        Interview

Customers        ⟶        Questionnaire

*Figure 2.1: Information gathering*

### 2.2 Scientific approach

Positivism and hermeneutic are the two most commonly used scientific perspectives in business economics. Positivism say's that knowledge only can be attained through experiences and always can be explained by logical relations.[24] Further on, positivism is characterized by structures, which shall guarantee that the science is general, objective and neutral.[25] Within the hermeneutic approach knowledge is gained through interpretations and pre-understanding and is therefore the opposite of positivism. The hermeneutic researcher interprets from his own values and comprehension, which can be seen as an advantage when trying to see the entirety around the problematic. [26] This leads to a more differentiated and richer knowledge.[27]

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[24] Patel & Davidsson., 1994, p. 23
[25] Patel & Davidsson., 2003, p. 27
[26] Patel & Davidsson, 1994, p. 25p
[27] Thurén, 1991, p. 51

*Our angle of scientific approach*

This study takes a hermeneutic perspective because we have pre-understanding from earlier research, we have e.g. written a project about delivery performance. From this project we have gained knowledge and pre-understanding. This will affect the master thesis in various ways, e.g. our pre-understanding about which aspects that companies find interesting and how different concepts are feasible to the reality.

The questionnaire will use logic relations and statistical data, but we consider that the master thesis to a greater extent is based on interpretations of the interviews. We consider an interpret approach catch the entirety in a better way.

## 2.3 Angle of Approach

Researchers can draw their conclusions on the basis of three different angles of approach; deduction, induction and abduction.[28] A deductive approach involves formulating certain assumptions based on theory and logic and has its starting point in theory.[29] Therefore deduction is also called the "proven" way.[30] The opposite of deduction is induction, and starts from reality and involves formulating theories based on empirical information.[31] Abduction is an assortment of deduction and induction and can be viewed to be in the middle of those, where the researcher varies between theory and empirical information.[32]

*Our angle of approach*

The angle of approach that has been used in our study is the deduction approach. We have been collecting theories within delivery performance and triadic relationships, and then we have been doing our empirical research. Therefore the deduction approach was suitable for our study. We went from theory to empirical findings. Then we analysed the theories and the empirical findings and came up with our conclusions.

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[28] Eriksson & Wiedersheim-Paul, 2001, p. 221pp
[29] Patel & Davidsson., 2003, p. 23
[30] Molander, 2003, p. 175.
[31] Patel & Davidsson., 1994, p. 21p
[32] Patel & Davidsson., 2003, p. 24

**2.4 Studied actors**

We are going to present our studied object and define the roles of the different actors in the studied object. The object we have studied is a triadic relationship. The different actors of the triad are supplier, 3PL provider and customer. With supplier we mean a manufacturer. The customer is a customer to the supplier and the 3PL provider is the actor that performs the delivery between the supplier and customer.

We started to contact SCA Packaging Division Värnamo, further on in this thesis we will refer to them as SCA. SCA work within the corrugated card board industry and are situated in Värnamo, Sweden. There is a complete presentation of the company in the empirical chapter. In the triadic relation we have studied SCA, the supplier and Green Cargo, the 3PL provider. We have also studied SCA's customers through a survey. The customers and 3PL provider we found trough SCA. Figure 2.2 is our modified study object with the actors we have studied.
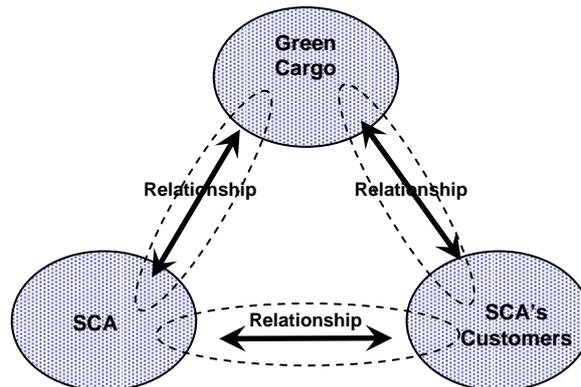


*Figure 2.2: Modified study object*

Interviews with:

| Company | Interviewed person | Position |
|---|---|---|
| **SCA Packaging** | *Niclas Strand* | *Supply chain manager* |
| **SCA Packaging** | *Siwe Persson* | *Quality manager* |
| **Green Cargo** | *Stefan Grönevik* | *Transport administrator* |
| **Green Cargo** | *Bengt Karlsson* | *Area manager* |

*Table 2.1: Interview table*

Questionnaire to SCA's customers:

| Total number of customers | Our random selection | Number of respondents | Survey method |
|:---:|:---:|:---:|:---:|
| 800 | 85 | 39 | Web based questionnaire |

*Table 2.2: Questionnaire*

## 2.5 Research Method

There exist two methods to apply the realisation of an investigation, which are qualitative and quantitative method.[33] Which one to choose depends on what kind of data that will be collected.[34] At qualitative investigations, the ambition is to gain a deeper knowledge and therefore a small sample must be used.[35] The purpose with the qualitative method is to seek understanding and to analyse entireties.[36] This can be attained through answering the question why and to see the underlying causes of what is being investigated. The quantitative method is statistically concentrated, where a bigger sample is used in order to be able to draw general conclusions and find eventual relations between different occurrences.[37] The final choice ought to be based on the investigation's key questions or the individual research task.[38]

*Our research method*

This research method is a qualitative method with a small sample and the ambition to gain a deeper knowledge. We also had a quantitative part of our master thesis involving the customers. At SCA and Green Cargo we did deep interviews to get a better understanding of the entirety and the underlying reasons of the problem.

## 2.6 Case study

A case study involves a few cases that are thoroughly investigated during a short or long period of time. In case studies different types of data are used, e.g. interviews and

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[33] Svenning, 1999, p.14
[34] Halvorsen, 1992, p. 78
[35] Svenning., 1999, p. 150
[36] Patel& Davidsson, 1994, p. 99
[37] Bjereld, et al., 1999, p. 108
[38] Patel & Davidsson, 2003, p. 14

observations.[39] The case study is one of several ways of doing social science research. General case studies are a preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events and when the focus is on contemporary phenomena within some real –life context. [40]

A case study's results can relatively easy be compared with another context.[41] The level of generalisation may be discussed and especially how the case companies have been selected.[42] If the sample mirrors the population there is no problem to generalise, however complications to generalize may arise if the sample does not represent the population.[43]

*Our case study*

We claim a case study is the most suitable approach to conduct our study. This choice is motivated by our research question, which answered the question how and moreover the data consisted mainly of deep interviews.

Our case study is based on one triadic relation and thereby we need to show preciousness drawing general conclusions, since this triadic relation may not mirror the entire population and most likely some businesses will differ from the chosen triadic relation. But the problem or research question is general. Many companies strive to get a common language within the supply chain, and with common language is it possible to create reliable measurements. A problem when defining and measuring between companies is that the interpretation of different criteria among the different actors. This study makes it possible to generalise that it is important to define common criteria to measure delivery performance within a triadic relationship. The criteria that is adapted to this particular triadic relationship might just fit this triadic relationship and that there are specific circumstances which are only valid in the triadic relation with SCA, their customers and 3PL providers. But it does not change the fact that it is of importance to together with the actors within the triad to define common criteria to define delivery performance.

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[39] Svenning, 2000, p. 130.
[40] Yin, 2003, p. 1
[41] Patel & Tebelius, 1987, p. 62
[42] Patel & Davidsson, 2003, p. 54
[43] Patel & Davidsson, 1994, p. 44

## 2.7 Data Collection

2.7.1 Primary data collection

Primary data involves information, which is gathered directly from the source without any links in between, e.g. interviews and observations. [44]  Since interviews are used to gather information, it is vital that the interviewer possesses knowledge within the specific subject area. The knowledge makes it possible to ask relevant questions to create an active dialog.[45] An interview has either high or low degree of standardisation; depending to what extent the questions are designed in advance. Further on, an interview is either high or low structured. A low structured interview involves that the interview respondent can answer the questions freely, whereas a high degree involves that the answer alternatives are more fixed, e.g. a questionnaire.[46]

When using a questionnaire is it important how the questions are constructed to achieve the purpose of the questionnaire.[47] The question should not be leading or hypothetical because the respondents could then be led in a certain way.[48]

*Our primary data collection*

SCA collaborate with two 3PL providers, Green Cargo and Schenker logistics. We chose to interview Green Cargo, this due to that Green Cargo performs approximately 80% of SCA's deliveries.

In this study primary data consists of deep interviews with SCA and Green Cargo, which constitutes the empirical chapter. Primary data was also gathered in a questionnaire from SCA's customers.

The design of our interviews had high degree of standardisation and was low structured. This because we designed the questions in advance but the respondents could answer them freely and that new questions were constructed during the interviews.

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[44] Patel & Davidsson., 2003, p. 65
[45] Ibid., p. 78p
[46] Patel & Davidsson., 2003, p. 71p
[47] Rosengren & Arvidsson, 2005, p. 147
[48] Dahmström, 2000, p. 103

We decided that the best way to get information from SCA's customer was to do a survey. When using a survey it is possible to get information from a larger amount of objects than when interviewing them. SCA have 800 customers and it was not manageable to send our survey to the entire population. Instead we used a sample; our sample consists of 85 customers. For this survey, SCA made a random selection without any specific criteria. This was done under our supervision, and then we sent these customers an e-mail that linked them to a web based questionnaire. The e-mail started with an explanation of our aim with the questionnaire. The questionnaire was constructed in the program *Query & Report.*

*Response rate analysis*

If the answer frequency in the survey to the customers is less than 50 % the researcher has to analyse the surveys result to be able to see if the result have been affected by this fact[49]. It was 39 customers of the total 85 customers that answered the questions, this leads to an answer frequency of 45.9 % and the non respondent frequency of 54.1 %. It was more respondents that answered the closed question than the open questions. The validity is high, but of course the validity had been higher if more customers had answered the questions. A frequency of 45.9 % is enough to help us answer the research question.

In our survey we have 39 respondents and according to SCA they have around 800 customers. If 25 % of the respondents give a specific answer we are able to say with 95 % security that between 12% and 38 % of the whole population would have answered the same. If 50 % gives a specific answer the figure is between 35 % and 65 %. If 75 % gives a specific answer the figure is between

2.7.2 Secondary data collection

Data, which cannot be directly gathered from the origin source, is secondary. Secondary data consist of books and foremost scientific articles. [50]

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[49] Andersen 1998, p. 170
[50] Patel & Davidsson, 2003, p. 65

*Our secondary data collection*

Our secondary data collection was gathered from books and articles. The books were gathered at Växjö University's library and the scientific articles were found in different databases such as ELIN, where we searched using keywords like; Triadic relationships, 3PL and delivery performance.

**2.8 The value of the study**

2.8.1 Construct Validity

In order to construct validity, multiple sources of evidence should be used in the research process. Another tactic to realise the validity is to establish a chain of evidence, by performing a linkage between the theoretical frameworks, the construction of data collection tools and empirical data.[51]

*Our Construct Validity*

In this master thesis the data are collected from several sources. We have interviewed employees at SCA, the 3PL provider Green Cargo and SCA's customers. Secondary data have been collected from books and articles. This gives the master thesis high construct validity with both multiple sources and a linkage between the theory and empirical data.

2.8.2 Internal Validity

Internal Validity is primarily concerned with casual relationships, whereby certain conditions lead to other condition. An investigator tries to determine if event X leads to event Y without any interference of a third event (Z). If an investigator incorrectly concludes that there is a casual relation between X and Y without knowing that some third factor Z may actually have caused Y, the internal validity has failed.[52]

*Our Internal Validity*

We have confronted our empirical data with theory and then analysed it to get a casual relationship with our conclusions. Our aim is to investigate a triadic relation and how it affects the delivery performance. To get a high internal validity we have thoroughly

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[51] Yin, 2003, p. 36
[52] Yin, 2003, p. 36

investigated if the different aspects of delivery performance are dependent on how SCA, the 3PL providers or the customer acts. We will do this to be able to decide how X lead to Y and to be certain that Z not has any relation to the result.

### 2.8.3 External validity

External validity is related to the possibility of generalise the results from the research. If the results from the study can be used on other similar studies the external validity is high.[53] A case study's results can relatively easy be compared with another context but however it may be hard for the sample to represent a population.[54] The level of generalisation may be discussed when using a case study and primarily how the case companies have been selected.[55] If the sample mirrors the population generalisations are possible, however complications to generalise may arise if the sample does not represent the population.[56]

*Our external validity*

We have described the possibility to make general conclusions in 2.6 Case study.

### 2.8.4 Reliability

The test of reliability is to ensure that if another researcher follows exactly the same procedures as described by a previous one, the researcher should come up with the same findings and conclusions.[57]

*Our Reliability*

If other researchers followed in our foot prints they would be able to make the same conclusions and findings as us. Of course it could be differences because of our pre-understanding and the following researcher's pre understandings, but the main findings should be the same.

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[53] Ibid., p. 36
[54] Patel & Tebelius, 1987, p. 62
[55] Patel & Davidsson, 2003, p. 54
[56] Patel & Davidsson, 1994, p. 44
[57] Yin, 2003, p. 37

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## 2.9 Summery of methodology

The below figure will summarise our methodological choices.

| Scientific approach | $\longrightarrow$ | Hermeneutic |
|---|---|---|
| Angle of approach | $\longrightarrow$ | Deduction |
| Research Method | $\longrightarrow$ | Qualitative |
| Investigation method | $\longrightarrow$ | Case study |
| Method of data collection | $\longrightarrow$ | Interviews & questionnaire |
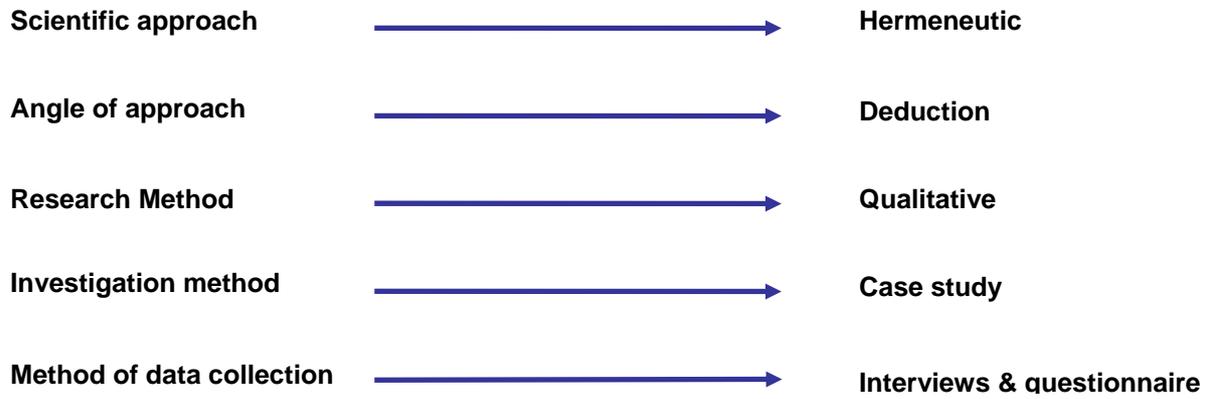
*Figure 2.3: Summery of our methodological choices*

## 3 Theory

*I n this chapter we will present our theoretical framework, which will be the foundation for our further research. The figure below explains how our theory chapter is disposed. The theory contains of our studied object, a triadic relationship and our main research area delivery performance. Under these headings a deeper explanation within those areas will be presented. The theory chapter will end up with an analyse model.*
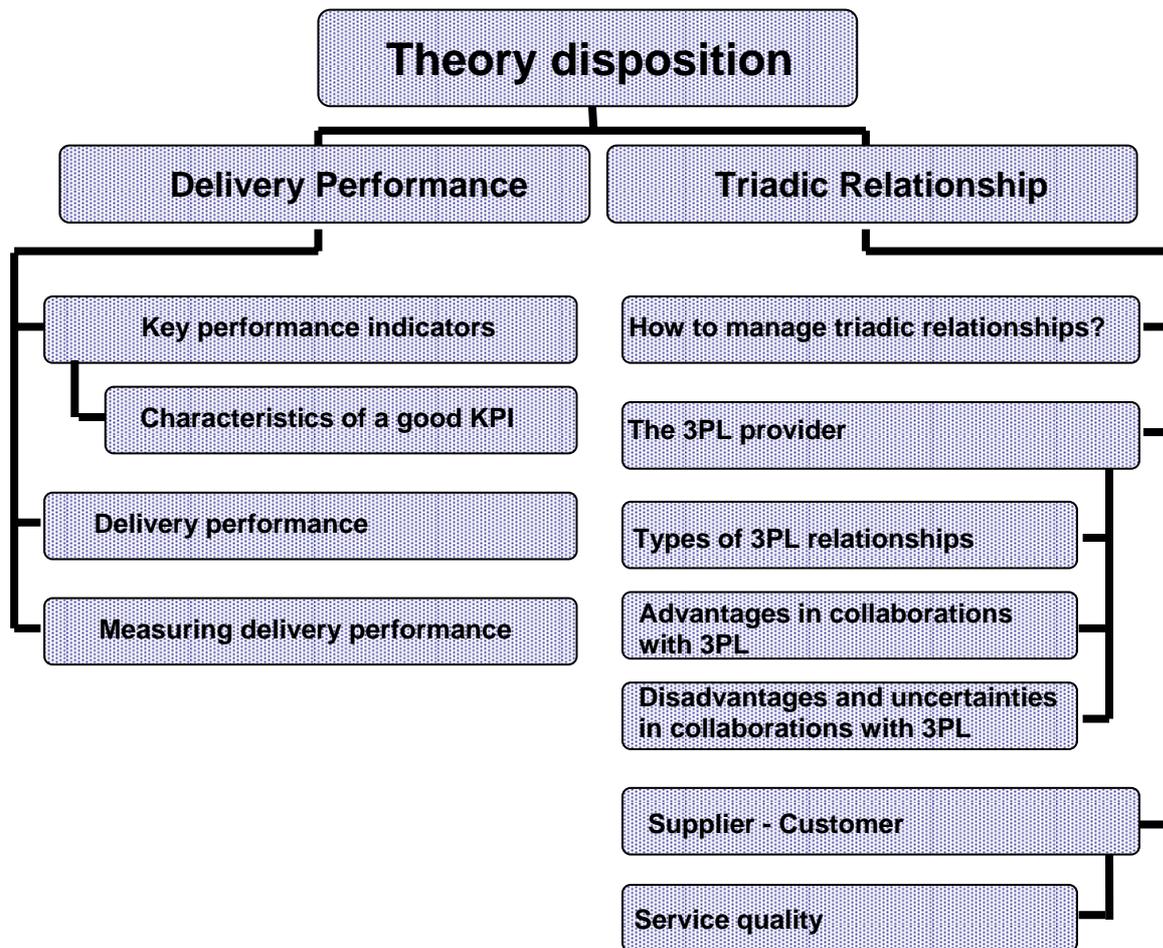


*Figure 3.1: Theory disposition*

## 3.1 Delivery Performance

*This chapter contains of two parts, key performance indicators (KPI) and delivery performance. The KPI chapter contain how to develop key performance indicators and all the aspects that companies have to have in mind when develop key performance indicators. In the delivery performance chapter we will present different aspects of delivery performance. This chapter concentrate on how to measure the delivery performance and which criteria's are important to measure.*

3.1.1 Key performance indicators

A KPI translate the business mission and vision into strategies, objectives and critical success factors. KPI metrics are of great importance for the business to identify and measure.[58] One key factor when companies developing KPIs are to differentiate the strategy driven metrics from the "usual" metrics. Selection of the wrong metrics for KPIs can damage a performance management initiative.[59] In the industry there are hundreds of metrics but there are just a few of great importance. Many of these metrics either measure similar process activities or have the comparable effects on the organisations critical success factors.[60]

*3.1.1.1 Characteristics of a good KPI*

One of the most important issues with KPI metrics is that everyone within the business on every level understands the meaning of it. The only way cascading KPIs work is if an organisation has established standard measurements. This is deceptively hard. It can take organisations months if not years to hash out the meaning of key measures or entities, such as "net profit" or "customer." Unfortunately, knowing what to measure and actually measuring it are two different things. Before using the KPI companies have to ask themselves if data exists to calculate the metric and whether it is accurate enough to deliver valid results. If the answer is no, companies have to revise the KPI or clean the existing data.

KPIs must be understandable. Employees must know what is being measured, how it is being calculated, and more importantly, what they should do (and should not do) to positively effect

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[58] Bauer, 2005, p. 64
[59] Bauer, 2004, p. 42
[60] Bauer, 2005, p. 64

the KPI. This means that it is not enough to simply publish a scorecard; companies must train individuals whose performance is being tracked and follow up with regular reviews to ensure they understand and are acting accordingly. This means that measurements without meetings are useless.

It is also critical to revamp business processes when implementing KPIs. The business process needs to empower users to take the appropriate action in response to KPIs. The last thing you want is informed, but powerless users. That is a recipe for disillusionment and poor morale. Forty percent of organisations said they modified business processes when implementing KPIs. Finally, KPIs should generate the intended action - improved performance. Unfortunately, many organisations allow groups to create KPIs in isolation. This leads to KPIs that undermine each other.

KPIs are communications vehicles. They enable top executives to communicate the mission and focus of the organisation and grab the attention of employees. When KPIs cascade throughout an organisation, they ensure that everyone at every level march together in the right direction to deliver the most value to the organisation as a whole.[61]

Companies should not stop when the KPIs are identified, defined and formalized. Companies need to continuously improve the KPI metrics and analyse the data that the KPI generate.[62]

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[61] http://www.tdwi.org/publications/display.aspx?ID=7114, 2006-05-03
[62] Bauer, 2005, p. 47

## 3.1.2 Delivery Performance

The link in a supply chain that directly deals with customers is the delivery of goods or services and therefore is it called "the driver of customer satisfaction".[63] Delivery is a service and as described in 3.2.2, the most important dimension of a service is dependability.[64] Deliveries operate in a dynamic and ever-changing environment. One way to overcome this problem is to have a total system view with the objective of understanding and measuring the system performance as whole, as well as in relation to the different actors.[65]

### *3.1.2.1 Measuring delivery performance*

Delivery performance can be measured as the percentage of customer orders delivered "on time and in full" (OTIF). On time is either the date when the customer want to have the goods (requested date) or when the customer and supplier have agreed upon a date (commit date). In full is when the supplier delivers all the items that the customer has ordered.[66] The reason why there are two different definitions on which date the delivery should be executed is that the supplier might not be able to deliver when the customer would like to have the order. To calculate OTIF to *customer commit date,* you calculate by take the total number of orders delivered on time and in full to customer commit date divided with the total number of customer orders. To calculate OTIF to *requested date* you use the same model but use request date instead of commits date. Of course the delivery performance is better when companies' measure commit date instead of request date.[67] Another definition of delivery performance is perfect order delivery. Perfect order delivery adds to OTIF other essential components as perfect invoicing (right quantity, right price and right item number) and perfect receipt (correct bill of lading and packing slip). [68]

If the supplier perform badly the supply chain managers tend to inflate inventory and production flow time buffers. Delivery performance is an important component in the overall continuous improvement of supply chain operations. Recent empirical research has identified

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[63] Gunasekaran et al, 2001, p. 77
[64] Bergman & Klefsjö, 2001, p. 315
[65] Gunasekaran et al, 2001, p. 77
[66] Ibid., p. 77
[67] Bolstorff, 2003, p. 7
[68] Gunasekaran et al, 2001, p. 77

delivery performance as a key management concern.[69] KPIs that are used in performance measurement influence the decisions at a strategic, tactical and operational level.[70] Delivery performance can be classified as a KPI metric. Delivery reliability is defined as a tactical metric.

Delivery performance needs to be measured in both financial and non financial terms. The inability to translate delivery performance into financial terms hinders managers' ability to justify capital investment for continuous improvement projects that are designed to improve delivery performance. Other advantages with measuring delivery performance in financial terms are that it is easily understood and compatible through different processes and stages.[71]

One important aspect of delivery performance is on time delivery. This act as a metric for the customer service level.[72] Customers require dependable on-time delivery from their suppliers. Both early and late deliveries are disruptive for the supply chain and need to be analysed.[73] A delivery window is defined as the difference between the earliest acceptable delivery date and the latest acceptable delivery date. Delivery windows captures the most important aspect of the delivery process; reliability. Reliability is the key component to improving the delivery process. Within the delivery window the delivery can be defined as early, on-time, or late. The delivery window may be measured in hours, days, or weeks depending on the businesses situation.[74] Figure 3.2 illustrates a delivery window.

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[69] Guiffrida & Nagi, 2004, p.24
[70] Gunasekaran et al, 2001, p. 72
[71] Guiffrida & Nagi, 2004, p. 23pp
[72] Gunasekaran et al, 2001, p. 77
[73] Guiffrida & Nagi, 2004, p.24
[74] Ibid., p.25p
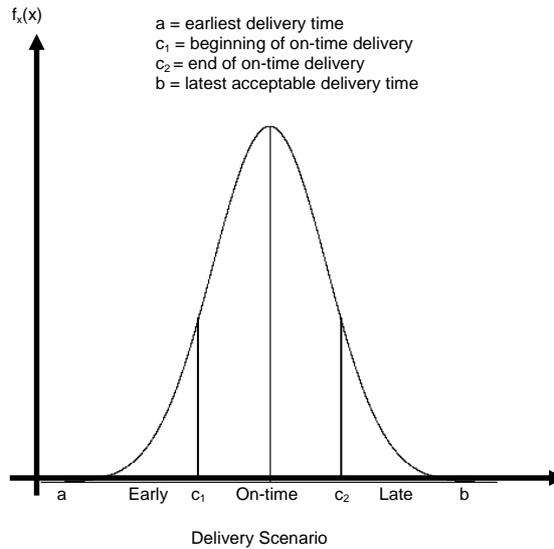
*Figure 3.2: Delivery Window (source: Guiffrida & Nagi, 2005, p. 25)*

Flexibility is ability to adapt the deliveries to the customers' requirements as order sizes, delivery addresses and documentation. Flexibility is also the ability to find solutions to the customers' problems.[75] Flexibility is one of the critical factors when competing with other supply chains.[76]

Like several other activities, delivery heavily relies on the quality of information exchanged. The quality and the way the information is presented determine the delivery performance to a large extent, which, therefore can be used to measure and improve performance.[77]

| Criteria | Description |
|---|---|
| On time delivery | The delivery should be delivered on the correct time. |
| Flexibility | The ability to adapt the deliveries to the customers requirements |
| Dependability | To be able to perform a service at a regular service level. |

*Table 3.1 Criteria of delivery performance*

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[75] Lumsden, 1998, p. 229
[76] Gunasekaran et al., 2001, p. 338
[77] Ibid., p. 78

SCA

Sometimes split deliveries are necessary to be able to solve a delivery. The reason for split deliveries is because it makes it possible to service a customer whose demand exceeds the vehicle capacity. Split deliveries also decrease costs in some cases. The split deliveries have to meet the time window which is defined by the customers. The customers demand will be fulfilled by more than one vehicle.[78]

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[78] Haugland, 2004, p. 1947pp

SCA

## 3.2 Triadic relationship

*T*his chapter contains three parts; triadic relationship, 3PL provider and Customer – supplier. The first part will present information about triadic relationships. It will contain information about how to measure, share, manage and what is important when handling triadic relationships. The 3PL part contains theory about the 3PL provider where different types of 3PL relationships will be discussed. Further on, advantages and disadvantages with 3PL relationships will be presented. The supplier - customer part deals with how to recognise the customers' requirements and how this knowledge can be used to improve the performance against customer. In this part we will also discuss service quality and the gaps between what a supplier offers and what the customer would like to have.

3.2.1 Triadic relationships

Third-party logistics has its foundation in a triadic form of relationship covering seller, buyer and third-party logistics provider. This triad consists of three dyadic relationships. In most researches 3PL relationship has been limited to a dyadic relationship between seller and logistics service provider or buyer and logistics service provider and the main reason for these dyadic relationships is that contracts are managed between seller and 3PL provider or buyer and 3PL provider. The limitations of using these dyadic transactional contracts are that it can lead to sub optimisation. For example, a manufacturer wants to sell so they can utilize as much as possible on the pallet or truck load. The buyer on the other hand is only willing to purchase batches according to their production. A triadic relationship characterised by take into consideration that everyone will create a successful relationship that cover all actors'. To start work against a triadic relationship is a procedure that can create matching services to seller-buyer relationships in supply chains.[79]

*3.2.1.1 How to manage triadic relationships*

In triadic relationships choosing collaborative partners are very important to have a successful relationship. All actors have to feel that the collaboration is mutually beneficial, and there can not be any conflicting goals.[80]

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[79] Bask, 2001, p. 472p
[80] Daugherty et al., 2006, p. 66

*Measure it (everything)*

Collaborations need not only rules and standards but also a way of monitoring that the rules are obeyed. Rules and standards should deal with long-term relationships, information sharing, and interactions. Long-term KPIs should be developed to monitor collaboration-related performance.[81] When performance is not measured a "presumed" performance often got established. This presumed performance is generally higher than the actual performance.[82] The most common cause of dissatisfaction in collaborative relationships is cost and when actors could not measure each others performance in an easy way.[83] Reviewing KPIs on a regular basis allows participating companies to adjust collaborative goals.[84] The criteria for effective KPIs are to measure the overall supply chain performance rather than the performance of an individual chain member. Furthermore the improvement should have the end-customers service as an overriding focus and managers should be allowed to both identify and eliminate causes of supply chain problems.[85]

*Share it (information)*

To be able to measure the performance in a efficient way the different actors of a triadic relationship have to share information.[86] There is a risk that the actors become overloaded with information, information which are unnecessary or simple too much information in a too short timeframe.[87] Routine data should be highly standardised. These routine data makes information sharing possible between companies. Sharing less formalised data is not as standardised today, but a study shows that companies would like this sharing to be formalised to a higher degree. This could be done by having formal meetings where collaborators can monitor progress, discuss goals and objectives.[88]

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[81] Daugherty et al., 2006, p. 66
[82] Guiffrida & Nagi, 2004, p. 25
[83] Logan, 2000, p. 27p
[84] Daugherty et al., 2006, p. 66
[85] Schimtz & Platts, 2004, p. 235
[86] Ljungberg & Larsson, 2001, p. 221
[87] Turner & Müller, 2004, p. 332
[88] Daugherty et al., 2006, p. 66

SCA

Conflicts between the actors often arise because actors try to maximize their own profits and advantages. What is best for one part might be the opposite for the other part. That is why it is important to not only share information but also profits and risks.[89]

*Manage it (relationships)*

Clear rules must be determined and applied to triadic relationships. It should be highly standardised and everyone should know the answers to the questions who, when and how much. To manage collaboration each company have to know what to do internally before it is possible to manage it externally.[90] Collaborative efforts often fail because critical strategic long-term details are overlooked. The partners do not match each other and the needs and capabilities of the supply chain are not utterly investigated.[91] Without flexible management, collaboration tends to be dropped responsibility, increased costs and external blame.[92]

A case study of Logan came up with some findings. These findings indicated that components for a successful relationship were high level of trust and commitment, risk/reward sharing and joint planning.[93]

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[89] Logan, 2000, p. 23
[90] Daugherty et al., 2006, p. 67
[91] Ibid., p. 62
[92] Sabath & Fontanella, 2002, p. 25
[93] Logan, 2000, p. 27p

SCA

### 3.2.2 The 3PL provider

*3.2.2.1 Types of Third-party logistics (3PL) relationships*

3PL providers can be seen as supportive supply chain members. This implies that logistics service providers should support alternative supply chain strategies. Supportive members can be defined as:*" companies that simply provide resources, knowledge, utilities or assets for the primary members of the supply chain'"*.[94]

There various types of classifications of 3PL relationships are market exchanges, customised logistic solutions, joint logistic solutions and in house logistic solution. [95]
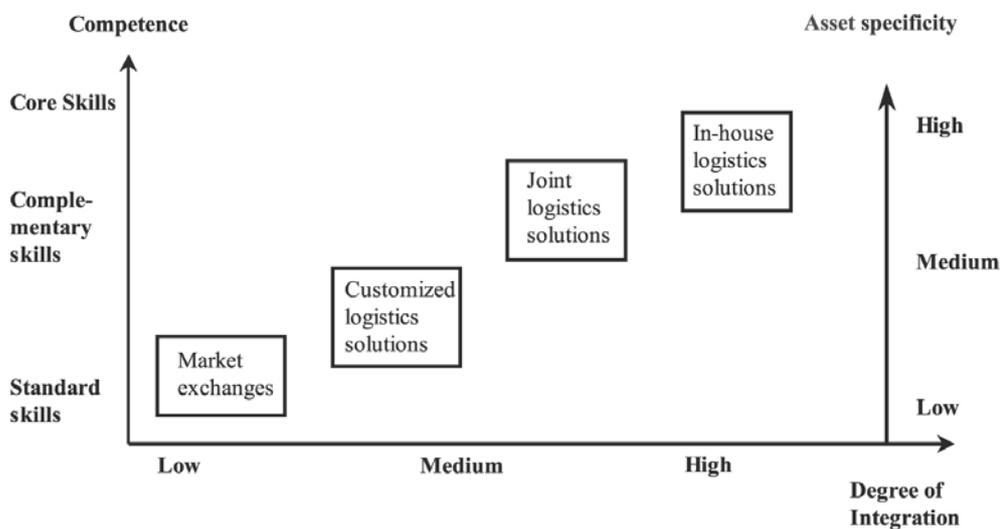


*Figure 3.3: Typology of 3PL arrangements (source: Halldórsson & Skjøtt-Larsen, 2004, p. 195)*

*Joint logistics solutions*: The 3PL provider and the customer jointly develop logistics solutions that are unique for the relationship. They look at the relationship as a win-win relation and it is a long-term agreement where they are willing to share information and solve problems together. The asset is medium/high and involves knowledge, experience, information and information technology.[96]

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[94] Bask, 2001, p. 472
[95] Halldórsson & Skjøtt-Larsen, 2004, p. 192pp
[96] Ibid.,

SCA

*3.2.2.2 Advantages in collaborations with 3PL provider*

Benefits that supply chains can achieve from 3PL services are that they can concentrate on core competencies and capabilities, concentrate on logistics management, improve overall performance, find global solutions, enable entry to new markets, control costs, improve customer satisfaction, improve flexibility, and find more cost efficient service solutions. In general, outsourcing of logistics services adds value when it enhances the performance of a company.[97]

*3.2.2.3 Disadvantages and uncertainties in collaborations with 3PL provider*

There are many reasons why the relationship between a provider, buyer and seller may not be successful. The biggest causes are unrealistic expectations, poor communications and that the companies do not trust each other. The lack in trust usually depends on lack of mutual benefits and shared goals.[98]

One problem could be that a provider has to invest in customer specific assets and this restricts their economies. They will be tied up in this commitment even if it proves to be unprofitable. Volume uncertainty is another area that may cause conflicts; it weakens the provider's ability to utilize the economies of scope and scale. Fluctuations also affect the provider's ability to serve other companies.[99]

Conflicts arise when one actor delegate work to the actor who execute the tasks. Conflicts mainly arise because of two reasons, the first reason is when the two actors have different goals and the second reason is when it is hard to measure exactly what the other actor is doing. Other reasons for conflicts are differences in risk and too low information availability.[100]

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[97] Bask, 2001, p. 472
[98] Logan, 2000, p. 21pp
[99] Logan, 2000, p. 23pp
[100] Ibid., p. 25p

SCA

3.2.3 Supplier – Customer

The voices of the customers are the customers' requirements. The customers' intentions are the crucial part of the message. Some companies have unconventional and innovative approaches to understand the customers' needs and wants.[101]

*3.2.3.1 Service quality*
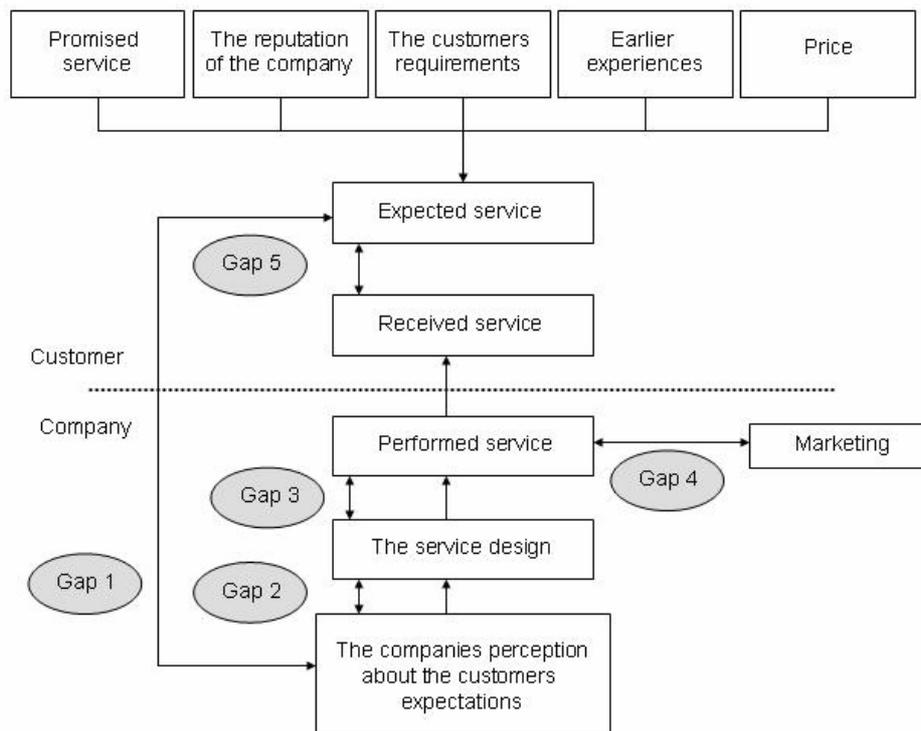


*Figure 3.4: Gap-model (*source: Bergman & Klefsjö, 2001, p. 328)

The gap-model is developed to measure service quality.[102] There have been several studies which have been carried out to investigate which criteria are important for the quality of a service. The most important criterion is dependability and surroundings are the least important.[103] The service quality gap model conceptualises perceived service quality as the service quality gap, which is the difference between expectation of service from an excellent service provider and the perception of service quality from the current service provider.[104]

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[101] Evans & Lindsay, 2005, p. 166
[102] Mukherjee & Nath, 2005, p. 175
[103] Bergman & Klefsjö, 2001, p. 315
[104] Mukherjee & Nath, 2005, p. 175

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The *first gap* is between the customers' expectations and the companies' perception about these expectations. This gap arises because the company does not understand what is important for the customer. To understand what the customer expect and want is the first step when one produces services and also products.

The *second gap* is between the companies' perception about the customers' expectations and the service. To listen to the customer through out the entire design process is not an easy thing to do. The customer expectations that are known can not be reached because managers do not have the right understanding about service quality and internal communication is poor.

The *third gap* is between the service design and the performed service. Even if the company have understood what is most important for the customer and developed a service that can exceed the expectations, the outcome can be unsatisfying. The employees can not execute the service because they have a lack of knowledge or they have a lack of will.

The *fourth gap* is between the performed service and the promised service that the customer should have. This gap arises because the company has promised something that they can not manage to perform.

The results of the four earlier gaps are the outcome of the *fifth gap*. The fifth gap is between the customers' expectations of the service and the received service. The gap- model is developed for services but with some modifications it can also be useful for product quality.[105]

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[105] Bergman & Klefsjö, 2001, p. 327pp

SCA

## 3.3 Analysis model

*T*he analysis model are constructed of two main parts that corresponds with our research question. The first part, delivery performance consists of different key objects for measuring delivery performance. The second part, relationships consists of how to adapt delivery performance to a triadic environment and how to manage a triadic relationship.

**Delivery performance**

**Triadic relationship**

**Theory**

**Delivery performance**

**Agreed date**

**Split deliveries**

**Delivery window**

**Non financial and financial measurements**

**Criteria of delivery performance**
- On time delivery
- Flexibility
- Dependability

**Triadic relationship**

**Measure it**
- Measure overall supply chain performance
- Identify & eliminate supply chain problems
- Dissatisfaction when not easy to measure other actors
- Focus on end customer

**Share it**
- Standardised routine data
- Share information
- Formal meetings

**Manage it**
- Standardised & clear rules must be determined
- Everyone should know the answers to who, when, how much
- High level of trust and commitment

**Service quality**

**SCA**     **3 PL**     **Customer**

**Empiric**

| Delivery performance | Triadic relationship | Delivery performance | Triadic relationship | Delivery performance | Triadic relationship |

**Analysis**

3PL provider

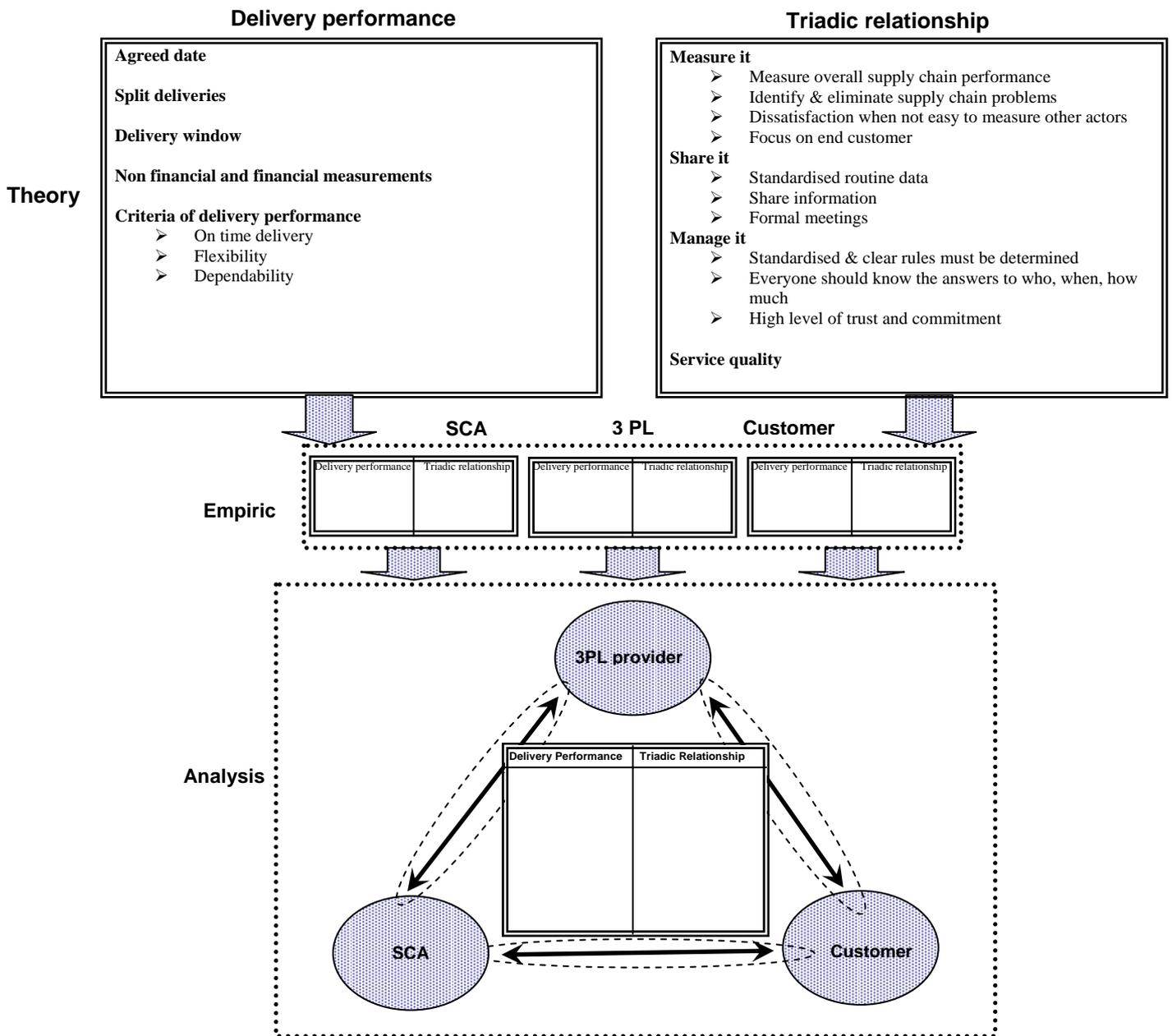| Delivery Performance | Triadic Relationship |

SCA     Customer

*Figure 3.5: Analysis model*

## 4 Empiric

*I*n this fourth chapter the empirical data will be presented. We start with presenting our triad; SCA, the 3PL provider and SCA's customers. In the second and third part, the findings from interviews with employees within SCA and Green Cargo will be presented. The last part will contain the results from our research at SCA's customers. After the presentation of each actor the findings will be presented. The chapter will summarise the empiric findings in the analyse model from all actors within the triadic relationship.

### 4.1 Introduction to the triad

*T*his part consists of a presentation of the actors within the triadic relationship.. We will explain how each actor in the three dyadic relationships is connected to each other. In the end there is an explanation of how the delivery process is performed.

4.1.1 The triadic relationship

The actors within the triadic relationship are SCA, a 3PL provider and a customer. In this triadic relationship is it three dyadic relationships between SCA and a 3PL provider, SCA and a customer and between a 3PL provider and SCA's customer.

*4.1.1.1 Dyad one: SCA – 3PL Provider*

SCA use 3PL providers to handle their transportations to their customers. SCA also use these providers to handle their safety stocks. SCA has a close relationship with the 3PL provider Green Cargo and they handle approximately 80 per cent of SCA's transportations. The last 20 per cent are performed by Schenker logistics. Which 3PL provider SCA use depends on where geographical the customer is situated.

*4.1.1.2 Dyad two: SCA – SCA's Customer*

SCA has approximately 800 customers. These customers differ in size. Their biggest customers' are Unilever, Pågen and SCA FPS and these customers are very important for SCA. Therefore, SCA keep safety stocks for these customers. SCA have safety stocks out of two reasons, first; it is a requirement from the customer, second; their production process is

not flexible enough to coop with the customers fluctuating demand. An important fact is that by having safety stocks SCA's possibility to deliver as promised increase.

*4.1.1.3 Dyad three: 3PL provider – SCA's customer*

The 3PL provider has the final contact with the customer and represents SCA for the customer. The 3PL provider plan the transportations from SCA out to the customer, and are therefore the actor within the triadic relationship who have the knowledge if the delivery is on time.

4.1.2 The delivery process

To make the delivery process more visible a flowchart of the process is essential. The process contains both information flow as well as the flow of the physical product. Figure 4.2 and 4.3 describes these flows.
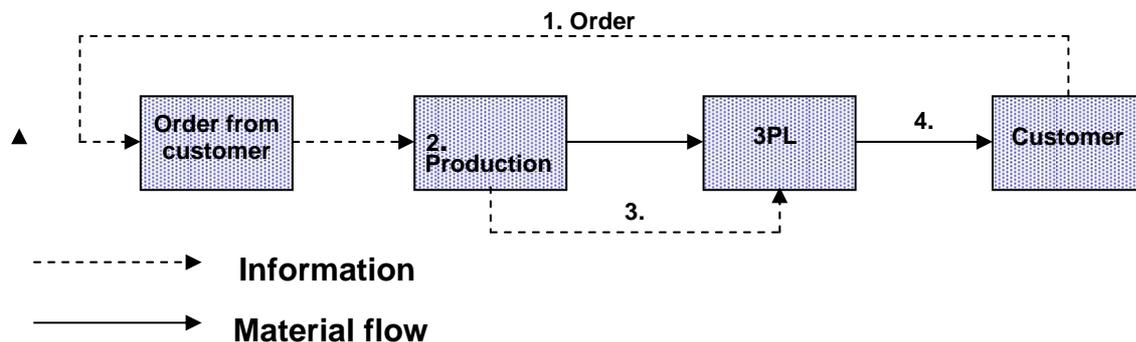


*Figure 4.1: Flowchart when SCA produce the order*

Figure 4.2 gives a simplified picture of the delivery process. The customer places an order (1) and SCA produce it (2). The 3PL providers see the finished order in SCA's system and plan the transports (3). The 3PL provider picks up the order and delivers it at SCA's customers (4). If SCA instead deliver from stock the flowchart in figure 4.3 should be the case:

SCA
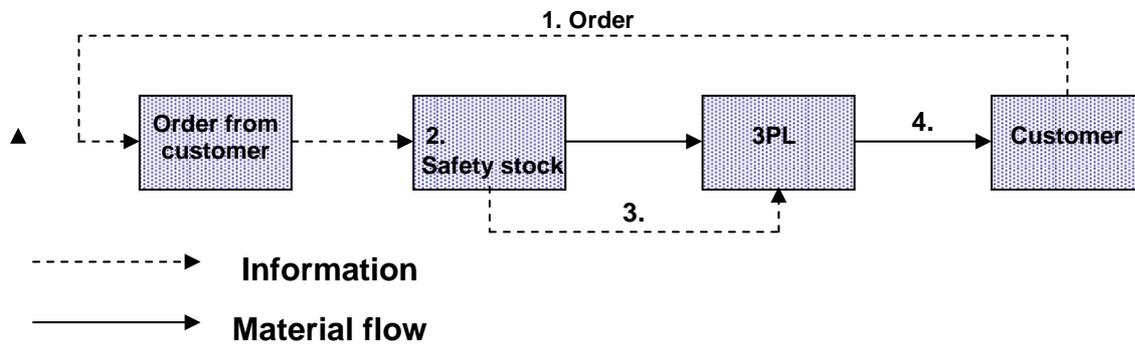


*Figure 4.2: Flowchart when SCA deliver from stock*

## 4.2 SCA

*T*his part will start with an introduction to SCA. The following part will contain our findings from interviews with employees at SCA. Our interviewees where Niclas Strand, Supply chain manager and Siwe Person, Quality manager.

4.2.1 Company presentation

*"SCA is an international paper company that produces and sells absorbent hygiene products, packaging solutions and publications paper. Based on customers needs, new products are developed for consumers, institutions, industry and the retail trade."[106]*

SCA was founded in 1929 by Ivar Krüger, in 2004 had SCA about 50 000 employees and was represented in 50 countries. SCA had in 2004 annual sales of 10 billion euros. Sales per business were; Hygiene Products 50 %, Packaging 35 %, Forest Products 14 % and others 1 %.
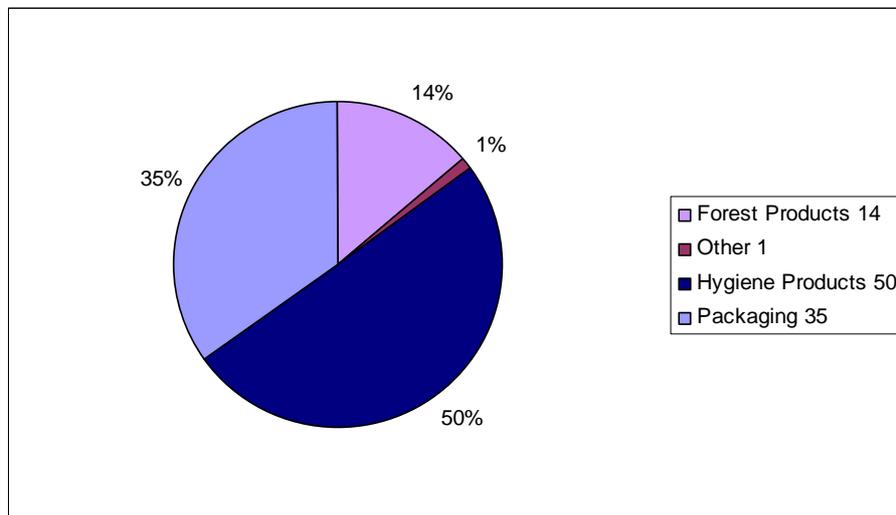


*Figure 4.3: SCA's different areas of business (source, www.sca.com)*

SCA Packaging is Europe's leading provider of customer specific packaging solutions. They produce corrugated card board, protective and specialty packaging as well as containerboard. SCA Packaging Europe produces over 35 million packages/day, 365 days a year. SCA

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[106] www.sca.com

Packaging in Sweden has around 900 employees and their turnover is over SEK 1, 5 billion. Their customers are e.g. Kellogg's, Unilever and Pågen. SCA's packages both protect the products and sell the products. SCA Packaging develop customer specific solutions that include; consumer and display packaging, customised protective packaging, packaging with advanced printing, heavy duty and industrial packaging. [107]

### 4.2.2 Delivery performance

*4.2.2.1 How do SCA measure delivery performance today?*

When SCA report the result of measuring delivery performance, they register their delivery performance in two different results; gross and net. SCA measure these concepts in order line (non financial measurements). The concept gross is used when SCA has not delivered as agreed. This involves all the incorrect deliveries. The concept net is used when SCA has not delivered as agreed and there have been contact with/from the customer. This does not involve all incorrect deliveries. These contacts are taken either of SCA or the customer, which for some reason have changed the delivery date or quantity and informed the other actor about it. E.g. SCA contact the customer and inform them that they can not deliver as promised and the customer agrees with the new terms. In this case SCA consider the delivery correct according to the net concept.

*4.2.2.2 Problems with measuring delivery performance*

Today, both SCA and some of their customer measure SCA's delivery performance, but they measure different. The customers that SCA know measure their delivery performance seldom update SCA about it. SCA claim they and these customers use different kinds of definitions on what, when and where to measure. If they do not measure variables that are equivalent, the measure will be unreliable. SCA measure their delivery performance when the goods are leaving their plant and add if there are any transportation days. The customers measure when they the goods arrive at their plant. E.g. SCA and their customer SCA Packaging FPS had different data of what SCA performed. SCA thought they had a high delivery performance, but according to SCA Packaging FPS the delivery performance was much lower. This due to differences in what, when and where to measure. This causes problems for SCA, because if

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[107] www.sca.com

they and their customer have different opinions according to measurement, SCA do not know if there are any problems with their deliveries.

As discussed earlier, SCA keep stock for some of their customers. SCA measure how they perform regarding delivery from SCA to the warehouse. SCA do not measure how these warehouses perform regarding delivery to customers. The reason why SCA do not measure from the warehouse is that the warehouse is not handled by SCA, but the 3PL providers. SCA claims that it should not be any delivery problems if the deliveries from their plant to the warehouse are performed in a good way. Another reason is that it should not be any delivery problem to the customers, due to the fact that the purpose of the warehouses is to increase the delivery performance by always having goods in the warehouses.

When a customer places an order, it is specified what day in the week or what week the order should be delivered. Today, SCA promises to deliver a specific week or day. There are some reason why SCA prefer to deliver a specific week instead of a specific day; one reason is that deliver a specific week gives a much higher flexibility in the production process. Another reason is that the IT system that is used by SCA is not transparent enough for the sales personnel to see the production schedule. When the sales personnel can not see the production schedule it is hard to promise to deliver on a specific day. SCA think that most of the customers would prefer if SCA specified the day for deliveries.

*4.2.2.3 Split deliveries*

Sometimes SCA has split deliveries. When deliver on two different dates the question is if SCA succeed to deliver the right quantity at the right time? There are different reasons why there are split deliveries. The most common reason for split deliveries is that there are no trucks or not enough trucks available at the 3PL providers. Another reason could be that SCA is not able to deliver all the items the customer has ordered. They then deliver the items the customer says have the highest priority. A third reason is that the 3PL provider tries to get full utilization in their trucks.

*4.2.2.4 Agreed date*

When measure the delivery performance there are several possible reasons for different data. One reason is when the customer places an order; SCA is obligated to deliver the product as agreed. If a problem appears during the production and SCA find out that they are not able to deliver as agreed, they contact the customer. If the customer accepts the new terms and conditions. SCA will deliver at the new accepted date. This creates a problem of definition, if the customer accepts, is it a correct delivery if SCA deliver on the new accepted time? The problem is that according to the original order agreement they should deliver on the agreed date. Vice versa, if the customer contact SCA and propose SCA to deliver another date. Either because they have no place to store the products or they need the product earlier/later than expected. This creates an issue of what does the customer think is the correct delivering date and how does this relate to SCA's point of view.

4.2.3 Triadic Relationship

*4.2.3.1 Information sharing, measuring and management*

One problem for SCA is that they do not know how their 3PL providers perform. They believe that Green Cargo performs well and that Schenker perform well most of the times. The problem is that SCA has no control about how Schenker and Green Cargo perform, this due to that SCA do not measure Schenker's and Green Cargos delivery performance. SCA know that Schenker sometimes re-load their goods on a distribution central and SCA add these days when they calculate the arrival date to customer. This means that the goods sometimes arrives one or two days later and increase lead times. It have happened that Schenker have leaved goods at their distribution central an additional day to increase the utilization of their trucks. The 3PL providers give this issue a higher grade of complexity. There are obviously problems with the information exchange and without correct information it is impossible to measure and get reliable data.

SCA keep stock for some of their customers. SCA keep stock for two reasons. One is when the customer demands that they keep stock and the second reason is that their production process is not flexible enough to coop with the customers fluctuating demand. For some customers it is impossible to know how much products they need because their sales depend on e.g. the weather. If SCA should not keep stocks for these customers they would not be able

to keep them as customers. The warehouses are situated close to the customers to serve them in the best way as possible and minimise the transport from the warehouse to the customer. SCA have outsourced their warehousing to different companies. Which company they use depends on where the warehouse is located.

| Delivery performance | Triadic relationship |
|---|---|
| **Agreed date**<br>➢ SCA do not think the customer change the dates when there are a new agreement<br>**Split deliveries**<br>➢ No trucks at 3PL<br>➢ Not enough production capacity<br>**Delivery window**<br>➢ SCA deliver a specific week<br><br>**Net – Gross**<br>➢ Two different ways of measure delivery performance, both measurements are non financial<br>➢ Measure different than the customers does | **Measure it**<br>➢ SCA do not know the performance of 3PL providers<br>➢ SCA do not have any control of the 3PL providers<br>**Share it**<br>➢ No exchange of delivery performance from 3PL providers<br>➢ Seldom information sharing regarding delivery performance with/from customers<br>**Manage it**<br>➢ No standardised way of measure delivery performance SCA & customer use different kinds of definitions on what, when & where to measure<br><br>**Service quality**<br>➢ Deficient knowledge about customers opinions regarding delivery performance |

*Figure 4.4: Empiric model, SCA*

## 4.3 Green Cargo

*T**he following part will contain our findings from interviews with employees at the 3PL provider Green Cargo: Our interviewees where Stefan Grönevik, Transport administrator and Bengt Carlsson, Area manager.*

4.3.1 Company presentation

Green Cargo is a national and international logistics company and work to promote sustainable development and to supply logistics solutions that meet the requirements of their customers. Green Cargo have 3 200 employees in over 100 locations throughout the Nordic region and Europe. 94 % of the goods they transport are carried on electrically powered trains and Green Cargo's entire operations carry the Good Environmental Choice label.

Green Cargo has 30 terminals and logistics centres, and provides road haulage distribution all the way to the customer. Their services include warehousing as well as advanced logistics solutions, and occasionally they are also responsible for the final production process and the distribution of the goods to the customer.

4.3.2 Delivery performance

*4.3.2.1 Transports*

Every day, Green Cargo Road load 400 loading meters corrugated cardboard and packaging, for distribution to SCA's customers, in the south and middle of Sweden.

Booking of transports, planning and inventory administration is handled by Green Cargos employees. To make the handling more flexible, Green Cargo has one truck for local transportations which is completely controlled by SCA Packaging. Green Cargo also have extra trucks for urgent transportations during the day, they also have employees that administrate slightly 2500 square meters inventory for SCA Packaging. For SCA Packaging flexibility and delivery performance is important for a successful logistic solution. Long-term relationship and the geographical closeness in Värnamo have made the foundation of a good relationship.

Green cargo has a big network of haulage contractors. If Green Cargo does not have enough trucks available, they use this network of contractors to fulfil the service. Green Cargo says that split deliveries happen due to economical facts. It is not profitable to transport small batches. Green Cargo uses their own trucks and drivers in most cases. The advantages of using own drivers are greater control over the entire supply chain and the increase knowledge about the customer. All decisions are centralized; the drivers have no influence in any decisions. The drivers have not the authority to plan their transports. This make that the control will increase and facilitates the transport planning.

Green Cargo has the possibility to load their trucks with 20 loading meters. They try to get as full utilization as possible. Green Cargo work within SCA's system and the transparency make Green Cargo able to see if there are any goods to deliver. This makes Green Cargo's planning of transports more efficient and they get higher utilization. This will also keep the costs as low as possible.

SCA's demand of transports is even on an annual basis. But, during a week, the demand fluctuates. The demand in the end of the week is higher than in the beginning. Sometimes the demand increase 50 percent on Thursdays compared to Mondays and Tuesdays.

*4.3.2.2 Measuring delivery performance*

Green Cargo does not measure their delivery performance. But if there are any problems they report them. Problems can be damage goods and delays in delivery time. This exception reporting is included in Green Cargos ISO certification. They are also certified for quality, environment and working environment. Green Cargo works with continuous improvements within these three areas.

Green Cargo has not an electronic scanning system for registration when leaving the goods at the customer. Green Cargo says that they do not need any scanning system because they do not reload their gods. When not reloading there is small chances of goods disappearing and therefore they know where the goods are. Green Cargo reports their deliveries by a waybill. The delivery is accepted when the customer sign the waybill.

In the past, Green Cargo was reporting to SCA a transport was delayed. They informed SCA about the delay. They reported the reason for the delay and who was responsible. Green Cargo does not work with this anymore, this due to that SCA considers that Green Cargo always performed well, and therefore these measurements are not necessary anymore.

4.3.3 Triadic relationship

*4.3.3.1 Information sharing, measuring and management*

The communication is handled to a large extent by a connected computer system where SCA's production information about finished orders transfers directly to Green Cargos transport administrator. The transport administrator can see how much goods that are produced for transportation to every customer. Green Cargo can also see which time the products should arrive at SCA's customers. SCA's customers have different time windows. Some customers have their deliveries a specific day and other customers have them a specific week. This can be seen in the integrated system that Green Cargo and SCA have developed. When Green Cargo print the waybill, the information transfers directly by EDI to SCA's business system for automatic invoicing.

Green Cargo can only see an order if it is complete. If the order contains 200 pallets, Green Cargo can only see the order in their system when the last pallet is produced. If they could see the order earlier the planning could be more precise.

It is more common that SCA's customer turn towards Green Cargo than SCA, if having any inquiries about the deliveries. They do this because Green Cargo is responsible and have deep knowledge about the transports. Green Cargo is also more updated about the transports than SCA. This make that one unnecessary contact step will be eliminated. Green Cargo has good contact with many of the customers and because of that they know how many trucks the customer can receive in one day. E.g. if there are 3 trucks that will be sent to a customer one day Green Cargo know that it is not possible to send them all at the same time. If they did, it should only result in two cars waiting for the third to be unloaded.

SCA

The employees at Green Cargo posses a lot of information about SCA's customers. They have gained this information because the customers often turn to them with their inquiries and they have had a relationship to the customer during a long period.

| Delivery performance | Triadic relationship |
|---|---|
| **Agreed date** <br> ➢ When SCA's customer has inquiries about the transports they turn towards Green Cargo, which tries to fulfil this. <br> **Split deliveries** <br> ➢ Use their network of haulage contractors to fulfil the service <br> ➢ Happens due to utilization in the trucks <br> **Delivery window** <br> ➢ SCA's customers have different time windows that are visible for Green Cargo. This information is visible in the integrated computer system between Green Cargo and SCA | **Measure it** <br> ➢ Do not measure their delivery performance <br> ➢ Use exception reporting, it is included in ISO certification, work with continuous improvement within this area. <br> **Share it** <br> ➢ Access to SCA's production system <br> ➢ Can only see a complete order in SCA's production system <br> **Manage it** <br> ➢ Do not use a scanning system for registration, <br> ➢ Using waybills <br> **Service quality** <br> ➢ Good knowledge about SCA's customers perceptions <br> ➢ Always use same drivers to SCA's customer in order to create a good relationship |

*Figure 4.5: Empiric model, Green Cargo*

SCA

## 4.4 Customers

*T*his part contains our empirical findings about the customers. We gathered the information through a questionnaire. In this chapter we will present the 13 questions with fixed alternatives and the 4 open questions. We will show graphs of the 13 questions with fixed alternatives together with explanatory texts and sum up the comments from the open questions.

We sent the questionnaire to 85 respondents and got 39 answers, which gives a return rate of roughly 45 %. In the questionnaire we mean a correct delivery that is delivered on time and in full.

4.4.1 Questions with fixed alternatives

*Question 1: How important do you think it is to measure the delivery performance?*
 *(Grade your answer between 1 – 5 where 1 is not important and where 5 is very important)*
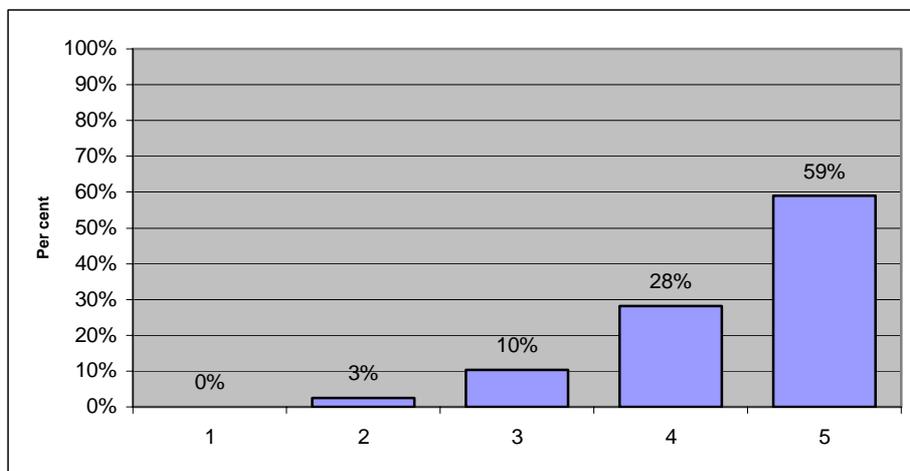


*Figure 4.6: Question 1*

We got 38 valid answers to this question and 1 non valid. The average of the answers is just over four. As the graph describe SCA's customers' thinks that measuring the delivery performance is very important. 97 % thought that measure delivery performance is important or very important (answer 3, 4, 5).

*Question 2: Do you measure SCA Packaging's delivery performance?*
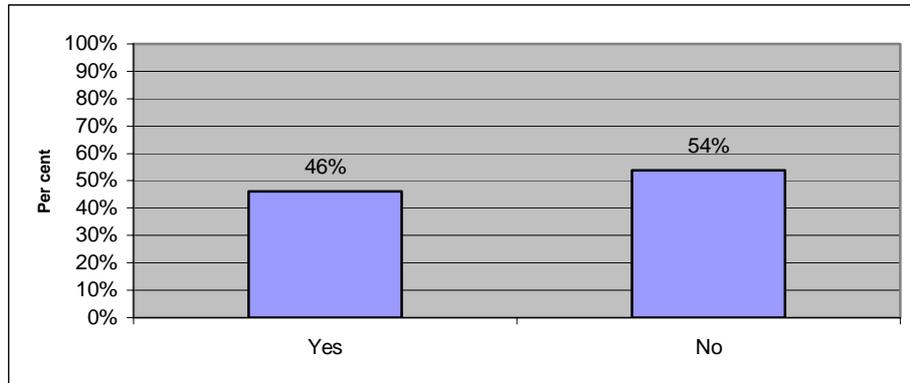


*Figure 4.7: Question 2*

We got 39 valid answers on question 2. Roughly half of the customers said that they measure the delivery performance of SCA.

*Question 3: If yes, how often do you report your measurements to SCA Packaging?*
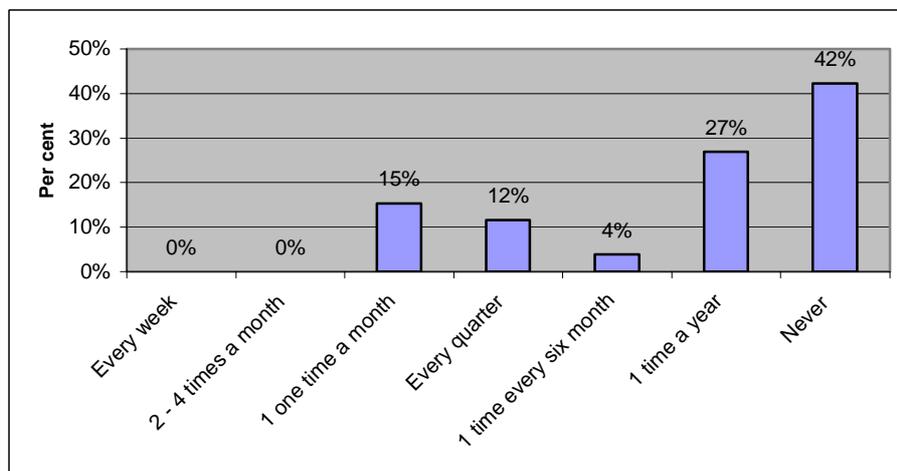


*Figure 4.8: Question 3*

We got 26 valid responses on question 3. We assume that many companies that did not answered this questions were companies that answered no, on the previous question. 15 customers answered that they report their measurements to SCA and half of them do it every half year or often.

SCA

*Question 4: How do you think the delivery reliability should be specified?*
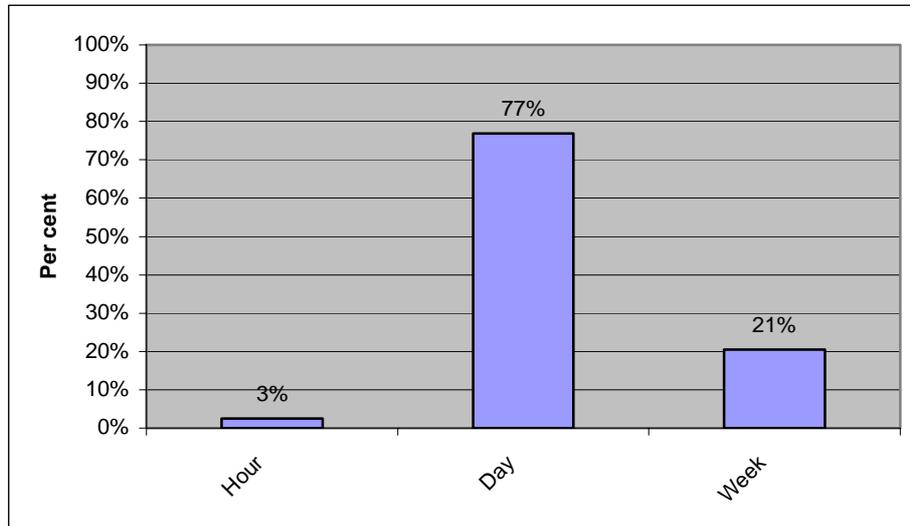


*Figure 4.9: Question 4*

We got 39 valid responses to question 4. We chose to not have intervals on this question. We were more interested to which extent the customers wanted the delivery date specified. The level of tolerance is covered by question 5. A big majority of the customers want to have a specified delivery day. No customer used the alternative *other* were they had a chance to specify.

*Question 5: What level of tolerance do you have for early/late deliveries?*
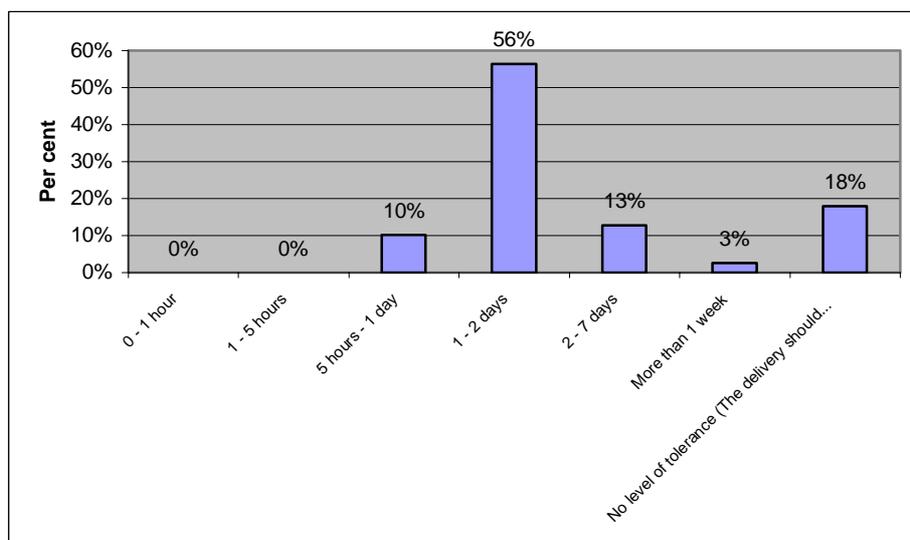


*Figure 4.10: Question 5*

We got 39 valid answers on question 5. One alternative dominated the answers; it was 1-2 days. This alternative got over 50 % of the answers. The two alternatives that are closest to 1 – 2 days got over 20 % of the answers. The alternative that differed from these alternatives was alternative; 5 *We have no level of tolerance.* This alternative got almost 20 % of the answers.

*Question 6: Which criteria's do you think is important according to delivery performance?*
*(Grade your answer between 1 – 5 where 1 is not important and where 5 is very important)*

This question contains of three sub-questions, time, dependability and flexibility. We got 39 valid responses on all the three sub-questions.

*A: Time*
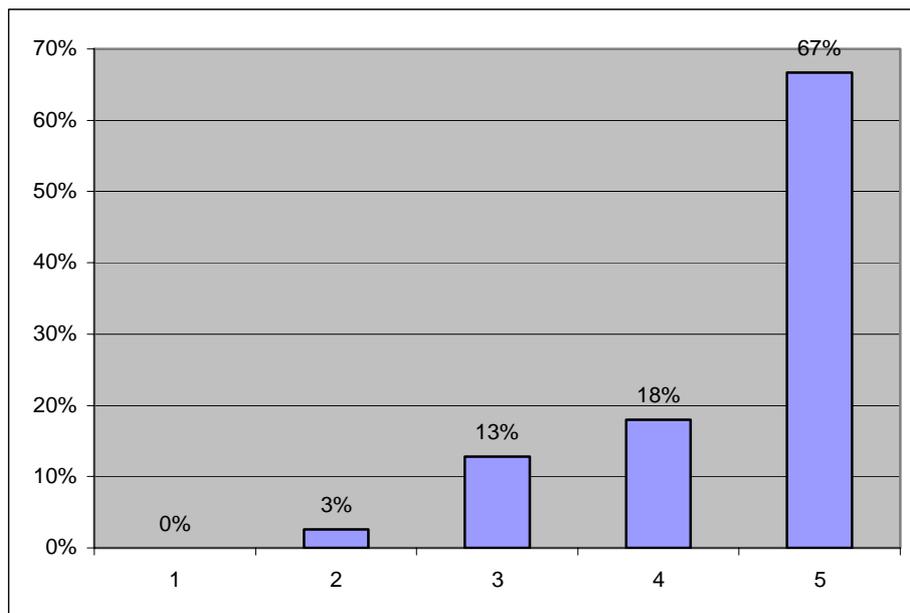


*Figure 4.11: Question 6 A*

The dominating answer with over 60% of the answers were 5 (very important), and then there are a falling amount of answers on the alternatives 4, 3, 2 and no respondent have chosen to answer 1 (not important). The average is around 4.3.

SCA
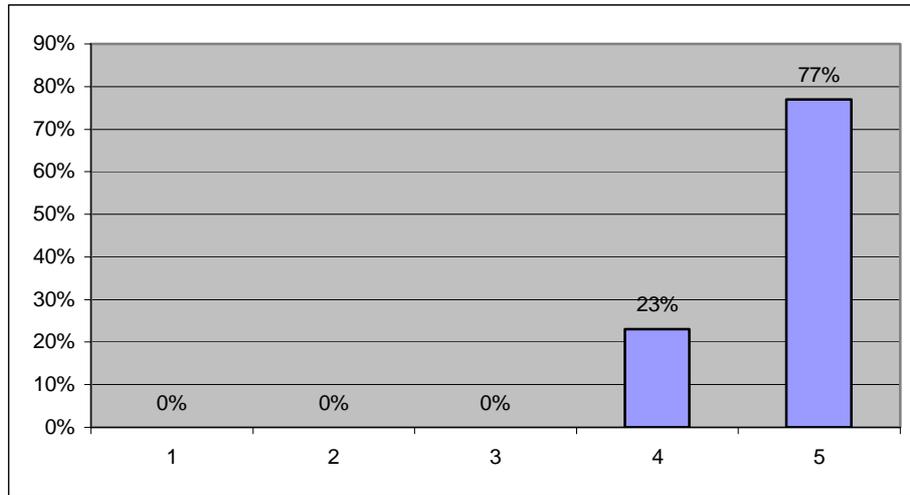
*Dependability*



*Figure 4.12: Question 6 B*

All customers answered either alternative 4 or 5. The meaning of these two alternatives is that dependability is very important. These answers make it very clear that the customer thinks that dependability is a very important aspect of delivery performance. The average of this question is around 4.8.

*Flexibility*
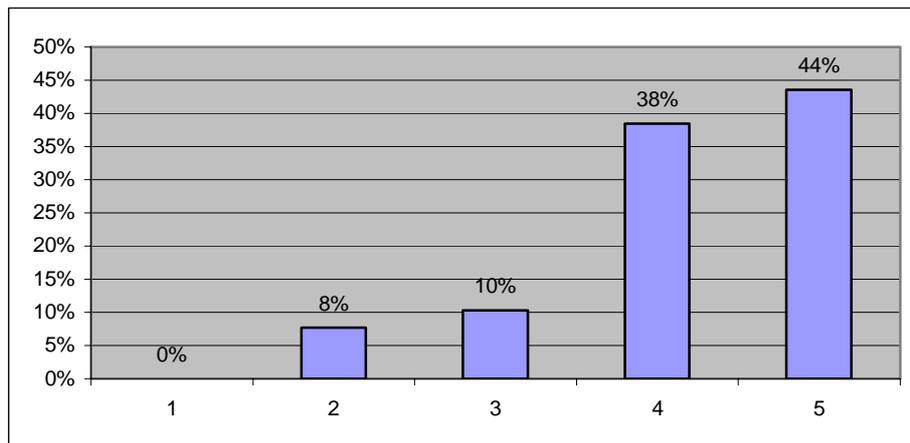


*Figure 4.13: Question 6 C*

Two answers were dominating, they were alternative 5 and 4, and those alternatives had almost 80% answers together. This shows that the customer thinks that flexibility is very

important. No one of the customers answered alternative 1. The average is around 4.0 on this question.

The customer ranked dependability as the most important criteria, then on time and then flexibility. To sum up, the customers thought that all criteria were very important.

*Question 7: Which way to measure delivery performance do you find most correct, by value of the order or by order line or is both ways of great importance?*
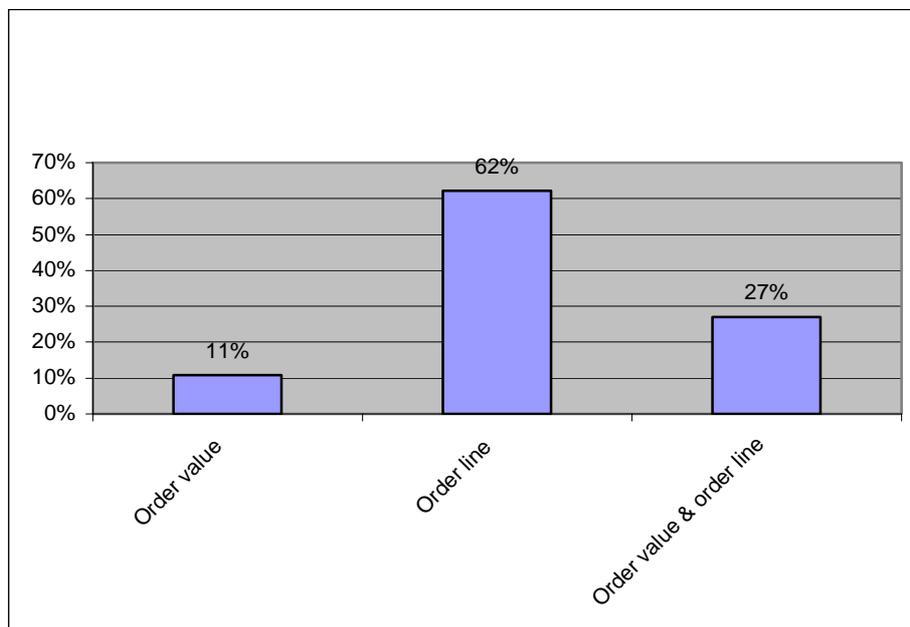


*Figure 4.14: Question 7*

We got 37 valid answers to this question. Most customers think that measuring delivery performance by order line is the best way. Around one fourth thinks that the best way is to measure both order value and order line. Only a few thinks that measuring order value is the best way.

*Question 8: If SCA Packaging is not able to deliver on the agreed date but you accept a new delivery date, do you think the order is delivered correct?*
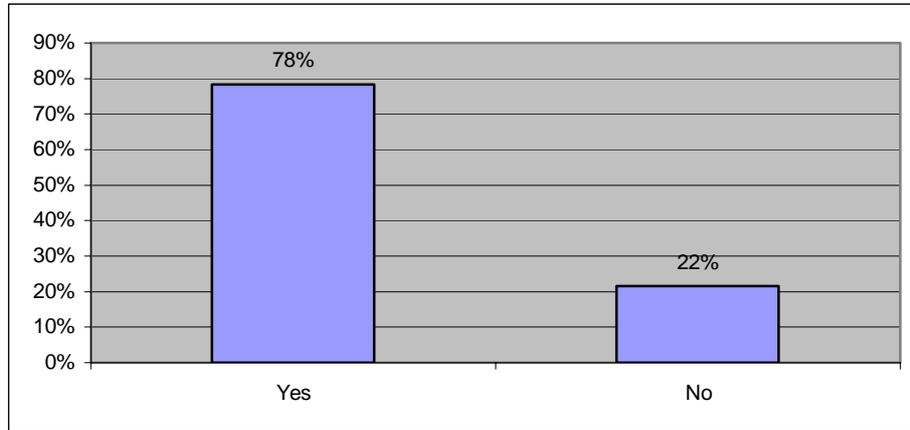


*Figure 4.15: Question 8*

We got 38 valid answers on question 8. 75 % of our respondents thought that if they accepted a new date, SCA had delivered correct.

*Question 9: If SCA Packaging change the delivery date and you accept the new date, do you change the delivery date in your system?*
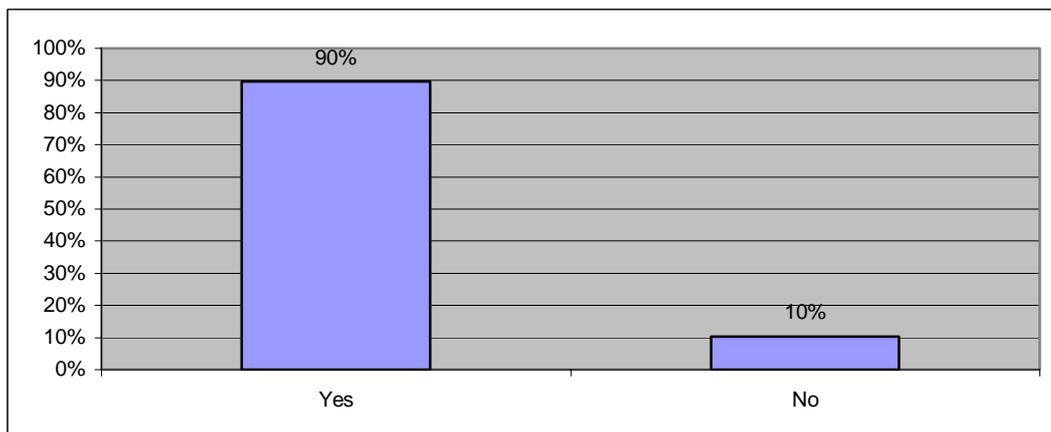


*Figure 4.16: Question 9*

We got 39 valid answers to this question. Almost 90% of the customers change the date in their system when there is a new accepted date.

*Question 10: If your company contacts SCA Packaging to change the delivery date, but SCA Packaging has no possibility to change the date, do you think SCA have delivered the order correct?*
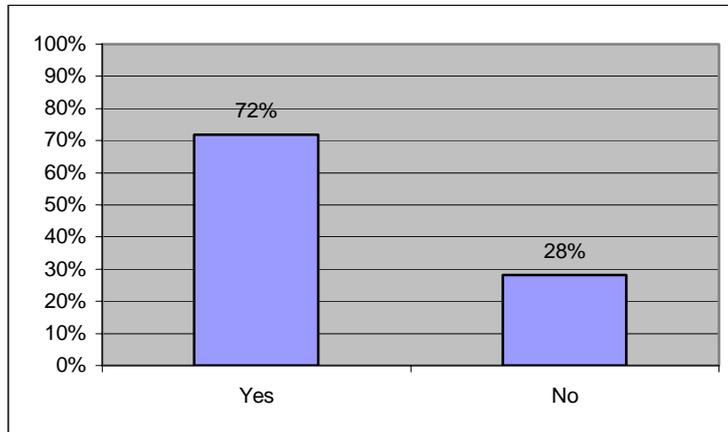


*Figure 4.17: Question 10*

We got 39 valid answers on this question. Around 70% thought this was a correct delivery.

*Question 11: If SCA Packaging only have the possibility to deliver a split delivery, e.g. the items which you need the most, do you find the delivery correct?*

*A: If there is a new delivery date initiated by you?*
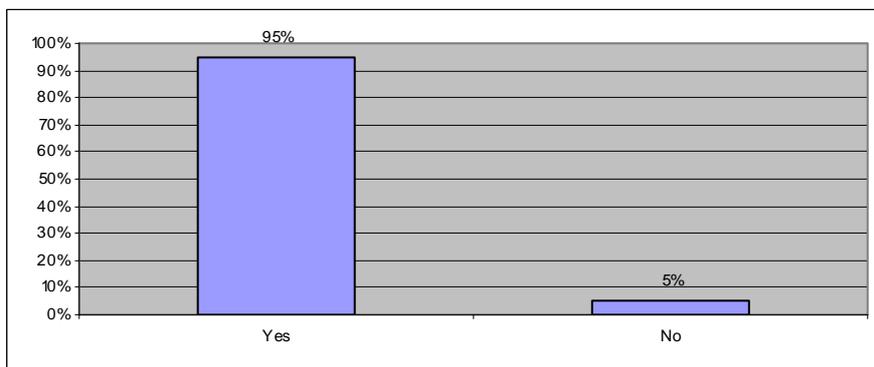


*Figure 4.18: Question 11 - A*

We got 38 valid answers on this question. Almost every one of our respondents answered that they think a correct delivery has taken place in this case.

*B: If it is the original delivery date?*
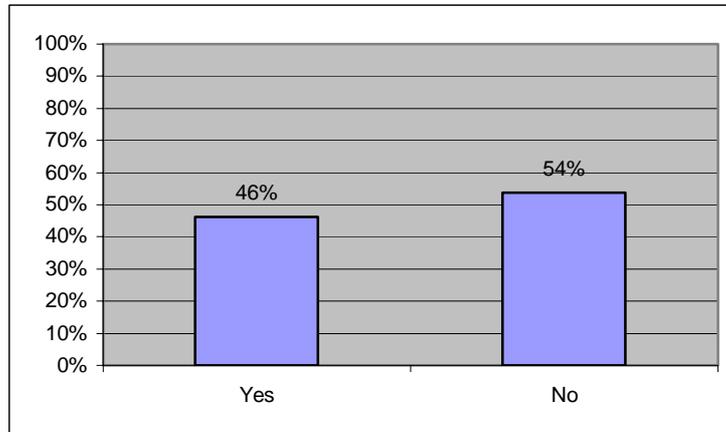


*Figure 4.19: Question 11 - B*

We got 37 valid answers on this question. It was almost equal between the alternatives. Half of the customers thought this was a correct delivery.

*Question 12: How long time in advance does SCA Packaging have to inform you about a delivery delay to make it acceptable?*
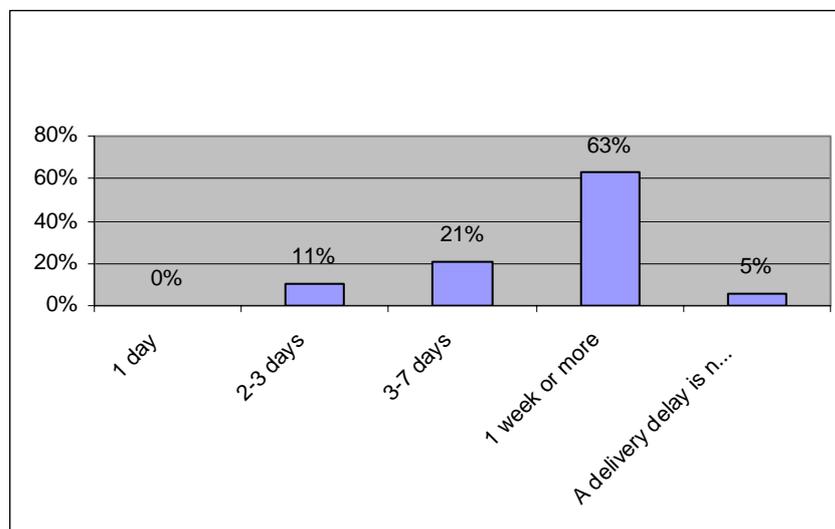


*Figure 4.20: Question 12*

We got 39 valid answers to question 12. Almost 60% of the customers think it is correct with a delivery delay if it is reported at least one week in advance. Around 30% of the customers accepted a delay if it was reported between 2 and 7 days in advance. Around 10% did not think a delivery delay is acceptable.

*Question 13: In those cases where the delivery is not correct, damaged or in another way not satisfactory, how do you report this to SCA Packaging?*
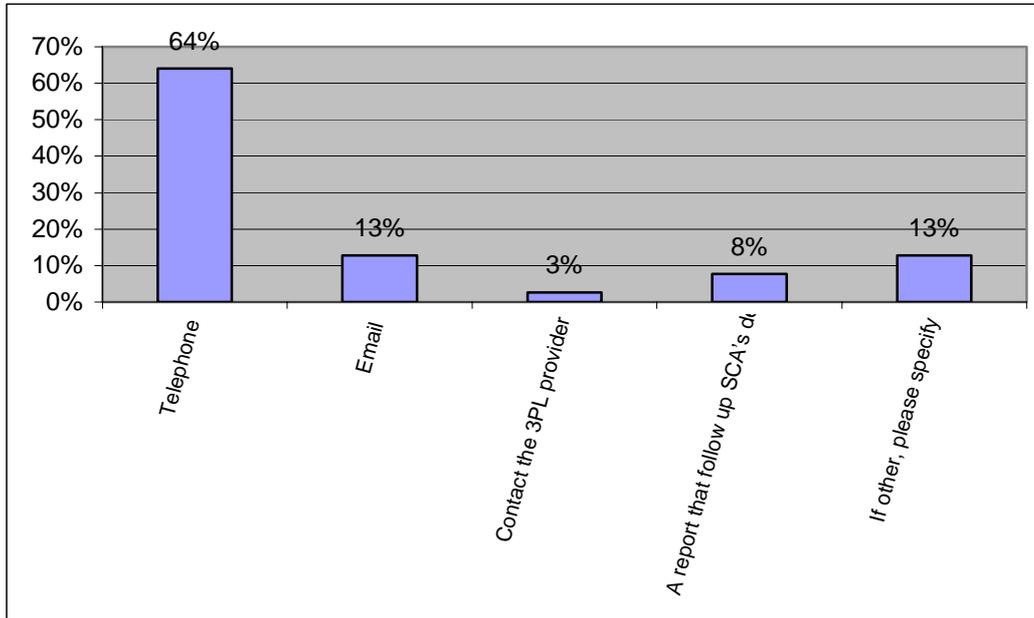


*Figure 4.21: Question 13*

We got 39 valid answers to question 13. The most common way to report failures in the delivery is by telephone. Some customers have chosen to use the alternative others. The specifications were that they used a mix of the alternatives or their own delivery reports.

4.3.2 Questions with open alternatives

**What do you think work well regarding the delivery performance of SCA Packaging?**

*4.3.2.1 Relationship*

Three of the customers answered that the relationship with SCA is very good. They think that SCA's customer support work very well and that the personnel are always helpful. One customer also answered that they and SCA have a good collaboration with SCA's representative when developing new packaging solutions.

*4.3.2.2 Delivery performance*

Twenty nine customers commented this question (What do you think work well regarding the delivery performance of SCA) and sixteen answered that they are very satisfied or satisfied with SCA delivery performance.

One customer answered that there have never been any delay in the deliveries. Two of the customers answered that the delivery is on time in 95 percent and 99 percent of all deliveries.

One customer answered that SCA always have a high delivery performance due to that SCA has a safety stock for the most frequent ordered products. This customer also said that this is the reason for not measuring delivery performance.

Three of the customers answered that SCA always contact them if there would be any delays in the deliveries.

*4.3.2.3 Flexibility*

Two of the customers mentioned that SCA has a high flexibility. If the customer would like to have the order or a part of the order earlier, SCA try to fulfil this for the customer. One customer answered that SCA could have shorter delivery times on selected products.

*4.3.2.4 Quality and marking of goods*

Two of the customers answered that the goods are always well lashed together and that there are always high quality with no damaged goods, three other customers thought that quality was something that work very well according to SCA delivery performance. The pallets, traveler and invoices are correct marked with right item number answered three customers.

***What do you think do not work well regarding the delivery performance of SCA Packaging?***

*4.3.2.5 Delivery performance- on time*

One customer answered that when SCA delivery a split delivery, the information do not reach the purchaser, this cause problem when planning the logistics.

One customer answered that SCA several time could not deliver on the agreed date, another customer say that the delivery performance is bad. The latter customer said that only 42 % of the orders have been completely finished on correct day during the first quarter 2006.

Two customers said that the delivery dependability is not satisfying. They would like to have a confirmation per day and not like today, per week. One customer also said that SCA do not contact them when there are delivery delays.

*4.3.2.6 Quality*

One customer answered that SCA have varying quality on their products and another customers said that the quality some times is bad due to inability to lash the pallets in good way. One customer also said that sometimes the marking of good is not satisfying.

*4.3.2.7 Other*

One customer answered that they do not know where the manufacturing is, sometimes is it in Värnamo, sometimes in Malmö or Mariestad.

One customer said that SCA deliver more than the number ordered.

SCA

*What do you think work well regarding the 3PL providers performance?*

Seventeen customers answered this question, nine of them answered that the performance of the 3PL provider works very well. Two customers answered that it is always good service and no damaged on the products.

*What do you think do not work well regarding the 3PL providers' performance?*

There where only two customers that have a negative comment on this question, the other do not have any bad experiences.

The first customer think that the goods are not loaded after their directions, this lead to extra work when unload the goods. The second customer answered that they are not satisfied with that the 3PL provider unload the goods after 16.00.

| Delivery performance | Triadic relationship |
|---|---|
| **Agreed date**<br>➤ 78 % thought that SCA delivered correct if the customer accept the new date<br>➤ 90 % change the new delivery date in their system<br>➤ If customer would like to change delivery date, but SCA has no possible to do this. 72 % thought the delivery is correct<br>**Split deliveries**<br>➤ 95 % thought that a split delivery is correct if the new date is initiated by customer<br>➤ 46 % thought it is correct if it is the original delivery date<br>**Delivery window**<br>➤ 77 % thought that the delivery reliability should be specified by day<br><br>**Criteria of delivery performance**<br>➤ 97 % thought on time delivery is important or very important<br>➤ 92 % thought that flexibility is important or very important.<br>➤ 100 % thought that dependability is important or very important | **Measure it**<br>➤ Around 54 % measure delivery performance<br><br>**Share it**<br>➤ 42 % do not report these measurements to SCA<br>➤ 27 % report only once a year<br>➤ 33 % report between 1 time/month to 1time/half year<br>**Service quality**<br>➤ The overall perceptions of the 3 PL providers service among customers are good<br>➤ Customers have different perceptions regarding SCA's delivery performance. Some customers have good experiences and some customers have bad experiences |

*Figure 4.22: Empiric model, Customer*

**Theory**

**Delivery performance**
- Agreed date
- Split deliveries
- Delivery window
- Non financial & financial measurements
- Criteria of delivery performance

**Triadic relationship**
- Measure it
- Share it
- Manage it
- Service quality

**Empiric**

**SCA**

| Delivery performance | Triadic relationship |
|---|---|
| -SCA change delivery date <br> -Customer change delivery date <br> -No trucks at 3PL <br> -Not enough production capacity <br> -SCA delivers a specific week/day <br> -Two different ways of measure delivery performance <br> -Measure different than the customers does <br> -Use stock to increase the delivery performance | -Do not know the performance of 3PL providers <br> -Seldom information regarding delivery performance with/from customers <br> -Deficient knowledge about customers' opinions regarding delivery performance <br> -Use stock to increase the service level |

**3.PL**

| Delivery performance | Triadic relationship |
|---|---|
| - When SCA's customers have inquiries about the transports they turn to towards Green Cargo, which tries to fulfil this. <br> -Use their network of haulage contractors to fulfil the service <br> -Delivery window; if SCA would like their customer to receive the goods the next morning they have to order it before two o'clock. | -Do not measure their delivery performance, use exception reports <br> -Access to SCAs production system, sees only complete orders <br> -Do not use scanning system for registration <br> -Good knowledge about SCAs customers' percep. <br> -Good relationship with SCAs customers |

**Customer**

| Delivery performance | Triadic relationship |
|---|---|
| -78 % thought correct delivery if accepted the new date and 90 % change the date in their system. <br> -If customer wants to change date but SCA can not, 72 % think the delivery is correct. <br> -95 % thought that a split delivery is correct if the new date is initiated by them and 46 % if initiated by SCA. <br> -97 % thought on time delivery is import. or very important. <br> -92 % thought that flexibility is very important <br> -100 % thought that dependability is very important. | -Around 54 % measure SCAs delivery performance <br> -69 % do not report or report only once/year these measurements to SCA Customers have different perceptions regarding SCA's delivery performance |

**Analysis**

3PL provider

| Delivery Performance | Triadic Relationship |
|---|---|
|  |  |

SCA

Customer

*Figure 4.23: Empiric analysis model*

*T*his chapter contains an analysis of theory and the empirical research. The analysis model presented in the theory chapter is the base for our analysis. We have divided this chapter into 4 parts; it starts with three partial analyses of the dyads and ends with an analysis about the whole triad. The three dyads will be an input to analyse the triad. The triad analysis will be the foundation for the master thesis results.

## 5.1 The dyad SCA-Customer

*T*his part of the analysis contains the dyad, SCA and Customer. We will use the interviews with SCA and the questionnaire to the customers as empirical input. This information together with relevant theory and our own reflections are presented in this partial analysis.
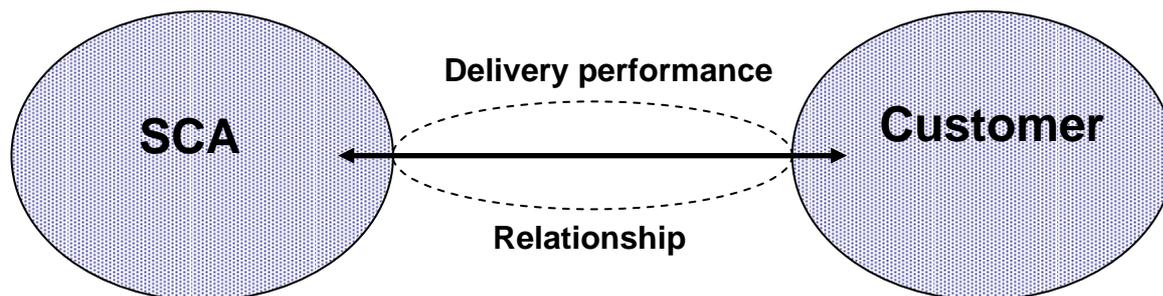


*Figure 5.1: Dyad SCA – Customer*

### 5.1.1 Delivery Performance

*5.1.1.1 Measuring delivery performance*

Today, barely half of SCA's customers' measure SCA's delivery performance, but around 97 % think it is important or very important to measure delivery performance. The customers' opinions show that there are of great importance for SCA to measure their delivery performance. SCA measure delivery performance when the goods are leaving their plant. This way to measure does not say everything about the delivery performance when the customers receive the goods. According to SCA's own measurements, they perform generally 98 % correct deliveries to their customers. But when SCA receives reports from some of their customers, the delivery performance is around 75 % correct deliveries and in the worst cases as low as 50 %. According to SCA they think that this different percentage depend on how the customers measure.

*5.1.1.2 Reasons for different data when measuring delivery performance*

SCA think that when the customers would like to change the delivery date, they do not change the new conditions in their system, but the survey shows that this is not the case. If there is a new agreed delivery date initiated from SCA, 90 % of the customers change the delivery date in their system. 78 % of the customers think the delivery is correct if SCA changes the delivery date. On the other hand, the survey also shows that SCA have to highlight this delay at least one week before. If SCA do not do this we assume the customers take this as a delivery failure. It is possible to see that 95 % think the delivery is correct if SCA is able to deliver a split delivery, if the delivery change is initiated from the customers. If SCA is the actor to initiate the split delivery around 50 % think it is a correct delivery. To summarise the different data that SCA and their customers have about SCA's delivery performance is it possible to say that the reasons for different data is not dependent on agreed date and split deliveries that SCA thought from the beginning.

The most common procedure for the customers to report a delivery failure is to call SCA by phone. By using the telephone is it possible to discuss the problem directly and hopefully solve the problem instantly. A problem that could arise when the customer report a failure by telephone is that the person that receives the call at SCA, does not register this in the system. This will lead to that the information will not be saved and that not everyone will have access to this information. A problem when receiving a delivery failure by telephone could be that the statistical data will be incorrect and that the delivery failure will not be counted in SCA's measurements of their delivery performance.

*5.1.1.3 Order line and order value*

From the questionnaire is it possible to see that most of the customers (62 %) would like to measure delivery performance in order line instead of order value. The advantage when measure in order line is that you can see direct in per cent the total of orders that is correct. One issue, which is not covered when measuring per order line, is the different financial impact of the failures. A delivery failure that cost 100 Swedish Crowns is equal with a failure that cost 100 000 Swedish crowns. 27 % of the customers would like to measure both order line and order value.

We claim that measure both order line and order value is a good way of measure delivery performance. Today, SCA only measure order line. To measure order line is good, due to that there will be no difference between "a big order" and "a small order". If there is a failure in the deliveries, both orders will have the same impact on the delivery performance. When having this type of measuring, the number of failed orders will be shown in the statistics of delivery performance. When measuring order value, the small orders will not have the same impact on the total delivery performance and it is not possible to see how many times SCA did not succeed to deliver a correct order. Another aspect could be that SCA tries to fulfil a "big order" more than a "small" one, due to that a big order has a bigger financial impact. As discussed above, when using order line instead of order value, the statistics will not take any consideration to the size of the order. If SCA do not succeed to fulfil an order, the statistics will make this visible and SCA will have more reliable data of how they succeed with their total delivery performance.

The reason for also measuring delivery performance in order value or in financial terms is like the theory claims. *"The inability to translate delivery performance into financial terms hinders managers' ability to justify capital investment for continuous improvement projects that are designed to improve delivery performance"* [108]. If SCA only measure in order line, the financial influence will not be shown to the same extent as when measuring in order value. This can lead to that working with improvement within delivery performance might be hindered. To make failed deliveries visible in money is often easier to understand for ordinary people. When measure in order value and the effect that failed deliveries could have on the financial result create an understanding of how important it is to work with continuous improvement to strengthen the delivery performance in order to influence the financial result.

*5.1.1.4 Criteria of delivery performance*
The customer ranked dependability as the most important criterion. The second most important criterion is on time and third flexibility. Overall, the customers thought it was important to measure all these criteria.

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[108] Guiffrida & Nagi, 2004, p. 23pp

*Dependability*

Theory says that dependability is the most important dimension of a service[109]. The customers in our survey also ranked dependability as the most important criterion. SCA's measurement of their delivery performance presents a high rate of correct deliveries especially when measuring the concept net. When a company has a high rate of deliveries they also have a high dependability. The problem is that not all customers agree with SCA about their delivery performance. As claimed before it is very important to have a common language and to measure the same criteria as the customers.

*Time*

SCA inform their customers what day or week they will receive the goods. From the questionnaire is it possible to see that the customers would like to have a specified delivery day rather than a delivery week. The majority of the customers would like to know what day the delivery will arrive. The majority of the customers answered that 1 – 2 days are acceptable for early and late deliveries. If the customers have more specified knowledge about what time the delivery will arrive, they do not need to have the goods standing for a long time in their facilities, just to be sure that the goods will be there when they need it. The customers will be more satisfied when the delivery date is more specified and they do not need to keep SCA's products in stock.

*Flexibility*

Like the theory claim, the different actors in the relationship often have different goals to fulfil. SCA want to produce their products in a way that is optimal to their production process. As discussed before, most of the customers would like to know a specific delivery day. As the situation is today, SCA in some cases only specify what week the goods will be delivered, this due to that their flexibility in their production process is not sufficient enough. SCA deliver a specific week because they want to have a good utilization in their production but they have to consider a compromise between the services they can give the customers versus low production costs.

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[109] Bergman & Klefsjö, 2001, p. 315

Today, the sellers at SCA can not see what specific date an order can be ready because the transparency in the production system is low. E.g. the sales personnel can not see that Monday and Tuesday the production is fully booked but SCA would be able to produce it on Wednesday. If SCA was able to see this, they could promise a delivery on Thursday instead of promise sometime this week. Due to that the transparency is not good enough makes it harder to work against the thoughts to have a specific date as delivery day.

5.1.2 Relationship

*5.1.2.1 Measure, share and manage*

Today, the information sharing and the visibility regarding delivery performance in the relationship between SCA and their customers are low. There are just a few customers that regularly report how well SCA perform regarding SCA's delivery performance. When there is lack of communication between the two actors, they could have problems to understand each other. According to theory, information sharing is a corner stone if actors would like to have a successful relationship[110].

*5.1.2.2 Service Quality*

From the open questions in the questionnaire is it possible to see that the perceptions of how SCA perform in the relationship are divided. Some of the customers think they have a well developed relationship that works well with SCA. On the other hand, some of the customers think SCA sometimes perform bad and there are often problems with the deliveries.

An important question is what differs in perception between the customers that think the delivery performance is good and the customers that think it is not that good. To understand the customers' need and wants and surpass their perceptions is not an easy thing to do. There are obvious differences between some customers' perceptions and what SCA think they perform. In the theory the GAP-analysis model is explained. The theory behind this model says that these service gaps exist in relationships[111].

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[110] Ljungberg & Larsson, 2001, p. 221
[111] Mukherjee & Nath, 2005, p. 175

The first gap is between the customers' expectations and the companies perceptions of these expectations. SCA have a good idea of what the customers expect. SCA e.g. thought that customers rather wanted the delivery specified to day instead of week and this was correct according to our survey among the customers.

The second gap is between the company's perception about the customers' expectation and the actual service. If discussing the delivery day/week example, SCA knows about the expectations, but chose to use delivery week to some customers because they want a better flexibility in their production process. There is a gap between the perception of the customers' expectations and the actual service.

The third gap is between the design of the service and how it is performed. Hence, it is not SCA that perform the service, they do not know if there is a gap between design and performance. It is the 3PL providers that perform the service and SCA do not have proper information about how this service is performed.

The fourth gap is between what the company has promised the customer and what the customer actually gets. To avoid this gap SCA keep stock to some customers. When they have to perform excellent delivery performance to a customer they use stock to ensure the quality of the service.

The results of the four earlier gaps are the outcome of the fifth gap. The fifth gap is between the customers' expectations of the service and the received service. Because of existing gaps in the stages before, the fifth gap exist.

SCA

| **Delivery performance (D.P.)** | **Relationship** |
|---|---|
| ➤ Measure D.P. when customer receive the goods<br><br>➤ 62 % of the customers would like to measure D.P. in order line, 27 % would like to measure both in order line and value (non financial and financial)<br>    ➤ Order line makes the number of correct orders visible<br>    ➤ Order value make D.P. in financial terms visible<br><br>➤ Customer change delivery date in their system when changing delivery date<br><br>➤ D.P. is correct if SCA inform customer if SCA change deliver date, but SCA must highlight the delay at least one week in advance<br><br>➤ D.P. is correct if SCA delivery a part order if delivery date initiated from customer<br><br>➤ Different data do not depend on agreed date and split deliveries<br><br>➤ Customers would like to specify delivery date to day<br><br>➤ Customers have a time window of 1-2 days for early/late deliveries<br>    ➤ Difficult today because sellers do not know what specific date the order will be ready, no transparency<br><br>➤ SCA would like to have good utilization when deliver the goods; customer would like the goods a specific day. Production process is not flexible enough<br><br>➤ Dependability is very important for customers, SCA and customer do not measure equal regarding delivery performance | ➤ SCA do not know how the customers think SCA perform regarding their delivery performance<br><br>➤ 46 % of the customer measure SCA's delivery performance, but 42 % of these customers do not report their measurement to SCA<br><br>➤ Different opinions between SCA and customer regarding how SCA succeed with their delivery performance<br><br>➤ Service quality<br>    ➤ Gap 1: SCA have knowledge about customers expectations<br>    ➤ Gap 2: Can not deliver as customer would like, due to flexibility, transparency e.g.<br>    ➤ Gap 3: 3PL handle transports, SCA do not have proper information how the service is performed<br>    ➤ Gap 4: SCA try to avoid this gap by using stock.<br>    ➤ Gap 5: This gap exists, due to earlier ones. |

*Figure 5.2: Partial analysis, SCA – Customer*

## 5.2 The Dyad 3PL provider –Customer

*T*his part of the analysis chapter contains the dyad, 3PL provider and Customer. We will
mostly use the interview with Green Cargo as empirical input to this chapter, but we will
also use information about Schenker which we have obtained from interviews at SCA. This
information will be analysed together with information from our survey with the customers.
This information together with relevant theory and our own reflections are presented in this
partial analysis.

In this dyad the actual delivery is made. Green Cargo, which is the 3PL provider, has the final
contact with SCA's customer. They have the knowledge about when and how the delivery is
performed.
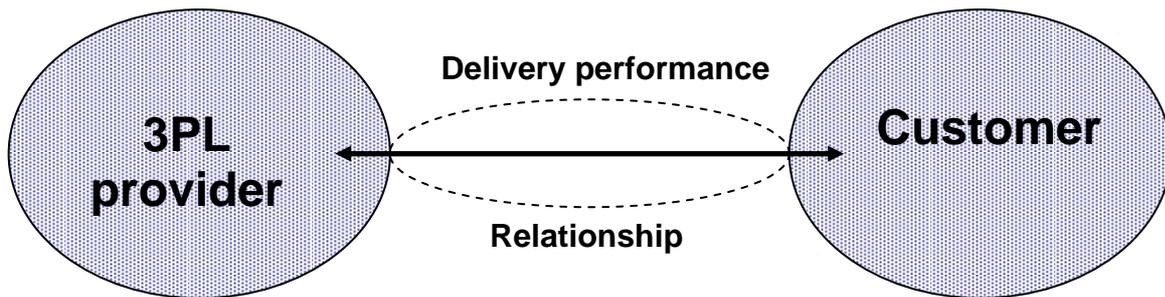


*Figure 5.3: Dyad 3PL provider - Customer*

5.2.1 Delivery Performance

*5.2.1.1 Measuring delivery performance*

If a relationship should work efficient, it is important to measure. The theory claims that if
you do not measure and share these results with your collaborative companies it is common
that problems arise. Problem arises because the other actors do not know exactly what you
do[112]. Green Cargo do not measure which delivery performance they have when delivering
goods to SCA's customers. Green Cargo claims that they perform well and do not need to
measure their delivery performance. According to SCA, Schenker does not measure their
delivery performance or at least do not report their measurements to SCA. Even if Green
Cargo does not measure, they report if there are any failures in the deliveries. The exception
reporting is one aspect of Green Cargos quality work and they work with exception reporting

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[112] Logan, 2000, p. 23pp

according to the standards of the ISO certification. Problems that are reported can be damaged goods or delays in delivery time.

In this dyad it is probably not a problem for the customer if the 3PL providers do not measure their delivery performance, because the customers do not care about the 3PL providers' delivery performance. The customers are only interested of the delivery performance from SCA to them. Where problems arise, is not the customer concern, but to know where the problems arise is a concern for SCA and the 3PL providers. We claim that it should be a good idea if the 3PL providers measured how well they perform. Out of several reasons the theory says that one of the most common cause of dissatisfaction in collaborative relationships are when actors could not measure each others performance in an easy way[113]. Another reason according to theory is the "presumed" performance. This means, if you do not measure you usually thinks that you perform better than you actually do[114]. If the 3PL providers think that they perform better than they actually do, this can make the delivery performance become worse than it could be. Furthermore, the performance of something that is not measured does not get improved. If you do not know that there are any problems, you do not try to eliminate them. Another problem when not measuring is that even if you know that there are problems it is hard to identify where the problems exist or why problems arise.

We think that one reason why Green Cargo does not measure their delivery performance is that they do not have a scanning system. If Green Cargo uses a scanning system, the system could automatically compare the goods they actually delivered with the ordered goods from SCA's customers. Green Cargo could also compare the time they delivered with the contracted time; this would instantly show how well they perform. Green Cargo says that they do not need any scanning system because they do not reload their gods. They claim when not reloading there are small chances of goods disappearing and therefore they always know where the goods are. We think this is true, but as we discussed above, we claim that there are other advantages than tracking with a scanning system.

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[113] Logan, 2000, p. 27p
[114] Guiffrida & Nagi, 2004, p.25

5.2.2 Relationship

*5.2.2.1 Measure, share and manage*

Green Cargo uses their own trucks and drivers in most cases. The advantages of using own drivers are greater control. Green Cargo thinks this control can increase the delivery performance by facilitating the delivery planning. Another advantage with using own drivers is that Green Cargo can send the same driver to the same customer every time. This creates a relationship between the driver and the customer. We can only see advantages when Green Cargo using their own trucks and same drivers to customers, we claim it leads to that the driver knows which times the customer wants their deliveries and get better knowledge about the customers' perceptions.

*5.2.2.2 Service Quality*

Green Cargo has a good relationship to SCA's customers. Through this relationship Green Cargo has gained good knowledge about SCA's customers and their perceptions. It is more common that SCA's customer turn towards Green Cargo than SCA if there are any problems with the deliveries. We claim that this is good because Green Cargo is more updated and have deep knowledge about the transports. Green Cargo is also responsible for the transports which make that it is better if the customer turn towards Green Cargo than SCA. Another advantage is that one unnecessary contact step can be eliminated. This make that non-value added time can be reduced, which lead to less costs and that SCA can focus on their core competencies.

One thing that we claim is an advantage with the relationship between Green Cargo and SCA's customers is that the customers' perception of the delivery performance gets better. Green Cargo e.g. knows that one customer has ordered goods that fill three trucks, but they are not able to unload all three trucks at the same time. Because of this knowledge Green Cargo send their trucks on different times, spread over the whole day. The customer perceives the deliveries to be better, because it fit them better when not all trucks arrive at the same time. This makes their unloading a lot smother.

| **Delivery performance** | **Relationship** |
|---|---|
| ➢ Green Cargo does not measure their delivery performance, which leads to a presumed performance<br><br>➢ Green Cargo report if they have any problems with damaged goods or late deliveries<br><br>➢ A scanning system could facilitate the measurements | ➢ Green cargo use the same drivers which gives increased control and increase delivery performance<br><br>➢ When customers contact Green Cargo instead of SCA, the customer eliminate one unnecessary step of the information process<br><br>➢ Green Cargo have good knowledge about the customers<br><br>➢ The knowledge increase the customers perceptions of the service quality<br><br>➢ The overall perceptions of Green Cargos service among the customers are good |

*Figure 5.4: Partial analysis, 3PL provider – Customer*

SCA

## 5.3 SCA – 3PL provider

*T*his part of the analyse chapter contains the dyad, SCA and the 3PL provider. This partial analysis will mainly focus on the relationship between SCA and Green Cargo; due to the fact that Green Cargo was the 3PL provider we have chosen to interview. There is also some information about Schenker that we have collected during interviews at SCA. This information together with relevant theory and our own reflections are presented in this partial analysis.

SCA collaborate with two different 3PL providers, Schenker Logistics and Green Cargo. SCA have a closer collaboration with Green Cargo, which provides 80 % of SCA's deliveries.
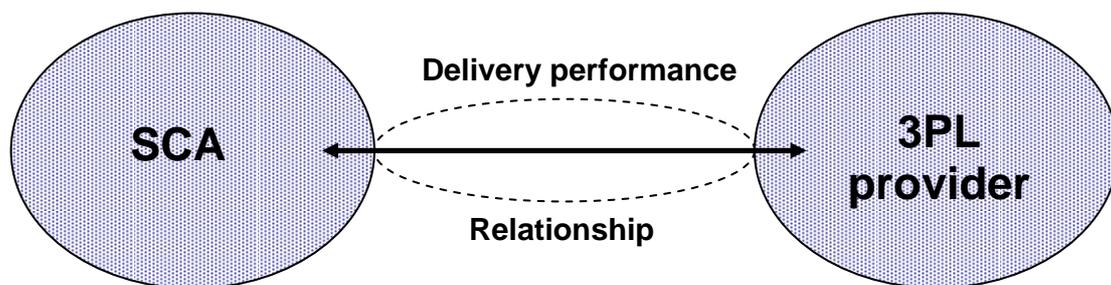


*Figure 5.5: Dyad SCA – 3PL provider*

5.3.1 Delivery Performance

In the partial analysis of SCA – Customer, we discussed that there are differences between the delivery performance SCA has measured and what the customer has measured. SCA measure when the 3PL provider picks up the goods at SCA and the customers' measure when the 3PL provider arrives with the goods. Between these two different occasions is the performance of the 3PL provider. The performance of the 3PL providers can be an explanation why SCA and there customers have different data about the delivery performance.

*5.3.1.1 Measuring delivery performance*

In the past, Green Cargo was measuring their delivery performance to SCA's customers. Green Cargo shared these measurements with SCA and used to report to SCA about the incorrect deliveries, the reason for the failure and who was responsible for the failure. SCA and Green Cargo stopped measure because Green Cargo performed well and both actors did

not think these measurements were necessary. We claim that it is always good to measure the performance because measuring is a prerequisite for improving.

*5.3.1.2 Split deliveries*

According to SCA, the most common reason for split deliveries is that there are no trucks or not enough trucks available at the 3PL providers. When we interviewed Green Cargo they claimed the reason why there sometimes are split deliveries mainly depend on that it is not financial defendable to send a whole truck with only little goods. This also agrees to the theory, it says that the 3PL providers always try to get economics of scope and scale by get full utilization[115]. No customer will pay for this service if they are not very dependent of this delivery and they usually are not in such hurry.

5.3.2 Relationship

*5.3.2.1 Measure, share and manage*

SCA and Green Cargo have a relationship that can be categorised as a joint logistics solution relationship[116]. This kind of relationship is distinguished by long-term agreements where collaborative companies are willing to share information and solve problems together. Long-term relationship and the geographical closeness in Värnamo have made the foundation of a good relationship between SCA and Green Cargo. The theory says that sharing information is a vital part of having a good relationship. The relationship between Green Cargo and SCA includes information sharing.

The information sharing between the two parts is relatively high. The communication is handled to a large extent by a connected computer system where SCA's production information transfers directly to Green Cargos transport administrator. The transport administrator can at the same time see how much goods that are produced for transportation to every customer. Green Cargo can also see which time the products should arrive at SCA's customers. SCA's customers have different time windows. This system enables a better planning of Green Cargos transports. When able to plan the conditions the possibility to have a high delivery performance increases. The only problem is that Green Cargo only can see a

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[115] Logan, 2000, p. 23pp
[116] Halldórsson & Skjott-Larsen, 2004, p. 192pp

complete order. The theory explains one problem which is associated with joint investments between the 3PL provider and the supplier. The problem is like the theory claim that big investments might tie the collaborative companies to a relationship that proves to be unprofitable[117]. We claim that this is not a problem in this specific case. This due to the fact that Green Cargo work in SCA's system and there has not been any big investments for Green Cargo.

Green Cargo has information about SCA that helps Green Cargo to do a better job, due to that they have access to SCA's production system. On the other hand, SCA do not have good information about how their 3PL providers perform. They believe that Green Cargo performs well and that Schenker perform well most of the times. The problem is that SCA has no control about how Schenker and Green Cargo perform, this due to that SCA do not measure or receive any information about the delivery performance of their 3PL providers. According to theory the biggest causes for unsuccessful relationship between 3PL providers and buyers are unrealistic expectations, poor communications and that the companies do not trust each other[118]. In this case, SCA and their 3PL providers' communication about the 3PL providers' delivery performance could be better in order to create a more successful relationship.

One problem regarding information sharing at Green Cargo is that the transport administrators have a lot of information in their minds and not in their systems. This make that the visibility of this information is low. If SCA would like to know something about a transport and the person that is responsible for the transports is not present, the information will be lost. We claim that there would be much better if the 3PL providers could gather their information in a computer system, which make the information available and visible for everyone.

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[117] Logan, 2000, p. 23pp
[118] Ibid., p. 21pp

SCA

| **Delivery performance** | **Relationship** |
|---|---|
| <ul><li>Green Cargo does not measure their delivery performance</li><ul><li>Used to measure delivery performance and report to SCA about delays, the reason for the delay and who was responsible</li></ul><li>Split deliveries exist due to that it is not financially defendable to send a whole truck with little goods to one customer</li></ul> | <ul><li>SCA and Green Cargo has a joint logistics solution</li><li>Green Cargo uses a computer system that is connected to SCA's production system. Information transfers to Green Cargo</li><ul><li>Green Cargo can see how much that is produced</li><li>Green Cargo can see what time the order should be delivered to the customer</li><li>The order is only visible at Green Cargo when the order is completed at SCA</li></ul><li>SCA have no control or knowledge about how Green Cargo and Schenker Logistics perform</li><li>Lot of information is in the mind of the transports administrators at Green Cargo. Not everyone has access to information or the information is not visible for everyone</li></ul> |

*Figure 5.6: Partial analysis, SCA – 3PL provider*

## 5.4 The Triad

*T*he triad is the last chapter of our analyse chapter. In this chapter we will analyse the measurements of delivery performance from a triadic perspective. We will discuss the problems and the good solutions from the dyads and see how they can be managed in a triadic relationship.

5.4.1 How to measure delivery performance in a triadic relationship

Today, the lack of a common language between the actors in the triadic relationship is obvious. It is of great importance that every member in the relationship understand and have the same apprehension about what, when and how to measure delivery performance. According to theory, it is a corner stone to have the same apprehensions if delivery performance in a triadic relationship should be successfully measured[119].

*5.4.1.1 Agreed date and split deliveries*

SCA thought the different apprehensions about the agreed date was dependent on that the customers does not registering the new agreed date in their system. This was not the case according to our survey. Our survey showed that almost every customer changed delivery date in their system if there is a new delivery date, but SCA must inform the customer about the new conditions and highlight the delay at least one week in advance if the customers should consider the order to be correct. If a customer would like to change their delivery date and SCA is only able to deliver a part of the delivery, the customers think this is a correct delivery. The theory also supports this interpretation, it says that when a customer and supplier agreed upon a date, this "commit date" is a correct delivery regarding on time[120]. The customers also change these new conditions in their system according to our survey.

Even if SCA and the customer have an agreement of split deliveries, the third actor within the triadic relationship have influence on split deliveries. Green Cargo says that split deliveries exist due to that it is not financial defendable to send a whole truck with little goods to one customer. Green Cargo tries to get full utilization in their trucks by co-ordinate their

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[119] Theodoras et al., 2005, p. 353
[120] Gunasekaran et al., 2001, p. 77

transports. We claim that co-ordinate the transports is important to make the transports financial defendable.

*5.4.1.2 Delivery Window*

According to our survey, time is one of the most important criterion to measure in the triadic relationship. A major part of the customers want to know what specific day the delivery will come. The customers also have a time window of 1 – 2 days for early/late deliveries. As the theory claim, delivery windows capture the most important aspect of a delivery process, reliability[121]. Reliability is the key component to improving the delivery process. For the customers is it important to know when the goods arrive of several reasons, like planning their production process e.g. To have a high reliability is important for SCA and to be able to succeed with this demands a close relationship with the 3PL providers. Green Cargo and SCA have a well developed relationship where Green Cargo has access to SCA's production system. The problem is that Green Cargo can only see complete orders in SCA's production system, which leads to that their planning process will be delayed. Green Cargo has no problem to deliver the goods on a specific day if they know the amount in advance.

We claim that when having a delivery window make it easier to measure if the delivery is on time. The customers expect that SCA could specify what day the delivery will arrive with a tolerance of 1 -2 days. If SCA deliver within this delivery window the delivery is on time. Another important



*Figure 5.7: The triadic delivery window*

aspect is the customers' acceptance when SCA is not able to deliver as agreed. A majority of the customers accept a delivery delay if SCA inform them one week in advance. This demands that SCA directly inform the customers if any problems with the delivery occur and
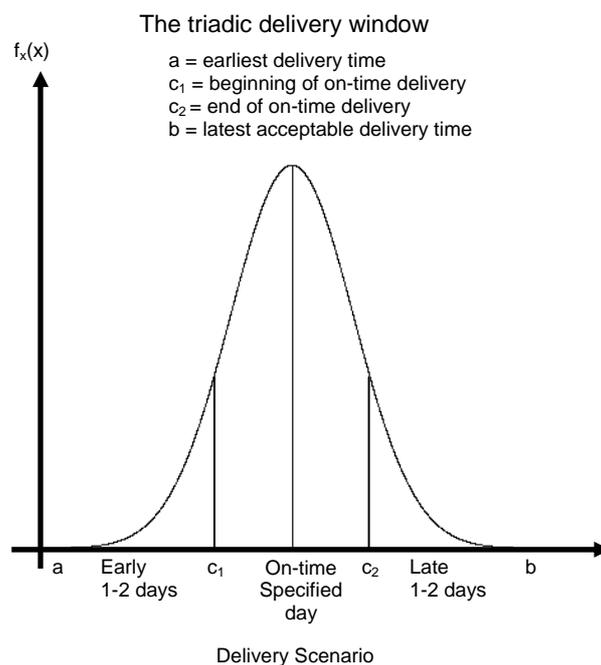
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[121] Guiffrida & Nagi, 2004, p. 25p

that SCA also inform the 3PL providers so they can reschedule their transportations plans, so the delivery will not be delayed dependent on the transportation plans. If the customer accepts these new conditions it will lead to that SCA will have a new delivery window of 1 – 2 days according to the new delivery date. To make the measurement of delivery window possible, SCA needs information and reports from the 3PL providers when they are leaving the goods at the customer. One possibly solution is if the 3PL providers used a scanning system, it could in an easy way register how much and when the delivery was delivered. A system like this could also easily transfer data to SCA's system. We claim that should Green Cargo start to report or use a scanning system when they are leaving the goods at SCA's customer. Another advantage is that SCA will get knowledge about how Green Cargo performs. Today, SCA feel like they have no control over how their 3PL providers perform, if the 3PL providers start to report or scanning when leaving the goods at SCA's customer this problem will be solved.

Green Cargo used to measure the delivery performance to SCA's customers. We claim that this experience makes that they have knowledge about measuring delivery performance which will make the implementation easier.

*5.4.1.3 Order line and Order Value*

We claim that measure both order line and order value is a good way of measure delivery performance. To measure order line is good, due to that there will be no difference between "a big order" and "a small order". If there is a failure in the deliveries, both the big order and the small order will have the same impact on the delivery performance. When having this type of measuring, the number of failed orders will be shown in the statistics of delivery performance.

When measure in order value the financial effect of failed deliveries creates an understanding of how important it is to work with continuous improvement to strengthen the delivery performance in order to influence the financial result.

To measure in both order value and order line is important for all actors within the triadic relationship. If all actors measure equal it makes it easier to compare the measurements and all actors will have the same preferences when measuring delivery performance which make the measurements more reliable.

*5.4.1.4. Delivery dependability*

Delivery dependability was one of the most important objectives to measure delivery performance according to both theory[122] and the empirical findings. We will claim that if the delivery is correct for a longer period of time, the delivery performance within the triad will have high delivery dependability.

*5.4.1.5 Flexibility*

Like the theory claim, the different actors in the relationship often have different goals to fulfil[123]. SCA want to produce their goods in a way that is optimal to their production process, the customers would like to know a specific delivery day so they can plan their production process e.g. and the 3PL provider Green Cargo would like to have utilization in their trucks that are as high as possible. The different goals within the triad are obvious. The theory claim flexibility is the ability to adapt the deliveries to the customers' requirements and to find solutions to the customers' problems. We claim that when having a delivery window the flexibility will increase and that SCA will have knowledge about the customers' perceptions regarding time. This knowledge makes it possible for SCA to plan their production process. If SCA is not able to succeed with delivery within the delivery window, they can inform the customers one week in advance and the order will still be counted as a correct delivery. The customer will have the possibility to plan their production process in better way when having the knowledge about which specific day the delivery will arrive. The time window will also be an advantage for the 3PL provider. When the 3PL provider has the possibility to deliver within the delivery window it makes that they can in a better way plan their transports.

5.4.2 Triadic relationship

*5.4.2.1 Measure, share and manage*

To be able to manage a relationship in an efficient way is it important to have valid information as a foundation for these decisions. To get this information companies have to measure their performance. Companies should measure important criteria from their business. To be able to measure a triadic relationship companies have to share information between each other.

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[122] Bergman & Klefsjö, 2001, p. 315
[123] Holmberg, 2000, p. 8p

Dependent on who you ask in this triadic relationship you will get different answers about the delivery performance. It is a problem when you do not have reliable information or the information sharing is low. In the triadic relationship between SCA, their 3PL providers and customers there are both good and bad examples of information sharing. A good example is the information sharing between the 3PL provider Green Cargo and SCA's customers. If the customers have inquiries about the transport they inform Green Cargo. The 3PL providers are the actors in the triadic relationship that perform the deliveries and because of that they have the best information and knowledge about the deliveries. The problem is that SCA will not get this information about the customers' perception. When SCA do not have this information they can not improve their delivery performance. We claim that it is good that SCA's customers inform Green Cargo, because this is the fastest and best way for the customer to get information about the deliveries. One way to solve the problem with SCA, which do not get this information, is to have meetings between SCA and Green Cargo where they discuss what the customers thinks is good and bad about the deliveries. If doing this the information is spread through out the entire triad. Another suggestion is to share this information through SCA's computer system where Green Cargo has access.

One aspect of the triadic relationship where we claim there are low and insufficient information sharing are between SCA and their customers. SCA believes that they have a high delivery performance towards their customers. The problem is that we have received information from both our survey and from SCA that their customers have measured SCA's delivery performance and that these measurements have shown a much lower delivery performance than SCA's measurement. We have also received answers from customers who say that SCA have a high delivery performance. We claim that one explanation to different measurements between the customers is that to some customers SCA deliver from stock. The contradiction between these different measurements has to be investigated. We claim that SCA have to get more information and more updated information from their customers. The survey we made with SCA's customer shows that only a few customers report their measurements of the delivery performance to SCA. Even fewer do it on regular basis. We claim it is necessary for SCA to have these reports from more customers and on a more regular basis. If SCA gets this information they are able to start working with the differences between their measurements of the delivery performance and their customers' measurements.

This information can then be analysed and the causes for the different results between SCA and customer can be solved. The differences between the different results from the customers also have to be analysed and solved.

The integrated computer system between SCA and Green Cargo is a very good tool to share information between these actors. This will help Green Cargo to plan their transports and make the triadic relationship more efficient. We claim that the integrated computer system is good, but we have also detected lack of information sharing between Green Cargo and SCA. SCA have no information about how Green Cargo performs. Green Cargo has a lack of information about how they perform, due to the fact that they do not measure their delivery performance. The theory says that when not measuring a "presumed" performance often gets established[124]. We claim that when Green Cargo does not measure their delivery performance is it possible that a presumed performance get established. The differences between SCA's and their customers' measurement might be explained by what happens when the 3PL providers handle the goods. The only way to get knowledge about that is to start measuring the 3PL providers' performance. This is possible if the 3PL providers use a scanning system when they are leaving the goods at SCA's customers and report these measurements to SCA.

*5.4.2.2 Service Quality*

An important issue is the customers' perception of SCA's delivery performance. Dependability which is the most important service criterion was also ranked as most important among the criteria in our customer survey. To be able to have a high dependability SCA have to know what customers think is important to measure. To get knowledge about what the customers wants and what they expect of a service, the gap model is a useful tool. The service quality gap model conceptualises perceived service quality as the service quality gap, which is the difference between expectation of service from an excellent service provider and the perception of service quality from the current service provider. The gap model shows five gaps and we have detected 3 gaps between SCA and their customers. We have detected gaps between the perception of the customers' expectations and the actual service, between the design of the service and how the service is performed and between the customers' expectations of the service and the received service.

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[124] Guiffrida & Nagi, 2004, p. 25

The gap between *the perception of the customers' expectation and the actual service*. If discussing the delivery day/week example, SCA knows about the expectations but chose to use delivery week to some customers because they want a better flexibility in the production. We claim that to be able to close this gap SCA has to increase the flexibility in their production process and they need to have a better transparency in their computer system that shows the production schedule.

The gap between *the design of the service and how the service is performed*. SCA is not the actor that performs the actual service and thereby do not have a direct influence over this gap. It is the 3PL providers that perform this service. The problem is that SCA do not have any control or knowledge about how this service is performed by the 3PL providers. This problem is connected to information sharing and measuring. There is a lack of information sharing between SCA and the 3PL providers and the 3PL providers do not measure their delivery performance. As discussed earlier, we claim that the information sharing and measuring between SCA and the 3PL providers have to be better if SCA should be able to close this gap.

Green Cargo has good knowledge about SCA's customers and thereby are able to give them good service. This knowledge and relationship make the customers perception about SCA's service better. A problem is that a lot of this information is in the mind of the transports administrators at Green Cargo. Not everyone has access to information or the information is not visible for everyone. We claim this can be solved trough meetings or the integrated system as discussed before.

The gap between *the customers' expectations of the service and the received service*.
This gap is the outcome of the earlier gaps and because it exists gaps before this gap also exist. If SCA are able to close the previous gaps this gap also will be closed.

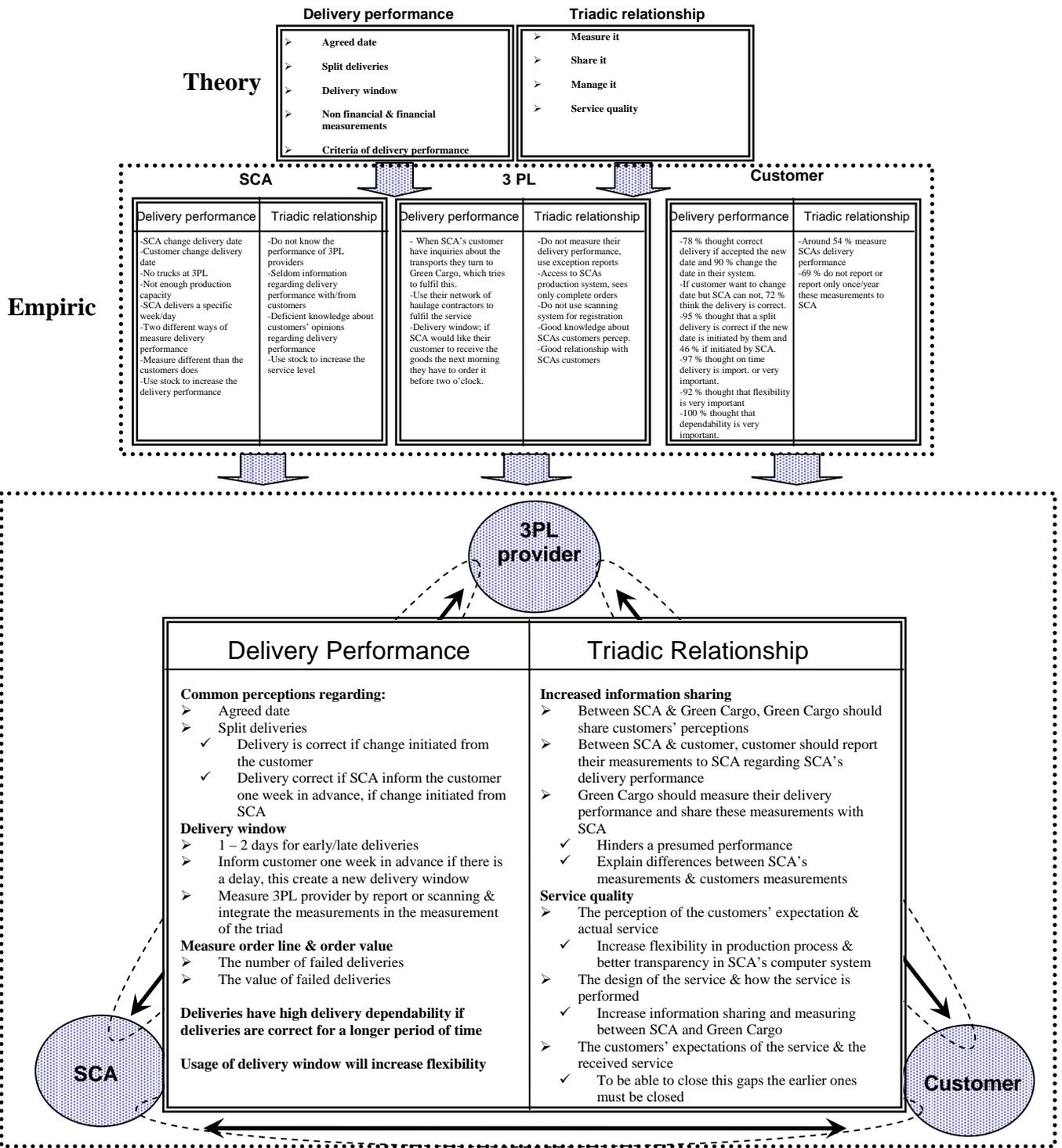*Figure 5.8: Revised analysis model*

# 6 Conclusions

*T he conclusion chapter answers our research question and fulfils our purpose. Under the sub-headings; common perceptions regarding, delivery window and measure order line & order value we have chosen to put some pointers about what is important for the specific triadic relationship we have studied. After these pointers we have more general conclusions which could be generalised for a larger population. This chapter also includes critique of our study and suggestions on further research.*

Our master thesis has the following research question:

> ➢ *How can delivery performance be measured in order to adapt it to a triadic relationship?*

## 6.1 Conclusions on the studied triad

6.1.1 Delivery performance

It is a perquisite to have a high delivery performance if the triadic relationship will be successful. The main objectives that our triad have to consider when measuring delivery performance are presented as followed:

*Common perceptions regarding:*

➢ Agreed date

➢ Split deliveries

✓ Delivery is correct if change initiated from the customer

✓ Delivery is correct if SCA inform the customer one week in advance, if change initiated from SCA

There are of great importance for the triad that they have the same perceptions about agreed date and split deliveries. When having the same perceptions the triad will create a common language and measure the same criteria. We claim that it is of great importance for a triad to create a common method to measure delivery performance where every actor knows when, where and how to measure.

*Delivery window*

➢ Specified delivery day

➢ 1 – 2 days for early/late deliveries

➢ Inform customer one week in advance if there is a delay, this create a new delivery window

➢ Measure 3PL provider by report or scanning when leaving the goods at SCA's customers and integrate these measurements in the measurement of delivery performance in the triad

To measure if SCA succeed to deliver within the customers' delivery window, they need to have reports from the 3PL providers. The most efficient way to measure is that the 3PL providers uses a scanning system and reports the measurements to SCA. Then the 3PL providers' measurements could be integrated in the overall measurements of the triad's delivery performance. The criterion for effective KPIs are to measure the overall supply chain performance rather than the performance of an individual chain member.

*Measure order line & order value*

➢ The number of failed deliveries

➢ The value of failed deliveries

When the triad measure in both order line and order value, they will have the knowledge about the numbers of failed orders and the financial impact of failed orders.

*Delivery dependability*

If the deliveries are correct for a longer period of time the deliveries will have a high dependability within the triad.

*Flexibility*

When the actors know each others preferences within the triad, is it also possible to increase the flexibility. Every actor has their own goals that must be achieved, but when having a common method to define when an order is on time gives the possibility to plan and increase the flexibility.

### 6.1.2 Triadic relationship

*Information sharing, measuring and management*

After studied literature about triadic relationships and delivery performance together with our empirical gathering, we claim that information sharing is very important. We claim that it has to be more extensive information sharing in the studied triad. Today, there are information sharing between SCA, their 3PL providers and customer but we think there should be even more. Today there are sufficient information between the 3PL providers and the customer. This information sharing works in a satisfying way. The information sharing between SCA to Green Cargo is also working well. There are two areas where the information sharing has to be increased. These areas are, from the 3PL providers to SCA and from the customers to SCA. SCA has to get information about how the 3PL providers' delivery performance is performed. From the customers, SCA have to receive information about their measurements of SCA's delivery performance in order to see if there are differences between their measurements and their customers' measurements. If SCA have this information it makes it possible to solve the different opinions regarding delivery performance and to work with continuous improvement within delivery performance.

*Service Quality*

The studied triadic relationships show that if a supplier should measure delivery performance in an efficient way they have to know what is important for their customers. We have detected three gaps between SCA and their customers regarding service quality. One gap is between the perception of the customers' expectation and the actual service. To be able to close this gap we claim both the transparency in SCA's computer systems and the flexibility in the production process has to be better. Another gap is between the design of the service and how the service is performed. SCA is not the actor that performs the actual service and thereby do not have a direct influence over this gap. It is the 3PL providers that perform this service. We claim that to solve this problem the information about the 3PL providers performance have to be shared. Green Cargo has good knowledge about the customers' preferences and this knowledge is mainly in the mind of the transport administrators. This information also has to be shared if this gap should be closed. The last gap is the outcome of the two others and if SCA are able to close those gaps, this gap will also be closed.

## 6.2 Generalisations

The conclusions we have drawn are to some extent possible to generalise to other triadic relationships and some conclusions are specific for the triadic relationship we have studied.

We argue for that the conclusions regarding the triadic relationship can be applied to other triadic relationships. The importance of measuring and information sharing can be applied to a majority of businesses. The conclusions about delivery performance are harder to apply to other businesses because the criteria which are best suited for a specific business differs a lot. E.g. a business with high value products can not have their products in stock for a longer period of time. The same reasoning is for businesses with products with short expiring date. This influences which criteria to choose when measuring delivery performance.

In the questionnaire we had a response rate of almost 50 % which gives us high possibilities to draw correct conclusions about SCA's customers. 97 % of the customers said that measuring delivery performance is important, from this we are able to say that measuring delivery performance are important for companies in the manufacturing business. The other two actors we have studied are one supplier and one 3PL provider. To draw correct conclusions about the whole population of manufacturers and 3PL providers with such a small sample is not possible. We are able to draw some conclusions about information sharing, measuring and managing triadic relationships because we have strong support from theory.

## 6.3 Critique of our study

If we could conduct the study over again, we would have made some changes. We would have interviewed the other 3PL provider, Schenker Logistics. This had made a comparison between the two different 3PL providers possible. We would also have done deeper interviews with some customers in order to get more deep knowledge regarding the customers' opinions regarding delivery performance. We claim that this would have been interesting and had given us a better foundation to draw conclusions from.

## 6.4 Suggestions for further research

An interesting research would be to have the perspective from another actor. This could lead to different problems would be addressed and would give a deeper knowledge of the problems regarding delivery performance and to measure it in a triadic relationship.

# 6 Conclusions

Another interesting research would be to study more than one triadic relationship. This would enable a better possibility to draw general conclusions about the findings.

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SCA

## Interviews with SCA

We have been doing interviews with SCA at four different occasions and at these occasions we have discussed various topics. When doing these interviews, we have done them without any pre-printed questions. The reason for using this method is that we wanted to see what SCA thought was important according to their delivery performance and their relationship to the other actors they collaborate with.

Topics we have discussed are:

> ➢ Delivery performance, problems and how they measure delivery performance today, how SCA want it to work in the future.
> ➢ Triadic relationship, which actors the triad consists of, which problems and opportunities arise as a consequence of the triad, how the collaboration works.

SCA

Questions to the 3PL provider Green Cargo

1. Can you give us a short description of Green Cargo?

2. How do you register that the goods are delivered?

3. Do you reload your goods? If yes, in which cases do you do this?

4. Do you have any statistics on how you perform regarding delivery performance?

5. Which criteria's of the delivery performance do you measure?

6. Do you use any systems where deliveries, pallets etc. are registered?

7. How do you perceive your role in the triadic relationship between supplier, 3PL provider and customer? What do you offer to your customer and their customers?

8. How do you plan your transports? Forecasts from customers? Windows were the customers have to put their order to be sure that the transports are executed before a certain time? A defined amount that the customers are entitled to send everyday?

9. If a customer wants you to transport more goods than you have capacity to, how do you solve it? Do you have extra trucks? Do you have collaborations with other 3PL providers?

SCA

## Questionnaire to SCA's customers

Questions with fixed alternatives

With a correct delivery we mean a delivery which is delivered on time and in full.

1. How important do you think it is to measure the delivery performance?

   *Grade your answer between 1 & 5, where 1 is not important and 5 is very important*

   **1       2       3       4       5**

2. Do you measure SCA's delivery performance?

   **Yes              No**

3. If yes, how often do you report your measurements to SCA Packaging?

   **Every week              2 – 4 times a month          1 time a month**

   **1 – 2 times a quarter of a year  1 time every 6 months        1 time a year**

   **Never**

4. How do you think the delivery reliability should be specified?

   **An hour          A day              A week**

   **If other, please specify**

5. What level of tolerance do you have for early/late deliveries?

   **0 – 1 Hour                    1 – 5 hours                    5 hours to 1 day**

   **1 – 2 days                    2 – 7 days                    More than 1 week**

   **No level of tolerance (The delivery should be on time)**

6. Which criteria do you think is important according to delivery performance?

   *Grade your answer between 1 & 5, where 1 is not important and 5 is very important*

   **Time          1     2     3     4     5**

   **Reliability   1     2     3     4     5**

   **Flexibility   1     2     3     4     5**

7. Which way to measure delivery performance do you find most correct, by value of the order or by order line or is the both ways of great importance?

*Order value     Order line     Order value and order line*

8. If SCA Packaging is not able to deliver on the agreed date but you accept a new delivery date, do you think the order is delivered correct?

*Yes              No*

9. If SCA Packaging change the delivery date and you accept the new date, do you change the delivery date in your system?

*Yes              No*

10. If your company contacts SCA Packaging to change the delivery date, but SCA Packaging has no possibility to change the date, do you think SCA have delivered the order correct?

*Yes              No*

11. If SCA Packaging only has the possibility to deliver a part delivery, e.g. the items which you need the most, do you find the delivery correct?

If there is a new delivery date initiated by you?
*Yes              No*

If there is the original delivery date?
*Yes              No*

12. How long time in advance does SCA Packaging have to inform you about a delivery delay to make it acceptable?

*1day        2-3 days        3-7 days        1 weak or more*
*A delivery delay is never acceptable        If other, please specify*

13. In those cases where the delivery is not correct, damaged or in another way not satisfactory, how do you report this to SCA Packaging?

*Telephone      E-mail        A report that follow up SCA's delivery performance*
*Contact the 3PL provider     If other, please specify*

Open questions

14. What do you think work well regarding the delivery performance of SCA Packaging?

15. What do you think do not work well regarding the delivery performance of SCA Packaging?

16. What do you think work well regarding the 3PL providers performance?

17. What do you think do not work well regarding the 3PL providers' performance?