



Open your mind. LUT.
Lappeenranta University of Technology

September 27, 2018

LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

LUT SCHOOL OF ENGINEERING AND SCIENCE

Industrial Engineering and Management

Operations Management

Master's Thesis

Inbound logistics outsourcing in electrical solutions providing company

Sanna Ruusunen

ABSTRACT

Author: Sanna Ruusunen	
Subject: Inbound logistics outsourcing in electrical solutions providing company	
Year: 2018	Place: Helsinki
Master's Thesis. Lappeenranta University of Technology, School of Engineering and Science, Industrial Engineering and Management. 103 pages, 4 tables, 6 figures and 3 appendices	
Supervisors: Professor Timo Kärri & Post-Doctoral Researcher Ari Happonen	
Keywords: inbound logistics outsourcing, logistics outsourcing, component warehouse outsourcing, LSP, logistics service provider	
<p>This study aims to create a guide to logistics outsourcing process for an electrical solutions providing company, which is currently evaluating the opportunity to outsource its component warehouse. Because well-functioning inbound logistics is a crucial part of continuous production and company success, the outsourcing process should be properly implemented. The research focuses on one factory, but the aim is to create a guide that can be utilized in other similar cases as well.</p> <p>The paper is executed as a systematic literature review. Relevant research is examined in a systematic way in order to provide guidelines for logistics outsourcing from planning to execution. The research is supplemented with company-related perspective: what is the meaning of each phase for the case company.</p> <p>Current literature has little focus on component warehouse outsourcing or inbound logistics outsourcing. Additionally, lack of practical research and operating models were discovered. Eventually, a comprehensive guide for inbound logistics outsourcing and best suiting operating solution was provided, with SWOT analysis of positive and negative effects that could occur during outsourcing.</p>	

TIIVISTELMÄ

Tekijä: Sanna Ruusunen

Aihe: Tulologistiikan ulkoistaminen sähköistysjärjestelmiä tarjoavassa yrityksessä

Vuosi: 2018

Paikka: Helsinki

Diplomityö. Lappeenrannan teknillinen yliopisto, School of Engineering and Science, Tuotantotalouden koulutusohjelma.

103 sivua, 6 kuvaa, 4 taulukkoa ja 3 liitettä

Ohjaajat: Professori Timo Kärrö & Tutkijatohtori Ari Happonen

Hakusanat: komponenttivaraston ulkoistaminen, tulologistiikan ulkoistaminen, logistiikan ulkoistaminen

Tämän diplomityön tavoitteena on kehittää logistiikan ulkoistamismalli sähköistysratkaistuja tarjoavalle yritykselle, joka parhaillaan kartoittaa mahdollisuutta ulkoistaa komponenttivarastonsa. Koska tulologistiikan toimivuus on tärkeä osa katkeamatonta tuotantoa sekä yrityksen menestystä, ulkoistamisprosessin implementointi tulee tehdä huolellisesti. Tutkimus keskittyy yhteen tehtaaseen, mutta tarkoituksena on luoda malli, jota voidaan hyödyntää myös muiden vastaavanlaisten tapausten kohdalla.

Diplomityö on toteutettu systemaattisena kirjallisuuskatsauksena. Oleellista kirjallisuutta on tutkittu systemaattisesti, jotta työ voi tarjota aiempaan tutkimukseen perustuvaa ohjeistusta logistiikan ulkoistamiseen suunnittelusta toteutukseen. Tutkimusta on täydennetty yrityksen näkökulmalla: mikä on jokaisen vaiheen merkitys juuri kyseiselle kohdeyritykselle.

Tämänhetkissä kirjallisuudessa löytyy vain niukasti tutkimusta komponenttivarastojen sekä tulologistiikan ulkoistamisesta; sama koskee käytännönläheistä tutkimusta ja toimintamalleja. Lopulta työ kuitenkin tarjoaa kokonaisvaltaisen mallin komponenttivaraston ulkoistamiseen sekä kohdeyritykselle parhaiten sopivan toimintaratkaisun. Lisäksi ulkoistamisen seurauksena syntyvät positiiviset ja negatiiviset vaikutukset on analysoitu SWOT-mallin avulla.

ACKNOWLEDGEMENT

First, I would like to thank Lappeenranta University of Technology for the past five years which have provided me with many memorable experiences and taught me a lot. I am glad I made the decision to go to Lappeenranta.

I am thankful for the case company for offering me the opportunity to do my Master's Thesis. Special thanks go to Tanja Timoskainen for supporting and guiding me during the whole process. I wish you all the best for your own future project. I also want to thank my supervisors Timo Kärri and Ari Happonen for all the help and ideas you gave me during this time. Your comments and feedback were truly valuable and helped me to finish the thesis. Special thanks to Happonen for answering e-mails no matter the time: even in July, on weekends and outside office hours.

Lastly, I am deeply grateful for my whole family for supporting me through my studies. You have always provided everything I need and made everything possible for me. Without you, I would not be here.

Helsinki, September 2018

Sanna Ruusunen

LIST OF TABLES

Table 1. Search terms and databases used for SLR

Table 2. Risks and benefits of outsourcing

Table 3. Pros and cons of ERP and WMS

Table 4. SWOT analysis

LIST OF FIGURES

- Figure 1.** Steps of a literature review
- Figure 2.** The decision logic of outsourcing
- Figure 3.** Logistics service providers
- Figure 4.** Tendering process
- Figure 5.** Inbound logistics material flows
- Figure 6.** The structure of the case study's outsourcing process

LIST OF ABBREVIATIONS

1PL	First Party Logistics
2PL	Second Party Logistics
3PL	Third Party Logistics
4PL	Fourth Party Logistics
5PL	Fifth Party Logistics
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
JIS	Just-in-sequence
JIT	Just-in-time
KPI	Key Performance Indicators
LSP	Logistics Service Provider
NDA	Non-Disclosure Agreement
RFI	Request for Information
RFP	Request for Proposal
SLA	Service Level Agreement
SLR	Systematic Literature Review
SOW	Statement of Work
SWOT	Strengths, Weaknesses, Opportunities and Threats
WMS	Warehouse Management System

TABLE OF CONTENTS

1	INTRODUCTION	3
1.1	Background	3
1.2	Goals and delimitations.....	4
1.3	Research methods	5
1.4	Research structure	6
2	INTRODUCTION OF THE CASE COMPANY	8
3	RESEARCH DESIGN.....	11
3.1	Systematic literature review	11
3.2	SWOT-analysis	17
4	OUTSOURCING.....	19
4.1	Risks of outsourcing	20
4.2	Benefits of outsourcing	23
5	LOGISTICS OUTSOURCING PROCESS	27
5.1	Making a decision to outsource	28
5.2	Forming a project team	32
5.3	Effects of outsourcing in personnel	33
5.4	Service provider selection process.....	37
5.4.1	Different forms of outsourcing relationship	38
5.4.2	Service provider selection criteria	43
5.4.3	Tendering process	46
5.4.4	Information sharing	56
5.5	Successful outsourcing relationship.....	59
5.5.1	Critical success factors	60
5.5.2	Continuous flow to the factory	62

5.5.3	IT	63
5.6	Operating models	70
5.7	Implementation process	76
6	RESULTS	80
7	SUMMARY	86

1 INTRODUCTION

1.1 Background

Many companies are focusing more and more on their core businesses. They aim to invest more in the areas they have competitive advantage, which is enabled by outsourcing functions that are not core competences. (Akbari 2018, p.1548; Zailani, Shaharudin, Razmi & Iranmanesh 2017, p.54) Outsourcing has been seen as a notable business strategy since 1989; it means external resources are being strategically utilized by companies that used to perform the activities internally. In fact, during the last 25 years outsourcing has become one of the major global supply chain strategies. (Akbari 2018, p.1548) When it comes to logistics, outsourcing has been utilized among 80% of Fortune 500 companies. One of the main reasons for the popularity is the expertise and knowledge of independent logistics service providers (LSPs), which operate functions that would be costly or complex to perform or acquire internally. (Zailani et al. 2017, p.54-57; Elliff 2004, p.48)

The company in question in this paper is Ensto: an electrical solutions designing and offering company. It renewed its supply chain strategy last year and is now planning to maximize the production in one of its factory by outsourcing finished product warehouse; additionally, it is considering the opportunity to outsource component warehouse as well. Of these, the latter is examined in the thesis. This requires investigation of outsourcing project execution and different operating options in such a manner that the paper can be utilized in other similar cases as well.

Ensto went through a supply chain renewal process and made new strategic decisions in 2017. The company decided to focus on supply chain and concentrate especially to what products are produced and where. The aim was to maximize the factory space for production and to dispose inventories in the factory; the goal was to concentrate resources and facilities to Ensto's core business. The reason the company decided to examine outsourcing instead of for example building new

warehouse facilities was that Ensto is not an expert on warehousing or logistics and it is not aiming to be one. Thus, it is more suitable option for it to select a logistics service provider, a professional on its field, to operate the component warehousing better and more efficiently.

1.2 Goals and delimitations

The aim of this thesis is to examine all aspects to consider in different phases of outsourcing process and once finding a suitable service provider. The company wants to know different operating possibilities: how the goods can be transported from the service provider's warehouse to the factory and how to ensure the components are at the right time at the right place. These are studied in the thesis. One of the goals is to clarify the risks and benefits that occur when outsourcing; the study also aims to recognize what are the subjects the company has to take into consideration when planning to outsource. The main research question is:

What are the key aspects of outsourcing a component warehouse?

In addition, there are sub-questions:

How to choose a proper service provider?

How to succeed in outsourcing?

In which way can outsourced inbound logistics be operated?

These questions were asked by the case company in the beginning of the thesis project; thus, they act as guidelines for the paper. The objective of the main research question is to identify the main issues that an outsourcing company can undergo and the things it should take into consideration. The sub-questions supplement the previous; they aim to identify the best ways to manage the planning, implementation and execution of an outsourcing project.

The study includes phases from planning and tendering to implementation; it examines different questions, such as what must be shared with the service provider, what are IT requirements for outsourcing and how outsourcing affects personnel. The aim is to provide data collected from multiple studies in one place and thus help the company to succeed in outsourcing.

The thesis has been delimited to inbound logistics outsourcing and it is specifically focusing on Ensto's Keila factory in Estonia. The study does not observe operating models for the outsourcing of final product warehouse, although the outsourcing process itself follows the same steps. What is more, specific costs of outsourcing are out of scope and the study does not observe any service providers by name; it is mostly focusing on third-party logistics, since the company is not looking for a "supply chain consultant", which is offered by fourth- and fifth-party logistics, but more a service provider for logistics services, such as warehousing and transportation. These other logistics service providers, consultants, are introduced in the event that they become useful in the future or in another case.

1.3 Research methods

This study has been executed as a systematic literature review. The original aim of the thesis was to be a qualitative case study, written during the Keila factory's component warehouse outsourcing project. However, the project was postponed and thus it was agreed the dissertation was to be written as a guide for the future project; ergo, the thesis proposes a guide, which can be followed in case any company decides to outsource its inbound logistics. However, every company has its own individual environment and business requirements. Therefore, even if this study introduces instructions that can be utilized by any company outsourcing their inbound logistics, it should be noted that not all factors are suitable or relevant to everyone.

Systematic literature review means a certain process has been followed to identify, evaluate and combine relevant research; it includes explanation of the protocols for

searching literature and including and excluding articles. The aim of a literature review is to unite as many relevant studies based on evidence as possible that are to be investigated. Because of consistent examination of all sources, systematic literature reviews are seen to provide high quality evidence research. (Andreini & Bettinelli 2017, p.2; Kitchenham & Charters 2007, p.3) In this case, the review focuses on inbound logistics outsourcing and combining relevant data from various academic journals. Precise search criteria delimited the number of articles, which were later also manually evaluated and included or excluded based on their relevancy. Further, the references of the included articles were used to find more accurate information. The goal was to find studies that would cover the whole outsourcing process from planning to implementation.

In addition to systematic literature review, a SWOT analysis was conducted. The aim was to recognize strengths, weaknesses, opportunities and threats that could arise during Ensto's component warehouse outsourcing.

1.4 Research structure

After introduction, the second chapter of this thesis presents the case company shortly. It introduces the background of the company as well as the current situation of the Keila factory. Chapter 3 focuses on explaining the theory and reasons behind systematic literature review and the execution process in theory as well as how it was executed in this report. The theory behind SWOT analysis is also explained. Chapter 4 introduces outsourcing in general and evaluates risks and benefits: it acts as a basis for the next chapter, which shifts the focus towards logistics outsourcing. Chapter 5 is the main part of the dissertation. It has been divided into multiple sub-chapters, describing the service provider selection process, indicating successful relationship factors and later on offering variation of operating models for inbound logistics in addition to providing helpful points for implementation process.

The aim of Chapters 4 and 5 is to move step by step through an outsourcing process and thus provide an understandable guide that can be easily followed. The process

begins with decision-making of whether to outsource or not and evaluation of the pros and cons; the steps then lead to clarifying the needs and wants of the outsourcer, thus defining the big picture of what the company is looking for. With the help of this internally set criteria, the project proceeds to selecting a suitable service provider by following a tendering process. Once the provider has been selected, the study continues to ways of managing the developed relationship, without forgetting the IT aspect. The steps then lead towards more practical issues, such as ways of operating the inbound flow of goods and putting outsourcing into action. Lastly, Chapter 6 presents results and a SWOT analysis of Ensto's outsourcing process based on the previous research and Chapter 7 finally gathers everything into a summary.

2 INTRODUCTION OF THE CASE COMPANY

"We believe in a better life with electricity and a more sustainable tomorrow". Ensto is a family business, founded in 1958 by Ensio Miettinen. During 2018, the majority of the ownership was transferred to the family's third generation. The company designs and provides smart electrical solutions in order to increase functionality, safety, efficiency and reliability of smart grids, transportation and buildings. There are approximately 1 600 employees at Ensto in 20 countries: in Europe, Asia and the USA; there is production in seven countries and research and development offices in five countries. The company has sales to hundred countries and in 2017 the company had turnover of 261 million euros. (Ensto 2018a)

Lean manufacturing is an important part of Ensto's culture. It is a business model focusing on methods that, with minimum cost and better effectiveness, provide high-quality products on time while eliminating waste. The company has developed a program called The Ensto Operational Excellence, which is used in the factories in order to promote continuous improvement, waste reduction and value creation; the aim is to decrease lead times and increase quality and flexibility with the goal of being the most sustainable option. The company focuses on enhancing delivery lead times, production flexibility and precision in logistics. (Ensto 2018c)

The business units of the company are Ensto Smart Buildings, Ensto Digital Solutions and Ensto Utility Networks. *Ensto Smart Buildings* focuses on human-centric, smart and flexible electrification, electronic vehicle charging and lighting solutions to building owners, facility management, construction companies, contractors and designers. The aim of the business unit is to offer solutions that response better to customer needs by increasing buildings' functionality and efficiency. *Ensto Digital Solutions* focuses on integrating software, hardware and services as well as installation life-cycle. The aim is to develop and deliver solutions for future businesses that are driven by Internet of Things, connectivity and data; they are safer and more comfortable, efficient and reliable to owners, users and operators. (Ensto 2018b, Fernando 2018) *Ensto Utility Networks* ensures power

quality and network capacity in electricity distribution utilities through their solutions: overhead lines, underground cables, power quality and network automation (Ensto 2018b, Kaikkonen 2018).

The biggest factory of Ensto, Ensto Ensek AS, is located in Keila, Estonia. There have been production since 1993 and currently there are 350 employees working at the site, which also has its own logistics center. Heavy metal and cold shrink products are being produced in Keila; it is also the final assembly site for a wide range of Ensto products. (Ritso 2018)

Current situation of the case company

During 2017, Ensto made new strategic decisions. The new focus point was set on supply chain and its renewal and particular emphasis was put on production: what would be produced and where. Because of these changes, the company decided to utilize the whole Keila factory, now being used for both production and warehousing, for production only. Current finished product warehouse was to be outsourced to a logistics service provider and the opportunity of outsourcing the component warehouse as well was to be examined; the company does not want to do warehousing itself because it wants to focus on its core competences. Plus, logistics service providers are much more efficient in logistics than Ensto, which has no interest in being a professional in this field.

There are approximately 5 780 different components at Keila factory. Their types vary from small screws, cables and glands to bigger frames and boxes and everything in between. The monthly number of shop orders is 4 000-5 000, which leads to components being transferred from the warehouse to production 23 000 times per month; the component warehouse employs eight people in the warehouse and four more at the reception.

The logistics costs are mainly formed by warehousing and of these almost half consist of component warehousing. The yearly costs of logistics are:

Other fixed operating expenses	455 262 €
Other variable operating charges	307 168 €
Fixed staff expenses	181 987 €
Indirect staff expenses	417 318 €
Depreciation	31 068 €
<i>Total</i>	<i>1 392 803 €</i>

At Keila site, the products are stocked by using supermarket method. It is similar to retail supermarket: the products are taken from shelves and the consumption initiates the need for replenishment. The replenishment is done by utilizing Kanban method, which means the downstream processes signal upstream to activate processes (Ahmad, Markkula & Oivo 2013, p.10). Signaling can be done by using containers: when a container is empty, more goods need to be produced (Diaz & Ardalan 2010, p.233). The company has approximately one day's supply in the supermarket and two hours' supply at each work station.

The components are quite easy to move and they do not require anything special for the trucks nor the warehouse, only a roof to protect them from varying weather conditions. The challenge with Keila's component warehouse outsourcing is the great number of different components, the need for deliveries multiple times per day and on the other hand the variation of the delivery frequencies, and the critical punctuality of deliveries in order to maintain a continuous production.

3 RESEARCH DESIGN

3.1 Systematic literature review

The aim of systematic literature reviews (SLR) is to summarize existing research for new academic practice, projects and policy. Since World War II, the pace of publishing new studies has increased and thus literature reviews have become key elements for mapping existing research, producing new research questions and fostering studies in academia. Over a decade ago, it was noticed that literature reviews addressing management reviews were often only descriptions of existing studies with only little added value and no criticism; this initiated the shift towards more explicit medical science principles and making precise protocols, evidence-based assumptions and values while reviewing. This shift made SLR an important piece of evidence-based practices. (Andreini & Bettinelli 2017, p.2)

According to Kitchenham and Charters (2007, p.3), "a systematic literature review is a means of identifying, evaluating and interpreting all available research relevant to a particular research question, or topic area, or phenomenon of interest". SLR is a *secondary* study, meaning it uses data from *primary* studies as sources, whereas primary studies generate data themselves. SLR summarizes the relevant content of primary research; it can be a technique that supports other methods only by providing an introduction part or it can be its own entity from beginning to end. (Salminen 2011, p.9)

SLRs can be undertaken for many reasons. Kitchenham and Charters (2007, p.2) define the most common motives to be:

- Summarizing existing evidence of technology and treatment, for example limitations and benefits of a specific method
- Recognizing gaps in current research for further study
- Providing background or a framework to properly position activities for new studies.

Many studies begin with a literature review, but unless they are fair and thorough they do not have much scientific value. Hence, systematic literature reviews are undertaken. What differs SLR from traditional narrative review are the scientific, transparent and replicable processes; extensive, predefined searches to minimize distortion; evidence-based decision-making; and audit trails of the used strategies, steps, decisions and procedures. In addition, non-systematic reviews tend to be only partially analyzed and provide inaccurate or even false findings. SLR defines the research question(s) and methods and has explicit exclusion and inclusion criteria for assessing potential primary studies. Both supporting and opposing studies should be identified and reported; the aim is to bring together as many relevant and reliable research as possible. (Andreini & Bettinelli 2017, p.2; Kitchenham & Charters 2007, p.3; Salminen 2011, p.10)

Fink's model

A clarifying model by Fink (2005, p.3-5) divides SLR into seven steps that are illustrated in Figure 1. Salminen (2011, p.10) and Kitchenham and Charters (2007, p.3) state the process starts by defining research questions, but according to Okoli and Schabram (2010, p.14), prior to setting research questions the purpose of the literature review must be defined and a plan for SLR should be drafted. The process then continues to selecting databases and websites; after this, the search terms are carefully considered to be such that they correspond to the chosen questions. (Salminen 2011, p.10; Kitchenham & Charters 2007, p.3; Okoli & Schabram 2010, p.19-21)

The next steps are related to the search process. Once the search has been executed in every used database, the results are cropped in step four via practical actions: setting language and year criteria, for example. The articles can be read first by screening only the headings and abstracts: once the most irrelevant papers have been excluded (with explanations why it was done), the rest can be analyzed in more detail. In case there are duplicates, they are removed. If the content is not applicable, it is excluded in this phase. Afterwards, the search results are cropped

methodologically: only the scientifically most qualified material is approved. For the review to be trustworthy and qualified, it should have a standardized form of collecting research data. Because the quality of the SLR is related to the quality of the primary research, it is essential the used articles are evaluated. There are no rules or definitions for assessing the quality: it varies in each SLR and it is based on the standards set by the author of the review. (Salminen 2011, p.10; Liberati, Altman, Tetzlaff, Murlow, Gotzsche, Aloannidis, Clarke, Devereaux, Kleijnen & Moher 2009, p.4; Okoli & Schabram 2010, p.21-22)

Step number six is the execution of the review; data is extracted from selected articles. The last step is synthesizing the results or integrating the research, which can include anything from narrative review to meta-analysis. At the end, the goal is to be able to write the research straightforwardly. (Salminen 2011, p.10; Okoli & Schabram 2010, p.21-22)

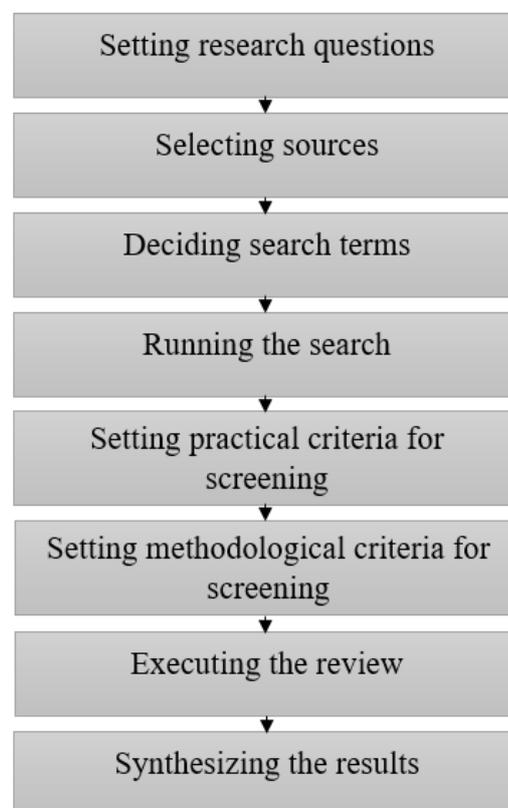


Figure 1. Steps of a literature review. (Adapted from Salminen 2011, p.11).

There are basic principles SLR follows. The review has to be *transparent* in order to be repeatable; this means there must be explanations for inclusions and exclusions as well as for the logic behind the key word selection criteria. The process must be *clearly* presented for the audience to create an audit trail and it is important the research is well *focused* so that the questions are linked to the chosen evidence. The used methods should inform both *practitioner and research communities* and all type of journals should be *equally* considered within a *broad coverage*; the review has to be *accessible* for people outside the academic and specialist community. Lastly, the SLR has to use wide variety of research methodologies and *synthesize* and compare findings from numerous study fields. These principles guide a SLR towards presenting meaningful, clear and replicable research, which critically analyses previous studies. (Andreini & Bettinelli 2017, p.3; Kitchenham & Charters 2007, p.4)

Conducting the systematic literature review

This thesis offers guidance on logistics outsourcing implementation, more precisely on inbound logistics. The reason for conducting systematic literature review is to provide a comprehensive whole; the method ensures all relevant research is being thoroughly utilized.

In this dissertation, the selected databases were: Scopus (Elsevier), ABI/INFORM, Emerald eJournals Premier, SpringerLink and Taylor & Francis Online. These were chosen since they include the main journals in the fields of operation, production and logistics. Some empirical data was sought from Google, as information of LSP services was found on more commercial sites; Google also provided a few relevant books. Additionally, one interview was carried out in order to gain deeper understanding of the issues relevant to the case company specifically.

The practical criteria were such that only peer-reviewed articles written in English and with full-text access were included. One Finnish book was selected since it

provided applicable data for this thesis: "Ulkoistamisen käsikirja" by Lehtikoinen and Töyrylä (2013) explains a complete outsourcing process through practice and case studies. No older texts than from 2008 were chosen, except in case they were in references of newer studies and found relevant for the dissertation. The search words were different combinations of "inbound logistics", "outsourcing", "3PL" and "operating models". Two of these combinations and the results in each of the databases are categorized in Table 1.

Table 1. Search terms and databases used for SLR.

<i>Search term</i>	<i>"inbound logistics"</i>	<i>"inbound logistics" AND</i>	<i>Summary</i>
<i>Database</i>	<i>AND "outsourcing"</i>	<i>"operating models"</i>	
<i>Scopus (Elsevier)</i>	183	236	419
<i>ABI/INFORM</i>	180	195	375
<i>Emerald Insight</i>	67	69	136
<i>SpringerLink</i>	24	26	50
<i>Taylor & Francis</i>	35	47	82
<i>Total</i>	489	573	1 062

The search was conducted on 2 July 2018. Many of the articles were found in multiple databases: after removing duplicates of both of the search terms, article count for "'inbound logistics" AND "outsourcing"' was 227 and 278 for "'inbound logistics" AND "operating models"'. The number was diminished to 401 after the search terms were cross-checked and 104 duplicates more were excluded. Based on titles and abstracts, the number of articles was reduced to 44. The reason for excluding most of the articles was that they only included data related to Supply Chain Management or strategic thinking, not related to logistics; re-shoring and offshoring are executed for different reasons than outsourcing so thus they were excluded as well. Other topics that were irrelevant for the case were related to route optimization, reverse logistics and transaction cost analysis. Articles written from service provider's point of view provided information that was not accurate for the outsourcer and thus they were excluded.

In the quality assessment phase, the studies were evaluated based on their reliability and validity; it was assessed how generalizable and consistent they were. The papers were conducted as quantitative survey research, systematic literature reviews, qualitative case studies and mathematical models or fuzzy logic and they all included a relevant literature review. It should be noted, however, that the author's lack of experience in conducting SLRs caused some challenges in quality evaluation. Additionally, to ensure the selected articles were relevant to the topic of the dissertation, assessment was done based on the following screening criteria:

- The paper addressed outsourcing and more precisely logistics outsourcing
- The objective of the study was clearly indicated
- The paper provided a relevant aspect or partial answer for one or more of the thesis' research questions.

After practical and methodological screening, 29 articles were chosen. Their references were utilized and specific search words were used to find more data on different subject areas. For example, common search words for logistics outsourcing provided very little information about personnel related aspect. Thus, it was searched with terms such as "outsourcing effects on personnel". Similar actions were taken for other sub-sections as well.

The next phase of SLR was to execute the review. First, the basic data was extracted from selected articles: author(s), publication journal and date, title of the article and page count. All articles were carefully read and evaluated: their main ideas were collected and relevant research was gathered into the thesis. The similarities and differences of the found material were compared and analyzed. The dissertation was then constructed based on structures found on literature: for example success factors and tendering process were distinguishable entities in the literature and thus they were considered such in the thesis as well. Since in this study the aim is not to conduct a meta-analysis of the type of literature but rather to systematically gather all relevant data of inbound logistics outsourcing process into an informative whole, the results are presented in a form of a narrative review.

3.2 SWOT-analysis

Strengths, weaknesses, opportunities and threats (SWOT) analysis is a tool for strategic planning. It is based on examining both internal, such as knowledge and resources, and external factors, such as environment and market trends; it provides guidelines for deep understanding of decision-making issues and for actions that can enhance the situation. (Jiang, Mao, Hou, Wu & Tan 2018, p.226) The strengths and weaknesses are related to company's internal environment, whereas opportunities and threats are affected by external factors. (Kotler & Keller 2012, p.49)

External environment analysis includes analyzing both micro- and macro-environmental factors that can affect the outsourcer's profit earning (Kotler & Keller 2012, p.49-50). These can be such as economic instability, political issues, technological or social changes or environmental factors (Syazwan Ab Talib & Bakar Abdul Hamid 2014, p.324). The aim is to discover important trends and developments and analyze all related threats and opportunities. Even though good opportunities are found, they are not necessarily suitable for each company. This requires internal environmental analysis of issues like tangible or intangible resource availability, productivity, capability and image (Kotler & Keller 2012, p.49-50; Syazwan Ab Talib & Bakar Abdul Hamid 2014, p.324); by evaluating internal strengths and weaknesses a company can recognize the opportunities it possesses the strengths for. (Kotler & Keller 2012, p.49-50)

The analyzing method has been used for many decades and it is nowadays one of the most popular strategic planning method; because it recognizes the relationship between external and internal environments, it can be used by industries, organizations or countries. By identifying different aspects, SWOT can be used as a basis for issue identification and as a guide for acknowledging desirable future position. Once analyzing all SWOT aspects, a company has more comprehensive understanding and it can try to transform weaknesses into strengths and threats into opportunities. (Syazwan Ab Talib & Bakar Abdul Hamid 2014, p.324)

In this thesis, SWOT is utilized in Chapter 6, when Ensto's component warehouse outsourcing is evaluated. The reason for using this method is that it provides framework for analyzing both internal and external factors and considers both positive and negative aspects. Because the aim of this paper is to provide guidance on outsourcing process, SWOT analysis helps the company to recognize the areas they can be successful at or in contrast the areas that can be possible pitfalls. By denoting weaknesses and threats, the company has the possibility to improve and develop the most critical factors; it is also beneficial to know which aspects support the outsourcing decision.

4 OUTSOURCING

This chapter introduces outsourcing in general. It presents recognized risks and benefits that outsourcing in general and logistics outsourcing can have: important aspects for Ensto to consider if it decides to outsource its component warehouse. The aim of the chapter is to clarify outsourcing as a term and to provide reasons to favor or oppose it, thus helping to recognize possible pitfalls and opportunities.

Nowadays, it is more and more common for companies to outsource their business functions. This means the outsourcing company moves some or all of its activities to an outside service provider (Lehikoinen & Töyrylä 2013, p.17). Rushton and Walker (2007, p.4) define outsourcing as "the strategic use of external specialized service providers to execute and manage activities or functions that are normally seen as non-core to the business". By moving routines and less important tasks to an outside provider, the company can focus on its core competences. The aim is to find new suppliers and ways of improving raw material, component, goods and service delivery with the experience, creativity and knowledge of new providers. Companies outsource for example cleaning, logistics, parts of IT and human resource services and nowadays even product development (Lehikoinen & Töyrylä 2013, p.26-28). Outsourcing should not be mistaken for contracting out: the latter means using an outside supplier on a job-to-job basis, whereas outsourcing is a common form of strategic alliance, based on a long-term relationship and handing over the planning, operation and management of a specific part of business. (Embleton & Wright 1998, p.94-95; Zineldin & Bredenlöv 2003, p.453) It is also a common mistake to confuse outsourcing with offshoring. The latter means moving services to another country to gain cost savings, but if the company still holds the ownership of the off-shore operation it is not outsourcing. (Rushton & Walker 2007, p.4; Lu 2011, p.35)

Outsourcing is seen as a way of cutting costs and reducing capital, saving time and focusing on core competences. Suppliers are professionals in their field, which means they have the right technology, tools and skills to provide the specific

functions; they can also achieve lower costs because of economies of scale. By outsourcing, the company sets internal resources free and becomes more flexible strategically, while sharing risks with the provider. (Embleton & Wright 1998, p.96-100; Zineldin & Bredenl w 2003, p.453-454; Lu 2011, p.34; Deepen 2007, p.21-22) On the other hand, there are many risks to consider when outsourcing: the company loses control of that part of the business and, since the supplier usually has more than one client, there is a risk of declined quality or negligence. (Embleton & Wright 1998, p.96-100; Zineldin & Bredenl w 2003, p.453-454; Lu 2011, p.34; Deepen 2007, p.23-24) The next two sub-chapters present the risks and benefits of outsourcing in general and of logistics outsourcing.

4.1 Risks of outsourcing

There has been many concerns about outsourcing over time. Like many other activities, outsourcing has many risks, which can be related to finance, strategy or operations (Selviaridis, Spring, Profillidis & Botzoris 2008, p.383). Service providers are not reaching expected service levels or business benefits, costs are higher than agreed and quality and commitment have decreased; service providers lack appropriate experience (Rushton, Croucher & Baker 2010, p.60, 534) and responsibility over customer needs (Selviaridis et al. 2008, p. 383). The implementation can be successfully executed, but when it comes to maintaining the outsourcing relationship the service provider may ignore continuous improvements completely (Rushton et al. 2010, p.560; Daim, Udbye & Balasubramanian 2012, p.32). Companies have recognized that once their productivity improves, outsourcing becomes their main bottleneck. This often drives a company to terminate the relationship. (Hartman, Ogden & Hazen 2017, p.214) The activities being outsourced are becoming more complex and extensive, which complicates the whole outsourcing process. There are four main obstacles that tend to damage the project. Firstly, it is forgotten that outsourcing relationship should be a win-win situation; secondly, different processes of outsourcing lack proper management; thirdly, companies go through changes continuously, which makes it more complex for both parties to stay on the same page; and lastly, information systems are not

suitable and they do not match. (Kivinen 2002, p.6) It can create many difficulties if the service provider does not understand the outsourcer's supply chain needs or business requirements; a LSP has to have a reasonable expertise in specific products and adequate descriptions of the services and service levels needed. (Hwang, Chen & Lin 2016, p.106; Shah & Sharma 2012, p.520).

One of the biggest risks is the fact that the outsourcer becomes dependent of the service provider (Shah & Sharma 2012, p.520; van Weele 2014, p.179). The outsourcer loses control over the outsourced function, which may affect competitiveness. There is a threat of the supplier failing and thus disrupting the business; it is also possible that service level or innovation decreases. The relationship is based on sharing confidential information, which exposes to misuse of intellectual property rights. Even though there are many financial benefits of outsourcing, it also affects financial activities negatively and creates a risk of financial loss. The fee structure can be unrealistic; it makes assessing cost savings difficult and creates dependency on the service provider. It is possible that unexpected fees or charges for "extra use" appear as well. (Lu 2011, p.38; Lehtikoinen & Töyrylä 2013, p.44-45; Selviaridis et al. 2008, p.385; Kalinzi 2015, p.18; Rushton et al. 2010, p.534; Johnson, Leenders & Flynn 2011, p.128; Daim et al. 2012, p.32; Hartman et al. 2017, p.201, 215) When outsourcing, an outsourcer becomes exposed to risks related to suppliers: lack of commitment, implementation issues, unavailable services, loss of responsiveness and poor daily quality. Usually a service provider has high quality technology, but it should be noted that that might not be always the case and thus an outsourcer can be tied to outdated technology. (Johnson et al. 2011, p.128; Daim et al. 2012, p.32; Shah & Sharma 2012, p.520; van Weele 2014, p.179)

An outsourcer may have higher expectations of the cost benefits than could be realistically achieved and a service provider may promise more than it is capable of delivering (Rushton et al. 2010, p.560; Shah & Sharma 2012, p.520). If an outsourcing decision has been considered short-term only, it can have a negative effect on continuous improvement and investments over long-term. A service

provider may not be able to meet changing business requirements or be flexible enough over longer period of time. The supplier's IT capabilities can be worse than the company's and there is no guarantee of the personnel quality and expertise; it is also possible that the cultures between an outsourcer and a supplier are completely incompatible. When considering outsourcing, it should be carefully discussed with personnel inside the outsourcing company; the effect on the employees and the image of the company might come out as negative after outsourcing has been executed. But, on the other hand, also the risks of not outsourcing need to be seen as criteria in decision making. (Lu 2011, p.38; Lehtikoinen & Töyrylä 2013, p.44-45; Selviaridis et al. 2008, p.385; Kalinzi 2015, p.18; Rushton et al. 2010, p.534, Johnson et al. 2011, p.128)

A study conducted by Deloitte (2012, p.16) showed that almost half of outsourcers had terminated the contracts. Of those, 71% stated overall service quality as the main reason for dissatisfaction; other factors affecting termination were subject related expertise (33%), pricing (33%), unsuccessful transition (29%), communication (28%), account management (20%) and cultural fit (13%). Rushton et al. (2010, p.539-540) and Percin and Min (2013, p.382) agree that quality and performance factors are more important than cost. Hartman et al. (2017, p.213-214) support the previous statement of the importance of quality and performance. Many companies have terminated their outsourcing relationship because of lack of trust for the service provider to reach the performance needs; it can create problems if a supplier changes processes without consulting with the outsourcer. In their study Hartman et al. (2017, p.208, 213-214) also state companies make insourcing decision mainly to reduce costs: for the same reason they outsource. This indicates costs are higher or unexpected costs arise during outsourcing. Some companies bring functions back in-house after realizing they are capable of producing them at a reduced cost; service providers are also utilized in order to learn the best practices and then to implement the technique in-house. Although, Selviaridis et al. (2008, p.389) note it is difficult to bring logistics activities back in-house because of the major investments needed for facilities, equipment and assets.

There are specific risks related to logistics outsourcing in addition to the ones above. Selviaridis et al. (2008, p.389) wrote during the 21st century economic depression that companies were afraid of losing their internal logistics competences as well as knowledge of costs and customer requirements. Perhaps attitudes have changed to more positive direction since the depression, but there are still concerns related to these issues. Even though transportation and warehousing capacities and transforming fixed costs to variables are more flexible once outsourced, flexibility regarding changes in systems and market requirements decreases; this is concerning particularly industries with fast changes. (Selviaridis et al. 2008, p.389) It is possible to reduce business process complexity by outsourcing, but it should be recognized, however, that coordination in the relationship can create different kind of complexity, which can obstruct the success of the outsourcing relationship (Kalinzi 2015, p.18). In addition, companies tend to lose their internal logistics and distribution expertise as a result of outsourcing (Rushton et al. 2010, p.534).

The best ways to minimize risks are related to clarity: all service specifications and contracts need to be explicit and detailed; the goal should be clear and the vision should be shared with the supplier. The outsourcer should know its realistic logistics costs and be aware of all current details and metrics. In addition, the performance of the service provider should be monitored and it should be considered that it takes a lot of time and effort to manage the relationship; there are necessary cultural changes that need to be adopted on both sides for the outsourcing to be successful. (Selviaridis et al. 2008, p.389; Kalinzi 2015, p.19; Rushton et al. 2010, p.561)

4.2 Benefits of outsourcing

As previously stated, one of the main reasons for outsourcing are cost savings. Because the service provider is professional in the specific field, it has structural economies of scale and it can produce more efficiently and with better quality than a company that has the function only as a part of the business. (Lehikoinen & Töyrylä 2013, p.21-23; Parashkevova 2007, p.30; Zailani et al. 2017, p.57; Kalinzi 2015, p.16; Rushton et al. 2010, p.535; Rodrigue 2012, p.19; Min 2013, p.141; Shah

& Sharma 2012, p.520; van Weele 2014, p.178; Hartman et al. 2017, p.201) As a result of outsourcing, a company can invest capital in something more profitable, as it does not have resources and facilities to invest in (Rushton et al. 2010, p.535; Kalinzi 2015, p.16; van Weele 2014, p.178). There is no need to use capital on infrastructure, if a company is planning on entering new markets or expanding globally (Brendamour 2014; Završnik & Jerman 2011, p.521). Outsourcing enhances cash flow; it can also decrease workforce, reduce operating costs and save IT related expenses. Fixed costs become variable costs, which means that since the company no longer owns the plant, property or equipment it can remove them from the balance sheet and thus appear more attractive from accounting angle. (Rushton et al. 2010, p.535; Kalinzi 2015, p.16; Daim et al. 2012, p.32; Završnik & Jerman 2011, p.521; Shah & Sharma 2012, p.519; Hartman et al. 2017, p.202) Not everyone agrees with the argument that outsourcing brings cost savings. Meixell, Kenyon and Westfall (2014, p.767) claim outsourcing does not have significant effect on the costs of goods sold, but it only changes the structure: labor costs decrease because the activities once performed in-house will be done by the supplier, while material costs increase because higher content materials have higher prices.

The biggest non-financial reason for outsourcing is focusing on core business; even though the company could produce the service cheaper itself, it is seen that the money can bring better profits invested in something else. By focusing on core competences, a company can enhance productivity and provide higher value to customers. (Lehikoinen & Töyrylä 2013, p.24-26; Percin & Min 2013, p.380; Busbin, Johnson & DeConinck 2008, p.105; Min 2013, p.141; Shah & Sharma 2012, p.520; van Weele 2014, p.178; Hartman et al. 2017, p.202) A company can redesign its supply chain by outsourcing logistics; there might also be an environment that drives businesses towards outsourcing. In addition to getting more flexible supply chain, the outsourcer gains better distribution networks and an opportunity to faster customer responses. (Min 2013, p.133) It can also react faster to business environment changes (Završnik & Jerman 2011, p.521). Other reasons for outsourcing are sharing risks and getting access to resources not available internally (Zailani et al. 2017, p.57; Završnik & Jerman 2011, p.521; Shah &

Sharma 2012, p.520; van Weele 2014, p.178), improving quality and cutting down the balance sheet. What is more, non-solicitation and utilizing outside professionals are also seen as motives to outsource. (Lehikoinen & Töyrylä 2013, p.24-26; Kalinzi 2015, p.16; Rodrigue 2012, p.19)

Service providers have usually all the newest technologies in order to stay on the market: by using their services the outsourcer can benefit and gain wider knowledge from these high technologies (Parashkevova 2007, p.30; Zailani et al. 2017, p.57; Rushton et al. 2010, p.534; Brendamour 2014; Završnik & Jerman 2011, p.521; Hartman et al. 2017, p.202). If a company has a complex supply chain, a service provider has the expertise and experience needed for planning and managing it. A supplier can also have the equipment and vehicles needed for special deliveries. (Rushton et al. 2010, p.537) A service provider can more easily balance varying demand than a company itself by decentralizing its customer portfolios and reduce labor costs by taking advantage of lower wage levels (Kalinzi 2015, p.16).

Even though there is a risk that the performance of a company can decrease along outsourcing, there is also a possibility that it increases. Because of the expertise of service providers quality and services are better, flexibility is increased and asset use is optimized; processes are more effective. These improvements allow companies to respond better to changing market needs with the help of service provider's resources and know-how; the higher distribution reliability assures demand is better met, which improves customer service. It also allows the outsourcer to decrease its inventory levels, lead-times and order cycle times. The freed-up space allows the company to expand its production inside the already existing space, which eliminates the need to invest in a new building and increases productivity. (Kalinzi 2015, p.17; Brendamour 2014; Rodrigue 2012, p.19; Shah & Sharma 2012, p.519-520; van Weele 2014, p.178; Hartman et al. 2017, p.202) Percin and Min (2013, p.380) summarize the benefits of logistics outsourcing well by stating it can be the key to greater competitiveness.

Table 2 summons the benefits and risks of outsourcing. It can be used to enhance the evaluation of Ensto's outsourcing decision: in order to recognize possible pitfalls and, on the other hand, possible opportunities as well.

Table 2. Risks and benefits of outsourcing.

<i>Risks</i>	<i>Benefits</i>
- Higher cost than agreed	- Cost savings: economies of scale, decreased workforce, reduced operating costs
- Dependency on the LSP: exposure to its problems	- Focus on core competences
- Decreased service level and quality	- Expertise of LSP: increased efficiency, higher quality, wider distribution network
- Lack of commitment and responsibility	- Freed resources and capital
- Ignorance of continuous improvements	- Increased supply chain flexibility
- Misunderstandings	- Fixed costs → variable costs
- Loss of control	- Faster reaction to business environmental changes
- Intellectual property rights' misuse	- Shared risks
- Financial risk, unexpected costs	- Access to external resources and professionals
- Unrealistic expectations ↔ unrealistic promises	- Access to newest technology and professional equipment
- Lack of proper technology, equipment, personnel	- Better management of varying demand → better respond to market needs
- Uncertainty over long-term	- Increased performance: higher quality and services, increased flexibility, optimized asset use
- Risk of the LSP making changes without consulting the company	- Decreased inventories, lead-times and cycle times
- Loss of competence, expertise and knowledge	
- Difficulty of bringing activities back in-house	
- Decreased flexibility with system changes	

5 LOGISTICS OUTSOURCING PROCESS

This chapter focuses on logistics outsourcing, including processes from planning to execution. A decision-making model of whether it is suitable for a company to outsource a certain function or functions is also presented, with factors affecting the decision. The aim is to clarify logistics outsourcing process by giving guidance on how to inform personnel of upcoming changes, how to create and maintain successful relationship and of the things to consider before implementation. The structure of the study follows the same structure as a real outsourcing project would have: beginning from internal preparation and finishing to implementation. There are also different operating models presented, which are selected especially for the case company's inbound logistics outsourcing situation.

According to Parashkevova (2007, p.29), Daim et al. (2012, p.32) and Huttu and Martinsuo (2015, p.766), there is a 7R principle as a logistics basic rule: "the *right product* with the *right quality* in the *right quantity* has to be delivered at the *right time* and *right place* to the *right customer* at the *right cost*". Only, globalization has made logistics more complex. Operating in an international marketplace means complicated networks and the need to consider all attributes in a global context, which means operating effectively is far more difficult. The legislation is constantly changing and it is becoming more and more restricted, while distribution costs are getting higher. Because of constantly growing competition and the rising level of customer service needed, companies like Ensto are making strategical decisions to focus on and re-engineer their core businesses. They also aim to introduce new services and products to markets faster and more efficiently. This has driven companies to outsource their logistics operations to LSPs. (Rushton & Walker 2007, p.8; Rushton et al. 2010, p.52-53; Završnik & Jerman 2011, p.522; Zailani et al. 2017, p.56; Chen 2008, p.309; Shah & Sharma 2012, p.520) A LSP takes management responsibility of a supply chain activity or activities; this means the outsourcer's success depends not only on itself but also on partner network, supplying technology and skills (Cezanne & Saglietto 2015, p.31).

According to Akbari (2018, p.1550), logistics is currently the most common function to outsource. Rushton and Walker (2007, p.7-8) state the most common outsourced logistics services are traditionally transportation and warehousing, although distribution, freight forwarding, cross-docking, order fulfillment, customs clearance and brokerage have become more popular to outsource as well. Fabbe-Costes, Jahre and Roussat (2012, p.72) continue by adding that certain production functions as well as management of product flow are among outsourced operations. A company can decide whether to outsource only chosen logistics operations or the whole logistics function. For example, many companies outsource warehousing and transportation and perform rest in-house; they also outsource services in packages by combining operations that have the same transactional dimensions and information flows. (Zailani et al. 2017, p.59)

5.1 Making a decision to outsource

As verified previously, there are many risks and benefits related to outsourcing. Thus, it is essential the company truly focuses on the decision making of whether to outsource or not: the project is complex because of all factors to take into account. The process is long and complicated, but many useful tools and frameworks have been developed to clarify and visualize the documentation of the decision making process. (Embleton & Wright 1998, p.100-102; Zineldin & Bredenl w 2003, p.454; Lu 2011, p.34) Figure 2 illustrates a simple tool for supporting the decision making process. It is based on four simple questions, to which the company can answer either "yes" or "no", depending on the nature of the activity.

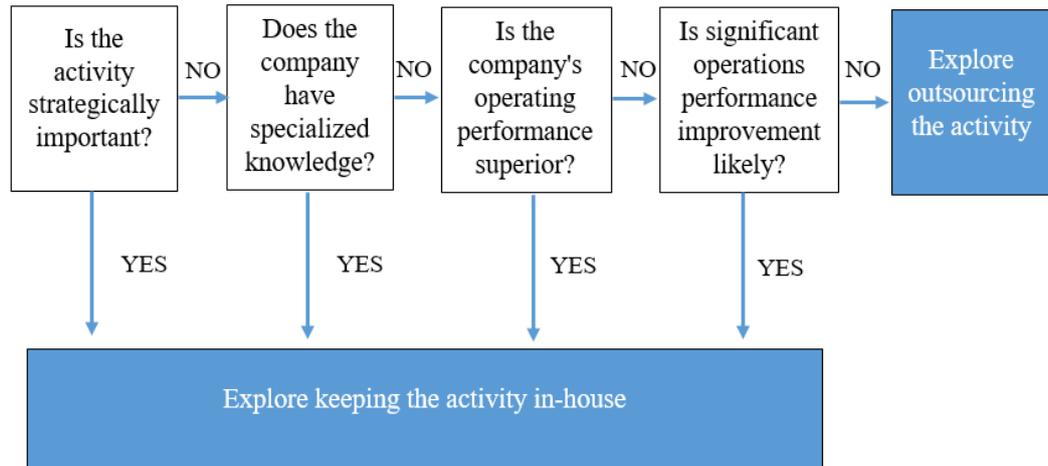


Figure 2. The decision logic of outsourcing. (Adapted from Slack, Brandon-Jones & Johnston 2005, p.155)

In other words, the company has to operate a make-or-buy decision: whether it should produce the goods or service itself or use an outside supplier to provide the function. If the activity is non-important or non-core and does not require specific knowledge, it is most likely an activity that can be outsourced. In case the decision is to outsource, a strategic analysis of what is expected from the service provider should be conducted before carefully selecting the supplier. There are many factors that can affect outsourcing, which means that even after deep analysis and well-managed cooperation, there is no guarantee the relationship will survive long-term or be successful. (Embleton & Wright 1998, p.100-102; Zineldin & Bredenl w 2003, p.454; Lu 2011, p.34) In Ensto's case, the answer to all four questions is "no", which means outsourcing is an opportunity for the company. For that reason, this thesis aims to provide information that can be utilized to enhance the success of outsourcing projects.

The previously mentioned questions are not the only things that matter when making an outsourcing decision. Zailani et al. (2017, p.57) and Shah and Sharma (2012, p.519) list specific aspects that have an effect on companies' decision to outsource logistics functions: information technologies, trade-offs, risk control and the centrality of the logistics function, as well as supplier dependency and the

company's economic viability are used as criteria for whether to outsource or not. In many cases, outsourcing is the solution for the lack of resources and capabilities.

According to Frazelle (2002, p.318-319), outsourcing should be executed carefully and only after continuous and thorough evaluation. The next arguments should **all** apply to the outsourcing case in question:

- A proven service provider can be found in the industry
- The service provider offers relevant cost (-20%) and service advantages
- Economies of scale and scope are available for the service provider
- The customer base accepts outsourcing
- The service provider's warehouse management system is better
- The cultures between outsourcer and service provider match.

If all of these apply, the questions arising after the initiative decision are the amount of outsourcing as well as which of the many providers to choose. The service range can vary from global to regional, wide to narrow and commodity to sector specific. When outsourcing logistics, material flows and the functionality of logistics determine the locations of the distribution centers; the wage costs are not as meaningful as they are when outsourcing other functions. (Lehikoinen & Töyrylä 2013, p.31; Rushton et al. 2010, p.59; Rodrigue 2012, p.19)

When making an outsourcing decision, discussion should also include in which way the outsourced function is wanted to be operated. Because the outsourcer may not have sufficient knowledge of all possibilities, it is good to consult the service provider of different operating models. Even though it is good to initially consider opportunities already in planning phase, the final solution is created later with the LSP. Thus, a decision was made that different operating models are presented later in this thesis, in Chapter 5.6.

Defining outsourcing goals

The core aim of outsourcing is to bring benefits. In order for a company to gain as much as possible in an outsourcing relationship, the LSP must be provided with

clear objectives: what is being outsourced, what is out of scope as well as what is tried to achieve with outsourcing. This will also act as a guide when limiting the scope of possible service providers. For the outsourcer to see the true results of outsourcing, it has to have a good understanding of its current situation. This requires internal preparation, or in other words getting the company in order. The company has to examine all its internal processes and objectives before involving other parties. To understand the results later, current costs and performance levels must be assessed. Additionally, current business requirements and ways of working must be documented; this means for example, in case logistics related function is outsourced, listing product flows, packaging requirements and delivery cycle times. More about documentation can be found in Chapter 5.4.4, which focuses on data requirements and on the information the company should share with the logistics service provider. Evidently, the outsourcer must have understanding of the data before it can share it with the provider. The benefit of clarifying product flows and business requirements is that even if outsourcing never occurred, the company would get a good understanding of its current supply chain. (Elliff 2004, p.50)

After clarifying the logistics outsourcing mission generally, more detailed objectives should be discussed, including precise units and measurements. These can be for example:

- Increase delivery accuracy to 99,9%
- Reduce transportation costs by 4% per year
- Implement new ERP (Enterprise Resource Planning) system by the end of year 2020. (Kivinen 2002, p.8)

In addition to clarifying the current situation, the company has to develop a clear scope of what is being outsourced and what is not, what services the LSP should provide as well as what outcome the company is trying to achieve. This planning phase is one of the most crucial factors that affect the success of outsourcing. As usual, a full commitment of the top management is crucial for the success of the project. From early on, there should be a project manager, the owner of the project, who should take the main responsibility for executing and directing a dedicated team. This is discussed with more detail in the next chapter. Once internal aspects

are all clear, the service provider evaluation can begin. There are multiple possibilities to choose from, but with a clear knowledge of what the company is looking for, it is merely executing tendering, sorting through the options and choosing a couple good matches. By having meetings and discussing more deeply of the possibilities and capabilities both sides have, the most suitable provider should be found. Communication must be open and clear not only inside the company but also with the service providers; what are expected and required of them and how the roles and responsibilities are divided. (Kalinzi 2015, p.12; Elliff 2004, p.50-51)

5.2 Forming a project team

As stated in the previous chapter, once the decision of outsourcing has been made, Ensto has to define roles for project team participants to cover all aspects of the project. The members should be selected based on backgrounds and expertise; each member should provide different point of view and different area of expertise so that nothing is to be neglected. The team should be formed and tasks should be addressed to all members from early on. This ensures achievable timetable and clear responsibilities for both the outsourcer and the service provider; the tasks include for example contingency planning, administrative and safety procedure preparation, as well as execution plan for the warehouse shift and practical issues, such as IT related questions. (Rushton et al. 2010, p.558)

An outsourcing process can include functions such as project management, procurement management and financial management. An IT expert or many experts are needed to ensure IT availability and integration with existing and possible new systems. Because IT integration and seamlessly functioning systems play a central role in outsourcing, it is crucial this task is properly managed. The team can make initial plans for the way outsourced inbound logistics could be operated; this is later agreed with the LSP. Another task for the group is to make plans for controlling and managing new warehouse processes and for quality development: for example the ways of inspecting inbound material, re-packing processes and reception

control. It should be decided how to control supplier quality and because of the size of the project, it is crucial to make forecasts and to evaluate possible risks and their probabilities. The project team is also responsible for training outsourcer's and service provider's employees to use new systems and to understand new operating models and ways of working.

As stated earlier in the thesis, it is important to have a dedicated project manager; a person taking care of internal communication to ensure satisfied employees, to avoid communication errors and to make sure all processes function the way they should. In fact, van Weele (2014, p.185) suggests having two project managers: from both the outsourcing company and from the LSP. Because of the complexity of the project, they would act as contact points and develop transition plan with proper timeline in cooperation; the steps provided in the plan would be followed to succeed in transition.

5.3 Effects of outsourcing in personnel

Since Ensto is planning to outsource its component warehouse, there arises the question regarding the current warehouse's personnel. It is inevitable some changes in employee structure will occur and it is for the company to decide how to re-organize people. It can be an emotive issue because it involves people and thus it should be managed professionally. The decision of how to inform personnel should be made early on, since in case it is decided to have open communication it should be open from the beginning; then again, if the decision is to withhold information all project members should know not to speak about the matter. This chapter focuses on offering research of the ways to manage outsourcing with personnel: how people behave and how communication can be handled.

When warehousing is outsourced, a supply chain becomes more agile since there is no on-hand inventory and lead-times are reduced (Mason, Cole, Ulrey & Yan 2002, p.615). In case outsourcing is due to increased production, the freed space can be used for expanding production lines (Lehikoinen & Töyrylä 2013, p.187). In many

cases when outsourcing the same amount of personnel is not necessarily needed, at least for the outsourced functions. According to Embleton and Wreight (1998, p.102-103), most of the staff feel outsourcing is a way of losing one's job. Maertz, Wiley, LeRouge and Campion (2010, p.277-280) continue by stating personnel have similar reaction to outsourcing as they have to layoffs. In fact, it may create even more negative atmosphere than layoffs, because the previous is seen as a voluntary management decision whereas the latter can be caused by unavoidable environmental issues. Because of the negative echo of the word, it is important the management covers the issue of structural changes and staff reduction well. The outsourcing project should be discussed wider with the whole personnel and all individual effects should be processed separately with everyone. Also, the management has to be aware of possible morale issues: personnel can violate company policies in self-defense, for example work faster to look more productive, to look good in the eyes of management and to keep their jobs, while compromising the quality of work. (Embleton & Wright 1998, p.102; Lehtikoinen & Töyrylä 2013, p.135) On the other hand, the negative attitude can have a decreasing effect on productivity and even lead to a strike (Barthelemy 2003, p.91).

There are different options of how personnel is affected:

- They will stay in the company
- They will no longer work in the company
- They will get transferred to the service provider's company. (Embleton & Wright 1998, p.102; Lehtikoinen & Töyrylä 2013, p.135)

The employees that stay in the company are known as survivors. Many of the staying ones feel fear, insecurity, anger, guilt or other negative symptoms because of their co-workers' unemployment. (Embleton & Wright 1998, p.102; Maertz et al. 2010, p.278) The procedures and policies inside the company need to be changed in such a manner that the staying personnel can be productive in the future. Because in many cases the job description changes to interacting with vendors and end users, the employees must be properly trained and supported. *The employees that leave* the company need help finding new jobs; the management should be truthful with layoffs and make sure there is minimal effect on the survivors. The last group,

personnel who join the service provider company, are key factors in the outcome of outsourcing. This means their commitment is crucial in order to keep the quality of work high. It is common the transferring personnel are offered with better positions than the ones they had in the outsourcer's company; this attracts many employees to join the service provider's firm. (Embleton & Wright 1998, p.102; Barthelemy 2003, p.91; Maertz et al. 2010, p.278) According to Tura (2018), it is good to emphasize how each transferring employee will become even more important than they used to be and thus create a more positive outcome of outsourcing. Barthelemy (2003, p.91) reported a case of transferring great amount of personnel to work for the LSP. The service provider was asked to provide the same salary and benefits than the employees had; the supplier also promised not to fire or transfer them to any other account without getting their approval. In the end, the outsourcing was executed successfully.

The transformation can be done in two ways: first one is called clean break approach, which means the employees will negotiate new jobs and contracts with the supplier without the outsourcer participating at all. This method is more cost-effective and takes less time. The second method, phased approach, costs a lot of time and resources, but if the outsourced function is depended on the employees' experience and skills, the latter should be used. (Embleton & Wright 1998, p.102; Barthelemy 2003, p.91; Maertz et al. 2010, p.278)

According to Lehikoinen and Töyrylä (2013, p.138-139), there are different ways to communicate outsourcing inside the company. Usually it is revealed only once the contract has been signed; the aim of this method is to prevent the key employees from leaving the company beforehand and to minimize rumors. Because rumors cannot be completely stopped, in case they occur they must be controlled; the content is usually negative and related to possible outcomes of outsourcing, such as losing one's job. The truth should be communicated as early as possible before inaccurate gossips start to spread. (Kublanov, Satyaprasad & Roshan 2005, p.5) The staff is on the side of more open communication: they hope to hear about outsourcing already on the planning phase (Lehikoinen and Töyrylä 2013, p.138-

139). Barthelemy (2003, p.91), Kublanov et al. (2005, p.5) and Tura (2018) are also on the side of openness. This prevents someone from the project team leaking the information and the employees hearing it through the grapevine. Attitudes toward outsourcing are also more acceptable if the communication is open; secrecy can decrease the trust employee has towards his or her supervisor. What is more, communication should include concrete facts: being open but in fact saying nothing only increases uncertainty. Similarly, raising too high expectations and not reaching them creates more negative opinions. It is better to discuss possibilities of both positive and negative outcomes and thus manage expectations. (Kublanov et al. 2005, p.8) On the other hand, it is possible early communication affects the personnel by depressing them and thus affecting their ways of working. Employers should know their own work community and know in which way they would react to outsourcing news. (Tura 2018)

The project can be kept as a secret in the beginning when senior level executives are involved and only the possibility of outsourcing is being evaluated. But, after that, before a larger team is formed and there is a clear intention to outsource, the communication should already begin. Because in the beginning everything is uncertain, the communication can be formed by estimates, probabilities and scenarios, which are specified periodically as the project proceeds. If nothing is told before decision making phase, it is possible personnel have already heard about the upcoming changes and react negatively, hence affecting the success of implementation. (Kublanov et al. 2005, p.6) Early communication enables better information collecting, since the personnel know best about the work they perform. In case there are employees with specific knowledge, the management may have to offer them higher salary or other benefits in order to keep them in-house. There is also an option between open and secret outsourcing communication: the company can include a deputy to participate in the outsourcing project from early on by signing a non-disclosure agreement (NDA). This person discusses all personnel related changes with the outsourcing company as well as with the service provider. (Lehikoinen & Töyrylä 2013, p.138-139; Barthelemy 2003, p.91; Kublanov et al. 2005, p.6)

People management in an outsourcing situation is not only about the way employees are being re-organized, but also about sharing what is important for the company: clarifying organizational goals, defining and training new roles for employees, sharing expectations in a new situation and prioritizing workloads. It should be noted that outsourcing affects not only internally but also external stakeholders: it is good to have a plan of how to communicate the outsourcing process externally and to inform changed contacts and operating models. It should be decided whose responsibility it is to communicate the outsourcing decision internally and externally; it can be for example CEO, HR, Corporate Communications or Heads of Business Units. (Embleton & Wright 1998, p.103; Lehtikoinen & Töyrylä 2013, p.142-143; Kublanov et al. 2005, p.4, 9) It is also important to understand the legislation regarding outsourcing and personnel rearrangements. Different countries have different laws so it is recommended to use a lawyer who knows the line of business well. (Lehtikoinen & Töyrylä 2013, p.136)

5.4 Service provider selection process

After forming a project team and deciding whether the project is kept as a secret or communicated openly, the company can begin the service provider selection process. Once outsourcing goals are set, requirements for the service provider can be determined. Every company has both must-have and nice-to-have requirements. Must-haves are the critical ones that affect whether a service provider is an option or not; nice-to-haves are complementary, ranking the possible providers based on their ability to fulfill these requirements. The service provider must-haves for Ensto are that the provider is focusing on inbound logistics activities, has the ability to stock a great number of components and locates not too far from the Keila factory. To find a suitable provider, the company has to evaluate different options based on the type of relationship they are aiming for and their own selection criteria. After initial evaluation of the type of relationship and qualifications Ensto is looking for, the final selection will be executed by following a tendering process with the best candidates.

5.4.1 Different forms of outsourcing relationship

There are different ways to analyze logistics outsourcing relationship. Kivinen (2002, p.16) divides partnership into three different levels: operational, qualitative and strategic. The lowest level is *operational* and it is usually the one all relationships start from; it may have features from higher levels as well but because of low personal relationship it is easy to change a supplier if the customer is not satisfied. The operational level relationship is usually based on price efficiency and discussions are mainly focusing on problem solving and price negotiations.

Qualitative partnership has deeper business relationship and more committed partners. It focuses more on cooperation and interaction, but the relationship is not as strategically significant as in *strategic* partnership. In the latter, the service provider has considerable responsibility of logistics coordination and there are mutual long-term plans; both managements are strongly committed. Because of the difficulty to create such a relationship, it should be well maintained over time so that both the customer and the service provider can indicate their opinions and evaluate the partnership. (Kivinen 2002, p.16-17) Rushton et al. (2010, p.60-61) add that forming a partnership is also a way of improving a relationship: the outsourcer and the service provider form a cooperative alliance in order to remove competition from the relationship and to create a culture where both parties aim towards cost reductions and improved services.

When outsourcing logistics, different service providers offer different amounts of services. Depending on the outsourcer's needs, it can choose from service providers offering basic simple services all the way to companies offering complete supply chain management solutions or choose something in between. These different logistics service provider categories can be seen in Figure 3. The more services a supplier provides, the higher the partnership level. When a company decides to outsource, it is crucial it concentrates on the management of the relationship, no matter the level of the partnership. Even though Embleton and Wright (1998, p.102)

wrote their article two decades ago, what they say is still accurate: there are always structural changes and new skills are needed to manage the outsourcing; once the implementation is complete, the relationship should be well evaluated and monitored through the whole partnership.

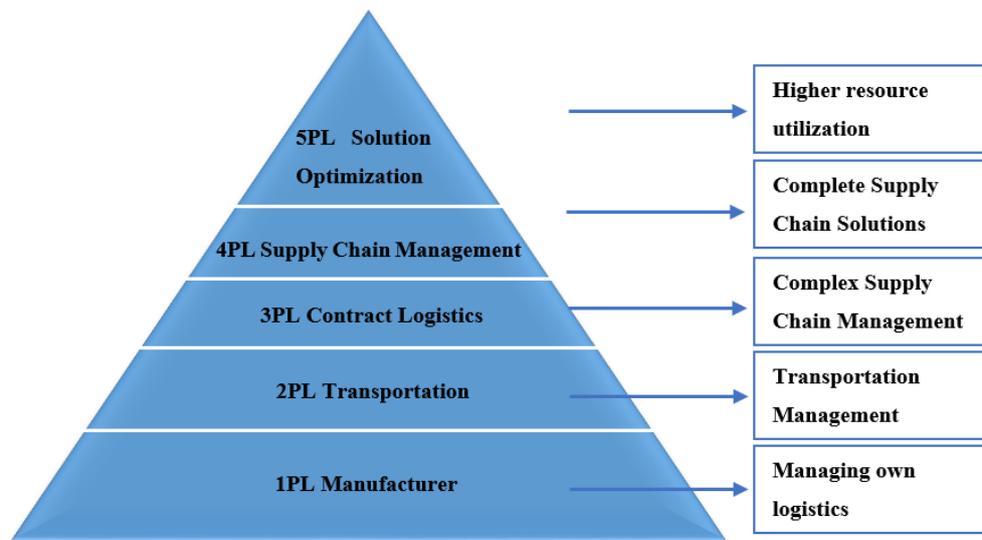


Figure 3. Logistics service providers.

1PL: First party logistics. Only the customer and the supplier or manufacturer are included in the transaction. The latter owns and manages all logistics functions, nothing is outsourced. (Leeuwen 2014; Trappey, Lin, Trappey, Liu & Lee 2011, p.1229)

2PL: Second party logistics. One of the parties involves subcontracted service provider. 2PLs provide a small amount of basic services, such as warehousing and transportation. The carriers deliver goods from point of origin to destination; they are asset-based, which means they can own or lease the transportation vehicle. (Leeuwen 2014; Trappey et al. 2011, p.1229)

3PL: Third party logistics. 3PLs are independent service providers in the fields of logistics, "performing all or part of logistics activities for the buyer, the seller, and

the manufacturer of raw materials, parts/components, goods in process, or finished products without taking the title of those goods" (Min 2013, p.134). They offer integrated logistics chain management and handling of complex logistics functions, such as transportation, order management, warehoused stock and physical distribution. The services may include information systems integration, consulting and survey execution in addition to material management, tracking and tracing, and value-added services (secondary assembly, for example). (Parashkevova 2007, p.31-32; Sharma & Choudhury 2014, p.2; Chen 2008, p.309; Percin & Min 2013, p.381; Rajesh, Pugazhendhi, Ganesh, Ducq & Koh 2012, p.270; Shah & Sharma 2012, p.518) In other words, 3PL service providers act as middlemen and perform those logistics operations that either the shipper (the first party) or the receiver (the second party) would have normally performed. Hence, the first and the second party can focus more on their core competences. (Hwang et al. 2016, p.105; Shah & Sharma 2012, p.518) The 3PL relationship is long-term and more beneficial to both parties: offerings are more customized and the variety of services is broader than in regular relationship (Fosso Wamba & Takeoka Chatfield 2011, p.694-695). This collaborative partnership is called "strategic alliance" (Sharma & Choudhury 2014, p.3; Busbin et al. 2008, p.105).

There are many benefits a 3PL may bring: the most common ones are improved flexibility, higher customer satisfaction, operational efficiency, lower investment base and access to international distribution networks. Further, as the 3PL collaborates with many partners in the supply chain, it can create more standardized data and processes and improve visibility throughout the whole supply chain. (Hwang et al. 2016, p.106) The biggest cost reductions appear when a company outsources all of its logistics chain's functions (Parashkevova 2007, p.35; Zacharia, Sanders & Nix 2011, p.41): it is possible to reduce 15-30% of inventory management costs by using 3PL services. With this approach the company can also cut the average order cycle length and overall inventories. (Parashkevova 2007, p.35)

3PLs can be divided into two based on whether they are asset-based or non-asset-based: the former operate distribution centers, modes or terminals, whereas the latter manage specific supply chains or new sourcing strategies on their customer's behalf (Rodrigue 2012, p.19). There are three types of solutions 3PL providers offer: supplier management solutions, order fulfillment solutions and reverse logistics solutions. (Cheong Lee Fong 2005, p.17) Of these, the first is suitable for Ensto's needs.

- **Supplier management:** a 3PL is responsible for the management of component and raw material flow; replenishments are frequent and lead time requirements are short. The final products can have very short life cycles and demand is very variable, which means the production can only be planned for short periods beforehand. The 3PL has to create a solution for coordinating multiple supplier inventory replenishments and a way to improve visibility in the distribution network. (Cheong Lee Fong 2005, p.17)
- **Order fulfillment management:** a 3PL is responsible for the incoming finished goods from manufacturer; the service provider picks, packs and delivers the orders according to end customer specifications. Because all customers have different delivery specifications, the 3PL has to decide the locations of warehouses and distribution centers and from which warehouse which customer should be served in order to meet lead time requirements. (Cheong Lee Fong 2005, p.17-18)
- **Reverse logistics management:** a 3PL is responsible for the management of faulty part returns to the brand owner for repair. An end customer will deliver the faulty part back to the 3PL, who will then communicate with the manufacturer. The challenge is how to locate the service centers in order to serve all customer sectors and how to route the returns to the manufacturer. (Cheong Lee Fong 2005, p.18)

4PL: Fourth party logistics. Also known as supply chain solution (Zailani et al. 2017, p.58). According to Rushton et al. (2010, p.69-70) and Cezanne and Saglietto (2015, p.32), 4PL is the future of supply chain management outsourcing. It means

an outside organization provides a solution through the whole supply chain, containing all the expertise and resources of all the third parties involved; it will participate in the management of the outsourcer's logistics system, design information systems and logistics architecture and enhance visibility and measurements in the supply chain, as well as the total supply chain perspective. That is, the service provider operates as a consultant (Fabbe-Costes et al. 2012, p.72). The term was invented by Accenture to describe "a supply chain integrator that assembles and manages the resources, capabilities and technology of its own organization with those of complementary service providers to deliver a comprehensive supply chain solution." (Accenture 2018)

The difference between 3PL and 4PL is that 3PL is asset-based, meaning it tries to fill its distribution centers, freight and vehicles' asset capacities, whereas 4PL usually owns only IT systems and intellectual capital and thus is light on assets. Therefore, a 4PL can use the best possible option for different logistics requirements and consider different perspectives, since it does not have to take the usage of its own assets into account. A 4PL is usually its own entity, acting as an only interface between the outsourcer and multiple logistics service providers and managing all aspects of the outsourcer's supply chain. In other words, 4PL, a logistics chain integrator, provides end-to-end solutions and focuses on understanding complex customer requirements in the whole supply chain affecting the whole business, whereas 3PL does not step out of its transportation and warehousing role. (Rushton et al. 2010, p.71-72; Tezuka 2011, p.25; Cezanne & Saglietto 2015, p.32; Parashkevova 2007, p.37)

5PL: Fifth party logistics. 5PLs aim to utilize all available resources in order to achieve best possible solution with decreased cost. They organize, plan and implement complete logistics solutions for customer companies by using best-suited technologies; the operation is based on mixing multiple 3PL requirements into bulk and negotiating with transportation companies in order to find better offers for higher volumes. 5PLs are non-asset-based; they manage supply chain networks

and focus on e-business across all logistics operations. (Ranjan 2017; Leeuwen 2014; MVP 2016)

In Ensto's case, 1PL and 2PL do not necessarily offer enough services, since the relationship is short-term and services are simply transportation or warehousing. More suitable options are 3PL and 4PL, depending whether the company wants to keep the management of logistics in-house or to outsource it to a service provider. Since 5PL offers solutions not only for supply chains but for supply networks, there may be too many services included for Ensto and thus it is not as good solution as 3PL and 4PL. Because the company is not planning to outsource the whole supply chain and its management, 3PL is currently the most relevant option.

5.4.2 Service provider selection criteria

Once the outsourcing company has decided the level of partnership (1PL-5PL) most suitable for it, it can begin to set qualifications the company is looking for the LSP to have. Every company has different criteria when selecting a service provider. The relationship is usually long-term so it is essential to select the right supplier; the outsourcer and the service provider work together closely and it is costly to change supplier (Embleton & Wright 1998, p.101). The aim is to create a clear picture of the service provider the company is looking for so that it is easier to recognize the most suitable possibilities in tendering phase.

According to Kivinen (2002, p.13), the LSP selection is usually based on *location, services, processes and quality* and *costs*. The geographic *location* and temporal distance of the service provider should be such that it will not create excess challenges for example with delivery times (Johnson et al. 2011, p.325). The further the service provider's location, the more uncertainty there is related to delivery accuracy. The type of *service* affects as well: different service providers specialize in different logistics areas. This should be taken into consideration when choosing possible candidates; some providers can be specialized in consumer market retail logistics, while another is focusing on spare part logistics in industrial market. A

standard service is a basic operation and easy to deliver, whereas special services always need to be set up from a scratch and thus there is greater risks in both operations management and efficiency. (Kivinen 2002, p.12-13) And, when outsourcing, it is common to require these additional services (Embleton & Wright 1998, p.101). Thus, it is better to choose a provider with special expertise on the field so it is able to deliver even the difficult services. Another factor to consider is that depending on the outsourcer's industry, there are different focal points: discrete manufacturing companies aim towards low inventories and thus require premium transportation and express shipments, while process manufacturing companies concentrate more on warehousing and transportation and less on inventory levels. Thus, these two companies would choose different LSPs. (Hwang et al. 2016, p.106)

The most popular criterion for service provider selection is *quality* (Hwang et al. 2016, p.106). Rushton et al. (2010, p.539-540) conducted a survey that indicates companies put more emphasis on service and quality of people than on cost; this was also proved earlier in the thesis, when discussing risks of outsourcing, in the Deloitte's (2012, p.16) study. Percin and Min (2013, p.382) add that also performance is more important than cost when selecting logistics service provider. This suggest that for example management quality, flexibility and ability to work with customers are critical factors when choosing a LSP. (Kivinen 2002, p.14-15; Chen 2008, p.310) Then again, if the product is not differentiated and the strategy of the company is to be cheap, the *cost* of outsourcing is in a big role when selecting a LSP. Even though it may not be the main criterion, cost still greatly affects supplier selection. (Hwang et al. 2016, p.106)

Selviaridis et al. (2008, p.386) annotates that previous experience in the outsourcer's industry and familiarity with both the products and industry-specific regulations are important selection criteria. Hwang et al. (2016, p.106) continue by adding service recovery, professionalism, track-and-trace, flexibility of the supply chain and relationship orientation to the list. They also remind consideration should include both quantitative and qualitative (for example supplier reputation) factors. Other

criteria are for example capability, responsiveness to request, quality, labor relations, information technology, performance and intangibles. Gupta, Sachdeva & Bhardwaj (2011, p.2347-2348) provide a list of LSP selection criteria, collected from multiple resources. The list has been supplemented by Qureshi, Abdelhadi and Shakoor (2014, p.10), Aktas, Agaran, Ulengin and Onsel (2011, p.842) and Percin and Min (2013, p.382); it is also amended and agreed by Hwang et al. (2016, p.106), Selviaridis et al. (2008, p.386), Završnik and Jerman (2011, p.521), Chen and Lin (2016, p.106), Min (2013, p.140) and Aguezzoul (2014, p.70). The list, found in Appendix 1, is helpful for service provider selection as the outsourcer can mark on the table the qualities and their importance it is looking for the LSP to fulfill.

Issues with service provider selection

According to Gupta et al. (2011, p.2345-2346), the complexity of the service affects the selection of the LSP by making it more difficult. The complexity is related to factors such as:

- Is there a single or a packet of services
- Is the focus on value adding or handling
- Is the focus on activity execution or management
- Are re-engineering and development included or is the service pre-defined.

Complexity is not only related to the service itself. Because outsourcing is not an everyday action, companies do not have deep knowledge of issues related to outsourcing. The selection of a service provider is difficult because the outsourcer may not have clear definition of user requirements; all providers can offer completely different solutions, which complicates their comparison. It is difficult to get complete information about the possible service providers and without the expertise and clear visions, it is time consuming to compare all provider candidates to several criteria with varying importance in order to choose the right fit. (Gupta et al. 2011, p.2346)

5.4.3 Tendering process

Once the outsourcer has narrowed the number of possible service providers to ten or less based on previously mentioned factors (location, services, quality and processes and cost) and with the help of service provider selection criteria list (Appendix 1) and made it clear to itself what type of service provider it is looking for, it can begin tendering. The aim of this sub-chapter is to go through the process by explaining different phases from the preparation of tendering to the part where a service provider has been selected and a contract is prepared. By following all steps, Ensto ensures the LSP is well-suited, all important issues are being addressed and both parties are on the same page.

Daim et al. (2012, p.32) suggest four steps to follow in service provider selection:

1. Make a strategic outsourcing decision
2. Search proper service providers
3. Dispatch request for proposals
4. Assess the proposals with cross-functional team by using pre-defined criteria.

The steps represent only the main parts of the process; the more detailed the outsourcing project is viewed, the more complex the steps become. This chapter examines steps three and four; steps one and two were addressed in the previous chapters.

Figure 4 illustrates different phases of a tendering process. The aim is to map available supply and based on analytical evaluation decide the service provider that is the best match: it fulfills all the needs and has the same goals regarding content, costs and quality than the outsourcing company has. Well-executed tendering process ensures the contract matches both parties' aims. (Lehikoinen & Töyrylä 2013, p.65-66)

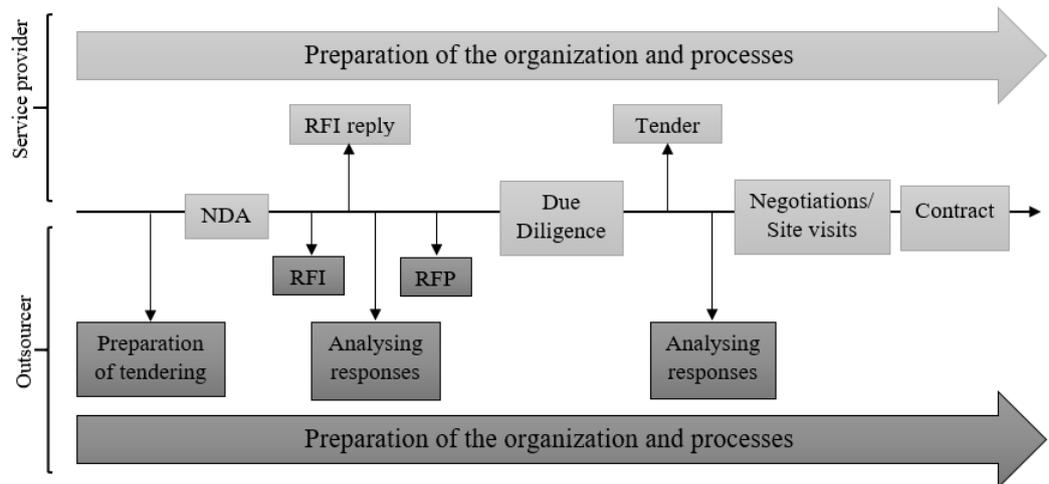


Figure 4. Tendering process. (Adapted from Lehikoinen & Töyrylä 2013, p.70)

Preparation of tendering

Before beginning tendering, the company should have a clear vision of the goals of outsourcing, it should have defined its processes and clarified the services and qualifications it wants the LSP to have. The tendering process starts with mapping potential service providers; the number of candidates should be around 5-10 so there is enough comparison but not too many to create excess work for both the LSP and the outsourcer. The number has been diminished in the previous chapters by defining the form of the relationship and setting selection criteria.

During preparation phase, the company should define the main contract terms to avoid unnecessary arguments later. The terms differ case by case. They can be related for example to pricing, service level agreement (SLA), documenting, auditing, benchmarking or termination of the service. This **Term Sheet** is usually sent as an appendix of the request for proposal. (Lehikoinen & Töyrylä 2013, p.86-88) Of these, pricing models and SLA are discussed with more detail.

Pricing models

The cost model can be defined already before discussing with service providers, although it is possible to let it for the supplier to offer. Deciding the pricing model

beforehand allows to guide the service provider's operating and thus positively impact the achievement of business goals. It also affects how the risks are divided, what is the profit margin and helps comparing tenders. Then again, the service provider can offer better pricing model, with better benefits. (Lehikoinen & Töyrylä 2013, p.74-75) There are four types of pricing models:

- **Resource-based:** the price is based on the used resources, for example spent hours, number of workers or actual costs (open book model: the service provider opens its accounting and reports all actual costs plus adds profit). This model is simple, but it is not encouraging service provider to develop its operations. It should be also clarified what can be charged and how to act in special situations: if an employee is ill, will the service provider charge those days or will lunch breaks or travelling be counted as work hours. (Lehikoinen & Töyrylä 2013, p.76-77)
- **Transaction-based:** the price is based on the number of transactions the service provider makes, for example number of phone calls, solved problems or used capacity. Employee and resource costs are included in transaction unit prices. The model drives the supplier to provide the transactions efficiently, but since the outsourcer does not know what takes resources there is a risk of paying too high price. Then again, the prices change according to transaction volume changes and the service provider has the higher cost risk. (Lehikoinen & Töyrylä 2013, p.77-78)
- **Value-based:** the price is based on the value of the service provides; the model is not common. The benefit of the model is that it guides the service provider to act in a manner that is in line with the outsourcer's goals, for example occupational health care can tie the price to the decreased number of sick leaves. The downside of the model is its uncertainty: the outsourcer may be scared of paying too much for the service and the causal connections are not always straightforward. (Lehikoinen & Töyrylä 2013, p.78-79)
- **Combinations of the previous.**

Lehikoinen and Töyrylä (2013, p.79) remind inflation and exchange rates can destruct the whole outsourcing process; the risk they bring should be carefully considered when processing pricing models. It should be noted that also the

implementation has its own costs that should not be neglected. They are related to storage and equipment, office, and information systems and technology. (Kivinen 2002, p.13, 29)

According to Gadde and Hulthen (2009, p.634), one of the biggest dissatisfactions when outsourcing logistics is that companies estimate the costs to be significantly lower than they really are. Selviaridis et al. (2008, p.388) explain that there is often confusion with costs; according to outsourcers, service providers tend to increase their prices during the contract term or at the renewal time. Then again, service providers claim outsourcers make unrealistic operational assumptions during service design process and thus they have to increase prices once the operations are running. According to Tura (2018), companies often want as simple pricing solution as possible: a fixed price for every product or transportation. In reality this does not work: the size of the product affects the handling time and thus increases the price and night time delivery is more expensive than day time because personnel costs are higher. Kivinen (2002, p.30-31) suggests "an open book charging method" to be implemented in the beginning and used for example for the first year of operations; in this approach, the provider's costs are based on activity and a provision will be added on total costs. Afterwards, the method can be changed for charging based on transactions, cost or performance or flat charges (Min 2013, p.139). Selviaridis et al. (2008, p.288) agree with Kivinen on the open book method: it is less risky regarding the supplier's financial compensation and well-suitable for a new relationship with little knowledge and high uncertainty.

Service Level Agreement

Rushton et al. (2010, p.536) state there is a debate regarding the effect of outsourcing on service level. For some operations the service level stays the same, since the service is provided exactly the way it would be provided by the outsourcer itself; for some operations the service level increases because the supplier can provide new perspective and thus improve the service; or, in case of multi-user operations, the supplier has better resources for more frequent deliveries, especially

to rural areas. SLA is a part of the outsourcing contract; the goals and measurements of the SLA should be derived from the main goals and measurements (Lehikoinen & Töyrylä 2013, p.81; van Weele 2014, p.185). With SLA, customer service provision related key performance indicators (KPI) can be identified. (Rushton et al. 2010, p.557; van Weele 2014, p.185).

The aim of SLA is to summarize the obligations of the contract and to specify the service level to be achieved. It includes description of the provided service, service related standards that need to be met, responsibilities of the outsourcer and the service provider, compliance provisions, monitoring and reporting requirements and mechanisms, timetable and protocol for performance review and revision protocol for technical or activity changes. The measurements can be for example customer satisfaction or the ability to react to service requests; in logistics related SLA the metrics can be for example 99,9% delivery accuracy or 5% overall inventory reduction during a quarter. In case the service provider does not reach the agreed service level there should be a fine to make the SLA more meaningful for the supplier; a reward for exceeding the service level may motivate the service provider as well. (Rushton et al. 2010, p.567; Lehikoinen & Töyrylä 2013, p.82; van Weele 2014, p.185)

Non-Disclosure Agreement

NDA is signed always before exchanging confidential information. Lehikoinen and Töyrylä (2013, p.89-90) recommend using the outsourcer's contract base instead of the service provider's so that the NDA will reflect the outsourcer's goals. It is also a good cooperation test: how easily the NDA is handled with possible LSP candidates.

Request for Information

Request for information (RFI) is a document that encompasses the information gathered in preparation phase. It includes basic information about the outsourcing

company and target to be outsourced, short summary of the outsourcing goals and requirements, and the tendering schedule. The more data a RFI includes, the better responses the company will receive. The document should have questions for the service provider, as well as guidelines for the response. Once the RFIs have been evaluated and analyzed, the best candidates will receive request for proposal. (Lehikoinen and Töyrylä 2013, p.89-90)

Request for proposal

Request for proposal (RFP) is a document that guides in detail the requirements for outsourcing (Embleton & Wright 1998, p.101): the preparation and evaluation of a tender, including the statement of work (SOW), evaluation factors, contract type and instructions for preparing the proposal. RFP is sequel to RFI: it does not repeat the same things, but rather deepen and widen the data. It should inform the requirements for service and quality and notify the selection method: whether the lowest price with minimum technical requirements is the bottom line or that there are some other important factors evaluated over the others. In case other factors are more meaningful than price, it should be stated how much more important they are. The evaluation criteria should be measurable, variable and determinant to create variance between the offers. RFP should also include descriptions of how the tenders are submitted and evaluated and what information is required. (Rumbaugh 2015, p.12-13; Lehikoinen & Töyrylä 2013, p.94) Below is the main content of the RFP.

Kivinen (2002, p.30-31), Embelton and Wright (1998, p.101) and McCaffree (2005, p.522) state that **general conditions** encompass a brief description of the logistics business environment and critical issues regarding successful outsourcing process: an overview of the project and administrative issues. It also informs of the tendering process: schedules and deadlines, content of the tender, language, quote distribution and pricing structure (warehouse price per pallet location/square meter, IT price per investment fee/per order line/fixed price and so on, including also the currency used). The introduction should also include a short overview of the company and

its products and operations, along with confidentiality clause (Rushton et al. 2010, p.545).

Another thing to include to a tender are **specifications** or **technical and management requirements**. These are issues discussed with more detail in Chapter 5.4.4: key figures, quality, processes, customer service, implementation costs, information systems and technology and other issues that might be relevant for the outsourcing process. A supplier can meet all technical requirements, but lack proper management and thus not be suitable. The service provider should add its **qualifications** to the RFP: history, skills, capabilities and resources needed for the project. Making a clear RFP brings benefits: there is lower risk for wrong assumptions and misunderstandings and the outsourcer is more likely to receive a clear offer, which eases the service provider selection process. (Kivinen 2002, p.32; McCaffree 2005, p.522)

The RFP should have a **pricing** section, including all project components up for bidding as a list: the service provider splits the costs into these components and thus makes the evaluation of different proposals easier (McCaffree 2005, p.522). Last but not least are **appendices**. They can be any relevant information that should be shared with the service provider: description of the operations with pictures, packaging material lists, customer specific equipment lists or confidentiality agreement, to name a few. (Kivinen 2002, p.32; McCaffree 2005, p.522) Also, the previously mentioned Term Sheet is added as an appendix to RFP.

Statement of work

A SOW can be produced on its own or as a part of RFP (Williams 2013). It details the work needed for producing or developing goods or services by the supplier. The language and terminology have to be clear, precise and understandable. (Miller 2007, p.58; Williams 2013) The detailed content of SOW can be found in Appendix 2.

Due Diligence

If the outsourcing process has effects on personnel or other meaningful inspection points, the company should be prepared for Due Diligence phase. It gives the service provider an opportunity to evaluate the validity and value of the outsourcing target. The documents needed are internal, fact-based documents and contracts that affect the outsourcing service and pricing; they are related to personnel (for example contracts, job descriptions, collective labor agreements and know-how), equipment and machines, systems, third-party contracts and offices and spaces. (Lehikoinen & Töyrylä 2013, p.88, 97-98)

Site visits

Kivinen (2002, p.32-33) and Embleton and Wright (1998, p.101-102) recommend site visits for both the outsourcer and the service provider before making the final decision. This is to better know the potential business partner and its ways of working. The company that looks good on paper should be as good in real life. The outsourcer should visit to know if the service provider's facilities are suitable, if there are expansion possibilities and how much space there is; it should also get to know the management processes: process, quality, human resources, transportation, projects... The focus should not only be on processes, but on personnel and cultural fit as well. If there have been any similar experience, it is good to discuss about it in this phase; if new ideas arise, their suitability for the site can be reviewed.

From the point of view of the service provider, a visit to the outsourcer's premises can help to get an overview of current operations, processes and IT systems as well as to resource needs. It is easier to make a SWOT-analysis after seeing the operations and to perform a final quote based on these recognitions. Or it can also happen that the service provider will not proceed any longer with the outsourcing after realizing it cannot provide what is needed. (Kivinen 2002, p.33)

Contracts

Once service provider candidates have made their tenders, the outsourcing company chooses two best options to start negotiations with. Most of the time negotiation phase and contract phase are merged into one; if there is a reason to specify the content, a separate negotiation phase can be organized. The aim is to create a document that includes the content of the outsourcing service and all needed juridical terms. Both parties should be satisfied with the entity. (Lehikoinen & Töyrylä 2013, p.104-106)

It should be mutually decided in contracting phase whether or not to use incentives and penalties. That is not the only matter to discuss: the scope of services should be described, the contract duration set, pricing and fee structures should be clarified, termination plan made, conflict resolution method should be agreed, communication guidelines set and control and management methods developed. (Van Weele 2014, p.185) It should also be decided in the beginning who owns the products. Vendor-managed inventory means the supplier owns the products in the warehouse and has all the responsibility until the goods are at the factory. A rare possibility is that the LSP owns the products and takes care of the inventory levels in exchange for a fee. Lastly, the warehouse can be owned by the customer who then manages the inventory levels based on data from the LSP. (Tura 2018)

Different services have different contracting practices when outsourced. Long-term agreements are usually made for warehousing, whereas transportation is executed with short-term contracts: however, LSPs would prefer long-term relationships. (Selviaridis et al. 2008, p.389) Chen and Sarker (2010, p.1665) state it is more effective to have long-term cooperation than to use incentives in a short-term relationship. Many outsourcers try to decrease supply chain costs and achieve synergies by shared-user solutions. They use rolling, short-term contracts to achieve cost savings and flexibility and in some cases do not even sign any contracts so the relationship is easily terminated, but once the relationship is successful they do not want to change suppliers. (Selviaridis et al. 2008, p.389)

Platz and Temponi (2007, p.1658-1659) state the contract between the outsourcer and the supplier is fundamental for successful relationship. They address four key elements that should be found in an outsourcing contract:

- **Performance:** Quality and service level expectations are clearly stated, with means for performance measuring. The supplier cannot only perform the activities, it has to do so while reaching the pre-determined standards; these are related to quantity, quality, order accuracy, delivery method and timing while emphasizing profit maximizing. Depending on the function also reliability, data accuracy, response time and support service quality should be defined. Incentives are a good way of motivating the supplier to reach quality standards: the reward structure and performance metrics should be defined in the contract. Not only should good performance be rewarded, but also underachiever should face penalties: without penalties a supplier can easily ignore incentives and settle to mediocre performance. To ensure communication between the companies, the infrastructure of communication channels should be put into the contract: direction, methods and appropriate subjects, including confidentiality issue. (Platz and Temponi 2007, p.1658-1659; Min 2013, p.140)
- **Financial:** The contract should include cost accounting systems. It is difficult to allocate which costs are direct and charged directly and which are indirect and put into cost pools for future allocations. In addition to these, also initial costs, for instance production planning, training and rearrangement, should be estimated in the contract. With properly allocated costs, the prices of products can be fixed more accurately; the most effective pricing happens when both parties acknowledge profit is mutual function. (Platz & Temponi 2007, p.1659-1663)
- **Human resource:** All personnel related issues must be addressed in the contract: interaction between the outsourcer's employees and supplier's employees, staff transfers, recruiting, downsizing and the infrastructure of personnel. It should also include both parties' responsibility areas and provisions for training and hiring: the quality of staff should not decrease

nor should there be any confusion between expectations. (Platz & Temponi 2007, p.1659-1663) The way outsourcing affects personnel is discussed earlier in the paper.

- **Legal:** The ownership and transfer of ownership of assets as well as the asset usage should be defined in the contract. All licensing agreements and intellectual property protection should be addressed too: intellectual properties are the most important assets to companies with approximately 85% of the company's overall economic value. There should also be a warranty claim in the contract: the service provider must ensure the product or service is certain quality, does not violate any ownership rights and is sold without any pretenses. Problems with warranties, usually originating from transaction technicalities or quality between the outsourcer and the vendor, can lead to liability issues; the contract should set reasonable liability cap that does not favor either company. (Platz & Temponi 2007, p.1659-1663)

In case the outsourcing relationship is no longer profitable, a framework for terminating the relationship is essential: it protects both parties from gaining economic benefits over the other and allows the parties to reclaim the price of the terminated function and define settlement expenses. To prevent any misuse of proprietary knowledge, no-compete and NDAs are suggested as well as re-addressing of the personnel and asset transfer to avoid disagreements with rights, properties or payments that lead to legal issues. (Platz & Temponi 2007, p.1663)

5.4.4 Information sharing

As mentioned in the beginning of the thesis, a company has to define its basic data to be shared with the service provider. It includes detailed, basic information of the outsourced function: numbers and figures. All used systems and processes should be listed so the service provider knows the activities it needs to operate; the company should define the expectations of service level and quality standards clearly, using for example percentages. This is helpful for internal process analysis

and to be shared with potential service providers during tendering process. (Kivinen 2002, p.18; Rushton et al. 2010, p.547) Kivinen (2002, p.18) continues that basic information can be divided into six categories: key figures, processes, quality, customer service, information systems and technology and implementation costs. Of these, the last one is discussed in other sections. Attachment 3 includes a more detailed table, which presents examples of data that could be included in basic information, shared with the service provider along with a RFP.

Key figures

There are many warehouse related aspects to define. First, the location of the warehouse should be decided and stated what should be accomplished through this location decision. Secondly, the requirements of the warehouse need to be defined: the square footage needed, air-conditioning or other facility requirements and whether it is a multi-user or a dedicated warehouse. Key figures should also cover the sizes and weights of the products as well as inventory and volume related data; the equipment requirements should be discussed with the service provider to ensure the availability and to agree on the costs of equipment. (Kivinen 2002, p.19-21)

Processes

As Kivinen (2002, p.23) continues, an outsourcing company has to describe its processes to possible service providers in order for them to understand the activities they need to operate. The processes concern inbound and outbound processes, storage, return policies, transportation and billing. Among inbound functions are for example how to notify incoming shipments and the process of unloading goods. Outbound functions share some of the processes with inbound functions: used information systems, deviation and rush order handlings are among important tasks. In addition to these, for example order receiving frequency and the process of changing orders should be defined as well. (Kivinen 2002, p.23-25)

The reason to define storage processes is to provide an overview of the way everything is handled. This includes factors such as the way products are located in the warehouse, the way they are registered and the inventory accuracy. In case of returns, the handling process should be clearly agreed; even though it is a small activity, it is an essential part of outsourced logistics. Transportation responsibilities of the service provider should be clarified as well. There are options: the service provider can take care of the whole management of transportation or only organize the consignment notes and call the pick-ups. Additionally, if there are special services they should be defined as well. Billing can also be arranged in many ways: as traditional paper copies or via Internet platform, for example electronic data interchange. The frequency is decided between the outsourcer and the service provider. (Kivinen 2002, p.24-26)

Quality

Some companies require a certified environmental or quality system, while others do not. Everyone has different expectations of good quality and performance and the performance measurements vary; targets can be set by a LSP company itself or they can be set by a customer. Hence, it is important both sides share their expectations openly. The data related to quality should define minimum quality standards of different processes as well as how penalties and rewards are organized. The expectations related to KPI quality should also be clearly stated. Discussion should include the way the service provider executes different processes and how the performance is measured. These processes can be for example related to warehousing and transportation and cover areas such as lead time, quality and resources. There are also diverse factors to discuss: the availability of information systems and technology and the availability of the service provider (for example 24 hours a day, 7 days a week or 8 hours a day, 5 days a week), in addition to the language skills of the staff and environmental issues. Despite of the performance measurement system used, measurements need to be consistent and coherent. (Kivinen 2002, p.14-15; Chen 2008, p.310)

Customer service

What is more, a customer service should be taken into account when discussing with possible service providers: what are the opening hours and duty time, what are the languages spoken and a plan in case of emergency. It is important to know the contact person and whether there is only one or multiple contact points. (Kivinen 2002, p.27)

Information systems and technology

A big portion of outsourcing costs comes from information systems and technology. Hence, to avoid any future problems, attention should be paid to the structure and features needed in the selected information technology systems. Again, a decision should be made regarding whether the supplier provides the system, and in that case how the costs are allocated, or will the outsourcer do it. The system ought to include for example warehouse activity profiling and performance measures, receiving, warehousing and order picking. (Kivinen 2002, p.28-29) Because of its importance, Chapter 5.5.3 is dedicated for IT systems evaluation.

5.5 Successful outsourcing relationship

Once the service provider has been selected after careful tendering process, the focus shifts to maintaining the relationship. Since Ensto's products are components needed in the production phase, it is crucial the service provider is trustworthy and delivers flexibly, always on time. By sharing information of the company's functions and ways of working, Ensto can ensure the service provider has a clear vision of its operations and culture. Because interaction in the relationship is managed via information technology, it is essential the systems function well. This focuses on analyzing the factors that affect the success of a relationship and decrease the risk of a stoppage; it is also examined what IT possibilities Ensto has when outsourcing warehousing functions.

5.5.1 Critical success factors

There can be many conflicts between an outsourcer and a LSP: the outsourcer may not trust the service providers' capabilities while the service provider may not receive clear specifications or receive adequate information. Even though outsourcers prefer short-term contracts, LSPs claim they restrict the success of the relationship because of the lack of incentives and create high risk for the supplier. (Selviaridis et al. 2008, p.390) This should not be the case: for the relationship to function seamlessly, it is important there is mutual trust and understanding of cultures and organizational structure (Kalinzi 2015, p.13). For example in Ensto's case, the culture is highly focused on Lean thinking. The service provider should share similar ideology in order to avoid cultural conflicts and to share similar operating models.

The most important factors to consider when outsourcing are that the decision has to come from the top management and that information has to be shared, which should be done both before and after contracting period and both internally and externally. Other critical factors supporting the success of the relationship are frequent communication, clarified specifications and service level agreements as well as understanding supply chain needs. (Selviaridis et al. 2008, p.390; Kalinzi 2015, p.12-13, 18) The whole process of successful outsourcing begins with careful strategic planning, which clarifies the execution of each part of the process. It is a common mistake for outsourcers to simplify their logistics to merely goods moving from one place to another; in reality there is much more to logistics and there are always many exceptions that should be noted as well. (Tura 2018)

According to van Weele (2014, p.184), contracting is the most important success factor of outsourcing. It acts as the legal basis and ensures risks are minimal and rewards maximal. Again, the importance of planning arises. The outsourcer must have clear internal functions and good collaboration and coordination inside the company to avoid external conflicts. The success is more certain if the outsourcer has clear plans of the services it is looking for the service provider to offer and it

knows what to negotiate in contracting phase. In case of a conflict, it is good to have a pre-defined procedure to solve it. The company should create operating standards and measure performance against them, know the payback period and know how to achieve expected benefits. Joint performance measurement projects every now and then support the equal sharing of the relationship management and planning. (Selviaridis et al. 2008, p.390; Kalinzi 2015, p.12-13; Min 2013, p.134; Liu & Lee 2018, p.8; Tura 2018)

Zineldin and Bredenl w (2003, p.455) contrast outsourcing relationships to marriage: the successful ones are based on true partnerships with commitment and trust, while disloyalty leads to divorce. Jazairy, Lenhardt and Haartman (2017, p.493) agree that trust and communication are the key factors for succeeding in relationship. Zineldin and Bredenl w (2003, p.455) identified also other factors that tend to support the success:

- **Individual willingness and motivation, strategic fit:** Both partners are motivated to begin and maintain a relationship and both can bring value to it; they share long-term goals they aim to achieve in collaboration and develop interdependence.
- **Interdependence:** Both partners need each other and invest in one another; their assets are complimentary and they can achieve more together than as individuals.
- **Cultural fit:** Partnership is based on sharing *all* needed information and knowledge; both partners are committed and trust one another. The relationship is defined as high priority and the best people are allocated to sustain and enhance it.
- **Organizational arrangements and institutionalization:** The relationship is formal and well defined; all responsibilities are allocated and problem solving mechanisms are clear to all parties.
- **Integrity and integration:** There is a well-functioning communication system linking many organizational levels and many people smoothly; the information gained is not misused, there is mutual respect and flexibility

and the attitudes are such that they sustain and enhance mutual commitment and trust. (Zineldin & Bredenl w 2003, p.455)

5.5.2 Continuous flow to the factory

If the flow of raw materials from the LSP is not continuous, there is a risk of stoppages or other problems. It is expensive for a factory to stop running because of missing raw materials and customers may be disappointed since they are not receiving orders when promised. To avoid these situations, the outsourcer-supplier relationship should be based on close cooperation and integration; creating close relationships with vendors through vendor-managed inventory or a quality-assured supplier system helps with ensuring materials are always in the right place at the right time. (Rushton et al. 2010, p.210; Svensson 2001, p.27) Liu and Lee (2018, p.6, 9) highly emphasize the importance of integration, which they define as a set of practical processes aiming to enhance strategic and operational efficiency via external and internal cooperation. They state internal integration affects external integration by for example enhancing dynamic transportation adjustments and thus delivery reliability. It also improves communication efficiency and service performance.

In addition to creating intimate partnerships, there are many ways of avoiding disturbances: the manufacturer can purchase the supplier company or demand the supplier to co-locate near the factory. Another option is to hold reasonable safety stocks at the factory; this increases inventory carrying costs but assures there is continuous flow in the manufacturing process and it can be cheaper than a stoppage. The longer the transportation distance, the more uncertain the time of arrival is. To ensure the goods are at the factory when needed, time slots can be set for deliveries based on demand or production schedule; this means the transportation has to be organized in such a way that it arrives within the time slot. Thus, vehicles usually come close to the factory to wait for their turn, which reduces the uncertainty. To minimize the risk of disturbance, the company can also utilize multiple sources and

inventories: this way if one supplier cannot deliver what promised, there is another supplier to compensate the loss. (Rushton et al. 2010, p.210; Svensson 2001, p.27; Ekwall & Torstensson 2011, p.180) Ensto could benefit from setting delivery time slots, since it would not have to increase its buffer inventories nor use multiple suppliers but it could still ensure components are at the factory when needed.

Another way to make sure the supplier delivers goods as planned is to apply a penalty system. The quality requirements should be clarified already in tendering phase; if these are not met, a penalty will take place. Then again, what might motivate suppliers to produce higher quality and to commit even more is to apply a rewarding system as well. (Kivinen 2002, p.26) Adding a penalty system to transportation accuracy could increase even more the certainty of goods being on time at the Ensto factory.

Inventory levels have a big part in continuous flow. Once the warehouse has been outsourced there is no longer the possibility to visually monitor the goods; this means if the systems are not showing truthful numbers, big problems can occur. A stoppage can follow if Ensto's system shows different numbers than the LSP's. There are usually express deliveries organized and a root cause analysis is executed in case an error occurs, but it can still take time before the missing goods are in production. Thus, it is critical the IT system integration is carefully executed, the systems are functioning the way they are supposed to and they provide realistic facts. There are different processes that ensure the numbers match; it is possible to compare inventory levels of both parties' daily and in case differences occur begin an investigation process of the reasons why they differ. In many cases the problems are human errors and not related to systems. (Tura 2018)

5.5.3 IT

The aim of this chapter is to provide data for Ensto so that it can compare different information technology solutions. The company has made initial choice of how to manage the information flows, but it also wants to take into consideration other

possibilities for the future. IT integration is a crucial part of successful outsourcing and continuous flow. Thus, great effort should be put to carefully plan and execute an IT solution that includes necessary functions, produces relevant data and communicates proficiently with the service provider's systems.

Sharing information is the key to collaboration in a supply chain. This, in turn, is enabled by IT. In outsourcing projects, IT is the key in logistics service integration: data communication systems between a service provider and an outsourcer are nearly always needed to support outsourcing arrangements, to maintain optimal lead times and to provide customized services. (Vieira, Coelho & Luna 2012, p.484; Fosso Wamba & Takeoka Chatfield 2011, p.695; Sharif, Irani, Love & Kamal 2012, p.2518) In addition to being a crucial part of the integration, IT tends to cause a great amount of outsourcing costs (Kivinen 2002, p.28).

The simplest solution is to give the service provider access to existing information systems; another option is to introduce a new system. (Lehikoinen & Töyrylä 2013, p.155-156) Daily logistics activities require LSPs to support various functions smoothly and to be aware of the outsourcers' requirements. There can be a great number of routine information and it can be boring to process; with the help of IT systems, the quality and efficiency of information sharing may improve. (Liu, Huo, Liu & Zao 2014, p.47) These are for example warehouse management system, transportation management system, routing system, track and trace system, barcode, radio frequency identification, electronic data interchange and the internet (Vieira et al. 2012, p.484).

LSPs providing standardized services can have highly developed processes and ready-made information systems. The question arising during outsourcing process is that who will provide the systems. If the service provider is dedicated to serve only one customer, it is more common to use the outsourcer's information system. In case the provider has multiple customers, it is more natural to use the service provider's information system. This enables all employees to work with all customers and decreases the number of different solutions, when comparing to a

situation in which every outsourcer uses their own solution. Another reason to use the service provider's system is that it has already all functions to fulfill all customer needs; the longer the contract, the more reason the provider has to invest in customer specific features. Then again, if the outsourced function is closely related to other functions, it is better to use the outsourcer's system. This also applies in case the outsourcer owns the machines and equipment. (Lehikoinen & Töyrylä 2013, p.154, 191)

Electronic data interchange

Nowadays companies utilize inter-organizational information systems to communicate and share information with customers and suppliers. The use of technology such as electronic data interchange (EDI) can help companies to generate cooperative relationships by coordinating material and information flows, which can reduce problems and misunderstandings with data sharing. It also enhances data integrity, product quality and responsiveness in addition to reducing purchase request processing time. The supplier deliveries tend to be more accurate and it can have a positive effect on manufacturing processes and overall performance. (Tan, Kannan, Hsu & Leong 2009, p.378-381) Boddy, Boonsta and Kennedy (2005, p.268) define EDI as "a set of standards, hardware and software technology that permits computers in separate organizations to transfer documents electronically". The fixed-format documents have pre-defined information fields and data. There are both traditional and web-based EDI technologies; studies have shown that using web-based EDI improves supply chain coordination and overall performance compared to traditional EDI (Tan et al. 2009, p.381; Bennett & Klug 2012, p.1282).

Enterprise resource planning

Enterprise resource planning (ERP) system automates and integrates different cross-functional business processes. It is formed by multiple individual modules, which must be purchased separately. These can be related to accounting and

controlling, production and materials management, quality management and plant maintenance, human resource management, project management, sales and distribution, supply chain management, customer relationship management and business intelligence. The aim of ERP is to facilitate information flow between all functional business areas. (Hwang & Grant 2011, p.231; Woo 2012; Bhardwaj 2016) Tejeida-Padilla, Badillo-Piña and Morales-Matamoros (2010, p.89) define ERP as "an information system that helps production systems to reach viability through several modules that process data and information as close to real time as possible and directs the information that flows around the various communication linkages". In other words, ERP aims to work as a centralized business system, in which all information is connected and data flows through the whole organization (Bhardwaj 2016). ERP is an all-in-one solution, which means it does not need other software application to work alongside. In fact, entering data into multiple applications can decrease efficiency and productivity and increase the risk of errors. (Woo 2012)

Warehouse management system

Warehouse management systems (WMS) is a centralized system for coordinating warehouse functions and inventory monitoring. It is usually a standalone system and requires modules such as customer relationship management and accounting; it does not include other supply chain operations but there can be transportation management capabilities (integration with main parcel carriers' shipment tracking systems for example) in some systems. Functionalities included in WMS can be for example setting up stocking and non-stocking locations to show true inventory counts while separating available and allocated products to existing orders; prioritizing and rating stocking locations to enhance picking efficiency; tracking precise product movement; and providing product receiving and shipping without a need to put the product away with cross-docking features. (Woo 2012; Hedges 2018)

The aim of WMS is to improve order processing and received stock processing by increasing visibility of inventory and warehousing. For example, if a product is added or removed from inventory, the system will detect it. The improved processes can enhance delivery accuracy and expedite delivery times; all these improvements lead towards decreased logistics costs. Companies using WMS have higher perfect order performance and decreased number of expedited orders. This is due to the integration of warehouse functions: it enables employees to pick and ship goods quickly since the system directs where the products are located. Systems, personnel, freight, outsourcing, overhead and other warehouse related costs (transportation, material flow, logistics strategy and reverse logistics) tend to be decreased in companies using WMS. Although overall logistics costs are lower, warehouse operating costs can increase. This could be explained with the fact that while implementation, maintenance, data storage and employee training increase systems costs, the rest of the logistics function costs have decreased. (Partida 2012, p.51-53; Bhardwaj 2016)

There are multiple different WMS products on the market. They include different functionalities; some of them are standalone systems and some are added to an existing ERP. When a company plans to use WMS, it should consider the need for extra employees dedicated to maintain and use the system and how the system interacts with the existing infrastructure. (Partida 2012, p.53)

Differences between ERP and WMS as warehousing system

WMS is specifically designed for warehousing. It provides a platform for the complete, end-to-end management of warehouse functions, aiming to increase efficiency and reduce supply chain costs. ERP, on the other hand, offers WMS system as a module, connecting warehousing with all other data into one place. (Tigernix 2017) What differs WMS of ERP is that WMS provides real-time information for intelligence inventory optimizing; it indicates optimal location for every product based on trends and historical data and whether a product should be in a warehouse based on shelf and bin utilization. (Woo 2012)

The question of whether to use existing ERP for warehousing or invest in a new WMS should be based on functional requirements and long-term business objectives. The focus must be on enhancing business value and reaching key performance goals, without forgetting to calculate the costs of implementation and integration. The pros and cons of both systems are listed in Table 3. Even though WMS can cost a considerable amount of money, it should not be overlooked that implementing warehouse module into existing ERP is not cheap either and there are risks with the integration process and touchpoints failing. For example, in case of missing functionality, how much do compensating workarounds cost and how does it impact customers? Then again, it should not be assumed implementing WMS with other systems goes seamlessly either. The costs of maintenance, supporting technology and hardware are also not to be neglected. Usually both ERP and WMS are priced in such a manner that each module and system have separate price from few thousands up to hundreds of thousands. (Satterfield 2006; Woo 2012; Tigernix 2017)

The issue should be viewed from different perspectives: functionality, flexibility, technology and financing. If the operations are complex and large, ERP solutions may force to compromise with functionalities; either they do not exist or they are not as highly developed as WMS. In-depth product tracking may not be as good in ERP as it is in WMS. Then again, if the operations are less complex, WMS can have unnecessarily advanced functionalities and high initial and on-going costs; it also produces great amounts of data every day, which requires resources to handle. In case the environment is linear, has limited exceptions and sequential activities, ERP is a better choice; WMS is more suitable for business with frequent priority changes. The benefit of ERP is that it stores all data into centralized hub, whereas WMS has usually multiple databases. The latter is also isolated from other departments. Both of the systems can be stored on the cloud and on a server and are based on real-time information. Technological issues should also be considered: can the existing hardware be used and what are the supporting capabilities of the IT group. It is a good idea to consult other companies that have outsourced their

operations: which one did they choose and how well the implementation process went. Lastly, the budget should not be ignored. ERP solution can be better for current investments, but the gains or losses of investing or not investing in high-quality WMS should be considered in return of investments analysis. (Satterfield 2006; Woo 2012; Tigernix 2017; Bhardwaj 2016)

Table 3. Pros and cons of ERP and WMS.

	<i>ERP</i>	<i>WMS</i>
<i>Pros</i>	For linear activities Centralized data hub All-in-one solution Information flow through the whole organization	For frequent priority changes Made for warehousing Complete warehouse management Better traceability Lower overall logistics costs
<i>Cons</i>	Not specifically for warehousing Lack of functionalities Lack of in-depth performance Difficult priority changes	Multiple databases, isolated Expensive Complex integration

Because of the size of Ensto's component warehouse operations, the great number of goods and warehouse activities, it is suggested they utilize WMS instead of ERP. WMS brings lot size benefits and enables resource centralization whereas ERP does not offer any additional benefits. It takes a lot of work to implement new systems, but it is mostly coding done by IT professionals. (Tura 2018)

Ensto has decided to utilize its ERP for the component warehouse outsourcing process, in which it will give the service provider limited rights to certain modules. This requires great amount of expertise and IT knowledge, but it is still simpler than changing the whole system. Later on, once the outsourcing has been implemented completely and it is functioning as it is supposed to, other possibilities such as WMS can be considered.

5.6 Operating models

In this thesis, the outsourcing process is related to inbound logistics and component warehousing. This means the operating models are focused on material flows from the outsourced warehouse to the factory and does not examine logistics to the end customers. For the manufacturing capacity to be fully utilized, it is essential the needed parts are available at the assembly line at all times (Dörnhöfer, Schröder & Günthner 2016, p.2). To ensure continuous flow and on-time deliveries even with shorter notice time, Ensto's outsourced warehouse has been planned to be located no further than one hour away from the factory by truck. It is more economical to deliver multiple times daily and to have minimal inventories; in case there are issues or changes in production or product quality, the responsiveness is better if the warehouse is closer. There is also less a risk that weather and road conditions disrupt transportation. All in all, the proximity of the service provider can reduce inventories, transportation damages and costs, decrease other costs (loading, handling, packing, unloading and working) and improve delivery reliability. Then again, the proximity that enables multiple deliveries can reduce the benefits of economies of scale. (Bennett & Klug 2012, p.1286; Ekwall & Torstensson 2011, p.179)

Lean thinking in production and logistics has increased the number of different logistics processes since there were merely indirect concepts full-truck-load and area forwarding. As seen in Figure 5, not only has the number of indirect delivery methods increased, but direct deliveries have appeared to their side. *Direct delivery* do not require warehousing whereas *indirect delivery* require some form of warehousing at the factory. (Dörnhöfer et al. 2016, p.9-10)

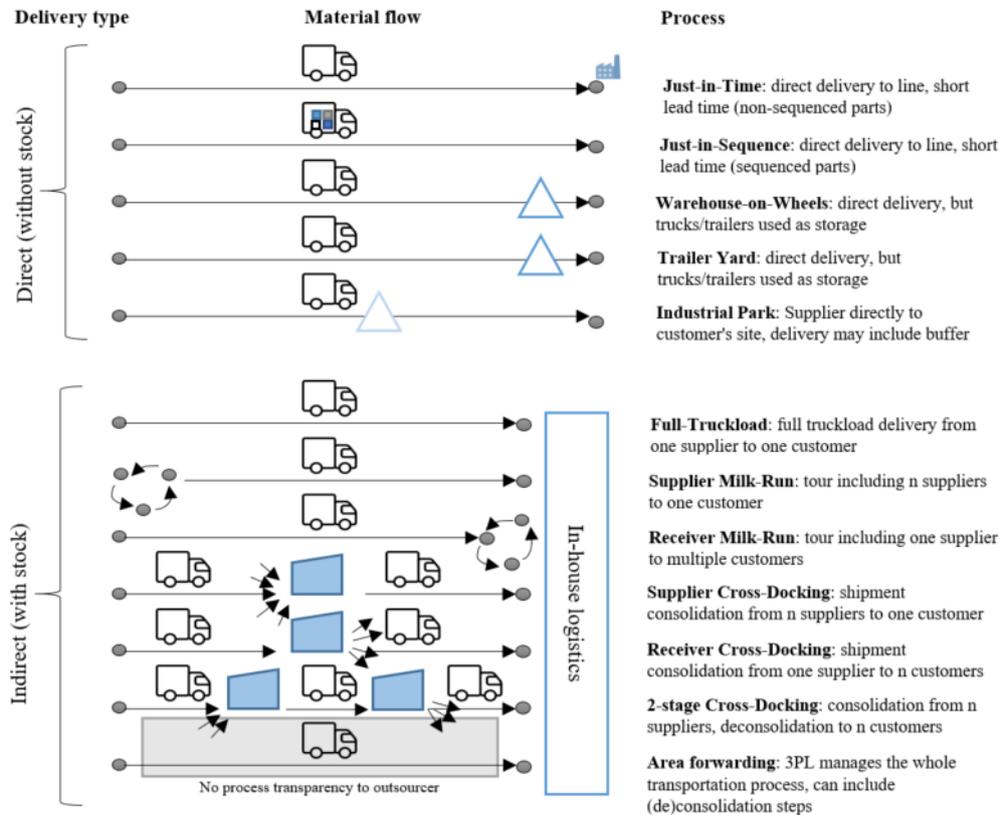


Figure 5. Inbound logistics material flows. (Adapted from Dörnhöfer et al. 2016, p.10)

Direct delivery types

Inbound supply chains are always dynamic, which creates uncertainties and unexpected events in manufacturing and complicates supply chain management. There can be production line breakouts, delivery delays or production plan changes: all of which can be managed with sufficient buffer stocks. Then again, having inventories ties money and space. In case these inventories are not wanted or to be kept minimal, the scheduling of deliveries is crucial; it is about finding the balance between disturbance risk and inventory levels. Many companies operate without any buffer stocks, by relying on the LSP to deliver the goods precisely on time. However, it should be noted that direct deliveries maintain lower inventory levels and lower inventory costs, but mean more vehicles are needed: thus transportation efficiency decreases and transportation costs increase. (Kiyoul, Cho & Jung 2014,

p.1002-1005; Chen & Sarker 2010, p.1665; Ekwall & Torstensson 2011, p.179; Tura 2018)

Just-in-time (JIT) and **just-in-sequence** (JIS) processes are similar to each other: the aim of JIT is to deliver the right amount of right products at the right time, in right quality, at the right place, whereas JIS, also known as sequenced in-line supply (Bennett & Klug 2012, p.1287), aims to deliver the parts in the right sequence as well. (Cedillo-Campos, Morones Ruelas, Lizarraga-Lizarraga, Gonzalez-Feliu & Garza-Reyes 2017, p.583; Graf 2006, p.436) These methods allow buffer stocks to be kept minimal and hence reduces waste costs: JIS even more than JIT. Because the goods are sent in specific order sequence in JIS, the production can be coordinated in an optimal manner (Graf 2006, p.436). Then again, to achieve synchronicity between logistics and production requirements, first-class control and planning are necessary. To avoid risks with supply, the inventory reduction requires process reliability, certainty of forecasts and relatively stable consumption. (Dinsdale & Bennett 2015, p.1084-1085; Graf 2006, p.435) Because of the variation and great number of different components, smaller containers and more frequent deliveries must be used to avoid inventories. This leads to higher freight and handling costs. (Graf 2006, p.435)

It is not always possible to deliver goods exactly at the right moment without the need for any warehousing. One possibility is to maintain a small buffer warehouse at the factory with JIT or JIS, but there are also other options. **Warehouse-on-wheels** is a process in which the delivery vehicles act as mobile storages instead of warehousing in the factory. The products can be organized into trucks in the order of assembly and packed into approximately same size containers; the vehicles have delivery dates, which define exact times the parts are needed at the factory. It is also possible to have a continuous flow of trucks to the factory and if the cargo appears to be early, they can wait on the road at a resting place or within the factory yard for the correct delivery time. Once at the factory, the vehicles wait until the latest delivery date of a container. (Dörnhöfer et al. 2016, p.10; Flidner, Briskorn & Boysen 2015, p.52-53; Ekwall & Torstensson 2011, p.180-181; Graf 2006, p.435)

In one of C.H. Robinson's case studies the company developed an inbound logistics system, which was based on a drop trailer on the supplier's yard: once the trailer was full, it was replaced with a new empty one. (C.H. Robinson 2018) This method could be used reversely; a trailer full of components could be placed on the yard to serve as a storage and to save warehousing space: once empty, it would be replaced with a new one.

Because longer transport distances create more uncertainty for the exact arrival time, there are certain time windows for deliveries; this means transportation may need temporary storage closer to the factory. The vehicles may wait in a **trailer yard** or at inbound delivery gates or in case the LSP's warehouse is far, an **industrial park** closer to the factory can be used to shorten the delivery time. (Dörnhöfer et al. 2016, p.10; Fliedner et al. 2015, p.52-53; Ekwall & Torstensson 2011, p.180)

Indirect delivery types

There are also many indirect methods to move the material. Usually in-house logistics processes contain goods reception, unloading of the truck, stocking and transportation; it is becoming more common to add order picking, deconsolidation and sequencing to part of the process as well (Dörnhöfer et al. 2016, p.10).

Full-truckload means there are enough products to fill a whole truck; usually this means more than 10 pallets. The benefits of using full-truckload shipments are related to lower number of risks, faster transportation times and better shipping rates. (Schmidt 2018; Robinson 2018) Transportation costs are not related to the shipping volume or weight, but only to the driving time and distance; this makes it cost efficient to high volume products with constant demand, which utilize the whole vehicle capacity (Meyer & Amberg 2018, p.149; Florian, Kemper, Sihn & Hellgrath 2011, p.252). It is also possible to use full-truckloads even when the amount of products fills the truck only partially, but a dedicated vehicle is needed

because of high risk packages, very heavy products or in case time is a critical issue. (Schmidt 2018; Robinson 2018)

In case the amount of products does not fulfill a truck and there are no reasons to use dedicated vehicle, **less-than-truckload** is a method used among LSPs. It combines shipments from different customers: each company pays only according to their volume and travel length. Because the truck stops, re-packs and unpacks multiple times, the shipment times are longer but costs are lower than with full-truckloads; less-than-truckload is a highly flexible transportation and well-suited for low-runner goods that can withstand the longer delivery time. (Schmidt 2018; Robinson 2018; Florian et al. 2011, p.252) According to De La Vega, Vieira, Toso and de Faria (2018, p.132), when planning distribution, it should be carefully considered whether to transport smaller quantities with reduced inventory costs but increased freight costs or to transport bigger quantities less frequently but thus have higher inventories.

Milk-run is a pick-up method, which, in case of supplier-milk-run, is based on one truck driving pre-defined route repeatedly and collecting packages from multiple suppliers to one manufacturer (Novaes, Bez, Burin & Aragão Jr 2015, p.327; Volling, Grunewald & Spengler 2012, p.173). Conversely, in receiver-milk-run, the truck brings products from one supplier to multiple manufacturers (Dörnhöfer et al. 2016, p.10). According to Meyer and Amberg (2018, p.149), milk-runs have fixed timetables for several weeks, which makes them suitable only for stable consumption rates and shipping frequencies. Then again, stability decreases process variability and thus enhances the planning of processes. The aim of milk-run is to utilize all vehicle space and avoid the waste of empty trucks; also, sharing transportation reduces inbound logistics costs for all participants. It is more time consuming compared to direct transportations, especially if the suppliers are not located nearby each other. However, with effective route planning, it is possible not only to have shorter shipment distances and lead times but also to save transportation costs. (You & Jiao 2014, p.1-2; Boysen, Emde, Hoeck & Kauderer 2014, p.111; Chen & Sarker 2010, p.1665; Volling et al. 2012, p.174)

Similar to milk-run is a method that consists of incoming shipments being collected to a terminal, sorted, reloaded into outbound trucks and sent to their destinations: called **cross-docking**. The purpose is to consolidate multiple shipments between number of suppliers and recipients to transport only full truckloads and gain economic benefits; like milk-run, cross-docking is more time consuming than direct shipping. On the contrary to traditional warehouses, the storage is reduced to minimum so the shipments are no longer than 24 hours in the terminal: only for the time it takes to sort and re-load trucks economically. (Stephan & Boysen 2011, p.129-130; Boysen et al. 2014, p.111; Vogt 2010, p.104-105) There are different forms of cross-docking: supplier-, receiver- and 2-stage-cross-docking. Supplier-cross-docking includes multiple suppliers whose shipments are re-organized in consolidation center and then sent to one manufacturer. Receiver-cross-docking is the opposite: the incoming shipments are collected from one supplier and after consolidation the goods are sent to multiple manufacturers. 2-stage-cross-docking combines the two previous: multiple suppliers' shipments are re-organized and delivered to another consolidation center, where the goods are consolidated again and then sent to multiple manufacturer. (Dörnhöfer et al. 2016, p.10)

The last delivery method in Figure 5 is **area forwarding**. It is a process managed completely by a LSP: there is no transparency to the customer. If the orders fulfill less than truckload, area forwarding can be recommended. The idea of the method is that suppliers are divided into groups based on their location, area. The LSP organizes all transportations from suppliers to the customer; this can be done either straight from the supplier (if the amount of goods fills a whole truck) or via consolidation center, where the goods are combined and then delivered to the customer. The LSP does not stock anything, the consolidation center is only for cross-docking. (Schöneberg, Koberstein & Suhl 2010, p.216 Meyer & Amber 2018, p.149; Dörnhöfer et al. 2016, p.9-10)

In addition to direct and indirect transportation models, there is also a possibility that does not involve truck transportations. A warehouse can be built to the

outsourcer's factory yard or to a neighbor property; the goods then flow through a pipe to the factory or they are delivered with forklifts. Because this requires building a warehouse, the commitment should be long-term and there must be spare space. (Tura 2018)

Because this case study only includes one warehouse and one factory and the aim is to completely or at least mostly dispose Ensto's component warehouse at the factory, milk-runs, cross-dockings and area forwarding are irrelevant. Hence, they are not considered suitable to be operating models for this dissertation. Although, it could be stated that the outsourcing process itself is a supplier cross-docking model, since the suppliers deliver to the LSP's warehouse instead of delivering straight to the outsourcer's factory warehouse. The service provider can combine Ensto's components in such a manner that it can utilize full-truckload deliveries. Furthermore, since the LSP probably has other customers as well, it can consolidate multiple orders into one truck; this means Ensto can benefit the less-than-truckload profits for components that can afford the longer delivery time.

5.7 Implementation process

After addressing issues related to the outsourcing relationship and deciding the most suitable operating models, there are implementation related and more practical issues to consider before the final implementation can be executed. These are discussed in this section.

Special attention should be paid on IT during implementation process. Even though the technical part of integration is usually quite simple, problems can arise with information flows: for example, the systems do not necessarily have the same fields, the lines are not fast enough or a firewall blocks all information. Hence, the integration planning should be started early. One of the things to consider is the level of IT integration: is complete integration needed or is partial enough. (Hall 2014) IT is one of the main bottlenecks in many outsourcing projects. The information system implementation can take months: during this time the most

critical warehouse management can be done manually. (Lehikoinen & Töyrylä 2013, p.157, 190; Tura 2018)

Monitoring the metrics assures the operation runs well and the service levels are met at a reasonable costs. Many of the metrics are related to SLA and the main outsourcing contract. There are different methods for controlling and monitoring LSPs: they can be monitored against the contract, budget, KPI or SLA; performance review meetings and audits can be organized; service performance based penalty program can be activated; targets should be redefined according to changing business; and the performance should be continuously improved. (Rushton et al. 2010, p.566-567)

There are always problems in the beginning of a project. This means the service provider is not going to achieve key targets and metrics from the first day; a suitable timetable for meeting operational requirements must be agreed. Other metrics should be set and agreed as well, for both the implementation and the finalized operation, but it should be noted that the metrics are set in planning stage and therefore they will probably need adjustments later on. Last minute decisions tend to postpone the process, which means no changes should be made close to contract finalization. Open communication is essential through the whole project and responsibility has to be mutual: the outsourcer cannot withdraw and let the service provider execute the whole implementation. (Rushton et al. 2010, p.565-566) The process should not include only managers and supervisors; warehouse operatives and sales order processors have such knowledge of procedures and processes that is usually not written or saved anywhere but only learned through experience (Hall 2014).

Practical issues to be discussed

There are many practical issues that must be considered in the implementation phase of an outsourcing project. Hall (2014) and Tura (2018) list things to negotiate with the service provider before implementation:

- The management of the inventory: is the inventory push- or pull-managed?
Which party takes responsibility?
- How to handle returns/late orders/other deviations?
- How often should there be deliveries?
- In how many shifts is the production organized?
- Who will handle reclamations and how the process works?
- How often should data be uploaded/downloaded to the IT systems or should it be real-time?
- What are response times to call-outs? How are they measured (starting and finishing points)?
- Does the outsourcer work to a forecast, make-to-order or make-to-stock?
- Is the service provider notified in advance for coming orders? How much in advance?
- What will trigger orders?
- When are there peaks in production? How much earlier are they known?
- How are the shipments organized?

It should be discussed whether the service provider can provide any additional value along with warehousing and transportation; for example, can products be organized into a specific order that could help production or can the goods be delivered straight to the hands of the production workers (Tura 2018). In Ensto's case the LSP could deliver the components into the carts that hold two hours' inventory, organize them into the right order and deliver them straight to the work stations. Another important issue is the management of the operations: it should be decided whose employees, and on what level, manage the supply chain and how responsibilities are divided. There should also be resources to develop the operations. In case the cooperation yields profit, there ought to be an in advance planned model for sharing earnings. For example DHL agrees with most of its customers of yearly meetings, where savings are shared equally. (Lehikoinen & Töyrylä 2013, p.192)

There are special occasion procedures that should be regarded. For example, product call-outs can bring surprises since the warehouse is no longer in the factory.

During high season, Ensto produces on the weekends in order to utilize full production capacity; this should be clarified with the LSP and operating models in such a situation should be agreed. In case weekend production is needed, it should be decided whether the IT system handles extra orders or will they be done manually and in that case who will be responsible for the execution. According to Tura (2018), it is usually possible to use existing systems but, again, a well-managed IT integration is crucial. It is also good to plan these special occasions as early as possible: the earlier the need for weekend work is known, the lower the cost of resources usually is.

Finally, the way of organizing the warehouse transfer should be decided. Because the outsourcing process is extensive, the transfer phase can easily affect production and create stoppages. Since in Ensto's case outsourcing is related to warehousing, the planning and scheduling of goods moving from the outsourcer to the service provider should be planned carefully; a stoppage is usually needed but it should be kept as short as possible. (Lehikoinen & Töyrylä 2013, p.189). There are different options for executing the warehouse outsourcing. Tura (2018) recommends the transportation of Ensto's components should be done in parts: moving only one product type at first and testing how the new processes function, or testing with slightly bigger batch by moving one complete product family. After the process has been tested, other products (single or family) can be transported piece by piece or at once. This method gives the opportunity to test outsourcing, but it takes more time and it means having the components in multiple locations, which can create complications with used IT systems. Then again, it is possible to organize information flows manually until the systems are working properly. Another option is to transport everything at once; it does not take as much time and everything is in one location, but there is no testing period and there is a high risk of something going wrong and thus affecting the production.

6 RESULTS

This chapter focuses on analyzing the previous research from Ensto's point of view. The positive and negative aspects are evaluated in a form of a SWOT analysis; the research questions are also briefly compiled.

Since Ensto is currently focusing on outsourcing only logistics functions, it should utilize 3PL service providers. In case it later prefers to outsource complete supply chain management, 4PL is an option. The whole outsourcing process begins with careful planning of which services and qualities the company is looking for the LSP to provide. In Ensto's case, the service provider should be able to adapt to seasonal variance and to a great amount of transports from the warehouse to production. Additionally, it should have the infrastructure to stock a great number of components. Some of the most important service provider selection criteria is: on time performance and delivery accuracy, flexibility to Ensto's processes and needs, as well as reliability. These issues should be discussed with possible LSPs; the selection of the service provider is executed via tendering process, which enables proper comparison between multiple options. The more data is shared during tendering, the more successful outsourcing is: sharing proper information of what is wanted ensures accurate tenders and clear vision for both parties of the aims of outsourcing.

An outsourcing project team should be formed by professionals of different functions so that each member knows critical issues of their own field to be considered during outsourcing. In planning phase, all these aspects should be observed. Once the outsourcing decision has been made, the discussion should include how it is informed to personnel in a way that creates least negative feelings. Most of the found literature suggest open communication from early on in order to maintain trust, minimize negative atmosphere and to best utilize the knowledge of the employees. However, managers know their employees and the work culture the best; what might work for one may not work for another. To avoid negative effects

in outsourced operations, it is important the relationship is well maintained not only during implementation but also throughout the whole relationship.

Based on what the company is currently aiming for, direct operating models are best suitable for Ensto. The ones with a buffer stock are more reliable; depending on the company's preference, a buffer stock can be kept inside the factory, where it takes space from production but can be easily visually monitored, or in trucks on the road, inside the factory courtyard or parked nearby. If the whole factory is wanted to be utilized for production extension, warehouse-on-wheels solutions are more accurate. There is also the possibility of not having any buffer stocks, which maximizes the freed space but increases the risk of a production stoppage. A good option would be that the LSP delivers the components in right order into the carts which hold two hours' inventory and then delivers the carts straight to each work station. Thus, there would be a buffer stock of the size of two hours. Once all other aspects are decided and the vision is clear, the planning of how the goods are moved from factory warehouse to the service provider's warehouse can be made. It is suggested they are transported in parts, not all at once.

SWOT analysis of Ensto's component outsourcing

A SWOT analysis was conducted to illustrate the Strengths, Weaknesses, Opportunities and Threats that would occur if Ensto decided to outsource its component warehouse (Table 4).

The main reason for the company to outsource the warehouse is to focus on its core competences. Once the components are moved to a service provider, Ensto has more free resources and free space to expand its functions; there is no longer the need to invest into a new warehouse or to expand the existing one. Because logistics is the service provider's expertise, efficiency can increase; the risks are also shared. If IT systems work seamlessly, also visibility can increase. A LSP has economies of scale and flexibility to adapt according to seasonal changes. There is less material handling at the factory since the goods arrive only when needed and in case

inventories are held there is merely the amount of stock to secure continuous production.

Table 4. SWOT analysis.

<p>Strengths:</p> <ul style="list-style-type: none"> - No need for new warehouse investment - Fixed costs → variable costs - Service providers bring higher flexibility - Less material to handle internally - Service provider's expertise - Shared risks 	<p>Weaknesses:</p> <ul style="list-style-type: none"> - Creating modified access for LSP to ERP is challenging - ERP is not WMS → not optimized for warehouse outsourcing - More complex operations management - No visual contact to components - Components are no longer in the factory → risk of not being on time at production → stoppage
<p>Opportunities:</p> <ul style="list-style-type: none"> - Focus on core competences - Production expansion possible because of freed space - Freed resources - Lower inventory levels - Service provider's economies of scale - Increased efficiency - Increased visibility 	<p>Threats:</p> <ul style="list-style-type: none"> - Interaction errors with IT systems - Loss of control over warehoused components - Lack of communication and cooperation - Quality issues - Loss of knowledge and knowhow - Inadequate contract: different views of objectives and priorities - LSP's loss of big picture

Then again, when Ensto outsources, it faces the risks of losing control over the outsourced functions and losing knowledge. There might occur quality issues or misinterprets: the parties can emphasize or prioritize different things, especially if the contract is not complete and thoroughly discussed. The relationship should be well maintained in order to avoid lack of communication or cooperation. Once the components are no longer in the factory, there is no longer the possibility to visually monitor inventories. It also creates the risk of components not arriving on time to production due to some delay, which can initiate production stoppage. The

operations management becomes more complex since there are more factors to be managed and more data to be analyzed. Over time the risk of the LSP forgetting the big picture increases. It can also be seen as a weakness that Ensto does not have IT systems made for warehouse outsourcing. Firstly, it is challenging to create modified access to ERP for the service provider and there are many issues to consider: for example, will the service provider need Ensto's internal internet connection in order to access the system and are there enough features for proper interaction. Secondly, even with all features, the question of whether ERP is as good as WMS arises: ERP is not optimized for warehouse management but procuring WMS is a big investment and it must be carefully considered on every aspect.

Discussion of the research questions

The main research question was: *what are the key aspects of outsourcing a component warehouse?* Figure 6 illustrates the steps of an outsourcing process, which were discovered in this thesis. The project starts with evaluating the pros and cons of outsourcing and the decision of whether outsourcing is relevant for the company. If it is relevant and the decision to outsource has been made, attention should be paid on the way personnel is informed: the manner should be such that it creates minimal amount of negative attitudes. The next step is defining internally selection criteria for a service provider: what are the qualifications the outsourcer is looking for in a LSP. This is used to limit the number of service provider possibilities. A tendering process is for evaluating and selecting the best fit out of previously diminished possibilities; by sharing enough information the company can ensure the tenders are realistic and no unwanted surprises occur later on.

The developed relationship must be professionally managed; the success is related to careful planning and information sharing, which leads to seamless cooperation. The outsourcer and the service provider should share similar cultures in order to understand each other's ways of working. For the information and data to flow without disruptions, IT integration must be carefully executed and maintained as well. After selecting a suitable operating model that fits the products (in Ensto's

case the components) and forming a project team, the last practical issues should be evaluated before transferring the goods to the service provider's warehouse and putting the outsourcing into practice. Once the contract expires, the company has to make a decision of whether to outsource again, which creates a sort of loop. This is presented in Figure 6 by dashed line.

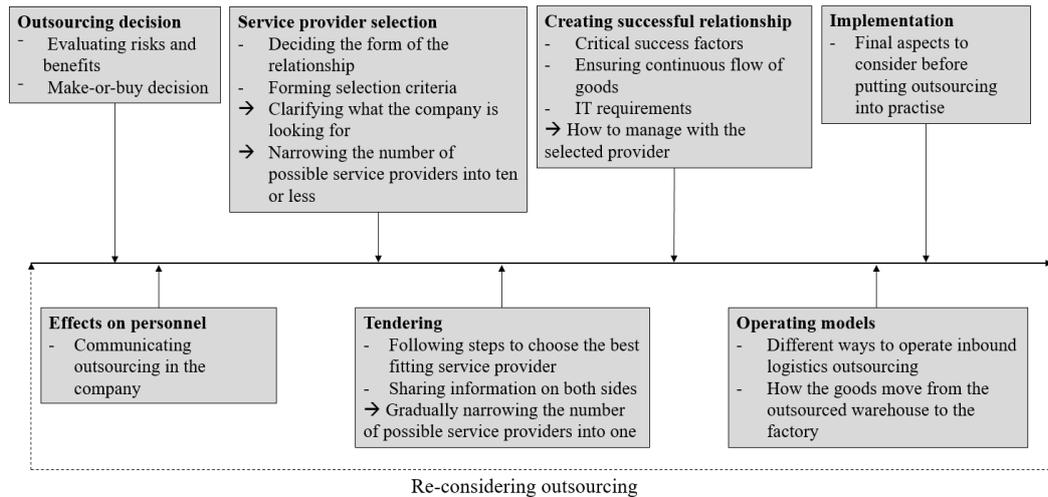


Figure 6. The key aspects of outsourcing inbound logistics.

The first two sub-questions were: *how to choose a proper service provider* and *how to succeed in outsourcing?* A proper service provider can be found by setting initial criteria and making internal processes and needs clear before involving external parties; mutual openness in tendering phase and sharing as much information and data as possible ensures realistic tenders, which enhances the success of the relationship. All tenders should be carefully evaluated, although it is not only about finding a good match on a paper but also about finding a cultural match. The success comes with careful planning, which should be done before each step of outsourcing: before making the decision to outsource, before starting to tender and before implementing. As previously mentioned, information should be shared mutually and both parties should aim towards continuous improvements and deeper cooperation; a great effort should be put on the relationship. Additionally, IT plays a critical part in outsourcing success. Since the whole outsourcing is based on IT, the systems integration should be carefully planned and executed; it should also be decided which systems are the most beneficial for the specific case. They should be

well-maintained and the accuracy of both parties' systems should be continuously evaluated.

The third sub-question was: *in which way can outsourced inbound logistics be operated?* There are two options: indirect and direct models. Indirect operating models include keeping warehouse in the factory. This is not optimal in Ensto's case, in which the aim is to dispose inventories completely or at least for the most part, but they enable cost efficient transportation either with full-truckloads for high-runner products or less-than-truckloads for less frequent and less crucial components. Direct operating models, on the other hand, do not require any warehousing or a small buffer stock at most: the buffer stock can be inside the factory or it can be "on wheels" or in other words in trucks waiting either on the road or in the factory's courtyard. There are many variations of warehouse-on-wheels solutions. This makes direct models more suitable for Ensto's needs. Most logistics service providers offer also tailored solutions that are specifically designed for each of their customers.

7 SUMMARY

This thesis focused on providing useful information about inbound logistics outsourcing for Ensto by conducting a systematic literature review and researching relevant studies. The aim was to map all aspects to consider from risks and benefits to operating models and implementation process; the thesis could be used as a guide for an outsourcing project not only for Keila factory, but later for other similar cases as well.

Outsourcing means utilizing outside service providers to perform non-core tasks in order for the outsourcer to focus on its core competences; since these providers are professionals in their fields, they can operate the tasks with better expertise than the company itself. (Lehikoinen & Töyrylä 2013, p.17, 26-28; Rushton & Walker 2007, p.4) Currently, the most common function to outsource is logistics (Akbari 2018, p.1550). Many risks and benefits are related to outsourcing. It is important to recognize what they are in order to avoid unwanted issues and to gain as much benefits as possible; both aspects should be carefully considered. Because of the complexity of outsourcing, no one reason for success can truly be pointed out.

There are different levels of logistics outsourcing, depending whether the company is looking for simple transportation or warehousing service or a service provider, which can offer supply network management in long-lasting relationship and close cooperation. In order to choose the right fit, the outsourcer has to carefully plan and execute the whole outsourcing process; it has to recognize all of its own processes, culture and ways of working in order to select the right service provider, who can fulfill the needs in a proper manner, on a proper price and act as another party of a close, cooperative relationship. Additionally, a LSP should provide such services and know-how the outsourcer does not possess itself for outsourcing to be beneficial.

The most important points of successful outsourcing are planning, IT integration and cooperation. The outsourcer must know exactly what services it wants and

needs from the LSP; when a company knows what it is aiming for, it is easier to reach set goals. When knowing and recognizing the requirements and wants from early on, a service provider cannot offer anything less or try to cheat. It also helps with clarity: both parties know what to focus on and aim towards, which leaves no room for misunderstanding or misinterpret. The whole outsourcing is based on IT, which makes it crucial to have the systems seamlessly integrated and functioning without errors. To gain the most of outsourcing, both parties should recognize the importance of communication and developing the partnership; outsourcing should be seen as a win-win situation. The relationship should be based on trust, which can be achieved with cooperation and familiarity between the parties.

Inbound logistics can be operated in multiple way. Depending on the outsourcer's needs and supply chain structure, deliveries can be organized directly, without holding greater than buffer inventories, or indirectly, by organizing deliveries in different ways to in-house warehouse. For Ensto's Keila factory, the most suitable are the direct ones, with minimum buffer stocks. Choosing an operating model is only a part of the project: there are multiple practical issues that need to be solved before outsourcing can be executed. These are such as deciding who takes responsibility over which function and how different things should be operated. It is an important issue as well to plan how the goods are moved from the outsourcer's (or Ensto's, in this case) warehouse to the service provider's.

Even though logistics outsourcing has been widely studied in various research, there were number of gaps identified in current literature. The thesis recognized a lack of research of inbound logistics outsourcing as well as lack of inbound logistics operating models. Another gap was identified in personnel management; more precisely in providing practical examples of the ways outsourcing can be managed in terms of employees. These suggest studies are focused on more theoretical aspect and delimit practical matters out of their scope. Hence, more practical research of inbound logistics outsourcing is recommended for future studies.

References:

Accenture. (2018). *World-Class 4PL capabilities*. [Online] Available at: <https://www.accenture.com/au-en/topic-fourth-party-logistics> [Accessed 16 Apr. 2018]

Aguezzoul, A. (2014). Third-party logistics selection problem: a literature review and methods. *Omega*, Vol. 49, pp. 69-78.

Ahmad, M., Markkula, J. & Oivo, M. (2013). Kanban in software development: a systematic literature review. *Software Engineering and Advanced Applications*. 39th EUROMICRO Conference, pp. 9-16. IEEE.

Akbari, M. (2018). Logistics outsourcing: a structured literature review. *Benchmarking: An International Journal*, Vol. 25, No. 5, pp. 1548-1580.

Aktas, E., Agaran, B., Ulengin, F. & Onsel, S. (2011). The use of outsourcing logistics activities: the case of turkey. *Transportation Research Part C: Emerging Technologies*, Vol. 19, No. 5, pp. 833-852.

Andreini, D. & Bettinelli, C. (2017). Business model innovation: from systematic literature review to future research directions. Cham: Springer International Publishing AG. 176p.

Barthelemy, J. (2003). *The seven deadly sins of outsourcing*. Academy of Management Executive, Vol. 17, No. 2, pp. 87-98.

Bennett, D. & Klug, F. (2012). Logistics supplier integration in the automotive industry. *International Journal of Operations & Production Management*, Vol. 32, No. 11, pp. 1281-1305.

Bhardwaj, A. (2016). *Understanding the difference between ERP and WMS*. [Online] Oodles Technologies. Available at: <https://www.oodlestechnologies.com/blogs/Understanding-The-Difference-Between-ERP-And-WMS> [Accessed 12 Jul 2018]

Bin, J., Frazier, G. & Prater, E. (2006). Outsourcing effects on firm's operational performance: an empirical study. *International Journal of Operations & Production Management*, Vol. 26, No. 12, pp. 1280-1300.

Boddy, D., Boonstra, A. & Kennedy, G. (2005) *Managing information systems: an organizational perspective*. 2nd ed. Harlow: Pearson Education. 282p.

Boysen, N., Emde, S., Hoeck, M. & Kauderer, M. (2015). Part logistics in the automotive industry: decision problems, literature review and research agenda. *European Journal of Operational Research*, Vol. 242, No. 1, pp. 107-120.

Brendamour. (2014). *5 Benefits to renting warehouse space*. [Online] Available at: <https://brendamour.com/5-benefits-to-renting-warehouse-space/> [Accessed 31 May 2018]

Busbin, J., Johnson, J. & DeConinck, J. (2008). The evolution of sustainable competitive advantage: from value chain to modular outsource networking. *Competition Forum*, Vol. 6, No. 1, pp. 103-108.

Cedillo-Campos, M., Morones Ruelas, D., Lizarraga-Lizarraga, G., Gonzalez-Feliu, J. & Garza-Reyes, J. (2017). Decision policy scenarios for just-in-sequence deliveries. *Journal of Industrial Engineering and Management*, Vol. 10, No. 4, pp. 581-603.

Cezanne, C. & Saglietto, L. (2015). Redefining the boundaries of the firm: the role of 4PLs. *The International Journal of Logistics Management*, Vol. 26, No. 1, pp. 30-41.

Chen, C. (2008). A model for customer-focused objective-based performance evaluation of logistics service providers. *Asia Pacific Journal of Marketing and Logistics*, Vol. 20, No. 3, pp. 309-322.

Chen, Z. & Sarker, B. (2010). Multi-vendor integrated procurement-production system under shared transportation and just-in-time delivery system. *The Journal of the Operational Research Society*, Vol. 61, No. 11, pp.1654-1666.

Cheong Lee Fong, M. (2005). *New models in logistics network design and implications for 3PL companies*. [Doctoral dissertation] Singapore MIT-Alliance.

C.H. Robinson. (2018). *Harvest time case study*. [Online] Available at: <https://www.chrobinson.com/en-us/resources/case-studies-download/harvest-time-case-study/> [Accessed 11 Jun 2018]

Daim, T., Udbye, A. & Balasubramanian, A. (2012). Use of analytical hierarchy process (AHP) for selection of 3PL providers. *Journal of Manufacturing Technology Management*, Vol. 24, No. 1, pp. 28-51.

De La Vega, D., Vieira, J., Toso, E. & De Faria, R. (2018). A decision on the truckload and less-than-truckload problem: an approach based on MCDA. *International Journal of Production Economics*, Vol. 195, pp. 132-145.

Deepen, J. (2007). *Logistic Outsourcing Relationships: Measurement, Antecedent, and Effects of Logistic Outsourcing Performance*. Heidelberg: Physica-Verlag. 349p.

Deloitte. (2012). *Outsourcing, today and tomorrow: insights from Deloitte's 2012 global outsourcing and insourcing survey*. [Online] Available at: <https://www2.deloitte.com/content/dam/Deloitte/de/Documents/human-capital/outsourcing-today-and-tomorrow.pdf> [Accessed 14 Aug 2018]

Diaz, R. & Ardalan, A. (2010). An analysis of dual-kanban just-in-time systems in non-repetitive environment. *Production and Operations Management*, Vol. 19, No. 2, pp. 233-245.

Dinsdale, E. & Bennett, D. (2015). Benefits; drawbacks and boundaries to deliver JIT: re-think the UK automotive industry operations supply strategy. *Benchmarking*, Vol. 22, No. 6, pp. 1081-1095.

Dörnhöfer, M., Schröder, F. & Günthner, A. (2016). Logistics performance measurement system for the automotive industry. *Logistics Research*, Vol. 9, No. 1, pp. 1-26.

Ekwall, D. & Torstensson, H. (2011). Risk trade-off linked to temporary storage function in road transports. *Journal of Transportation Security*, Vol. 4, No. 2, pp. 171-185.

Elliff, S. (2004) How to get started in outsourcing logistics. *Logistics Today*, Vol. 45, No. 11, pp. 48-51.

Embleton, P. & Wright, P. (1998). A practical guide to successful outsourcing. *Empowerment in Organizations*, Vol. 6, No. 3, pp. 94-106.

Ensto. (2018a). *Sähköistysratkaisujen tarjoaja*. [Online] Ensto. Available at: <https://www.ensto.com/fi/yhtio/yritys/ensto-lyhyesti/> [Accessed 28 Jun 2018]

Ensto. (2018b). Our businesses. [Online] Ensto. Available at: <https://www.ensto.com/fi/yhtio/yritys/organisaatio/> [Accessed 28 Jun 2018]

Ensto. (2018c). Lean manufacturing at Ensto. [Online] Ensto. Available at: <https://www.ensto.com/company/sustainability/lean-manufacturing-at-ensto/> [Accessed 31 Jul 2018]

Fabbe-Costes N., Jahre, M. & Roussat, C. (2012). Supply chain integration: the role of logistics service providers. *International Journal of Productivity and Performance Management*, Vol. 58, No. 1, pp. 71-91.

Fernando, T. (2018). Ensto Digital Solutions. Company's internal material.

Fink, A. (2005). Conducting research literature reviews: from internet to paper. 2nd ed. Thousand Oaks: Sage Publications.

Fliedner, M., Briskorn, D. & Boysen, N. (2015). Vehicle scheduling under the warehouse-on-wheels policy. *Discrete Applied Mathematics*, Vol. 205, pp. 52-61.

Florian, M., Kemper, J., Sihm, W. & Hellingrath, B. (2011). Concept of transport-oriented scheduling for reduction of inbound logistics traffic in the automotive industries. *CIRP Journal of Manufacturing Science and Technology*, Vol. 4, No. 3, pp. 252-257.

Fozzo Wamba, S. & Takeoka Chatfield, A. (2011). The impact of RFID technology on warehouse process innovation: a pilot project in the TPL industry. *Information Systems Frontiers*, Vol. 13, No. 5, pp. 693-706.

Frazelle, E. (2002). Supply chain strategy: The logistics of supply chain management. New York: McGraw-Hill. 357p.

Gadde, L-E & Hulthen, K. (2009). Improving logistics outsourcing through increasing buyer-provider interaction. *Industrial Marketing Management*, Vol. 38, No. 6, pp. 633-640.

Graf, H. (2006). Innovative logistics is a vital part of transformable factories in the automotive industry. In A. Dashchenko, ed., *Reconfigurable manufacturing systems and transformable factories*. Berlin: Springer-Verlag. 731p.

Gupta, R., Sachdeva, A. & Bhardwaj, A. (2011). Criteria of selecting 3PL provider: a literature review. *International Journal of Industrial and Manufacturing Engineering*, Vol. 5, No. 11, pp. 2345-2349.

Hall, C. (2014). *Prepare your ERP for 3PL*. [Online] The Logistics of Logistics. Available at: <https://www.thelogisticsoflogistics.com/prepare-your-erp-for-3pl/> [Accessed 18 Jun 2018]

Hartman, P., Ogden, J. & Hazen, B. (2017). Bring it back? An examination of the insourcing decision. *International Journal of Physical Distribution & Logistics Management*, Vol. 47, No. 2/3, pp. 198-221.

Hedges, L. (2018). *WMS, SCM or ERP: which is best for 3PLs?* [Online] Software Advice. Available at: <https://www.softwareadvice.com/resources/wms-scm-erp-which-is-best-for-3pls/> [Accessed 25 Jun 2018]

Huttu, E. & Martinsuo, M. (2015). Differentiation value through services in a manufacturer's delivery chain. *The Service Industries Journal*, Vol. 35, No. 14, pp. 763-782.

Hwang, B-N., Chen, T-T. & Lin, J. (2016). 3PL selection criteria in integrated circuit manufacturing industry in Taiwan. *Supply Chain Management*, Vol. 21, No. 1, pp. 103-124.

Hwang, Y. & Grant, D. (2011). Understanding the influence of integration on ERP performance. *Information Technology and Management*, Vol. 12, No. 3, pp. 229-240.

Jazairy, A., Lenhardt, J. & von Haartman, R. (2017). Improving logistics performance in cross-border 3PL relationship. *International Journal of Logistics Research and Applications*, Vol. 20, No. 5, pp. 491-513.

Jiang, R., Mao, C., Hou, L., Wu, C. & Tan, J. (2018). A SWOT analysis for promoting off-site construction under the backdrop of China's new urbanization. *Journal of Cleaner Production*, Vol. 173, pp. 225-234.

Johnson, P., Leenders, M. & Flynn, A. (2011). Purchasing and supply management. 14th ed. New York: McGraw-Hill. 526p.

Kaikkonen, K. (2018). Ensto Utility Networks. Company's internal material.

Kalinzi, C. (2015). Outsourcing (logistics) services and supply chain efficiency – a critical review of outsourcing function in Mukwano group of companies. [Research paper] Kyambogo University School of Management & Entrepreneurship.

Kivinen, P. (2002). *Value added logistical support service part 2. Outsourcing process of spare part logistics in metal industry*. [Research report]. Lappeenranta University of Technology: Department of Industrial Engineering and Management.

Kitchenham, B. & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software engineering: version 2.3*. [Technical report]. Keele University: School of Computer Science and Mathematics, University of Durham: Department of Computer Science.

Kiyoul, L., Cho, H. & Jung, M. (2014). Simultaneous control of vehicle routing and inventory for dynamic inbound supply chain. *Computers in Industry*, Vol. 65, No. 6, pp. 1001-1008.

Kotler, P. & Keller, K. (2012). Marketing Management. 14th ed. New Jersey: Prentice Hall. 657p.

Kublanov, E., Satyaprasad, S. & Roshan, N. (2005). *Best practices in communicating global outsourcing initiatives*. [Online] Available at:

http://www.neogroup.com/PDFs/Whitepapers/OIv3i04_0405_Best-Practices-Communication.pdf [Accessed 15 Aug 2018]

Landau, P. (2018). *Statement of work: Definition & examples*. [Online] Project Manager. Available at: <https://www.projectmanager.com/blog/statement-work-definition-examples> [Accessed 15 May 2018].

Leeuwen, T. (2014). *1PL to 5PL: the differences between a 3PL logistics provider and other logistics service providers*. [Online] BCR. Available at: <http://logistics.bcr.com.au/blog/1pl-to-5pl-the-differences-between-a-3pl-logistics-provider-and-other-logistics-service-providers> [Accessed 27 Jun 2018]

Lehikoinen, R. & Töyrylä, I. (2013). *Ulkoistamisen käsikirja*. Helsinki: Talentum. 281p.

Liberati, A., Altman, D., Tetzlaff, J., Murlow, C., Gotzsche, P., Aloannidis, J., Clarke, M., Devereaux, P., Kleijnen, J. & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *PLOS Medicine*, Vol. 6, No. 7, pp. 1-28.

Liu, C., Huo, B., Liu, S. & Zhao, X. (2014). Effect of information sharing and process coordination on logistics outsourcing. *Industrial Management & Data Systems*, Vol. 115, No. 1, pp. 41-63.

Liu, C-L. & Lee, M-Y. (2018). Integration, supply chain resilience, and service performance in third-party logistics providers. *The International Journal of Logistics Management*, Vol. 29, No. 1, pp. 5-21.

Lu, D. (2011). *Fundamentals of Supply Chain Management*. [E-book] Ventus Publishing ApS. 112p. Available at: <http://library.ku.ac.ke/wp->

content/downloads/2011/08/Bookboon/Magement%20andOrganisation/fundamentals-of-supply-chain-management.pdf

Maertz, C., Wiley, J., LeRouge, C & Campion, M. (2010). Downsizing effects on survivors: layoffs, offshoring and outsourcing. *Industrial Relations: A Journal of Economy and Society*, Vol. 49, No. 2, pp. 275-285.

Mason, S., Cole, M., Ulrey, B. & Yan, L. (2002). Improving electronics manufacturing supply chain agility through outsourcing. *International Journal of Physical Distribution & Logistics Management*, Vol. 32, No. 7, pp. 610-620.

McCaffree, J. (2005). The request for proposal: A primer. *Journal of the American Dietetic Association*, Vol. 105, No. 4, pp. 522-523.

Meixell, M., Kenyon, G. & Westfall, P. (2014). The effects of production outsourcing on factory cost performance: An empirical study. *Journal of Manufacturing Technology Management*, Vol. 25, No. 6, pp. 750-774.

Miller, J. (2007). Fifty tips for your statement of work. *Contract Management*, Vol. 47, No. 8, pp. 58-59, 61.

Min, H. (2013). Examining logistics outsourcing practices in the United States: from the perspectives of third-party logistics service users. *Logistics Research*, Vol. 6, No. 4, pp. 133-144.

MVP. (2016). From 3PL to 5PL – Third party logistics explained... [Online] MVP: Supply chain recruitment. Available at: <https://www.mvp-search.com/news/from-3pl-to-5pl-third-party-logistics-explained-286.htm> [Accessed 27 Jun 2018]

Novaes, A., Bez, E., Burin, P. & Aragão Jr, D. (2015). Dynamic milk-run OEM operations in over-congested traffic conditions. *Computers & Industrial Engineering*, Vol. 88, pp. 326-340.

Parashkevova, L. (2007). Logistics Outsourcing – A means of assuring the competitive advantage for an organization. *Vadyba / Management*, Vol. 15, No. 2, pp. 29-38.

Partida, B. (2012). WMS can produce big logistics benefits. *Supply Chain Management Review*, Vol. May/June, pp. 51-53.

Percin, S. & Min, H. (2013). A hybrid quality function deployment and fuzzy decision-making methodology for the optimal selection of third-party logistics service providers. *International Journal of Logistics Research and Applications*, Vol. 16, No. 5, pp. 380-397.

Platz, L. & Temponi, C. (2007). Defining the most desirable outsourcing contract between customer and vendor. *Management Decision*, Vol. 45, No. 10, pp. 1656-1666.

Qureshi, M., Abdelhadi, A. & Shakoor, M. (2014). Developing new services for 3PL services providers using fuzzy QFD: a LOGINET case study. *IUP Journal of Supply Chain Management*, Vol. 11, No. 3, pp. 7-38.

Rajesh, R., Pugazhendhi, S., Ganesh, K., Ducq, Y. & Koh, S. (2012). Generic balanced scorecard framework for third party logistics service provider. *International Journal of Production Economics*, Vol. 140, No. 1, pp. 269-282.

Ranjan, R. (2017). *Logistics: what is the difference between 1PL, 2PL, 3PL, 4PL services?* [Online] Quora. Available at: <https://www.quora.com/Logistics-What-is-difference-between-1PL-2PL-3PL-4PL-services> [Accessed 27 Jun 2018]

Ritso, E. (2018). Estonia, Keila. Company's internal material.

Robinson, A. (2018). *What is full truckload shipping & how it differs from other over-the-road modes?* [Online] Cerasis. Available at: <http://cerasis.com/2018/03/19/full-truckload-shipping/> [Accessed 14 Jun 2018]

Rodrigue, J-P. (2012). The geography of global supply chains: evidence from third-party logistics. *Supply Chain Management*, Vol. 48, No. 3, pp. 15-23

Rumbaugh, M. (2015). Why does source selection take so long? *Contract Management*, Vol. 55, No. 11, pp. 10-18.

Rushton, A., Croucher, P. & Baker, P. (2010). *The handbook of logistics & distribution management*. 4th ed. London: Kogan Page. 636p.

Rushton, A. & Walker, S. (2007). *International Logistics and Supply Chain Outsourcing*. London: Kogan Page. 432p.

Salminen, A. (2011). Mikä kirjallisuuskatsaus? Johdatus kirjallisuuskatsauksen tyypeihin ja hallintotieteellisiin sovelluksiin. [Report] Vaasa: Vaasa University.

Sanjay, S. & Choudhury, A. (2014). A qualitative study on evolution of relationships between third-party logistics providers and customers into strategic alliances. *Strategic Outsourcing: an International Journal*, Vol. 7, No. 1, pp. 2-17.

Satterfield, P. (2006). *The million-dollar question: ERP or WMS?* [Online] Inbound logistics. Available at: <http://www.inboundlogistics.com/cms/article/the-million-dollar-question-erp-or-wms/> [Accessed 20 Jun 2018]

Schmidt, S. (2018). *What are the differences between LTL and FTL shipping?* [Online] JBT Transport. Available at: <http://www.jbttransport.com/what-are-the-differences-between-ltl-and-ftl-shipping/> [Accessed 14 Jun 2018]

Schöneberg, T., Koberstein, A. & Suhl, L. (2010). An optimization model for automated selection of economic and ecologic delivery profiles in area forwarding based inbound logistics networks. *Flexible Services and Manufacturing Journal*, Vol. 22, No. 3-4, pp. 214-235.

Selviaridis, K., Spring, M., Profillidis, V. & Botzoris, G. (2008). Benefits, risks, selection criteria and success factors for third-party logistics services. *Maritime Economics & Logistics*, Vol. 10, No. 4, pp. 380-392.

Shah, T. & Sharma, M. (2012). 3PLSP scale for co-operative dairies in Indian context. *Asia Pacific Journal of Marketing and Logistics*, Vol. 24, No. 3, pp. 515-532.

Sharif, A., Irani, Z., Love, P. & Kamal, M. (2012). Evaluating reverse third-party logistics operations using a semi-fuzzy approach. *International Journal of Production Research*, Vol. 50, No. 9, pp. 2515-2532.

Slack, N., Brandon-Jones A. & Johnston, R. (2013). *Operations Management*. 7th ed. Harlow: Pearson Education Limited. 733p.

Stephen, K. & Boysen, N. (2011). Cross-docking. *Journal of Management Control*, Vol. 22, No. 1, pp. 129-137.

Svensson, G. (2001). The impact of outsourcing on inbound logistics flows. *The International Journal of Logistics Management*, Vol. 12, No. 1, pp. 21-35.

Syazwan Ab Talib, M. & Bakar Abdul Hamid, A. (2014). *Halal logistics in Malaysia: a SWOT analysis*. *Journal of Islamic Marketing*, Vol. 5, No. 3, pp. 322-343.

Tan, K., Kannan, V., Hsu, C. & Leong, G. (2009). Supply chain information and relational alignments: mediators of EDI on firm performance. *International Journal of Physical Distribution & Logistics Management*, Vol. 40, No. 5, pp. 377-394.

Tejeida-Padilla R., Badillo-Piña, I. & Morales-Matamoros, O. (2010). A systems science approach to enterprise resources planning systems. *Systems Research and Behavioral Science*, Vol. 27, No. 1, pp. 87-95.

Tezuka, K. (2011). Rationale for utilizing 3PL in supply chain management: A shippers' economic perspective. *IATSS Research*, Vol. 35, No. 1, pp. 24-29.

Tigernix. (2017). *What is the difference between a warehouse management system (WMS) and an enterprise resource planning (ERP) system?* [Online] Tigernix's Business Blog. Available at: <https://www.tigernix.com/home/blog/difference-between-wms-erp-system> [Accessed 12 Jul 2018]

Trappey, C., Lin, G., Trappey, A., Liu, C. & Lee W. (2011). Deriving industrial logistics hub reference models for manufacturing based economies. *Expert Systems with Applications*, Vol. 38, No. 2, pp. 1223-1232.

Tura, A. (2018). Development Manager, DHL Supply Chain (Finland) Oy. Vantaa. Interview 30 Aug 2018.

Van Weeley, A. (2014). *Purchasing and supply chain management*. 6th ed. Hampshire: Cengage Learning EMEA. 438p.

Vieira, C., Coelho, A. & Luna, M. (2012). ICT implementation process model for logistics service providers. *Industrial Management & Data Systems*, Vol. 113, No. 4, pp. 484-505.

Vogt, J. (2010). The successful cross-dock based supply chain. *Journal of Business Logistics*, Vol. 31, No. 1, pp. 99-119.

Volling, T., Grunewald, M. & Spengler, T. (2013). An integrated inventory-transportation system with periodic pick-ups and leveled replenishment. *Business Research*, Vol. 6, No. 2, pp. 173-194.

Williams, M. (2013). *Putting together a solid statement of work*. [Online] Bright Hub Project Management. Available at: <https://www.brighthubpm.com/templates-forms/96996-putting-together-a-solid-statement-of-work/> [Accessed 5 Jun 2018]

Woo, G. (2012). *The difference between warehouse management and ERP software systems*. [Online] Blue Link. Available at: <https://learnmore.bluelinkerp.com/blog-0/bid/52440/The-Difference-Between-Warehouse-Management-and-ERP-Software-Systems> [Accessed 21 Jun 2018]

You, Z. & Jiao, Y. (2014). Development and application of milk-run distribution systems in the express industry based on saving algorithm. *Mathematical Problems in Engineering*, Vol. 2014, pp. 1-6.

Zacharia, Z., Sanders, N. & Nix, N. (2011). The Emerging Role of the Third-Party Logistics Provider (3PL) as an Orchestrator. *Journal of Business Logistics*, Vol. 32, No. 1, pp. 40-54.

Zailani, S., Shaharudin, M., Razmi K. & Iranmanesh, M. (2017). Influential factors and performance of logistics outsourcing practices: an evidence if Malaysian companies. *Review of Managerial Science*, Vol. 11, No. 1, pp. 53-93.

Završnik, B. & Jerman, D. (2011). Evaluating the process of logistics and outsourcing. *Ekonomika Istrazivanja*, Vol. 24, No. 1, pp. 520-530.

Zhu, W., Ng, S., Wang, Z. & Zhao X. (2016). The role of outsourcing management process in improving the effectiveness of logistic outsourcing. *International Journal of Production Economics*, Vol. 188, pp. 29-40.

Zineldin, M. & Bredenlow, T. (2003). Strategic alliance: Synergies and challenges: A case of strategic outsourcing relationship "SOUR". *International Journal of Physical Distribution & Logistics Management*, Vol. 33, No. 5, pp. 449-464.

Appendices

Appendix 1. 3PL selection criteria based on multiple research.

Cost savings	Management capability
Geographical location / proximity	Production capacity
On time performance	Reputation
Dedicated capacity	Specialization
Service improvement	Consistency
Quality of service	Relationship
Increased flexibility	Asset reduction
Flexibility in customer inquiry	Variety of services
Equipment flexibility	Value added services
Labor flexibility	Customized services
Cultural fit	Company size
Innovations in process	IT capability
Reliability of carrier	Human resource management
R&D investments	Breadth of services
Financial stability	Technology improvements
Ease of collaboration	Response in delivery cycle
Mutual trust	Environmental expenditure
Information sharing	Contract length
Experience in cooperation	Warranties
Ability to understand	Disposal of end-of-life product
Experience	Discounts
Wide service range	

Appendices

Appendix 2. The content of SOW. (Miller 2007, p.58; Landau 2018)

Introduction: Briefly describe the project: what will be done, who are involved.

Background: Report the reasons behind the project: why it is executed and what is the purpose of it. This section should provide answers to questions regarding deliverables, return on investment and objectives.

Scope: Describes what should be done in the project and possibly a work breakdown structure: outcomes, time needed and general steps. Mandatory hardware and software should be listed here as well.

Location: The location of the project should be specified: whether it is a site specific, at a central department or there is a possibility to work remotely.

References: All documents listed that are referenced in the SOW

Tasks: The general steps that were briefly described in scope are explained with more detail here, in subsequent order: methodology, specifications, performance requirements, standards, locations, travel...

Deliverables: All project related deliverables should be listed here: criteria for acceptance and work products among others. Again, the information should be specific, for example colors, sizes, quantities.

Schedule: How much time is scheduled to finish the project? Milestones, performance period, kickoff, testing... Times should be detailed: for example billable hours per week and moth.

Assumptions and expectations: The assumptions the SOW is based on and the expectations of the stakeholders.

Requirements: If there is any specific equipment or certifications needed, it should be listed in the SOW.

Monitoring Progress / Compliance: Meetings, reports, reviews, etc.

Notes: Confirmations, clarifications, other information (for example restrictions or safety issues).

Appendices

Appendix 3. Basic data to be shared with LSPs along with RFP. (Kivinen 2002, p.18-29; Rushton et al. 2010, p.547)

Key figures	Processes
<p>Location</p> <p>Warehouse</p> <ul style="list-style-type: none"> - warehouse/office m2 - extension areas - facility handling - multi-user/dedicated <p>Product description</p> <ul style="list-style-type: none"> - size - weight <p>Inventory</p> <ul style="list-style-type: none"> - ABC-analysis - volumes - normal storage level/peak level - resource indication - picking events - seasonal variance - annual volume changes <p>Volumes</p> <ul style="list-style-type: none"> - inbound/outbound - orders per day - lines per order - articles per line - packing types - picking events <p>Equipment</p> <ul style="list-style-type: none"> - storage systems: pallets/ small items/hazardous goods - warehouse equipment 	<p>Inbound process</p> <ul style="list-style-type: none"> - ABC-analysis - number of suppliers - palletization extent - IT systems - notification process of incoming shipments / delivery times - unloading - customs clearance - damage inspection - bookings to system - reporting - rush order handling <p>Storage</p> <ul style="list-style-type: none"> - location - system registrations - stock accuracy - insurances <p>Return process</p> <ul style="list-style-type: none"> - estimated volumes - handling - system registrations - scrap material handling <p>Outbound process</p> <ul style="list-style-type: none"> - IT system - order receiving frequency - concrete activity descriptions - receipt-to-delivery service time cycles - packing instruction handling - deviation handling - rush order handling - shipment documentation - consolidation process <p>Transportation</p> <ul style="list-style-type: none"> - transportation management - carrier nomination
<p>Customer service</p> <p>Customer service management</p> <p>Contact point</p> <p>Opening hours</p> <p>Duty time service</p> <p>Language requirements</p> <p>Emergency plan</p>	

Appendices

<p>Implementation costs Storage/equipment Office Information systems and technology</p>	<ul style="list-style-type: none"> - special document process - destination split - cut-off times of the carrier - service/quality requirements - location related issues - delivery methods - volumes - seasonality - track and trace arrangements <p>Special services Billing</p> <ul style="list-style-type: none"> - paper copies/EDI/internet
<p>Information systems and technology Warehouse management system Requirement specifications Back-up/restoring Interface management Licenses Software functionality description Data communication flow Features needed</p>	<p>Quality</p> <p>Inbound</p> <ul style="list-style-type: none"> - on-time booking - minimum quality standard <p>Outbound</p> <ul style="list-style-type: none"> - on-time booking - minimum quality standard <p>Transportation</p> <ul style="list-style-type: none"> - on-time deliveries - minimum quality standard <p>All KPI related quality expectations Penalty procedure Rewarding procedure</p>
<p>Others Re-packing Stock checking Telesales Promotions</p>	