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# Improving Import Supply Chain

Retail Logistics for Fruit and Vegetables Business

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Oh my, what a ride. Finishing this thesis feels absolutely amazing. There have been so many hours that I've spent sitting on this computer in our living room and focusing all my energy in pushing forward. The year has been most challenging and rewarding. I wanted to develop myself as a professional and push out of the comfort zone, and that certainly has happened. Long hours studying and writing assignments have taken almost all of my free time and not much time has been available for hobbies, friends or family. This Master's programme surely requires a lot of effort, but in exchange provides a huge opportunity to develop as a professional and a person. The courses have been rewarding, lecturers are true professionals and I have met a bunch of amazing people.

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<p>This thesis describes the objective for improving efficiency within the import supply chain of the case organization. The Finnish retail business is becoming increasingly competitive. This is forcing companies to consider their pricing in order to defend their market positions. The price decreases create high pressure for cost-effectiveness throughout the supply chains. Decreasing product related costs, such as transportation costs, are one of the few methods enabling price reductions in retail.</p> <p>The objective of this thesis is approached by mapping the current state of the supply chain. The sources of data include stakeholder interviews, participant observation, a workshop and company historical data. The inclusion of the key stakeholders from different functions and analysing historical transport data provides a thorough view on the current state of the supply chain. The current state analysis illustrates strengths, weaknesses and development priorities which are then studied from existing knowledge. Existing knowledge from academic and practitioner literatures is then utilized in order to design a conceptual framework to provide tools for building the proposal.</p> <p>The outcome of this thesis is a list of recommendations to provide managerial suggestions and operational guidelines for the case organization. The list of recommendations includes roles and responsibilities and was co-created with the key stakeholders from purchasing and transportation. By implementing the recommendations, the case organization is able to create immediate efficiency improvements and to promote the overall performance of the supply chain. This enables the supply chain to support the price reductions in stores.</p>	
Keywords	Supply chain, efficiency, collaboration, transportation

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## 1 Introduction

The Finnish retail market is currently undergoing some major changes. Predominantly, the retail markets in Finland have been quite stable and largely concentrated within two major retail chains. However, the current market trend is heavily affected by the difficult economic situation and increased competition in the form of an established international entrant. Euromonitor, an independent organization providing country specific market research, describes the market situation in Finland as follows:

*“Exceptional price reductions in grocery retailers erodes the positions of the leaders”*  
(Euromonitor 2016)

The situation forces the retail chains to continuously monitor their pricing and decrease them if necessary in order to stay competitive. Price reductions create pressure on organizational efficiency and cost reduction projects. Cost reductions in retail have a major positive impact on the profit margin and pricing opportunities, especially when the profit margins are low and retail chains have no own production facilities.

### 1.1 Case Company Background

The case company is a logistics service provider in the field of retail and based on the company official website employs on average 2200 people. The vision of the company is to provide warehousing, transportation and other logistics services cost effectively and profitably to its parent company within a large case organization context. The individual services provided include for instance quality control, order picking, customs clearance and deliveries to stores. The company has several warehouse- and terminal locations across the country and is currently constructing a new, partly automated, daily consumer goods central warehouse in Southern Finland.

This thesis focuses on the import transportation services for fruit and vegetables in the international logistics department. The task of the import service team is to provide reliable and cost effective import transportation solutions for the goods procured by the purchasing department of the parent company. The daily work of the import service team consists of collaborating with goods suppliers, parent company purchasers, external transport companies and in house warehouse receiving in order to manage the

transportation process. The two transport coordinators receive purchase order information from purchasing and based on the order details organize the transportation to Finland by utilizing services of individual transport companies. The origin countries for the selection of fruit and vegetables include for instance Spain, Italy, Poland, the Netherlands and Egypt. There is a high seasonal variation in both the volumes and the origin countries where the goods are sourced from during the year. For instance, during summer and autumn the availability of Finnish fruit and vegetables is higher which decreases the requirement for imports and during winter time citrus fruits are imported in high volumes from countries such as Spain, Egypt and Israel.

## 1.2 Business Challenge

Increased competition in the Finnish retail business creates price pressure throughout the market. The purchasing department of the case organization requires development in overall cost effectiveness in order to tackle the competition and defend the market position of the whole group in the long run. Retail in Finland has previously been largely concentrated with two large Finnish store chains controlling the market space. However, with the entrance of international competition and the threat of even more entrants, companies are forced to focus on pricing and quality of services in order to attract customers.

There is a significantly high focus on retail prices currently and different sources of media are continuously monitoring and comparing the price of a food basket in different stores. This fact makes customers increasingly aware of prices and differences between the different retail store chains. During the previous months there have been clear signs of trying to attract the customers through pricing within different kinds of campaigns and marketing programs. The different retail chains have immediately commented or reacted with pricing to their competitors' actions with visible press releases and commercial actions.

Retail is a bit different from traditional manufacturing in a sense that the retail organization does not necessarily produce anything itself. That is exactly the case with fruit and vegetables within the case company where the goods are purchased with price A and sold with price B. The difference between price A and B includes various costs and the margin. The possibility to affect final product pricing or profit margin within the context



of import logistics lies in decreasing the total costs and improving the efficiency of the import supply chain.

### 1.3 Objective and Scope

The objective of this thesis is:

*To suggest efficiency improvements within the fruit and vegetables import supply chain.*

The scope of the thesis is to study the import transportation process of fruit and vegetables from the Benelux countries. Currently there is a constant flow of goods being sourced from the Benelux countries throughout the year. In addition to their own fruit and vegetable production, Benelux countries, and especially the Netherlands, serve as a major hub for goods sourced from around the world by local importers. The focus is to perform a current state analysis on the fruit and vegetable imports from the point of purchase order to the point of delivery to warehouse receiving and quality control, and to search for possibilities to improve efficiency.

As a result, the outcome of this thesis is:

*A proposal for improved import supply chain for fruit and vegetables.*

This thesis explores the import supply chain of the case company and factors which have an influence on the performance of the supply chain. To this end, the thesis describes the current practices within the purchasing and transportation departments of the supply chain in order to identify improvement possibilities. Finally, based on current state analysis and existing knowledge, the thesis suggests a proposal for improved import supply chain, in order to improve efficiency within the import process.

This thesis is written in seven sections. Section 1, Introduction, describes the background and purpose of this thesis. Section 2, Method and Material, introduces how the research is conducted. Section 3, Current State Analysis, discusses the current supply chain practises, including strengths and weaknesses, of the case organization. Section 4, Existing Knowledge, studies best practise from topics of collaboration, information and cost-effectiveness in supply chains. Furthermore, existing knowledge is utilized as a basis to illustrate a conceptual framework for this thesis. Section 5, Building the Proposal for the Case Organization, merges the conceptual framework and results of cur-

rent state analysis towards building the proposal for improved supply chain. Section 6, Validation of the Proposal, discusses the validation and piloting of the proposal in cooperation with the key stakeholders. Section 7, Discussions and Conclusions, summarizes the thesis and evaluates the objective, outcome and future implications.

## 2 Method and Material

This section introduces the research approach and research design of the thesis. Secondly, the data collection and analysis are described and finally the validity and reliability plan of the thesis is presented.

### 2.1 Research Approach

There are several different ways to conduct research, with each method including specific advantages and disadvantages depending on the type of research question, the level of control over behavioural events and the factor of time as contemporary versus historical (Yin 2009: 2). Case study research includes single- and multiple-case studies and can include qualitative and quantitative evidence (Yin 2009: 19). This thesis utilizes the case study research approach to answer the research question of how to improve efficiency within the import supply chain. The case study approach is particularly functioning when “how” and “why” questions are being asked, the researcher has little control over events and the focus is on contemporary events within a real life context (Yin 2009: 2). Below the research process of a typical case study is visualised.

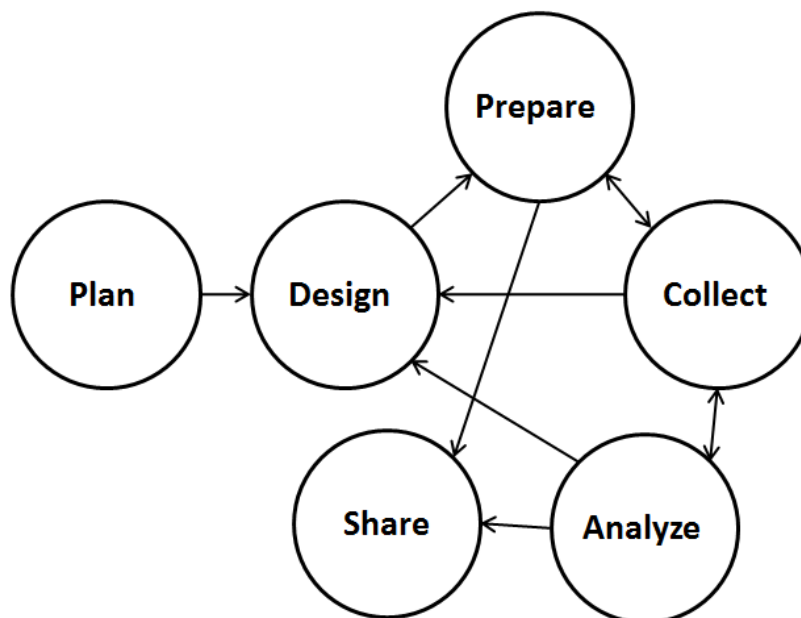


Figure 1, Case Study research process (Based on Yin 2009: 1)

Yin describes doing case study research as a linear, but iterative process including six defined phases (Yin 2009: 1). The case study starts with identifying the research question, describing the study design and focus and preparing for the data collection (Yin 2009: 2). Data is then collected from multiple sources and is required to converge in a triangulating fashion (Yin 2009: 18). Furthermore, data is analysed utilizing quantitative or qualitative methods or both and finally findings are reported with enough evidence for audience to reach their own conclusions (Yin 2009: 126, 164). As mentioned, the process is linear, but includes iteration to support the outcome towards successfully answering the research question.

This thesis combines qualitative and quantitative data in its analyses, yet mainly focuses on qualitative data. Case study approach is one of the basic designs in qualitative research. In qualitative research, the aim of case studies is to describe or reconstruct the case by utilizing data collection methods such as interviews and observation (Flick 2006: 141-142). In other words, the data is non-numerical whereas quantitative data is numerical data. Overall, qualitative case study research is focused on studying and evaluating concrete cases and describing current practises in detail (Flick 2006: 136). This thesis mainly utilizes the qualitative case study research approach since the target is to describe and evaluate current company practises. Additionally, this thesis analyses quantitative case company data to support the qualitative research findings and show concrete examples.

## 2.2 Research Design

A research design can be defined as a logical plan which describes the steps required in order to proceed from defining the research objective toward the final outcome (Yin 2009: 26-27). The research design of this thesis is illustrated on the next page: It describes the steps that are necessary to take in order to reach the objective, the data collection in three individual stages and the outcomes of each step during the research process.

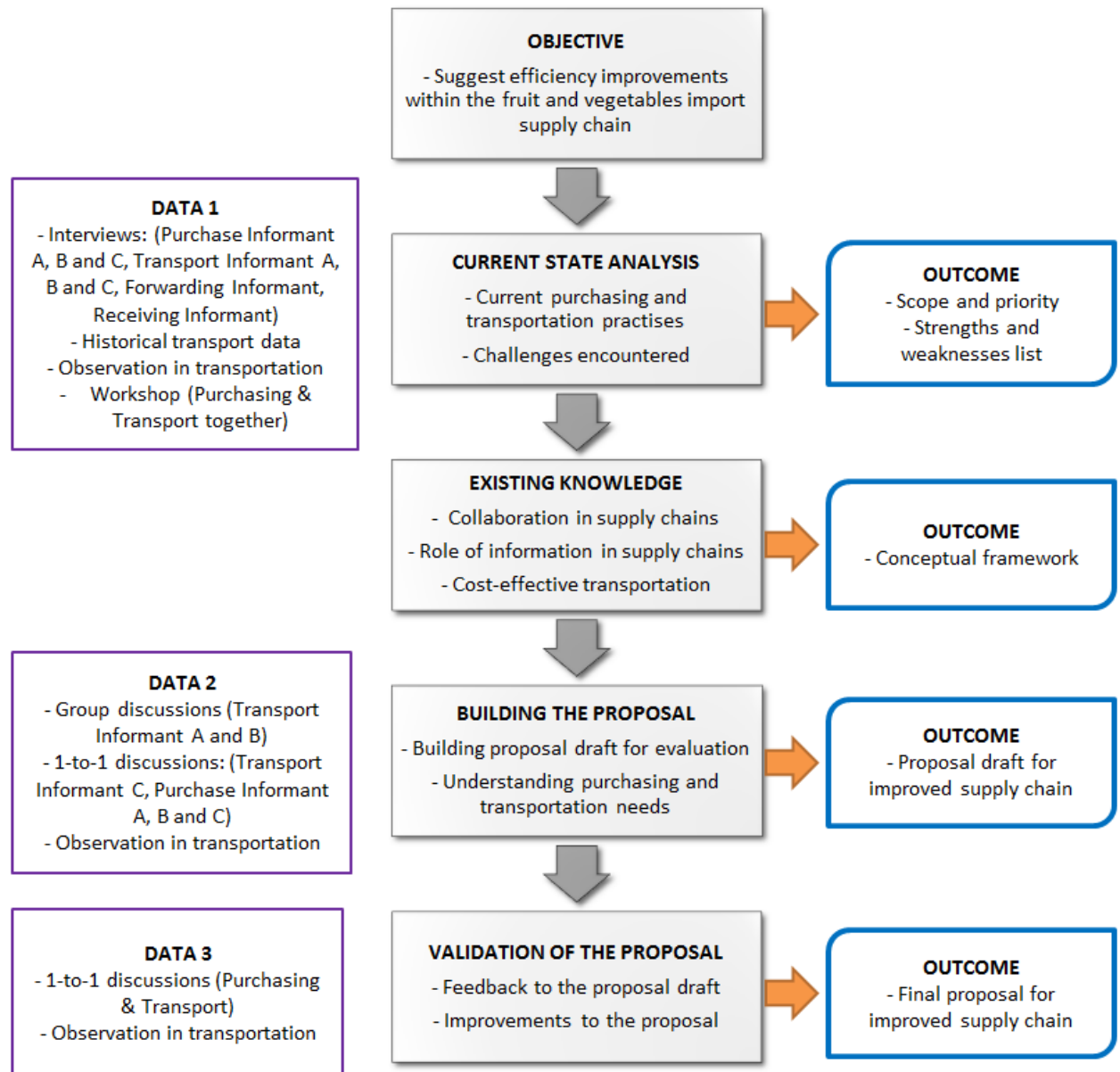


Figure 2, Research design illustration

As seen from figure 2, the objective of this thesis is to suggest efficiency improvements within the fruit and vegetables import supply chain. After the research objective is defined, a current state analysis is conducted by interviewing purchasing and transport department personnel, utilizing observation in transportation department, analysing historical transport data and organizing a workshop. The target of the current state analysis is to thoroughly understand and describe the current purchasing and transportation practises and define the current operational challenges. The outcome of the current state analysis is a strengths and weaknesses list and the narrowed scope and priority for this thesis.

Existing knowledge is then studied concerning collaboration, role of information and cost-effective transportation in supply chains and utilized to define a conceptual framework for this thesis. The next step is building the proposal where the target is to produce a proposal draft for evaluation. Discussions and participant observation are conducted in order to understand the specific needs of the key stakeholders. Based on the data gathered from company stakeholders and existing knowledge, the proposal draft is prepared. The final step of the research process is to validate and improve the proposal together in feedback discussions with the key stakeholders in order to formulate the final proposal for improved supply chain.

### 2.3 Data Collection and Analysis

This thesis utilizes a number of different data sources which were analysed during three individual stages of the study. Data collection round 1 was focused on the section three of this thesis, the current state analysis. Data collection round 2 was focused on the section 5, building the proposal. Finally, the data collection round 3 was designed for section 6, validation of the proposal. Additionally, a number of company historical transport documents was analysed in order to gain a holistic view on the subject. The data collection rounds included interviews, discussions, observation and a workshop. Several different departments of the case organization were included in the data collection rounds in order to create a thorough understanding of the practises and identify the main operational challenges. The individual data collection rounds are described below.

The data collection for DATA 1 was performed in the beginning of February 2016. The utilized methods of data collection were interviews, participant observation and a workshop. It was decided to include key purchase and transportation employees in the data collection since the two departments are cooperating closely and their individual activities have a direct effect on the financial performance of the supply chain. Additionally, informants from forwarding and warehouse receiving were included to verify their linked activities within the import process. Table 1 below describes the events of data collection for round 1. The focus of this data collection was to study the current state of the import supply chain and identify strengths and weaknesses.

Type of Data Collection	Participant(s)	Location	Date and Duration	Documentation	Analysis
Interview	Purchase Informant A	Purchasing	2.2.2016 60 min	Recording + field notes	Section 3, Current State Analysis
Interview	Purchase Informant B	Purchasing	2.2.2016 35 min	Field notes	
Interview	Purchase Informant C	Purchasing	2.2.2016 40 min	Field notes	
Workshop	Purchasing + Transportation departments	Purchasing	2.2.2016 60 min	Field notes	
Interview	Transport Informant A	Import Service	3.2.2016 40 min	Field notes	
Interview	Transport Informant B	Import Service	4.2.2016 30 min	Field notes	
Interview	Transport Informant C	Import Service	4.2.2016 45 min	Field notes	
Participant observation	Transportation department	Import Service	Week 5, 2016	Field notes	
Interview	Forwarding Informant	Forwarding	3.2.2016 5 min	Field notes	
Interview	Receiving Informant	Receiving	3.2.2016 10 min	Field notes	

*Table 1, Data collection for DATA 1 (Current state analysis)*

As seen from Table 1, three purchase informants, three transport informants, one receiving informant and one forwarding informant were interviewed. To secure the confidentiality, the names and titles of the informants are not provided in the tables of this study. The interviews were semi structured with predefined questions designed to illustrate the current operational practices, strengths and challenges from the personal viewpoint of the interviewee. The interviews were conducted face-to-face, except for the receiving interview which was a phone interview. The interviews were spoken in Finnish language, documented and translated into field notes.

The interview themes focused on the roles and responsibilities of the key stakeholders. The target was to formulate the interview questions in order to clearly identify the activities of each department within the supply chain. Furthermore, it was designed to encourage interviewees to share their personal opinions on the current strengths and weaknesses. The experience of interviewing was different with each interview. There

was variation in the level of talkativeness and openness during the interviews. In general, interviewees were very thorough in describing their personal activities, but less eager to describe development ideas when directly asked. Development ideas were mostly generated during discussion around the daily activities of the interviewees.

All the created interview field notes were checked and verified for correctness by the interviewees. Additional field notes were created on the details of the purchasing and transportation workshop and participant observation in the transportation department. The field notes were analyzed by utilizing the content analysis method to identify the most common challenges within the import supply chain. The interview questions and an example set of field notes are available in the appendices of this thesis.

In order to create a thorough view of the current state and to illustrate effects, company historical transport data was analyzed. It was decided to focus on the transportation, because the freight solutions provide one of the most significant cost reduction opportunities within the case company.

Document title	Created	Collected from	Short description	Analysis
HeVi 2015 rekat	January 2016	Import Service	Volumes and paid freight in 2015	Section 3, Current State Analysis
X hevi luotettavuus 2015	January 2016	Import Service	Transport company reliabilities in 2015	
Y hevi luotettavuus 2015	January 2016	Import Service	Transport company reliabilities in 2015	
Hevikuljetusten tehostaminen 020216	January 2016	Import Service	Workshop material	

*Table 2, List of historical transport data*

As seen from the table, four different documents were analysed. The documents include information about volumes, freights, reliability and the DATA 1 workshop. The results from the document analysis are discussed in the current state analysis section.

The data collection for DATA 2, building the proposal, was performed during end of March and beginning of April 2016. This data collection round included a group discussion, several 1-to-1 discussions and participant observation. The focus of this thesis is on the cost savings potential of cooperation between purchasing and transportation. Therefore, the data 2 was collected at import service and purchasing departments in order to define the requirements and ideas of the key stakeholders from these two de-



partments. Table 3 below describes the events of data collection for round 2. The focus of this data collection was to identify the requirements and ideas of the key stakeholders when building a proposal for the case company.

Type of Data Collection	Participant(s)	Location	Date and Duration	Documentation	Analysis
Group discussion	Transport Informant A + B	Import Service	31.3.2016 45 min	Field notes	Section 5, Building the Proposal
1-to-1 discussion	Transport Informant C	Import Service	1.4.2016 30 min	Field notes	
Participant observation	Transportation department	Import Service	Week 13, 2016	Field notes	
1-to-1 discussion	Purchase Informant A	Purchasing	6.4.2016 1 h 20 min	Field notes	
1-to-1 discussion	Purchase Informant B	Purchasing	6.4.2016 15 min	Field notes	
1-to-1 discussion	Purchase Informant C	Purchasing	6.4.2016 30 min	Field notes	

*Table 3, Data collection for DATA 2 (Building the proposal)*

As seen from the table, one group discussion was held in the import service department and several 1-to-1 discussions held in the import service and purchasing departments. Additional source of data was participant observation, which was recorded as field notes. The focus of the data 2 discussions was to merge the ideas from the development priorities of the current state and the existing knowledge studied in section 4 in order to consider development opportunities. The discussions were performed as free-form discussions and provided information on what could be possible in the case company context and what the requirements of the key stakeholders were. An example of the themes discussed at purchasing department can be found in the appendix.

The data collection for DATA 3, validating the proposal, was the final data collection round. The data collection for this round was performed during week 15, April 2016. The data collection included several 1-to-1 discussions in the purchasing and import service departments. Furthermore, participant observation was performed in order to evaluate the immediate cost savings of improved consolidation efforts and piloting alternative transportation modes. The aim of data collection for DATA 3 was to validate the proposal by going through the proposal and requesting for feedback and improvement suggestions. The events of data collection for DATA 3 are illustrated in the below table.

Type of Data Collection	Participant(s)	Location	Date and Duration	Documentation	Analysis
1-to-1 discussion	Transport Informant A	Import Service	12.4.2016 20 min	Field notes	Section 6, Validation of the Proposal
1-to-1 discussion	Transport Informant B	Import Service	12.4.2016 15 min	Field notes	
1-to-1 discussion	Transport Informant C	Import Service	12.4.2016 15 min	Field notes	
1-to-1 discussion	Transport Informant D	Import Service	13.4.2016 20 min	Field notes	
Participant observation	Transportation department	Import Service	Week 15, 2016	Field notes	
1-to-1 discussion	Purchase Informant A	Purchasing	13.4.2016 30 min	Field notes	
1-to-1 discussion	Purchase Informant B	Purchasing	13.4.2016 20 min	Field notes	
1-to-1 discussion	Purchase Informant C	Purchasing	14.4.2016 15 min	Field notes	

*Table 4, Data collection for DATA 3 (Validation of the proposal)*

As can be seen from the table, several 1-to-1 discussions were performed in order to receive feedback and improvement suggestions to the proposal draft. In total, discussions were held with four informants from transportation and three informants from purchasing in order to get a thorough view on the status of the proposal within the case organization.

## 2.4 Validity and Reliability Plan

When considering an academic study, it is necessary to discuss the topics of validity and reliability. Validity in research refers to the questions of whether research results address the research question, researchers see what they think they see and which methods were utilized during the research process towards the outcomes (Flick 2006: 371-396). Validity includes topics such as objectivity and subjectivity in data collection, correctness of conclusions and interpretations, consideration of rival possibilities and generalization level of study findings. Data collection should be performed objectively by utilizing multiple sources of evidence. Collected data should be accurate and different alternative possibilities should be evaluated thoroughly. (Yin 2009: 41-44)

To ensure validity in this research, it is necessary to utilize multiple sources of information including key stakeholder interviews, discussions, observation, workshops and

internal company data in order to formulate a holistic view of the current import supply chain of the case company. Furthermore, the data is collected in three different points of time and in different locations. The current state analysis includes data sources from two different departments and an analysis of historical company data. Building the proposal is undertaken in cooperation with the key stakeholders and the specific requirements are evaluated. The final proposal takes into account the feedback from the key stakeholders.

The objective of reliability is to ensure that when the case study would be repeated with the same procedures as described, the findings and conclusions should be the same. The target of increasing reliability of a study is to minimize the errors and biases. (Yin 2009: 45) To ensure the reliability of this thesis, data is collected from multiple sources and, furthermore, the DATA 1 interview questions and DATA 2 discussions themes are included in this thesis as appendix.

### 3 Current State Analysis

This section presents and analyses the current operating practices within the import supply chain of fruit and vegetables of the case company. The current state analysis is based on interviews, discussions, historical transport data and participant observation in the international logistics of the case company, as presented in Chapter 2.

In this chapter, the main findings of the current state analysis are presented as follows. Firstly, the key stakeholders and their responsibilities within the import supply chain are introduced. Secondly, the current operating practices within the import process are described. To this end, swim lane process mapping is utilized to illustrate the different stakeholders and their roles. Thirdly, a closer look is taken at the purchasing, transportation and receiving practices within the case company. This analysis leads, in the fourth section, to identifying the key findings including strengths and weaknesses of the current supply chain and defining the priorities of this thesis.

#### 3.1 Key Stakeholders and Their Responsibilities

It is possible to identify several different organizations and departments that are involved in the import process of fruit and vegetables of the case company. Some responsibilities are naturally more time consuming than others, but if the starting point of the process is purchasing, this is followed by suppliers, import service department, transport companies, forwarding, warehouse receiving, quality control and invoicing. This thesis focuses on the purchasing and import service departments. Below please find a simplified process chart illustrating the stakeholders of the supply chain from purchasing to invoicing. The supplier and the transport company, marked purple below, are external companies whereas the other stakeholders are part of the case organization.

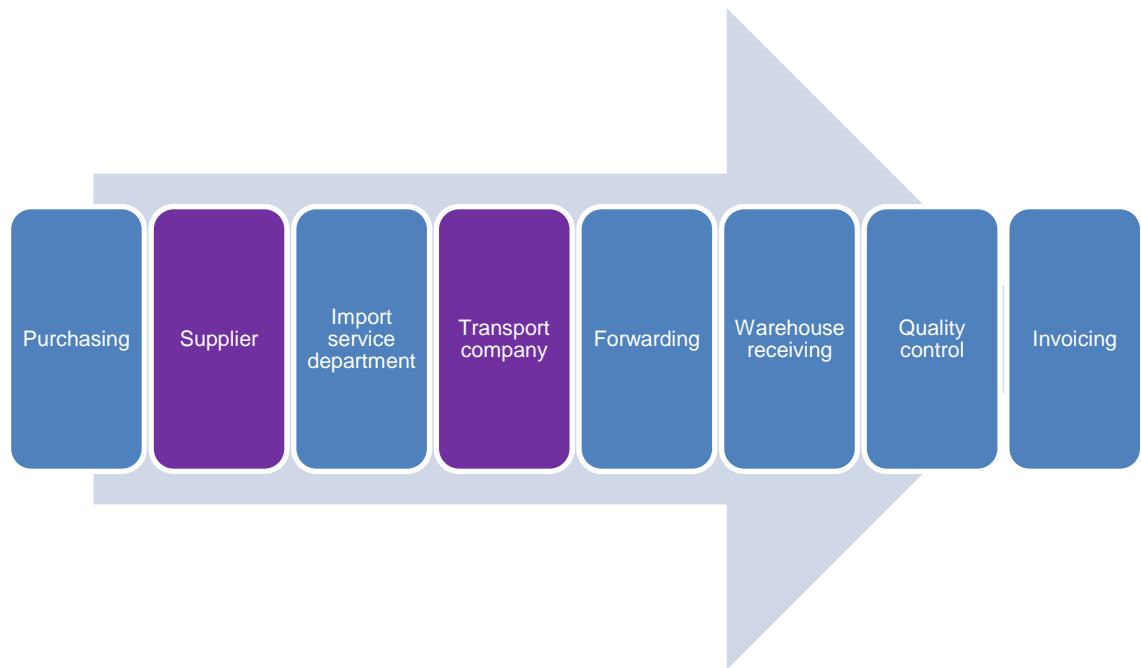


Figure 3, Simplified process chart

The tasks of the fruit and vegetables sourcing managers, found in purchasing in the figure above, slightly differ from the tasks of their equivalent colleagues in the purchasing department. Fruit and vegetables sourcing managers are responsible for both the planning phase purchase manager tasks as well as the actual daily operational ordering practices. The tasks of the sourcing managers are numerous, including season planning, price negotiations, maintaining packaging specifications, keeping track on origin countries and possible suppliers, checking warehouse balances and ordering according to them, preparing weekly programs, forecasting demand, rapid supplementary ordering and creating claims to suppliers in case necessary.

Sourcing managers are also responsible for defining the selection together with the category manager and setting the level of store pricing. Sourcing managers are thus setting the level at which stores can purchase the products, but they do not define the consumer pricing. This is the role of the purchase department category manager. The selection and pricing of fruit and vegetables can change very rapidly. As an example, prices in June for summer potatoes might vary on a day to day basis. Thus, selection is defined only for a week at a time. This is quite a difference in comparison to for instance frozen food products, where the selection is defined for a period of up to six months.

The import service department is responsible for organizing the transportation for the goods sourced by the purchase department. The organization does not possess its own transportation equipment. Instead it purchases transportation services from both Finnish and international transport companies. The activities include reservation of transportation capacity, order monitoring, problem solving, communicating between the different organizations to ensure smooth loadings, freight negotiations, and route planning.

Furthermore, the transport coordinators are responsible for providing transportation related assistance and advice to the purchase department. The discussed topics include for instance transit times, ferry schedules, weight limitations, loading times and information on freight costs for pricing and planning. The general purpose of the import service team therefore is to serve as a knowledge base on transportation related issues and to ensure the cost effective and reliable transportation service. Transportation should not become the bottleneck of the import supply chain when the warehouse levels are set low and goods are ordered based on actual store demand. The roles of the purchasing and import service departments are summarized below.

### Purchasing

- Season planning
- Price negotiations
- Packaging specifications
- Supplier and origin evaluation
- Warehouse balances and ordering
- Weekly programs
- Demand forecasting
- Purchase claims
- Product selection

### Import Service

- Purchasing transportation services
- Reservation of transportation capacity
- Order monitoring
- Transport problem solving
- Loading communication
- Freight negotiations
- Route planning
- Transportation advise to purchasing

*Figure 4, Purchasing and import service roles*

As can be seen from the figure, there are numerous different roles within the two departments of the case organization. The following sections will describe the roles within the import process in further detail.

### 3.2 Current Operating Practices

The supply chain stakeholders have clearly defined activities for which they are responsible in the different phases of the import process. The figure below is a swim lane process map illustrating the different tasks starting from the planning and purchasing, continuing to transportation practices, receiving and quality control and finalizing in invoicing. The main line illustrates the process path required in order to get from supply planning to warehouse and invoicing. The dotted lines describe the information flows established to support the stakeholders in conducting their individual activities.

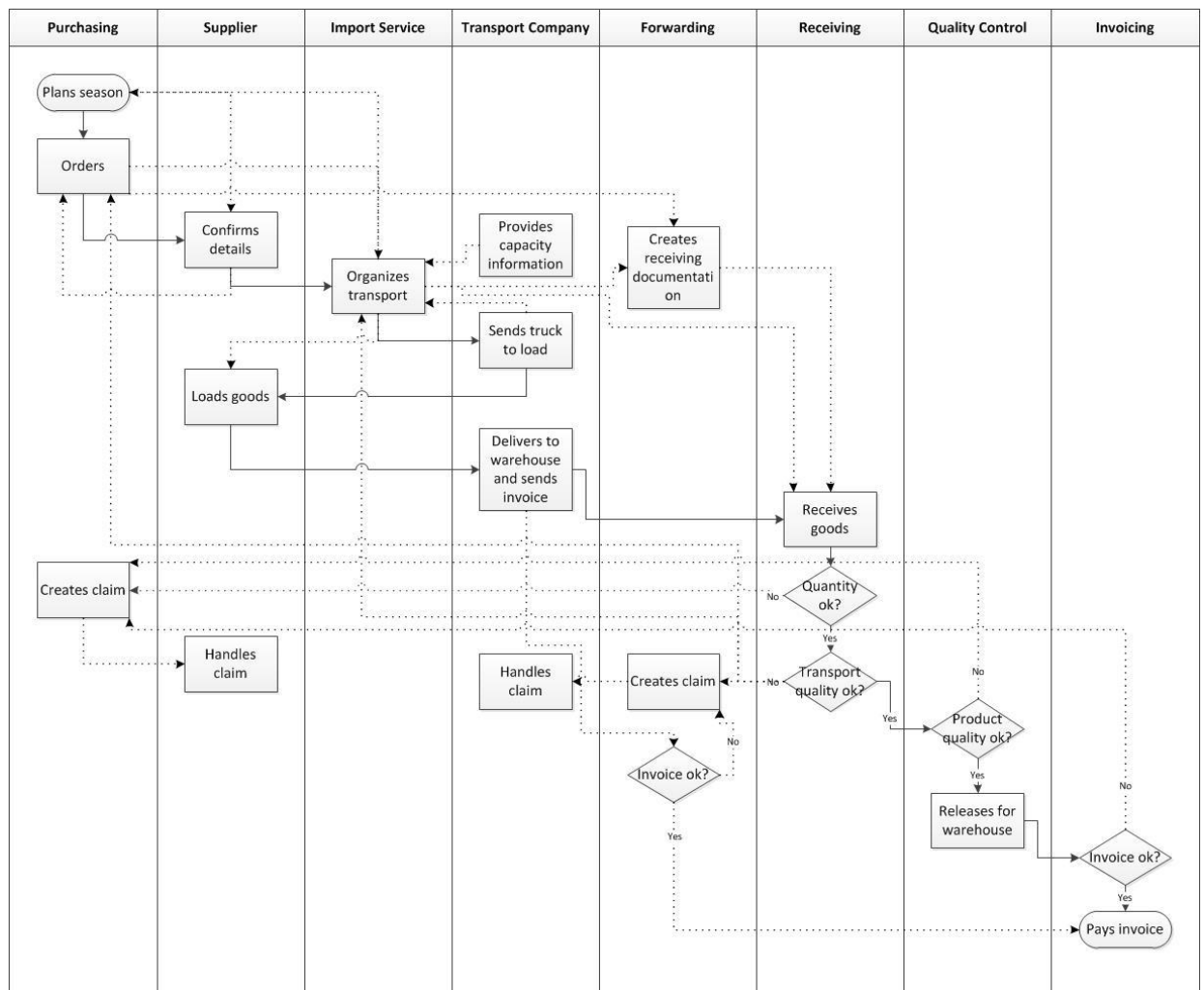


Figure 5, Swim lane process map on the import supply chain

As mentioned earlier, the individual activities are clearly defined and it is considered as a benefit in the process. Previously, the purchasing department was responsible for booking the transportation of a number of part loads directly from transport companies resulting to extra work and inefficiencies. Currently, when purchasing is responsible for purchasing related activities and transportation for transportation related activities, both departments are able to focus on their core strengths and expertise. It is possible to combine individual activities from the above process map and identify four major phases within the import supply chain. The phases including the related main stakeholders can be seen in the figure below.

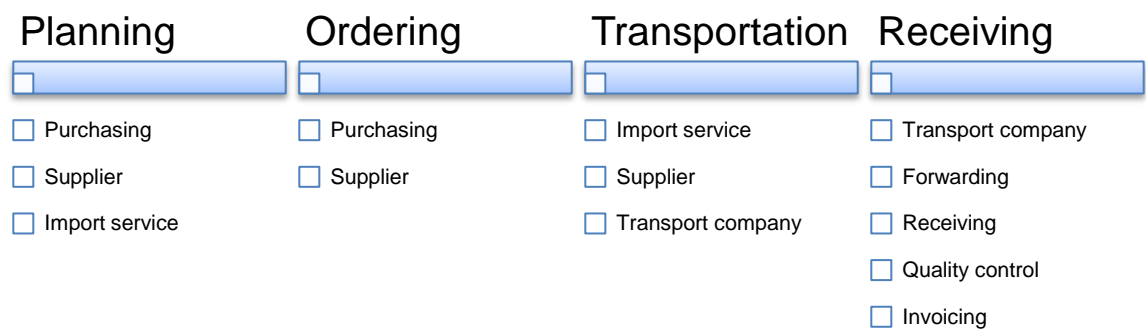


Figure 6, Major phases of the import process

The next sections describe in detail the planning, ordering, transportation and receiving phases of the import process. Additionally, the key strengths and weaknesses within the activities are identified.

### 3.2.1 Planning a Season

The planning of the import process is usually initiated approximately six months prior to the actual season and operational ordering. The purchase department works in close collaboration with the Nordic purchase alliance in order to combine the purchase volumes of three individual retail chains in Norway, Denmark and Finland. Approximately 90% of the fruit and vegetables imports are sourced through this particular alliance and the target is to increase that percentage in the long run. The combined volumes of the three retail chains increase the negotiation power of the purchase departments in relation to the suppliers.



During the planning phase, the purchase department considers topics such as general price level, where the required quality and volume is available, which origin country possibilities are available and which logistics solutions should be utilized. Requests for quotations are provided to suppliers and topics of price, volume, quality and timetables are negotiated. Products have specific requirements concerning issues such as size, net weight, juice content, pressure and coloration. Planned volumes vary from product to product where, for instance, the demand for asparagus during winter might be two to four pallets per week and mandarins 20 to 40 trucks per week.

Normally, sales promotions are planned one week prior to campaign start, but for long transit time items, such as bananas or Israeli citrus, the campaigns are planned earlier within the season volume demand. The purchase managers plan the sales promotions and harvest season campaigns in collaboration with the category manager. The logistics solutions and especially freight pricing is discussed in collaboration with the transportation department. The import service department is responsible for providing transportation related assistance, estimations on freight prices and availability of certain transport solutions. Transportation prices and reliability may have an effect on the selection of supplier or delivery terms.

The main challenges of the planning phase are related to (1) season volume estimations and (2) information flow. Starting with the former, the purchasing department defines a required volume within a certain timetable to be available during the season. However, delays of overseas container shipments and increased or decreased demand create requirements for adaptability. Especially container transportation reliability, in comparison to road, was concerned challenging with the demand planning of overseas products:

*“Concerning the transit times, in my opinion when talking about road transportation [reliability is] very close to 100% just like it should be, containers then always a bit of a question mark. It depends on the ice situation and other things.”*

*Purchase Informant 1*

*“Trucks are reliable and on time, (...) Container transportation reliability and schedules is always difficult.”*

*Purchase Informant 2*

Cancelling agreed volume from the supplier might be challenging, but ensuring availability of more volume in cases of increased demand is usually more costly and difficult.

Increasing volumes during the season usually increases the purchase costs due to unplanned demand. As regards the second main challenge, the information flow between purchasing and transportation during the planning phase is in general rather thin. The topic was discussed during the collaborative purchasing and transportation cost efficiency workshop meeting:

*“Information on planned seasonal programs, we [at the transportation department] have a feeling or a guess that it is for instance 3 months on certain apples and pears, but is that correct? Information on where to load and which suppliers and how long should be beneficial to share.”*

*Workshop 2.2.2016*

While the purchasing department describes possible supply locations and transportation provides freight costs estimations, the final season decisions are not systematically shared. The transportation department is not aware of the volumes, timetables and other details of the agreed season programs. It is inefficient to plan for transportation on a certain route when the duration of the season is not known. Import freight costs are linked to export loads and their destinations and, therefore, the supply location information and timetables may have major impact on transport pricing. When the season details are planned, it is possible to focus on the ordering phase.

### 3.2.2 Ordering Practises

The actual purchase ordering is conducted when the planned season launches. The purchase manager orders products from the supplier within estimated volume scale and predefined timetable. The ordering is based on warehouse levels and forecasted store demand for one week. Store orders, which serve as actual demand information, are available in the company ERP system 48 hours prior to delivery to stores. This provides the purchase managers some time to react and conduct supplementary orders in order to fulfil the requirements with higher efficiency.

Forecasting in general is based on the demand of the previous weeks, sometimes even the previous year if previous week information is not available. Promotional campaign forecasts are conducted in collaboration with the category manager. The role of the category manager is increasingly important when conducting forecasts for minor volume products where the demand might be several times larger during promotion when comparing to a standard week. There are various topics that may have an effect on the

demand such as midweek holidays, the weather, competitor price shifts and the more recent changes of longer store open times and harvest season thinking. Furthermore, in cases of product quality problems, a requirement for supplementary ordering is often created to fulfil the availability gap created by insufficient product quality.

During recent years, the purchasing department has implemented system updates and strived to increase the share of ERP system assistance in ordering. The target of these actions has been to decrease the manual workload and improve efficiency within the department and according to the interviewees the tools are currently sufficient. Purchase orders are currently conducted via ERP system EDI, ERP system automatic emails, manual emails, Excel sheets as email attachments and phone. Especially rapid orders are often conducted by phone or email enquiries, and only afterwards the purchase order details are inserted to the ERP system for forwarding and receiving purposes.

The timing of ordering is different with different product groups and origin countries. For instance, programs for Spain loadings are currently produced once per week for a whole week forward, and then sometimes adjusted in cases of demand changes. However, some orders, especially part load orders from the Benelux countries, are currently conducted several times a week and with less than 24 hours prior to loading. This creates a challenge to one of the current improvement topics discussed within the purchase department, consolidation of cargo:

*“Somewhat, within the big picture, in this organization also there has been discussion about consolidation, meaning combining goods into the same transportations. In fruit and vegetables we do it on some scale, on the purchase manager level, seeing when I have one truck over there with 3 pallet places where you can fit some of this or that, for example with Spain goods. Then I don’t know how much we do it with Holland goods, is there a possibility to check that. Of course often the planning timespan might be shorter, (...) but like if that guy has four pallets and that guy has eight and this 12, then would it be possible to make one truck out of these.”*

*Purchase Informant 1*

The purchase orders are sent to the supplier and in a majority of cases also to the import service at the same time. Whatever is the case, it is the responsibility of the purchase manager to ensure that the purchase order information reaches the transportation department in due time prior to loading. After the order is received by the supplier, they confirm the necessary details such as number of cartons per product and invoice

values to the purchasing and logistics details such as final number of pallets, loading address and release number to the import service. Before the ordering, the purchase department advises the supplier about pallet labels, invoicing and documentation. As the purchase order information and supplier provided loading information are available, the import service is able to organize the transportation for the goods accordingly.

### 3.2.3 Transportation Practises

In this section, I will review the following transportation practises: Freight contracts and tendering, transportation management practises at import service department, supplier involvement in transportation, transport company responsibilities, key strengths and weaknesses in the process and the nature of fruit and vegetables transportation within the case organization.

The responsibilities for organizing the transportation are based on the terms of sale between the supplier and the purchase department. If the term of sale is for instance Incoterms Free Carrier (FCA) or Ex Works (EXW), the transportation is organized by the case company logistics, meaning import service department. Import service tenders transportation currently once per year for low season and high season freights. Low season runs from April to the end of October and high season from November until the end of March. High season freights are generally more expensive than the low season freights, especially within Spain transportation. The freight tender, based on possible loading countries, enables the import service to provide freight cost estimations and organize transportation immediately when season launches.

The actual transportation organizing initiates when the purchasing department informs import service about a purchase order. The information concerning the purchase order details most commonly arrives via email either manually sent by the purchase manager or automatically created by the ERP system. Sometimes, but more seldom, the purchase managers phone the import service informing that they just purchased something which requires transportation and only later send the details by email. As mentioned in the previous section, the information flow and timing of ordering from purchasing creates challenges in transportation. These issues are visible in the planning and ordering phases of the process. The topic was discussed in several occasions:

*“Information flow from purchasing, for example about selection changes, is not on good level. We do not get the details about changes in products or suppliers when that info should be available to us well before for us to handle all the practical necessities.”*

*Transport Informant 3*

*“Effective part load management or consolidation currently difficult because suppliers, loading dates and volumes are not known to transportation and changes to orders are frequently made on a short time interval. This makes it very difficult to establish steady route planning, combine part loads to wholes and to reserve transport capacity.”*

*Workshop 2.2.2016*

Uncertainties, late ordering and rapid changes increase transport related costs in the case company. Based on the company historical data, during weeks 1-5 of 2016 the company had 69% of all fruit and vegetables purchase orders from the Benelux countries as part loads. This creates a significant cost in relation to full truck loads and is largely linked to the current operating practises within the purchasing department.

The supplier is responsible for providing import service with the necessary transportation details. If they are not provided, the import service requests for confirmation. Correct loading details are important, since incorrect pallet amounts, lack of release numbers or incorrect loading addresses generally cause delays and extra costs. Another important topic currently, due to stricter working hour legislation, is loading times. Loading time information is important in the Benelux countries transit time for instance, where the ferry timetables to Finland do not allow long delays with loadings. In Spain, the challenge is more related to supplier communication. The official purchase order details instruct the suppliers to prepare the goods for loading in the morning, but the reality is often different.

Different suppliers in Spain prepare goods for loading within a timescale from morning until night and that information is important in order to manage delivery to Finland on time. For instance, if a driver assumes goods to be ready at 8:00 in the morning and starts their day, they will lose almost the whole working day waiting for the goods to be prepared. This is especially a challenge with Southern Spain loadings, which have the same transit time as other Spain regions, but include increased distances of hundreds of kilometres. Detailed loading planning increases the reliability of the transportation and is therefore important for the import process.

Fruit and vegetables transportation within the case company context is different in comparison to the other product groups, such as processed food, frozen food and dry goods. Whereas with different product groups, fruit and vegetables currently have no steady long term transportation planning with set loading dates and fixed transportation companies per location. The transport company pool, based on the yearly tender, includes tens of different transport companies. Additional challenge within transportation is related to the current yearly tender process and transport company selection:

*“There should be some improvements to the pricing; currently we have huge differences between transport companies from the same loading address. There should be more attention given to the freight negotiations, perhaps decrease the number of transport companies.”*

*Transport Informant 2*

The yearly tender process produces a variety of offers and the pool of transport companies is the largest in fruit and vegetables. Maintaining such a selection of transport companies improves the availability of transport capacity, but additionally creates lack of available loads to offer and may result to decreased level of service and partnership from the transport companies.

The transport companies continuously inform import service about available trucks in certain regions at a specified time. Latest when the final purchase order details are available, it is possible to reserve the transportation capacity. Purchase order and transportation information of fruit and vegetables is organized and stored in Excel. Currently the company does not possess a sufficient developed or flexible IT system to support the requirements transportation planning. The level of IT in transportation was brought up several times during the interviews:

*“[Challenges in transportation?] Manual labour with the IT systems, there can be found several development areas in IT. IT systems development would help with cost reductions, information reliability and transparency.”*

*Transport Informant 1*

*“I am also doing a lot of manual labour in checking order weights and maintaining information in ERP and Excel to get a proper overview on the loadings. ERP alone is not sufficient.”*

*Transport Informant 3*

Transport booking is based on existing transport capacity availability, prices and historical transport data. The fruit and vegetable transport bookings are sent to transport companies by email, based on Excel stored information and copies of previous book-

ings. Additionally, sometimes transport bookings are conducted via phone and confirmed later by email. After receiving the transport booking, the transport company confirms the truck and trailer numbers of the loading unit. Import service provides the supplier with the information concerning the transport company and trailer number prior to the loading to verify the loading of correct order into corresponding trailer.

The supplier is responsible for loading the goods into trailers in a majority of the purchase orders. This is true in most of the cases, but, for instance in Benelux countries, it is often necessary for drivers to load themselves to avoid long waiting times. The transport company is responsible for measuring the loading temperatures and informing import service in case necessary. Too high loading temperatures are not allowed and generally import service requires suppliers to further decrease the temperature of the goods before loading. Higher loading temperatures cause quality problems especially with more sensitive products such as berries or salad. After the loading, the transport company delivers the goods to the warehouse receiving for unloading, and sends a transport invoice to forwarding. Import service provides the transportation information to forwarding and warehouse receiving to support their individual activities within the supply chain.

#### 3.2.4 Receiving the Products

Before it is possible to unload the goods, the warehouse receiving requires arrival information from import service and forwarding. Import service is responsible for providing the warehouse receiving with the overall plan for arrivals, indicating details such as unloading dates, order numbers, volumes, transport companies and truck numbers. Forwarding is responsible for providing an arrival advice to receiving and a quality control check form to quality control for each individual order. Forwarding receives the purchase orders when they are created in the ERP system by the purchase managers.

The forwarders combine the purchase order information with the transport details provided by import service. The transport details, which are important to forwarding, are the transport company name, truck number and the freight costs. This information is utilized to open the order in the forwarding IT system where from the arrival advice and quality control forms are sent to the warehouse receiving and quality control. Based on this information, the warehouse receiving is able to plan their work schedules and unload arrivals with sufficient resources.

Trucks arrive to warehouse at different times depending on the ferry connection and transport unit utilized. Transport companies utilize several different ferry connections from for instance Rostock, Travemünde or Tallinn which are connected to Helsinki and Hanko in Finland. In general, trucks with a driver on board are earlier in unloading in comparison to trailers on the same ferry since they are not dependant on the schedules of the harbour unloading units.

As the trucks arrive to warehouse receiving, they are registered and their arrival time is noted on the CMR waybill. Furthermore, the warehouse receiving checks the truck details to ensure the correct arrival date. Mismatches are reported to the import service in cases of uninformed early arrivals or delays. After checking the general information, the truck is passed on to the waiting queue. Trucks are unloaded as first in first out basis, excluding goods running out of stock and therefore prioritised. When it is time to unload the truck, the receiving employees either call the cell phone of the driver or walk to their truck to pass on the information and allocate the correct unloading door.

The receiving is responsible for checking the quantities of the goods. The employees check and count the number of individual boxes of an order. If the quantities, in relation to the purchase order details, are incorrect, the information is passed on to the purchase manager who is then responsible in creating a claim to the supplier. Receiving additionally measures the arrival temperatures of the products and conducts a brief check for anything unusual or transport damages. Pallets should be secured firmly without allowing movement of the pallets or the boxes during transit. The product specifications define the target temperatures for transportation and arrival to warehouse and the official advice allows for deviation of two degrees Celsius.

In cases of transport quality problems, the receiving employees send information to the forwarding claim team, purchasing and import service. Forwarding claim team is responsible for creating the transport claim and communicating the issue with the transport company. If the original order products were fully or partially destroyed, purchasing reacts to the transport problem by ordering supplementary goods in case necessary. Furthermore, import service collects information on transport damage cases in order to manage the transport company selection and decrease future risks. The further follow up of transportation claims was considered as one of the major development issues in the purchasing department:



*“Concerning transport claims it is unsure whether anything works and if we ever get our money from the insurance company even though we pay a lot of money for the insurances probably.”*

*Purchase Informant 3*

*“Transport claims also, I still have somewhat hazy understanding of it: a) who is handling it and b) do we ever get the money from any source or do we always cover it ourselves, I don’t know how eager the insurance company is to pay these. When looking at the discussions it’s always like this cannot be put to the insurance company, the transport company washes their hands out of it and supplier does the same and we end up being the last one who just nods and says oh this is how it went again. We however pay like millions for our transport insurances probably.”*

*Purchase Informant 1*

After checking the transport quality, the receiving passes the responsibilities to the quality control team. The quality control team measures the product temperatures again, including the outer boxes of the pallet, but furthermore, the inner parts of the pallet to identify possible lack of precooling at the loading place. Lack of proper precooling often causes quality problems due to the inner boxes of a pallet remaining too warm even when the outer boxes have reached the target temperature during cooling. In addition to the temperature measurement, the quality control performs a full quality check on the products, based on the product specifications. The measured attributes include for instance sugar levels, pressure and coloration.

When the quality check has been conducted, the quality control reports the results to the purchasing manager. In case the quality control identifies a quality problem within the products, the problem is communicated to purchasing and purchasing then creates a claim to the supplier. It is the responsibility of the quality control to define whether products are allowed to be released to the warehouse and distributed further to the stores and end customers. Quality control operates in the warehouse receiving, but additionally performs their duties for example in the warehouse reserve and order picking areas to check the shelf life and quality of products.

As the products are released for warehouse order picking and delivery to customers, the invoice is checked by invoicing. In cases of for instance incorrect price, quantity or missing order number the invoicing reports to purchasing. Purchasing is again responsible for checking the details and creating a claim to the supplier in case necessary. When the product invoice is correct, it is paid and the import process is finished. Transport invoices are checked in forwarding based on the information provided by

import service and forwarders create a claim to the transport company in case of differences. After checking that the transport invoice is ok, the forwarder delivers it to invoicing where it is paid, which finishes the transportation process.

### 3.3 Key Findings and Priorities from the Current State Analysis

This section discusses the key findings from the current state analysis of the import supply chain and additionally defines the priorities of this thesis. The current state analysis was based on several interviews, participant observation, a collaborative workshop and historical transport data. The interviews, observation and the workshop were utilized to identify the practises, strengths and weaknesses of the current import supply chain. The historical transport data was analysed to illustrate the effects of the key strengths and weaknesses within the import process. The findings of the current state analysis are visualised in table 5 below.

Strengths	Weaknesses
+ + + High availability of road transport capacity	- - - Seasonal program changes not communicated to transportation on time
+ + + High reliability of road transportation	- - - Planning phase information not reaching transportation sufficiently
+ + Clear roles and responsibilities	- - - Cost-effective transportation difficult with current order practises
+ + Good level of knowledge within employees	- - High price differences and too large pool of transport companies in some areas
+ Sufficient IT tools in purchasing	- - Lack of proper IT system in transportation
	- Container transportation unpredictable
	- Lack of visibility within the transport claim procedure

Table 5, Key strengths and weaknesses of the current import process

As seen from the table, it is possible to describe five strengths and seven weaknesses within the current import supply chain. The table includes all the import process related strengths and weaknesses that were described by stakeholders during the data collection. It was possible to combine some of the themes under the same points in the table. There are two key strengths marked with (+++) and three key weaknesses marked with

(- - -) indicating their higher relevance to the objective of this thesis. Furthermore, the three key weaknesses were coloured with distinctive colours that will be linked to the corresponding parts of the development priorities, the conceptual framework and the improvement proposal of this thesis. All the topics are further discussed in the below chapters in order to understand the individual strengths and weaknesses and their effects on the operational activities of the supply chain.

### 3.3.1 Strengths of the Current State

The first strength concerning high availability of transport capacity includes several different dimensions. The case company import service has established a broad supplier base for road transportation services within Europe. There are over 30 individual transport companies from various different countries providing year round transportation services for the company. The country of origin for sourcing products does not create significant challenges to organizing the transportation in most of the cases. The transport company base is large enough to fulfil the requirements of the most challenging seasons, including Christmas season in Spain where transport volumes can be over five to six times greater than during the summer.

Another dimension of the high transport capacity availability is related to the point of time of ordering and transport company flexibility. Sometimes late orders or necessary supplementary orders might arrive with less than a couple of hours before the loading is supposed to commence and these are in general handled with almost 100% certainty. This is another remarkable feat when considering that transport companies are sometimes ready to move or lease trucks on their own expense and delay other customers' goods from the trucks to fit in the case company additional order. This does not require extra effort from the import service, but is rather seen as a highly valuable additional service.

The second strength is related to the level of reliability of road transportation, when excluding product supplier mistakes. Based on the company historical data, the reliability of road transportation in Southern Europe is 99.07% and the comparable figure for rest of Europe is 99.10%. This is considered a major advantage and the way the situation should be. The import service team is continuously working to improve the reliability of the transportation services and to minimize the risks of delays in the supply.

Additional strengths within the import supply chain include clear roles and responsibilities, sufficient IT tools within the purchasing department and, in addition, generally good level of professional knowledge within the employees. Several interviewees stated that the roles and responsibilities of each department are clear and there is no serious overlapping of tasks. The working methods are well established and everyone knows their duties. The clear tasks and division of responsibilities enables the different stakeholders to focus on their core expertise and build their strengths on their own areas of operation. Furthermore, the general level of knowledge was considered to be on high level within the different departments. Purchasing interviewees considered IT tools within the department to be sufficient and providing required assistance.

### 3.3.2 Weaknesses of the Current State

The first and second weaknesses are quite similar: the first describes the lack of proactive communication when sourcing programs are altered during season and the second the lack of information during the planning phase of the seasons. The information concerning season details is not systematically shared to transportation, which causes lack of transport planning and preparation. Lack of information concerning decided suppliers and durations of seasons limits the possibilities to design effective transport solutions. Import freight prices are largely linked to export freight prices and therefore the detailed season information would be extremely important.

The third weakness is related to the current order practises and lack of cost-effective transportation. For instance, Benelux countries are increasingly important since based on the company data the import volumes from the region increased by 12% last year. That is by far the largest natural increase within yearly import volumes in fruit and vegetables when compared to other import regions in Europe. Based on transport data from week 1 to 5 of 2016, 69% of all purchase orders from Benelux countries were part loads which were not combined, but booked as part loads. Part load freights are up to over 20% higher than the freights for combined full truck loads. Combining part loads is rather uncommon, because Benelux order dates, volumes and other details are unpredictable and orders are often conducted within a short notice prior to loading. In addition, alternative transportation modes are not evaluated with currently established order practises.

Additional weaknesses include problems with managing the transport company pool, lacking IT in transportation planning, unreliable container transportation and lack of visibility in the transport claim process.

There are large differences between the prices of transport companies from the same regions and the selection of transport companies in some regions is quite high in relation to the amount of loads available. Lack of sufficient volume to offer creates friction between transport companies and import service and does not encourage service improvements. The level of IT in transportation is low and the current ERP system is not flexible enough to sufficiently support the operational transport planning. This creates plenty of manual work and results to inefficiencies and possible human errors.

Container reliability was increasingly described challenging within the purchase department and is largely related to the planning and promotional campaigns of overseas products. Containers are cheaper and more efficient when moving large volumes of overseas products to Finland. However, the container movements to Finland are highly dependent on the timing of connection ferries between Central Europe and Helsinki. One day delay to Bremerhaven may for instance result into a seven day delay in Helsinki due to lack of replacement feeder connection.

Other delay reasons include powerful headwinds, technical problems and vessel rotation changes. All the issues are common, but in general uncontrollable. The shipping lines, furthermore, generally take little or no responsibility for delays which leaves the case company to tackle with the stock out situations on their own. Effects include mentioned stock outs and extra costs due to supplementary orders or trucking containers by road from Central Europe harbours to Finland.

Finally, the level of visibility and traceability of the transport claim procedure was considered as one the major issues within the purchasing department. The purchasing is concerned that there is no sufficient effort allocated to handle claims, creating unnecessary insurance costs and preventing successfully handling the claim procedure towards receiving refunds.

### 3.3.3 Priorities of this Thesis

The priorities of this thesis were identified on the basis of the list of strengths and weaknesses. The import activities of purchasing and transporting fruit and vegetables from Europe by road were selected as the focus of this thesis. There is plenty of development potential within the purchasing and transportation operations which could provide significant efficiency improvement opportunities within the import process. The two key strengths of road transport capacity availability and reliability were considered as major advantages which need to be secured in the future. The prioritized key weaknesses, in other words development topics, are listed below in table 6. These topics were selected as the priorities of this thesis supporting the objective *to suggest efficiency improvements within the fruit and vegetables import supply chain*.

Development Priorities	Effects
Seasonal program changes not communicated to transportation on time	- Proactive transport planning impossible
Planning phase information not reaching transportation sufficiently	- Planning of transport for the season inefficient - Transport costs cannot be optimized when durations and locations are unknown
Cost-effective transportation difficult with current order practises	- Especially Benelux number of part load bookings high - Transport costs are up to over 20% higher - Alternative transportation solutions not evaluated

Table 6, Development priorities and effects

As seen from the table, all the selected development priorities are related to collaboration and the flow of information between the different stakeholders in the supply chain. The current supply chain is highly flexible and reliable, but tackling the above development topics could yield significant benefits in terms of more efficient and planned transport solutions. These challenges will be confronted in the following sections of this thesis. The next section studies the existing knowledge based on the defined development priorities in order to come up with a conceptual framework in support of developing a *proposal for improved import supply chain for fruit and vegetables*.

## 4 Existing Knowledge

This section discusses existing knowledge concerning supply chain topics derived from the development priorities of the current state analysis. The aim is to describe development topics in order to formulate a conceptual framework for this thesis, which is then utilized to propose improvements to the supply chain of the case organization.

Supply chains include various activities from processes such as manufacturing, storage, transportation and retail systems. These activities are connected, for instance, in terms of outputs of manufacturing activities acting as inputs for storage and transportation (Simchi-Levi et al. 2009: 164-165). Below figure illustrates typical activities within a supply chain.

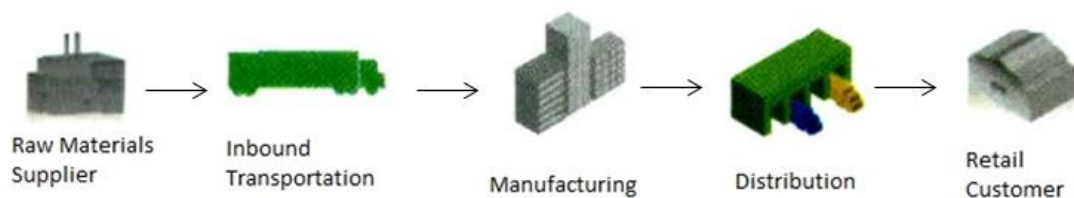


Figure 7, Supply chain activities (Modified from Bailey 2015: 31)

The individual topics covered in the section include collaboration, role of information and cost-effective transportation in supply chains.

### 4.1 Collaboration in Supply Chains

The aim of this chapter is to describe collaboration in supply chains. Discussed topics include collaboration and different levels of collaboration in general, typical difficulties with the lack of collaboration, the necessity to consider the supply chain as a whole and benefits of efficient integration and collaboration in organizations.

According to Langley et al. (2009), *'Collaboration may be thought of as a business practise that encourages individual organizations to share information and resources for the benefit of all'*. Today's supply chain relationships are most effective when collaboration occurs, enabling stakeholders to perform better together in comparison to

being isolated. Supply chain improvements usually include several different stakeholders leading to the requirement for effective relationships. Langley et al. state that collaboration is a business practise that requires (1) Parties to share and interchange information, (2) experienced benefits to exceed individual benefits, (3) parties to modify their own practises, (4) parties to operate in new and visibly different way and (5) parties to provide a process for collaboration to occur. (Langley et al. 2009: 115-116)

Ayers & Odegaard (2008) describe three different levels of collaboration as data exchange-, cooperative- and cognitive collaboration. Data exchange collaboration includes day-to-day transactions where partners exchange information as required. Cooperative collaboration includes shared systems and tools between partners with simultaneous access to decision making information. Decisions are still made independent in cooperative collaboration and examples are access to sales and forecasting data. Final level, cognitive collaboration includes knowledge exchanges and joint decision making between partners. (Ayers & Odegaard 2008: 225)

Simchi-Levi et al. discuss two different supply chain optimization approaches within companies: Local optimization and global optimization. Local optimization is described as a result of insufficient supply chain coordination. In local optimization one supply chain component optimizing own operations without considering the impact on other components in the supply chain (Simchi-Levi et al. 2009: 165). Sanger & Tochtermann (2007) studied the same organizational issue in the form of organizational silos. Organizational silos can occur for instance between sales and supply chain departments where the activities of the employees are completely disconnected. The compensation of salespeople often depends on the created revenues and completion of deals. Supply chain professionals are rarely involved in the sales process even though this would enable the effective evaluation of supply chain cost aspects (Sanger & Tochtermann 2007: 4).

Many times, for instance, the logistics component of the achieved sales deal severely decreases the margin of companies. Early and open collaboration between sales, purchasing and supply chain professionals would promote the opportunity to create shared savings, and thus joint gains (Sanger & Tochtermann 2007: 4). The study conducted by Godsell et al. (2006) describes similar issues within organizations: Companies often struggle in managing their overall supply chains where functional silos, for instance between manufacturing and logistics, create inefficiencies. Functional divides within



organizations promote development in parts of the supply chain instead of taking into account the system as a whole.

The connection between different supply chain activities results to the requirement to consider the system as a whole instead of optimizing solutions for one stage at a time. This is described as global optimization by Simchi-Levi et al. (2009). For instance, a cost increase in one stage of the activities might be tolerated if the result yields greater cost decreases within the overall supply chain. If there is a common owner of several activities within the supply chain, then it is clearly in the interest of the owner to maximize the overall efficiency of the supply chain. This is reasonable despite the possible efficiency decreases in local facilities. (Simchi-Levi et al. 2009: 165)

Lee (2009) reached similar conclusions: Aligned supply chains are organized in a way that all the stakeholders within the supply have common interests. When the interests of all stakeholders do not match the interests of the supply chain, the performance cannot be maximized. Lee's methods for building supply chain alignment include free information exchange with stakeholders, clearly defined roles and responsibilities and sharing of risks, costs and gains of improvements activities. Basu & Wright (2008) describe service level agreements (SLA) as one method of defining expected roles and responsibilities within organizations.

The SLA document defines the services to be delivered and the expected performance from that service. SLA is an agreement between two parties with defined goals and mutual understanding. Basu & Wright (2008) describe four topics to be included within a service level agreement. First, shared gains or structured incentives based on added value. Second aspect, shared risks. Third, best practises including training and cost-effectiveness initiatives freely shared. Fourth, forecast data and planning processes are shared between agreement parties. (Basu & Wright 2008: 94)

Overall, the cost-effective coordination of each of the supply chain components requires information. One of the major barriers to global optimization and maximizing supply chain performance is conflicting goals between different stages of the overall system. Effective integration, coordination and utilization of available information enable companies to tackle conflicts, and to move from local optimization toward global optimization (Simchi-Levi et al. 2009: 165-166). This is described by Simchi-Levi et al.

as the key method to reduce the overall supply chain costs while considering the requirements and trade-offs between the different stages.

One example of the benefits achieved through integration and collaboration is the Spanish-based fashion company Zara. Zara has significantly improved its supply chain operations performance through cross-functional teams. These cross-functional teams were created to manage the design, production and delivery activities of the fashion and apparel products to stores. The teams actively collaborate with store managers and are situated together in order to promote effective communication. With these efforts Zara is able to deliver their products from design to store in 15 working days, which is a significant achievement in comparison to its competitors. In addition to cross-functional collaboration, Zara promotes postponement techniques and lean inbound supply chains with the result of an agile responsive supply chain to stores. (Gattorna 2010: 150)

As to conclude, Gattorna (2010) describes the successful fast and responsive organizational configurations, including Zara, as having one common attribute: cross-functional team design. The most successful responsive organizations have established teams from different functions, aligned them to focus on a common objective and set incentives through joint KPIs to promote performance in all situations. The utilization of cross-functional teams provides a broader base of knowledge when compared to the organizations with vertical functional silos. Broad cross-functional base of knowledge is critical in providing more tools for decision making that takes into account the requirements of the different stakeholders. (Gattorna 2010: 154-155)

As described in the above chapters, several authors agree on the necessity of broad collaboration within supply chains. Collaboration generally promotes performance increases throughout the supply chain and ensures that the requirements of individual stakeholders are considered. Efficient collaboration requires information to be available and sufficiently exchanged between stakeholders. The role of information in supply chains is described further in the next chapter.

## 4.2 Role of Information in Supply Chains

The aim of this chapter is to discuss the role of information in supply chains. The topics include the necessity of information in supply chains, benefits of sufficient information sharing, requirements for information quality and defining the key pieces of information.

According to Langley et al. (2009) it is known that “information is the lifeline of business, driving effective decisions and actions.” Information is in a key position especially within supply chain management where direct line of sight to the chain activities is often lacking (Langley et al. 2009: 189). Managers equipped with accurate information about inventory levels, orders, production and delivery status throughout the supply chain are able to coordinate their activities with higher efficiency in comparison to their less informed comparisons (Simchi-Levi et al. 2009: 153). As an example, information about customer orders enables grounded responses based on actual emerging situations. This kind of knowledge provides tools to utilize sufficient resources much more efficiently in comparison to a situation based on estimations. (Langley et al. 2009: 189).

Considering the distances between suppliers and customers it is often impossible to gain insights and visibility to the different activities without flow of information. Without proper information, it is difficult or even impossible to achieve efficiency or to create appropriate results. Information is equally important for long range strategic planning, tactical collaboration with supply chain partners and execution of activities on a day-to-day basis. The effective flow of information within the internal company and between key stakeholders is necessary in order to enable the reliable flow of materials and money in the supply chain. (Langley et al. 2009: 190)

The figure one the next page illustrates the information flows within a supply chain.

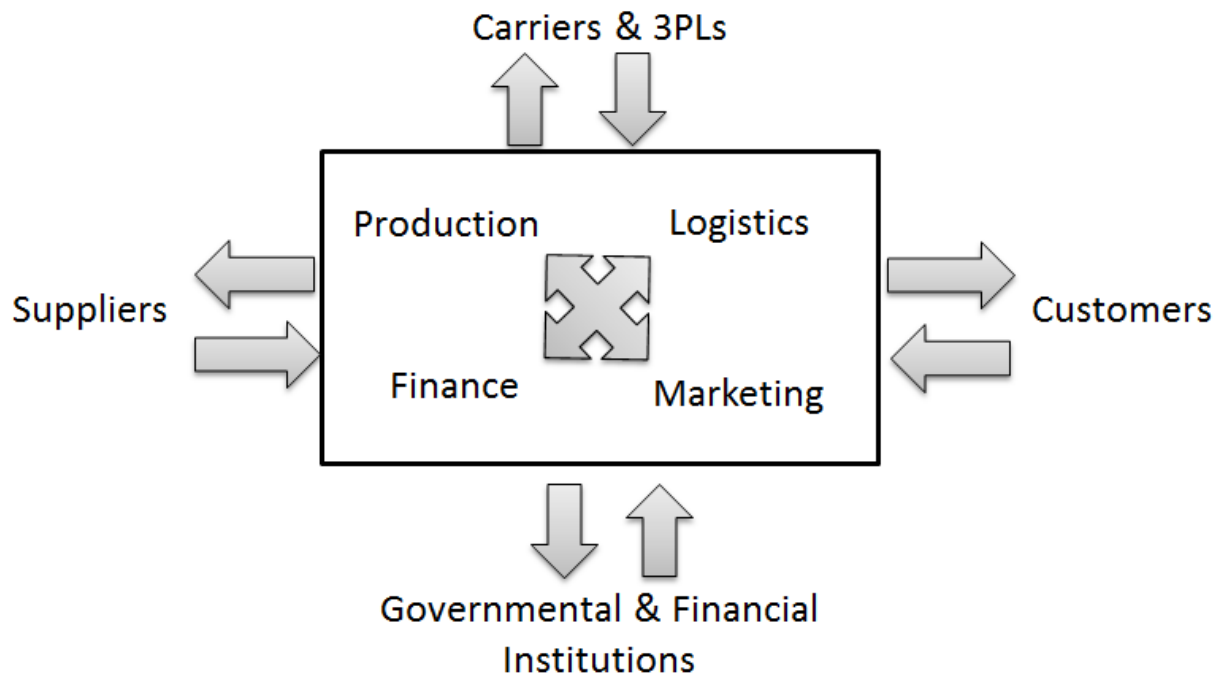


Figure 8, Supply Chain Information Flows (Based on Langley et al. 2009: 190)

As can be seen, the supply chain includes several different stakeholders within and outside the organization. The relevant information must effectively flow between these stakeholders in order to support their individual activities.

Internet and computer networks allow people from different organizations to continuously share information and stay in contact. Real time information provides possibilities to enhance performance in terms of for instance lower inventories and fewer transaction costs (Basu & Wright 2008: 242). Simchi-Levi et al. (2009) describe similar conclusions about the relation between abundant information and supply chain efficiency. They state that abundant information provides significant opportunities for companies to improve their supply chain design and management. Abundant information for instance reduces variability, enables better forecasting, improves reaction time to supply problems and enables lead time reductions (Simchi-Levi et al. 2009: 153).

Information can be utilized to co-ordinate efforts between different supply chain stakeholders instead of each party making decisions in isolation. Companies that are willing to work together and share information are able to improve their overall supply chain performance and create mutual benefits (Basu & Wright 2008: 242-243). An additional example of effective information sharing in relation to supply chain performance is discussed by Simchi-Levi et al (2009): They define the cost-customer service trade-off as

the link between, for instance, reducing inventories or transportation costs with a relative effect on the customer service level. They describe that it is possible to decrease the mentioned operational costs without an effect on the customer service by utilizing information and appropriate supply chain designs. For instance, cost effective operational response to customer demand can be achieved with rapidly available order information throughout the supply chain (Simchi-Levi et al. 2009: 169-170).

Langley et al. (2009) describe the requirements for information quality to be critical in order to manage supply chain operations effectively. They define five attributes which are necessary for the information to be valuable: The information must be (1) accessible, (2) relevant, (3) accurate, (4) timely and (5) transferable. Firstly, the information must be accessible to whoever reasonably needs it in order to perform effectively. For instance, access to sales information is critical to supply chain professionals when planning deliveries. Secondly, the information needs to be relevant. Overflow of irrelevant information to stakeholders has the potential to delay decision making and create extra diversions that are unnecessary to the situation at hand. (Langley et al. 2009: 190-191)

Thirdly, the information must be accurate. Inaccuracies within information can for instance cause replenishment errors, overstocks and transportation delays. Fourthly, the information must be timely. Real time data available on time is essential when companies strive to synchronize activities or address problems before they escalate. Fifthly, the information must be transferable. Supply chain information must be in electronic formats where it can effectively be converted or sent from one location to another. (Langley et al. 2009: 190-191)

Overall, information provides opportunities for companies to improve efficiency and decrease costs. Lower costs can be passed on to customers in the form of lower prices or retained as increased profits (Basu & Wright 2008: 242). However, there is a limit of how much information sharing actually benefits organizations. Companies should not focus purely on sharing all information, because there is always a relative effort and cost related to it. Many times the key pieces of information provide the majority of the required data in order to create cost benefits within the supply chain. It is necessary for supply chain stakeholders to understand and define the relative importance of the key pieces of information and focus on those instead of striving for full information availability (Simchi-Levi et al. 2009: 170-171).

As a conclusion, the role of information is critically important in efficient supply chains. Without sufficient information available, different stakeholders are unable to plan and execute their processes efficiently. Insights into different activities through information sharing create companies significant possibilities to improve their supply chain design. Supply chain improvement topics are further discussed in the next chapter.

### 4.3 Cost-effective Transportation

This chapter discusses several individual topics related to cost-effective transportation management. The described topics include supply chain cost reduction, attributes of lean and agile supply chains and the cost effects of consolidation and transportation service level. The aim is to identify and describe methods to reduce costs and improve overall supply chain performance.

#### 4.3.1 Supply Chain Cost Reduction

The target here is to describe a disciplined supply chain cost reduction process. The disciplined cost reduction process including different key stakeholders is designed to maximize the potential of savings efforts and to identify the root causes for unnecessary supply chain costs.

According to Ayers & Odegaard (2008), a process focus is a necessity in improving supply chain performance due to several reasons: It avoids local decisions at the expense of the overall system, takes into account the connections between departments and businesses and provides the advantages of shared knowledge for problem solving. This process-centred focus, which includes various supply chain partners, is the basis of collaboration. Ayers (2003) describes that companies often fail in including a correct set of personnel in supply chain development efforts. For instance, omitting one key department from development project might leave root cost aspects unnoticed. Limited participation often results to minor local savings which are largely below of what could have been achieved with broader collaboration.

There are several ways to approach a supply chain cost reduction process. According to Ayers (2003), a disciplined approach is more effective in comparison to a less structured approach. A disciplined approach enables companies to identify root causes for

unnecessary supply chain costs. Identifying the root causes is necessary in order to effectively tackle these issues. Below figure illustrates the discussed model.

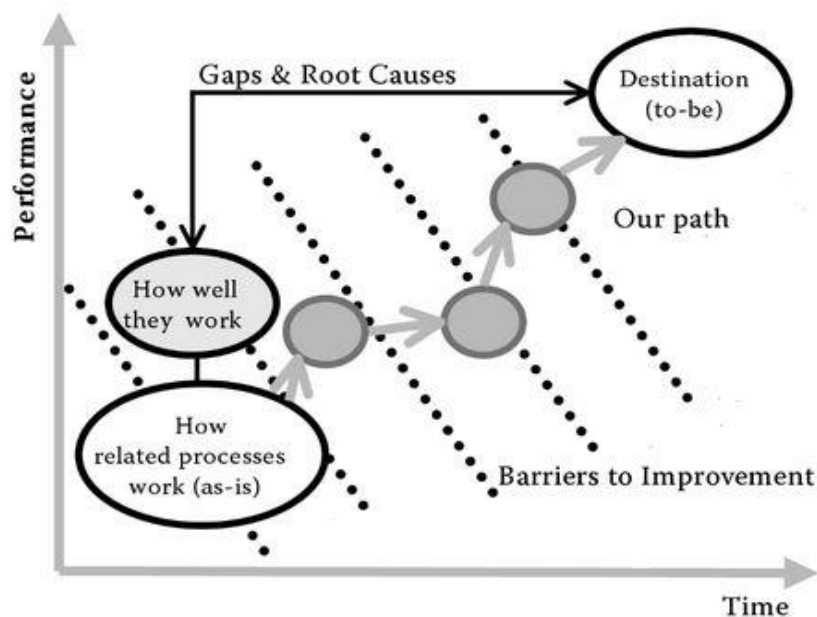


Figure 9, Model for implementing supply chain change (Ayers & Odegaard 2008:240)

In the above model, the process initiates with the analysis of how the company is currently performing. After this, the company establishes a detailed 'destination' vision for the supply chain with competitive cost and service performance. When the destination is defined, the company can use gap analysis to discover the difference between the current state and destination. Based on the gap analysis, the company is able to find the root causes for the gaps and set priorities for development (Ayers 2003: 26).

Unnecessary supply chain costs can generally be allocated to one or more of total six root causes, originally described in *The Handbook of Supply Chain Management*. First is 'Lack of clarity' including accounting practices and unwillingness to share cost information within the company or supply chain level. When cost sources and effects of decisions are unknown, it is difficult to optimize the costs within the internal company and especially the overall supply chain level. Secondly, 'Variability' meaning the factors that create uncertainty in the supply chain processes. These factors include, for instance, missed deliveries and unforeseen demand, which both have significant potential in creating extra costs in the supply chain. Thirdly, 'Product design' including design decisions such as material choices and level of effort required in manufacturing. (Ayers 2003: 24)

Fourth root cause 'Lack of information sharing' creates difficulties for companies to effectively and efficiently coordinate their activities within the supply chain. One of the well-known effects of lack of information is the "bullwhip effect" where production volumes have high deviation even when the actual overall demand is rather stable. Fifth root cause 'Weak links' includes make-or-buy decisions, the choice of partners and the level of relationships with supply chain partners. If decisions and management of partners is not conducted effectively, costs can increase for instance through poor supplier selection. The sixth and final root cause 'Unintended consequences' includes situations where good intentions to create results in one area of supply chain create bad overall results. An example of this is selecting a low price supplier, which is underperforming and creating extra costs, and therefore not decreasing the overall supply chain costs. (Ayers 2003: 25)

As a conclusion, broad cross-functional participation promotes increased gains in cost development projects. Identifying root causes enables companies to tackle issues where they emerge rather than merely focus on healing the symptoms.

#### 4.3.2 Lean and Agile Supply Chains

This chapter describes the attributes of lean and agile supply chains. Methods and benefits of both approaches are discussed and the usability evaluated.

A lean supply chain strategy focuses on accurate demand and capacity planning, keeping inventory levels low and running the plant efficiently (Basu & Wright 2008: 44). One of the main weaknesses of the current state of this thesis was unpredictable and variable purchase practises. A popular lean method for increasing process efficiency and decreasing variability is standardized operations/standard work. In standard work individual operations and related expectations for a process are documented in order to promote best practises. The standard way includes for instance the operations routine, work methods and skill definitions and thus decreases variability within processes (Ayers & Odegaard 2008: 256).

An agile supply chain focuses on high service level and fast response to customer demand. An agile supply chain requires flexibility in process and plant capacity (Basu & Wright 2008: 44). Based on Lee (2009), companies are able to create agility within their



supply chains by utilizing six basic methods. The methods include for instance promoting flow of information and eliminating information delays, developing collaborative relationships with suppliers and customers and building a dependable logistics system sufficient to tackle unexpected demand.

Originally described by Christopher (2000), a hybrid strategy in supply chains is often required where the attributes of lean and agile supply chains are combined. Below figure illustrates the differences between lean and agile supply chains.

	Lean	Agile
<b>Objectives</b>	<ul style="list-style-type: none"> <li>• Low cost</li> <li>• High Utilization</li> <li>• Minimum stock</li> </ul>	<ul style="list-style-type: none"> <li>• Fast response</li> <li>• Buffer capacity</li> <li>• Deployed stock</li> </ul>
<b>Process characteristics</b>	<ul style="list-style-type: none"> <li>• Elimination of waste</li> <li>• Smooth operation flow</li> <li>• High level of efficiency</li> <li>• Quality assurance</li> </ul>	<ul style="list-style-type: none"> <li>• Flexibility</li> <li>• Market sensitivity</li> <li>• A virtual network</li> <li>• Postponement</li> <li>• Selected lean supply chain principles</li> </ul>
<b>Product characteristics</b>	<ul style="list-style-type: none"> <li>• Functional products</li> <li>• Low variety</li> <li>• Low margin</li> </ul>	<ul style="list-style-type: none"> <li>• Innovative products</li> <li>• High variety</li> <li>• High margin</li> </ul>

*Table 7, Lean and agile supply chain characteristics (Based on Basu & Wright 2008: 228)*

A pure agile supply chain is generally most suitable for products with unpredictable demand, high profit margin and high number of variety. A pure lean supply chain approach is considered to be suitable when volumes are high, margins are low and changes more uncommon. It is possible to introduce longer lead times within a lean supply chain if it can be justified with lower overall costs. According to Basu & Wright (2008) it is not important to strictly follow lean or agile supply chain strategy in real-life context. Companies have different products and services where seasonal demand can sometimes create requirements for agility in a normally lean operating environment. Therefore, it is important to recognize and adapt supply chain strategy between agile, lean and hybrid as the situation requires. (Basu & Wright 2008: 226)

As a conclusion, any organization with different products or experiencing seasonal demand fluctuation is not purely able to focus on only lean or agile approaches. The key to success is to adapt supply chain design based on product demand characteristics and the situation the organization is operating in.

### 4.3.3 Consolidation and Transportation Service Level

The purpose of this chapter is to describe ways to improve cost-effectiveness in transportation management through consolidation and evaluation of transportation service level. The topics considered are cost of part loads, consolidation of orders and requirements for transit time.

Sänger & Tochtermann (2007) describe in their research how performance-based logistics allowances represent an opportunity for European manufacturers to increase their profit margins. These manufacturers provide incentives for their customers to order in a more cost-effective manner such as ordering full truck loads instead of partial loads or conducting orders online rather than by telephone. The logistics costs of these companies are typically 10 to 20 percent below average as their customers are following the performance-based incentives. (Sänger & Tochtermann 2007: 1)

An example of the transport costs per pallet can be seen in the figure below.

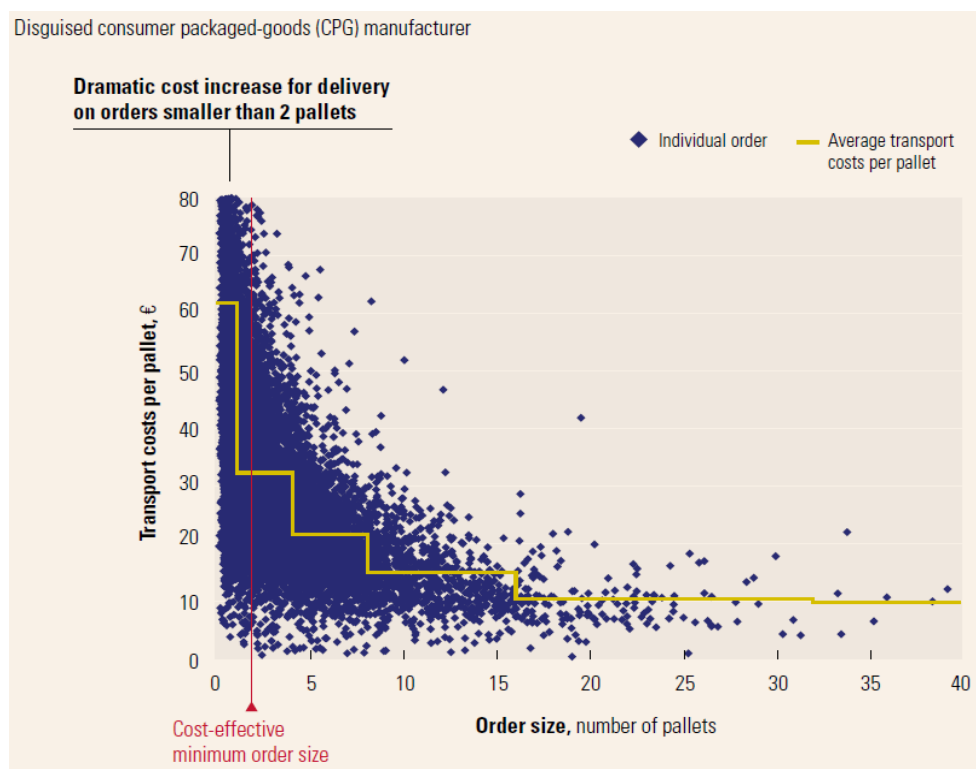


Figure 10, Transport costs per pallet (Sänger & Tochtermann 2007: 3)

As can be seen from the figure, the number of pallets per order has a significant impact on the transport cost per pallet. Especially below 10 pallets per order, the transport cost increases rapidly. Orders of four pallets already have approximately three times higher transport price per pallet in comparison to orders closer to 20 pallets.

Full truckloads are usually cheaper to operate than less than truckloads. This is due to the fact that each truck has certain fixed and variable operating costs. When a truck is carrying more pallets, the costs are spread out between more pallets, thus decreasing the cost per pallet within the truck. In many cases however, companies are not able to fill trucks without increasing inventory. This is the trade-off between inventory and transportation costs which the company needs to evaluate. Methods to tackle less than truckload transportation are ordering as late as possible to ensure full truckloads without increasing inventory or combining shipments of different products in order to fill trucks. Combining shipments to increase the number of full truckloads requires knowledge about orders, demand forecasts and supplier delivery schedules. (Simchi-Levi et al. 2009: 167-168)

As mentioned, combining shipments/consolidation to full trucks enables transportation managers to achieve lower transport rates from carriers, because of increased total volume. Freight consolidation can support competitive price marketing strategy through lower transportation cost per unit and thus decreased total purchasing cost for buyers (Langley et al. 2009: 310). Van Weele (2010) gives an example of Li & Fung: A Hong Kong based supply chain integrator which utilizes its scale and expertise to increase logistics efficiency. The company consolidates different shipments of different customers into one container in order to minimize the transport costs for the customers.

Hammer (2001) describes a cross-company transportation consolidation effort between two non-competitive dairy product suppliers. The two suppliers are not producing same products, but share mutual customers and same transportation and warehousing requirements. The companies decided to combine their distribution networks in order to gain improved fill rate of delivery trucks. The results of their consolidation agreement were fuller delivery trucks, fewer stops and fewer delivery delays leading to lower costs and increased customer satisfaction. According to Hammer, today's internet and communication technologies create potential for willing companies to share resources and gain significant benefits through merged processes.

However, customer service level sometimes prevents companies from utilizing consolidation if, for instance, the consolidation is not possible on the required transit time. In addition to consolidation, it is possible to evaluate the required customer service level in transportation. There is a relation between transportation service quality and cost. It is advisable to compare the service level required by the purchasers in relation to the transportation service level offered by the carrier. For instance, in a case where the purchaser requires three-day transit time and the carrier offers two-day transit time, there is a mismatch. The faster transit time is not required by the purchaser and is usually more costly. (Langley et al. 2009: 311)

In order to match the requirement of the purchaser, it is possible to negotiate slower transit time and decreased price with the carrier. Otherwise the transportation manager can utilize a slower, but less expensive alternative transport mode, such as rail transportation. Monitoring and evaluating the transportation service quality requires information. It is necessary to know the requirements of the customers and the service level the carriers are offering in order to effectively evaluate the situation. Based on this information, it is possible for the transportation manager to make effective decisions based on the actual stakeholder requirements and possibilities. (Langley et al. 2009: 311)

As a conclusion, information and collaboration can be utilized in order to increase cost-effectiveness in transportation. It is possible to consolidate different orders into full truckloads when timely knowledge about orders and demand is available. Consolidation can go even further when different companies share resources to create savings. In addition to consolidation, transportation service level has an impact on the transportation costs. Longer transit times enable the utilization of lower cost carriers or alternative transportation modes such as sea or rail. The next section combines all the discussed topics from the chapter into a conceptual framework for this thesis.

#### 4.4 Conceptual Framework of This Thesis

This section has discussed existing knowledge concerning supply chain topics derived from the development priorities of the current state analysis. The purpose of this last chapter is to summarize the findings from the existing knowledge and combine them into a conceptual framework. The three main elements of the conceptual framework of

this thesis are collaboration in supply chains, role of information in supply chains and cost-effective transportation. Please find the conceptual framework below.

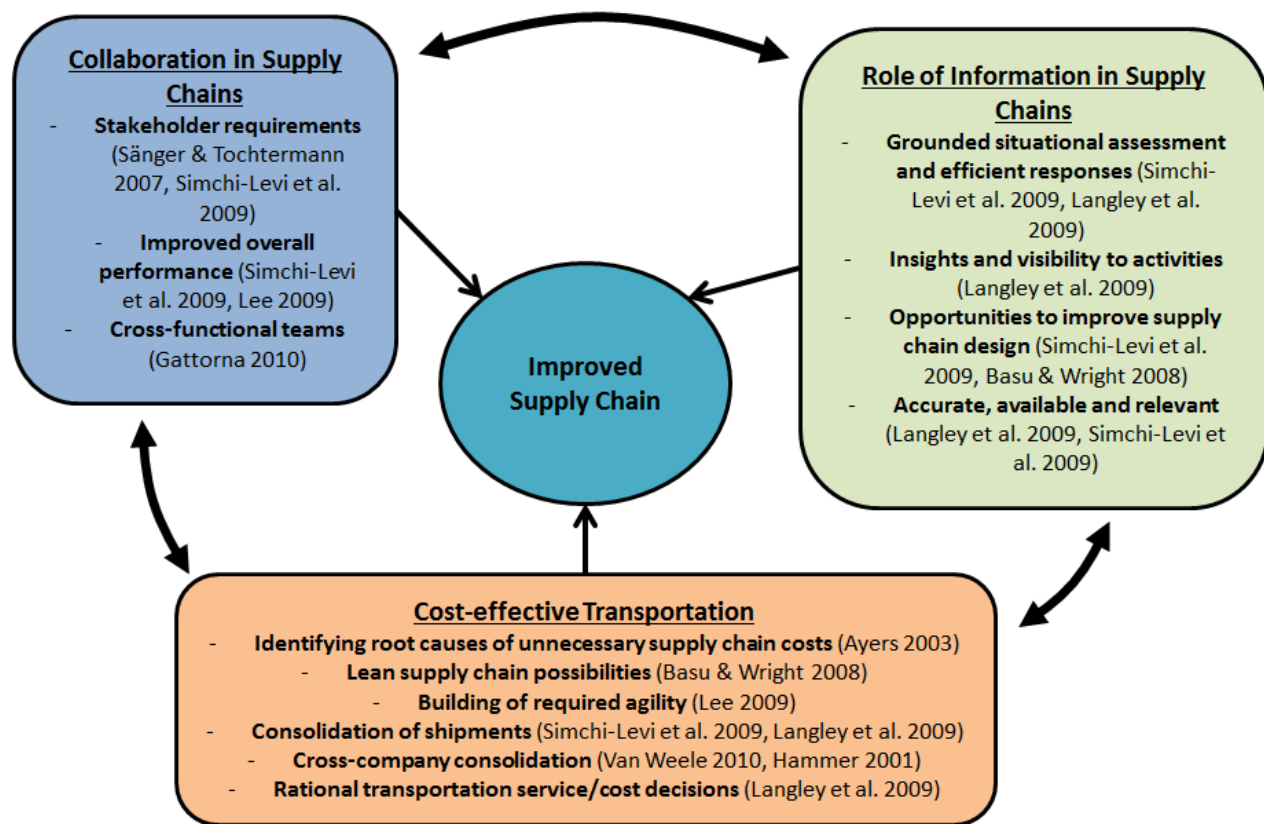


Figure 11, Conceptual framework of this thesis

As seen from the figure, the conceptual framework of this thesis consists of three inter-related building blocks contributing towards improving the supply chain. Collaboration in supply chains is a key topic when discussing high performance responsive supply chains. First, promoting efficient collaboration within supply chains ensures the requirements of all key stakeholders are taken into account. Second, companies are able to achieve improved overall performance when conflicting goals have been eliminated and the system is seen as a whole instead of partial individual phases. Third, cross-functional team design promotes a broader base of knowledge for decision making when compared to decision making in local organizational silos

Role of information in supply chains is critical. First, accurate and up-to-date information provides a sound basis for situational decision making and efficient responses. Second, it provides insights and visibility to supply chain activities that would otherwise be unknown. Visibility to activities in other parts of the supply chains reduces variability

and uncertainty. Third, available information provides opportunities for companies to seek for supply chain design improvements and execute key processes more effectively. Fourth, information has certain quality requirements, such as accuracy and availability, which are necessary for the information to be useful. Furthermore, companies are not required to share all information, often key defined pieces of information provide the majority of relevant knowledge.

Finally, promoting cost-effective transportation through different methods provides opportunities to create sustainable cost savings. First, disciplined analysis of the supply chain provides means to identify root causes for unnecessary costs. Second, it is possible to utilize lean supply chain approaches to achieve lower costs whenever the process and product attributes allow it. Third, companies are able to build required agility within their supply chains based on collaboration and efficient flow of information. Fourth, consolidation provides companies with significant potential for transportation costs savings. Fifth, cross-company consolidation enables companies to share resources and promote mutual gains. Sixth, rational transportation service/costs decision can be evaluated when customer and carrier information is available. Communication enables matching of required service level with the actual customer demands.

This section described the conceptual framework of this thesis, including the building blocks to improve the supply chain of the case organization. In the next section, the insights from the conceptual framework are utilized in order to build a proposal for improved supply chain for the case company.

## **5 Building the Proposal for the Case Organization**

This aim of this section is to merge the results of the current state analysis and the conceptual framework towards the building of the proposal. The section discusses the steps of building the proposal, development needs and ideas based on data collection round 2, and, finally, the proposal draft to improve efficiency within the supply chain.

### **5.1 Steps of Building the Proposal**

The current state analysis performed earlier in this thesis revealed the strengths and weaknesses of the current company practices. Three key weaknesses were selected as development priorities in order to support the objective to improve efficiency within the supply chain. Best practices and methods to tackle the development priorities were then described in the section 4 of this thesis. The development priorities are described below.

Firstly, program changes are not communicated to transportation on time. To promote communication, the benefits and requirements of collaboration in supply chains were described. Secondly, planning phase information is currently not reaching transportation sufficiently. To promote information availability and sharing, the role and requirements of information in supply chain were described. Thirdly, cost-effective transportation is currently difficult with established order practices. To increase cost-effectiveness in transportation, the methods and requirements of consolidation and alternative transportation configurations were defined.

The proposal draft builds on the summary of the current state analysis and the conceptual framework of this thesis. Building the proposal was performed in cooperation with several key stakeholders from the transportation and purchasing functions of the case organization. The summary of the current state and the development possibilities based on the existing knowledge were discussed in cooperation with the key stakeholders. This was performed in order to identify the functionality and requirements of the methods. The next chapter describes the development needs and ideas of the case organization.

## 5.2 Development Needs and Ideas

This chapter describes the development needs and ideas of the case organization on improving efficiency. These development needs and ideas were discussed and evaluated together with the stakeholders during data collection round two. The topics were derived from the development priorities and the conceptual framework and include collaboration, information sharing and cost-effective transportation. The themes from the conceptual framework were utilized as a frame for the discussions. This was designed to promote case organization specific ideas in collaboration with the key stakeholders.

Firstly, the level of communication and collaboration between key stakeholders in purchasing and transportation requires improvement. Currently the two departments are located separately and communicating mainly about topics concerning daily routine tasks. It is important to consider the requirements of all key stakeholders more widely within the supply chain if cost improvements are to be achieved. According to several informants, some of the purchasing managers do not necessarily know the details and cost effects of their daily purchase decisions in relation to the overall supply chain.

For instance, during data 2 discussions it was found out that transportation topics are actually rather rarely considered when as the activities are performed somewhere else. Including transportation early in purchase decision making could promote savings through more targeted transport planning. Furthermore, it was suggested that transportation department should take a more active role in suggesting new solutions and informing purchase managers about the development possibilities.

Secondly, the demand and seasonal planning information available at purchasing is not reaching transportation sufficiently. Purchasing department possesses detailed information concerning upcoming harvest season campaigns and regular seasons. However, the information is not made available for transportation planning in due time. According to the discussions, purchasing regularly maintains updated information concerning actual supplier selections and planned demand volumes. It is possible to share seasonal estimations and programs to transportation with minimal effort from purchasing.

Supplier selection generally defines the loading place and the origin country. Available information concerning weekly volume estimates and suppliers is thus highly beneficial



for transportation planning. Additionally, harvest season campaigns often increase sales of individual products significantly and thus have a direct impact on the loading volumes of certain locations. Pre-knowledge about increasing volume should enable transportation to be more sufficiently prepared for the requirements.

Thirdly, cost-effective transportation is not evaluated actively. According to the discussions, purchasing is widely based on established habits rather than considering the possibilities to perform differently. For instance, based on the current state analysis 69% of all purchase orders from Benelux countries are currently ordered and transported as part loads. High demand variation and uncertainties in product availabilities, loading dates, loading times and pallet weights currently cause difficulties in consolidation efforts. The uncertainty is further increased when purchasing orders products as late as possible, often one day or less prior to loading, leaving limited possibilities to plan consolidation. According to the interviews it is possible to agree on certain details, which could decrease uncertainty and ultimately costs. For instance, it is possible to agree on common loading dates for part loads or promote initial ordering with weekly programs.

Currently the transportation service level and transit times are not actively considered within the case organization. Orders are transported with the principle “as fast as possible” with no consideration for alternatives. However, during discussions it was mentioned that this is also more of planning and habit issue. If purchasing knows the different transit times before ordering, it can plan purchase orders accordingly and the transit time does not need to be the fastest possible. An example of this was already seen after the current state analysis workshop where one purchase order was granted more flexible transit time to promote a cost decrease. Purchasing is additionally interested in piloting container transportation from Europe with longer transit time and decreased costs.

As a conclusion, the development needs and ideas considered during data 2 discussions were derived from the development priorities and the conceptual framework of this thesis. It was possible to identify several development ideas that could prove beneficial for the case organization. The next chapter introduces the proposal draft of this thesis.

### 5.3 Proposal Draft

The aim of this chapter is to describe the proposal draft for improved supply chain in the case organization context. The proposal draft is based on the strengths and weaknesses of the current state analysis of the case organization and the conceptual framework of this thesis. The current state analysis defined development priorities of this thesis, which were studied under the topics of collaboration in supply chains, role of information in supply chains and cost-effective transportation. The considered topics were designed to support the objective *to suggest efficiency improvements within the fruit and vegetables import supply chain*.

The proposal draft was designed as a list of recommendations to improve the activities within the supply chain, including roles and responsibilities. As the main focus and the development topics of this thesis were on the purchasing and transportation departments, the proposal draft is limited to these two key stakeholders. The colours within the list indicate the link to the corresponding parts in the weaknesses of the current state, selected development priorities and topics of the conceptual framework. Please find the list of recommendations on the following page.

Role	Responsibility
Transportation	Take a more active approach in suggesting new transportation solutions and development possibilities to purchasing.
Transportation	Promote open communication about the requirements of daily activities.
Transportation	Consider the possibility of relocating under one roof with purchasing to promote cross-functional team design.
Purchasing	Share campaign and harvest season product details to transportation after decisions have been made.
Purchasing	Share common season programs to transportation after supplier selections have been made.
Transportation	Continuously evaluate and share the requirements for key pieces of information.
Transportation	Request for missing information when necessary.
Purchasing	Promote initial ordering with weekly programs when possible.
Purchasing	Promote standard work including operations routine and work methods to reduce variability.
Purchasing	Adopt a more active approach in considering the relation between transit time and costs.
Transportation	Maintain a reliable selection of cost-effective transportation companies.
Transportation	Combine shipments whenever possible and reasonable.
Transportation	Consider the possibilities of cross-product type consolidation within case organization.
Transportation	Promote active communication with suppliers and transportation companies regarding requirements for consolidation.
Transportation	Pilot container transportation on long shelf life products with agreement from purchasing.

*Table 8, Proposal Draft for Improved Supply Chain*

As seen from the table, there are specific responsibilities for transportation and purchasing departments. Several responsibilities require mutual agreement and commitment, but the initiative roles must be clear to avoid confusions concerning responsibilities. Each of the development priorities includes several recommendations which are designed to improve performance and promote cost decreases within the supply chain. The individual parts of the development proposal are discussed in further detail in the following sections. Furthermore, the tables in the following sections illustrate the sources for the recommendations in terms of data 1, data 2 and literature. This is designed to transparently show the reader which source of information the recommendations are based upon.

### 5.3.1 Proposal to Improve Collaboration

The aim of this section is to describe the proposal to improve collaboration within the case organization. Please find the collaboration related recommendations of the proposal in the below table.

Role	Responsibility	Source
Transportation	Take a more active approach in suggesting new transportation solutions and development possibilities to purchasing.	Data 2
Transportation	Promote open communication about the requirements of daily activities.	Data 2
Transportation	Consider the possibility of relocating under one roof with purchasing to promote cross-functional team design.	Literature

*Table 9, Collaboration related recommendations*

Transportation department should take a more active approach in suggesting new transportation solutions and development possibilities to purchasing. The responsibility of transportation department is to continuously update knowledge about transportation solutions. The new transportation solutions, such as efficient lines of alternative transportation modes, should actively be brought to the attention of purchasing for practical evaluation and possibility of performance development. Collaboration ensures that development possibilities are timely considered and implemented when reasonable.

According to the stakeholders, purchasing is not aware of the requirements of transportation concerning their activities unless the topics are openly discussed and brought up. Therefore, especially transportation should increase their responsibility and activeness in providing information on effects of current working habits. The trend was clearly visible when interviewing stakeholders: Purchasing reports everything to work well and transportation identifies several requirements, which could be tackled with communication and collaboration. It is important that transportation promotes open dialogue where daily activities and work requirements are considered. Tools such as service level agreements can be utilized in order to define expected performance from stakeholders.

Finally, transportation department should consider the possibility of relocating under one roof with the purchasing department. This recommendation is provided to promote the benefits of cross-functional team design. The two departments are currently working on the same products and with the same stakeholders and communicating via

email and phone on a daily basis. However, clear functional silos are visible and communication is not maximized. A closely integrated cross-functional team with common goals should provide possibilities for increased performance and broader base of knowledge for decision making. Broad cross-functional knowledge efficiently promotes decisions that take into account the requirements of the collaborating functions within the team.

### 5.3.2 Proposal to Improve Information Sharing

This section presents the recommendations to improve information sharing between the key stakeholders. Below table illustrates the information related recommendations.

Role	Responsibility	Source
Purchasing	Share campaign and harvest season product details to transportation after decisions have been made.	Data 2
Purchasing	Share common season programs to transportation after supplier selections have been made.	Data 2
Transportation	Continuously evaluate and share the requirements for key pieces of information.	Literature
Transportation	Request for missing information when necessary.	Data 2

*Table 10, Information related recommendations*

Firstly, based on the discussions during the proposal phase, purchasing department possesses a wide range of available seasonal and purchase information that could be shared with the transportation department if required. The currently identified key pieces of information include campaign planning, harvest season products definitions and pre-season supplier selections. Sales campaigns and harvest season product campaigns promote significant volume increases in comparison to regular sales weeks and therefore inflict pressure on transportation capacity. Purchasing should share details of these campaigns directly after decisions have been made in order to promote sufficient and effective capacity planning in transportation. The timely information concerning high volume sales campaigns additionally promotes opportunities for campaign related cost-effective transportation deals.

Secondly, purchasing should start to share common season programs to transportation after supplier selections have been made. Based on the current state analysis, supplier selections are generally conducted in due time before the season launch and readily

available within the purchasing department. However, currently this information is not shared to transportation until the first actual orders are performed. Sharing details concerning volumes and supplier selection is essential in promoting optimized transport planning. Supplier selection generally defines the loading address and even the country, which is highly important information when considering transportation planning in the long run.

Further recommendations in the category include evaluation of key pieces of information and active participation of transportation requesting information when it is lacking. Evaluation of key pieces of information promotes searching and considering the cost effects of sharing specific information from planning. It is the benefit of the overall supply chain if transportation employees identify which pieces of information from purchasing could prove important in their individual activities. Finally, transportation should be active and open in requesting for information when it is missing from purchasing.

### 5.3.3 Proposal to Improve Cost-effectiveness in Transportation

The aim of this section is to discuss the recommendations to improve the cost-effectiveness of transportation within the supply chain of the case organization. The table below includes the roles and responsibilities.

Role	Responsibility	Source
Purchasing	Promote initial ordering with weekly programs when possible.	Data 2
Purchasing	Promote standard work including operations routine and work methods to reduce variability.	Literature
Purchasing	Adopt a more active approach in considering the relation between transit time and costs.	Data 2
Transportation	Maintain a reliable selection of cost-effective transportation companies.	Data 1
Transportation	Combine shipments whenever possible and reasonable.	Data 2
Transportation	Consider the possibilities of cross-product type consolidation within case organization.	Literature
Transportation	Promote active communication with suppliers and transportation companies regarding requirements for consolidation.	Data 2
Transportation	Pilot container transportation on long shelf life products with agreement from purchasing.	Data 2

*Table 11, Cost-effective transportation related recommendations*

According to the discussions, it is possible for purchasing to promote the shift from short lead time ordering towards ordering with weekly programs once per week. The focus of weekly program ordering is to order based on the standard weekly demand and then conduct additional ordering in case necessary. Weekly program ordering is a significant improvement in terms of transportation requirements since it promotes increased planning time for efficient planning. Especially consolidation of part load benefits from earlier ordering which results to increased number of full truckloads versus part loads.

Variability is one of the basic root causes of unnecessary supply chain costs described by Ayers (2003). Purchasing should promote the lean method of standard work, including operations routine and work methods, to reduce variability in the current ordering practises. For instance, ordering part loads within the same time limits for the specified weekly loading dates significantly reduces variability related costs in transportation planning. If transportation knows that a number of part load orders are always planned for, for instance, Monday, Wednesday and Friday loadings, consolidation possibilities are increased.

A more active approach in considering the rational relation between transit time and costs should be adopted in purchasing. Most of the transit times are established and based on experience and habits within the purchasing department. However, there are cases when even one day longer transit time promotes significant cost savings. The issues are not actively considered, but it was mentioned in the discussions that purchasing is able to alter ordering patterns to different transit times if they are informed. Therefore, it is beneficial to consider longer transit times whenever they have significant cost effects.

The current supply chain has two major strengths: High availability of road transportation capacity and high reliability of road transportation. The third recommendation in the above table is related to these two strengths. The case organization should continue to work closely with selected key transportation partners in order to continue promoting reliability and cost-effectiveness in transportation. Transportation reliability is considered as one of the most important things in purchasing, which is understandable when warehouse balances are low and stock outs are costly.

Promoted by decreased variation and increased information flow from purchasing, transportation should consciously search for reasonable possibilities to consolidate part load shipments into full trucks. Consolidation is not reasonable when it does not promote significant cost savings or alternatively excessively increases the risks of delays. Furthermore, in order to support the collaboration with key flexible part load carriers, it is necessary to consider not decreasing the number of part loads to an ultimate minimum. Sufficient volumes promote the collaboration and results in higher mutual dependability.

Hammer (2001) described a cross-company consolidation effort to share resources and promote performance increases. In the case organization context, it is possible to consider the possibilities for cross-product type consolidation between the different parts of transportation department. For instance, frozen and processed foods are weekly collected as part loads from the Benelux countries. Processed foods are transported in the same temperature as many of the fruit and vegetables and delivered to the same warehouse, but consolidation is not practised. Increasing the possibilities to select from a larger number of shipments to consolidate increases the possibilities to successfully fill trucks and therefore should be considered.

Consolidation of shipments requires detailed knowledge about orders. Purchasing and transportation should jointly promote active collaboration with suppliers and transport companies concerning the requirements for consolidation. Information concerning pallets weights, tolerances in temperatures and loading times is essential to successfully consolidate orders. In addition, it is necessary to inform transport companies about the transportation requirements, such as two temperature trailers.

Based on the discussions with purchasing, it is possible in transportation to pilot container transportation for longer shelf life products such as apples or pears. It is recommended to pilot the alternative transport mode to promote cost savings, even when the transit time is longer. When the product and transportation quality is good, it is possible to transport the whole weekly program in containers at the same time. Containers are provided with sufficient free demurrage time in the Vuosaari harbour, meaning the possibility to deliver to the warehouse only when required.

This section discussed the proposal draft for improved supply chain for the case organization. The proposal draft was designed and presented as a list of recommendations



including roles and responsibilities. The discussed topics included collaboration, information sharing and cost-effective transportation within the supply chain. The next section discusses the validation of the proposal draft towards the final proposal.

## 6 Validation of the Proposal

This section discusses the validation of the proposal in terms of feedback from the stakeholders and piloting of proposed methods for cost-effective transportation. Furthermore, the final proposal is discussed and action plan for immediate activities defined.

### 6.1 Findings of Data Collection 3

The proposal draft was co-created with the key stakeholders from purchasing and transportation. The proposal was based on the current state analysis and the conceptual framework of this thesis. For validation of the proposal, several 1-to-1 discussions were performed with the key stakeholders in order to gain a thorough view on the functionality of the recommendations. Furthermore, it was suggested for stakeholders to give feedback and suggest development topics to improve the proposal. The stakeholders provided positive feedback on the proposal and considered the recommendations to be reasonable and generally beneficial for the organization. The overall feedback comments are illustrated in the table below.

Informant	Feedback comment
Transport Informant A	These are all reasonable and logical. Basically things that should already be in order if you think about it.
Transport Informant B	These are very good points. I especially like the last point, the purchasing seems to rarely think about the costs of shorter transit time and they just order without even considering alternatives.
Transport Informant C	Looks good. You didn't suggest the multimodal alternative then?
Transport Informant D	Excellent work. It is very good to have these things here on paper instead of just talking about them and nothing ever changing.
Purchase Informant A	This is good: I don't want to add anything to this list. It would be good of course always to have something to say or develop, but I cannot think of anything now.
Purchase Informant B	These are good points. I especially like the point about moving under the same roof, it would be so much easier to just shortly ask for something or give a heads up if you were right here.
Purchase Informant C	When I look at these, it's hard to add or change anything on the list. Everything here is valid.

*Table 12, Feedback comments on the proposal*

As seen from the table, the proposal was thoroughly accepted by the different stakeholders. The recommendations were generally perceived as valid and manageable. Some of the topics, such as cross-product type consolidation, relocating under one roof and the habits of the purchasing department, aroused more discussion. No development suggestions to the proposal were described, partially because the proposal ideas were considered during the proposal building phase. Multimodal transportation was not suggested, because it was more expensive and slower in comparison to road transportation. However, the situation should be monitored again, for instance when oil prices increase.

The consolidation of shipments was piloted in cooperation with key transportation service providers and with the support of timely ordering. During the pilot, different shipments were combined in one and two temperature trailers in order to increase the number of full truck loads. Based on the consolidation efforts of 16 part load purchase orders, it was possible to decrease the transportation costs of the consolidated purchase orders by an average of 15%. Some of the trucks were not filled 100% and some of the locations are not suitable for less reliable or cheaper part load carriers, when collected as part loads. Therefore, the actual costs savings from consolidation are potentially higher in reality. Additionally, it was agreed to pilot container transportation on apples and pears in the near future. The actual cost savings per purchase order when utilizing short sea container transportation is on average 17%.

## 6.2 Final Proposal

The objective of this thesis was *to suggest efficiency improvements within the fruit and vegetables import supply chain*. The proposal includes recommendations that promote immediate efficiency improvements through cost-effective transportation solutions such as consolidation of shipments and alternative transportation modes in the form of container transportation. In addition to the recommendations with cost effects, the proposal includes topics to improve the efficiency of the supply chain in the long run.

The current state analysis of this thesis indicated that there is lack of communication, information sharing and cost-effectiveness in the current supply chain. Based on existing knowledge, collaboration and information sharing are increasingly important when striving to increase the overall efficiency in supply chains. Cross-functional collabora-

tion ensures that the requirements of the different stakeholders are considered and information provides insights and reduces uncertainty.

The recommendations concerning cross-functional collaboration, open sharing of key pieces of information and continuous consideration of cost-effectiveness in transportation provide means for the case organization to improve the performance of the supply chain currently and in the future.

The proposal draft was thoroughly accepted and no development ideas were suggested by the seven key stakeholders. As the stakeholders agree on the importance and relevance of the development recommendations, it is a mutual benefit to facilitate and promote the improvements. Therefore, the final proposal is the same as the initially proposed list of recommendations including roles and responsibilities of the stakeholders at purchasing and transportation. The proposal can be found in the previous section, in chapter 5.3.

### 6.3 Action Plan

The aim of this chapter is to describe the action plan of the immediate activities to undertake in order to promote the improvements within the supply chain. There are specific responsibilities defined for the stakeholders within the proposal. Some of the recommendations are guidelines or behavior related, but others are activities that should be initiated as soon as possible.

First, it is suggested that purchasing shares available and confirmed campaign and harvest season product planning to transportation. Second, purchasing should share all planned common seasonal programs of which supplier selections are already made. Third, transportation should consolidate part load shipments on all loading dates, when reasonable. Fourth, transportation should daily promote the requirements of consolidation to enable increased number of full truck loads. Fifth, transportation should perform a pilot on container transportation in collaboration with purchasing in the near future. The resources and specifications for container transportation are already available.

The next and final section discusses the thesis and draws conclusions.

## 7 Discussion and Conclusions

This section summarizes the thesis and describes managerial implications. Furthermore, the thesis is evaluated in terms of outcome vs objective, reliability and validity.

### 7.1 Summary

The objective of thesis was to suggest efficiency improvements within the fruit and vegetables import supply chain of the case organization. The retail industry in Finland is increasingly competitive and highly visible price campaigns are common. The purchasing department of the case organization requires continuous development in overall cost-effectiveness in order to efficiently respond to the competition. Decreasing product related costs, such as transportation costs, are one of the few ways in retail to promote lower selling prices or increased profit margins.

A current state analysis was performed on the import supply chain in order to identify the strengths and the weaknesses of the supply chain. The current state analysis revealed several weaknesses which could be addressed in order to improve the current supply chain. Communication and collaboration related weaknesses between purchasing and transportation were selected as the priorities. Based on the development priorities, existing knowledge was studied in order to create a conceptual framework for this thesis. The created conceptual framework included three interrelated building blocks to promote the increase in supply chain efficiency.

The final outcome of this thesis is a proposal for improved import supply chain for fruit and vegetables. The proposal was designed as a list of recommendations including roles and responsibilities from the purchasing and transportation departments of the case organization. The proposal included recommendations to improve collaboration, information sharing and cost-effectiveness within the supply chain. The recommendations were designed both, to create immediate efficiency improvements, and to promote the future performance of the supply chain.

The proposal was built and validated in collaboration with the key stakeholders from purchasing and transportation. The stakeholders shared a mutual understanding on the benefits and relevance of the recommendations. No further developments to the proposal draft were suggested, partially because it was discussed thoroughly during the

proposal building phase. In addition to the discussions, the immediate improvement methods to increase efficiency within transportation were piloted.

Firstly, piloting consolidation of part loads was successfully conducted with the support of key transportation service providers and timely purchase orders from purchasing. In total, 16 part load shipments of different fruit and vegetables were consolidated into full truck loads during the pilot. The results indicated an average of 15% decrease in the actual transportation costs of the consolidated purchase orders. It is possible to decrease the transport costs even further when the trucks are utilized 100%, which was not always the case during the pilot. Secondly, it was agreed to pilot container transportation to promote cost savings. Container transportation increases the transit time, but promotes average cost savings of 17% on the selected routes. As a conclusion, actual efficiency improvements were achieved through cost-effective transportation solutions.

## 7.2 Managerial Implications

This thesis defined an action plan (see chapter 6.3) for immediate operational activities to promote the increase in efficiency within the supply chain. However, some of the proposal recommendations are managerial level or behavioural guidelines which require management consideration and commitment.

Firstly, management in transportation should promote the requirements for increased activeness and open communication from transportation to purchasing. Purchasing repeatedly described the lack of knowledge concerning transportation requirements and development possibilities. It is advisable to promote the culture of open dialogue concerning requirements and suggestions with the other key stakeholders within the supply chain. For instance, if purchasing is not aware of any development requirements, they will not change their operational activities or habits.

Secondly, management in transportation should consider the possibilities of relocating the import service team under the same roof with the purchasing department. Best practises describe how cross-functional team design promotes significant performance increases in organizations. During the discussions with the stakeholders, the topic of cross-functional team design was considered a beneficial and reasonable recommendation. Cross-functional team design generally provides organizations with possibilities

to enhance the capabilities for decision making and acknowledges the requirements of different stakeholders.

Thirdly, management in purchasing is advised to promote timely weekly program ordering and standard work methods in order to reduce variation and promote efficiency within the operations. Initial ordering through weekly programs enables suppliers and the transportation department increased time to prepare for the demand. This enables more reliable supplier performance and increased cost-effectiveness in transportation planning. Furthermore, promoting standard purchasing work in terms of operations routine and work methods should decrease variation, which is one of the basic root causes of unnecessary supply chain costs.

### 7.3 Evaluation of the Thesis

This thesis was conducted in a structured manner as described in the research design. First, the ultimate objective of the thesis was defined. Second, the current state analysis of the case organization supply chain was conducted in order to understand the current practises and the challenges encountered. The current state analysis was conducted in cooperation with the stakeholders and by analysing company data in order to identify strengths, weaknesses, priorities and scope of this thesis. Third, existing knowledge derived from the development priorities was studied in order to create a conceptual framework. Fourth, the conceptual framework and strengths from the current state were utilized to build a proposal draft in cooperation with key stakeholders. Fifth, the proposal was validated in cooperation with the key stakeholders resulting in the final proposal for improved supply chain.

This thesis described improvement recommendations within different supply chain functions. Many times trust is a key bottleneck limiting collaboration and information sharing within supply chains, but this was not the case within this thesis. Therefore, the recommendations are partially limited to open environments, where trust is not an issue. Furthermore, it would have been beneficial to include more stakeholders, such as warehouse receiving or key transportation partners, within this thesis. However, to save time and ensure the completion of this thesis on time, it was decided to focus on the purchasing and transportation activities within the case organization.

### 7.3.1 Outcome vs Objective

The objective of thesis was to suggest efficiency improvements within the fruit and vegetables import supply chain of the case organization. The outcome of this thesis was a list of recommendations including methods to promote immediate efficiency improvements and guidelines to promote the future performance of the supply chain. Part load consolidation was successfully piloted with an average of 15% decrease in transportation costs on the consolidated purchase orders. Furthermore, planned container transportation is estimated to provide average savings of 17% in comparison to full truck loads on road. Therefore, it is possible to argue that the objective was fulfilled.

### 7.3.2 Validity and Reliability

Validity in research refers to the questions of whether research results address the research question, researchers see what they think they see and which methods were utilized during the research process towards the outcomes (Flick 2006: 371-396).

To ensure validity in this research, multiple sources of information including key stakeholder interviews, discussions, participant observation, a workshop and internal company data were utilized. The target was to create a holistic, objective view on the current state of the supply chain. The data for the different phases of the thesis were collected in three different points of time and in different locations. The interviews and discussions were not always as effective as possible, because participants were sometimes less talkative or descriptive of topics. However, broad participation from transportation and purchasing departments provided sufficient resources for data collection.

The objective of reliability is to ensure that when the case study would be repeated with the same procedures as described, the findings and conclusions should be the same. The target of increasing reliability of a study is to minimize the errors and biases. (Yin 2009: 45)

To ensure the reliability of this thesis, data was collected from multiple sources. Furthermore, the DATA 1 interview questions and DATA 2 discussions themes are included in this thesis as appendix. It would have been beneficial to tape record all the discussions and interviews. However, providing participants the possibility to read and modify the generated field notes minimized errors in conclusions.



#### 7.4 Closing Words

As the aggressive price competition in the Finnish retail business forces companies to consider their profit margins, cost-effectiveness in operations has become increasingly important. This thesis has identified that through integrated cross-functional collaboration and effective information sharing companies are able to create sustainable potential for cost-effectiveness. It is important to consider the supply chain as a whole, instead of barely focusing on local silos. Considering the system as a whole ensures that the requirements of the different stakeholders are evaluated and the overall performance of the supply chain increased. Only by aligning their supply chains to work towards common goals, are companies able to maximize the overall performance of the system.

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**DATA 1 Interview Questions in Transportation**

1. Please describe the general responsibilities of the import service department
2. How does the import transportation process work?
  - a. Where does it start? What happens before transport orders?
  - b. How is a transport order conducted?
  - c. What happens after the transport order? Responsibilities?
  - d. Who are you collaborating with?
  - e. Are there clear roles of who does what?
  - f. How do you define the starting point and the finish point of your duties?
3. What do you see as strengths that are working well in transportation? What about the whole import supply chain?
4. What kind of challenges do you see in transportation and the current import supply chain? What kind of an effect does it have?
5. If you could improve something, what would you do and how? Is there something you would wish to eliminate?
6. How do you see working with other organizations and departments? What kind of benefits or challenges?
7. Could you describe the ideal situation of the import process in relation to transportation?

**DATA 1 Interview Questions in Purchasing**

1. Please describe the general responsibilities of the purchase department
2. How does the import purchasing process work?
  - a. Where does it start? What happens before purchase orders?
  - b. How is a purchase order conducted?
  - c. What happens after the purchase order? Responsibilities?
  - d. Who are you collaborating with?
  - e. Are there clear roles of who does what?
  - f. How do you define the starting point and the finish point of your duties?
3. What do you see as strengths that are working well in purchasing? What about the whole import supply chain?
4. What kind of challenges do you see in purchasing and the current import supply chain? What kind of an effect does it have?
5. If you could improve something, what would you do and how? Is there something you would wish to eliminate?
6. How do you see working with other organizations and departments? What kind of benefits or challenges?
7. Could you describe the ideal situation of the import process in relation to purchasing?

**DATA 2 Discussions Themes**

- Benefits and methods of increasing collaboration
- Lean and agile supply chain characteristics in the case organization context
- Consolidation potential and requirements
- Alternative transportation modes
- Importance and effects of information sharing
- Key pieces of information instead of need for sharing everything
- Purchasing targets vs transportation targets
- Future methods and ways of working to support purchasing and transportation needs

**Example Set of Field Notes (DATA 1)**

**REMOVED**