

Understanding current and future requirements on logistics
service offerings in the Danish construction industry
A case study on how a supplier can better match customer requirements

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Abstract

Purpose - The purpose of this research is to create a better understanding of what the current and future customer requirements are on logistics service offerings in the Danish construction industry and how the studied case company can better match these.

Methodology - The research was conducted as a case study. A supplier (referred to as the case company) of tools, consumables and installation materials in the construction industry was studied. Empirical data was collected from three sources: interviews with personnel and customers of the case company, sales and delivery data from the case company, and grey literature on the Danish construction industry and its actors. By combining qualitative and quantitative data, an understanding of the requirements on logistics service offerings was established. Following this, an analysis on how the case company could focus its efforts to improve the match with the requirements was performed.

Findings - The study identifies and analyzes the relative importance of seven dimensions of logistics service offerings and fourteen services. Based on the empirical findings and analyzes, offering early and fast deliveries was indicated to be of the highest importance on the studied market. Requirements do however vary depending on customer segment. Installation firms are currently more demanding but requirements from contractors are indicated to increase faster the coming years. And as it is a competitive market, customers are indicated to become increasingly cost-sensitive. Requirements and willingness to pay in specific situations do, however, seem to be dependent on several contextual factors, such as industry characteristics, project characteristics and product characteristics. This study identifies customer segments, service dimensions and services that the case company could focus on to improve current and future match with customer requirements.

Originality - Previous studies on logistics in the construction industry have often investigated how improved logistics could improve productivity in construction projects. They usually have the perspective of constructions firms or end-clients. Furthermore, requirements on logistics service offerings have often been analyzed in B2C and e-commerce contexts. This study is original in that it analyzes the requirements on logistics services from a supplier perspective in the (Danish) construction industry. It complements previous studies by analyzing the requirements in a B2B context and by investigating the actual requirements, not would-be requirements to improve productivity.

Key Words - Logistics service offerings, logistics service dimensions, Danish construction industry, customer requirements.

Paper type - Master's thesis

Preface

This thesis was conducted during the spring of 2019 as the final part of our engineering studies within mechanical engineering and industrial management (with master specialization within the field of supply chain management) at Lund University, Faculty of Engineering. The thesis has been completed in collaboration between two authors, Erik Dufberg and Anton Forsström. Each author has been involved in every part of the process and contributed equally.

The research has given us plenty of insights into how companies in the construction industry are operating, what challenges they are facing and how logistics plays an important role in this context. Throughout the process, we have improved our skills in analyzing and solving real case problems and lead projects. The research has further highlighted the importance of connecting theory to practice, and vice versa.

We would greatly like to thank our collaborating partner, the case company, for making this master thesis possible. Representatives from the case company have provided us with substantial help in setting up interviews and providing data. Furthermore, they have given us weakly feedback during the process. Finally, we would like to thank our supervisor at Lund University, Joakim Kembro, for continuous guidance throughout this thesis.

Lund, June 2019

Erik Dufberg

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1 Introduction

In this chapter, the reader is introduced to the study and the case company is presented. The study is motivated, the purpose of the study is presented and research questions derived. Lastly, the chapter discusses the delimitations of the study.

1.1. Background

Construction projects are in general complex and characterized by their variability. The development within the construction industry has historically been slow compared to other industries (Ekeskär and Rudberg, 2016; Sundquist et al., 2018). Practitioners argue one reason for the slow development is due to a conservative approach among workers. However, recent research shows that the construction industry is undergoing changes and companies are putting more effort into developing better logistics services and supply chain solutions (Bengtsson, 2018; Kristiansen et al., 2005). The complexity of construction projects is strongly related to the number of different actors involved, which has made coordination between different stakeholders increasingly important (Bengtsson, 2018).

Failure to manage the complexity in the industry is one of the major reasons many construction projects suffer from both low productivity and high production costs (Ekeskär and Rudberg, 2016; Vrijhoef and Koskela, 2000). An important aspect of managing the complexity is making sure that the right materials are at the right place at the right time. Downtime and material handling have been indicated to account for 23 % respectively 14 % of total work time on construction sites (Olsson, 2018). As this time constitutes a substantial part of the total work time, it is important that material deliveries are on point. A study by Thunberg and Persson (2014) does, however, indicate that less than 40 % of deliveries from suppliers to construction sites are perfect deliveries, meaning right product, right quantity, right time, right location and right documentation.

Low delivery performances like these could not be imagined in the retail industries, where the importance of logistics service performance has increased immensely. Increased on-line purchasing, integrated sales channels and fierce competition have drastically caused customer demands to escalate. The retail industry has attempted to meet this pressuring challenge with new technologies, extended range of service options and improved solutions for deliveries in the last mile (Daugherty et al., 2019). Indications from the case company imply that similar patterns are starting to appear in the otherwise conservative construction industry.

As logistics is an underperforming key component in the construction industry, it becomes interesting to understand what the customer requirements for logistics service offering are, and what impacts them. What are the key components of the requirements and what services should a supplier offer to remain competitive? Construction projects are dependent on suppliers and customers are likely to put higher demands on their suppliers in terms of logistics services in the future. Understanding and predicting these requirements is therefore likely to become crucial for suppliers in order to identify opportunities and threats in the market. This thesis makes an attempt to explore this area by conducting a case study in the Danish construction industry.

1.2. Introduction to the case company

This thesis is conducted in cooperation with a global supplier of tools, equipment, and components in the construction industry. The case company controls its own value chain. Controlling its own value chain means that products are produced, marketed, and sold in-house. However, the final delivery from the finished goods warehouse to the stores and end-customers is outsourced. The case company's product portfolio ranges from tools (screw-drivers, breakers, measuring and hammer-drills) to fastening and installation systems (anchoring, pipe hanging system, channels), insulation and protection, cutting and grinding as well as fire protection systems. Being a global company with sales offices in 120 countries, over 27 000 employees worldwide and responsibility for the whole value chain, logistics is important for an effective and efficient business. The company has however not differentiated through logistics services but instead focused on high product quality, product innovation, and a dedicated sales force. When it comes to product and customer service, the company categorizes itself as an innovator. However, in terms of its logistics services, the company can rather be seen as a follower. It's therefore vital for the company to be aware of what the innovators bring to the market and how to respond to it.

On the Danish market, the case company has approximately 150 employees and a revenue of DKK 343 million (2018). Thus, making the Danish market a rather small business region for the company. The majority of the employees are working with direct sales as sales managers or key account managers. This direct selling sales force is a differentiating factor for the company. Customer contacts are managed either through the sales and account managers, customer service, case company-owned stores or online. Customers on the Danish market are divided into three business areas, namely, contractors (64 % of net sales), installation (29 % of net sales) and manufacturing industry (7 % of net sales). This thesis focuses on investigating the requirements within the two first business areas, namely, contractors and installation. These are further described in Chapter 2.

Customers of the case company are currently served through both stores, located closer to the end market, and direct deliveries from a finished goods warehouse in Malmö, Sweden. The company expresses an increase in competition and changing market requirements on logistics service offerings. Competitors are differentiating themselves through advanced logistics services and staying competitive in this landscape is an issue that the company needs to address in order to maintain its position on the market.

1.3. Purpose

The purpose of this research is to create a better understanding of what the current and future customer requirements are on logistics service offerings in the Danish construction industry and how the case company can better match these.

The definition of logistics service offering in this thesis is described as services related to the delivery of goods directly to customers or distribution via stores. Customer requirements will be analyzed from two interlinked perspectives. The analysis will aim at identifying important services to offer on the market, as well as provide an understanding of what dimensions of the service offering that are important. The identified customer requirements will then be used to study how the case company could better match these.

1.4. Research questions

To design successful logistics service offerings, suppliers must first understand the customers' needs and requirements. To fulfill the stated purpose, this thesis aims to answer the following research questions (RQs):

RQ1: *What are the current and future customer requirements on logistics service offerings in the Danish construction industry?*

In order to answer this question, one must first establish knowledge about what contextual factors impact the requirements. Requirements will further be investigated by analyzing the importance of service dimensions and specific services. A time horizon of five years will be used to define future requirements in this thesis.

RQ2: *How can the case company's logistics service offering be changed to better match the current and future customer requirements?*

Based on the answers from RQ1, the logistics service offering of the case company will be analyzed in relation to identified customer requirements. The perceived performance of the case company will further be investigated in the context of the competition on the market.

1.5. Focus and delimitations

This study will be performed by investigating the Danish construction industry from the perspective of a supplier in the industry, namely the case company. Figure 1.1 below illustrates the system boundary for the studied case. The focus will be on logistics service offerings related to delivery and pick-up of goods. A delivery service is defined as a delivery of goods directly to the customer's job-site. A pick-up service is defined as letting the customer travel to a store and pick up the goods. Furthermore, material handling and logistics operations on the actual construction sites of the customers, i.e. when goods have been delivered and received, will not be studied in any greater depth. Neither will the functions of the case company's warehouse nor the upstream network be studied.

An aspect commonly associated with last mile delivery in the consumer industries, and waste handling in construction, is how to handle returns. This study will delimit itself from accounting for this phenomenon and only investigate the forward flow of goods.

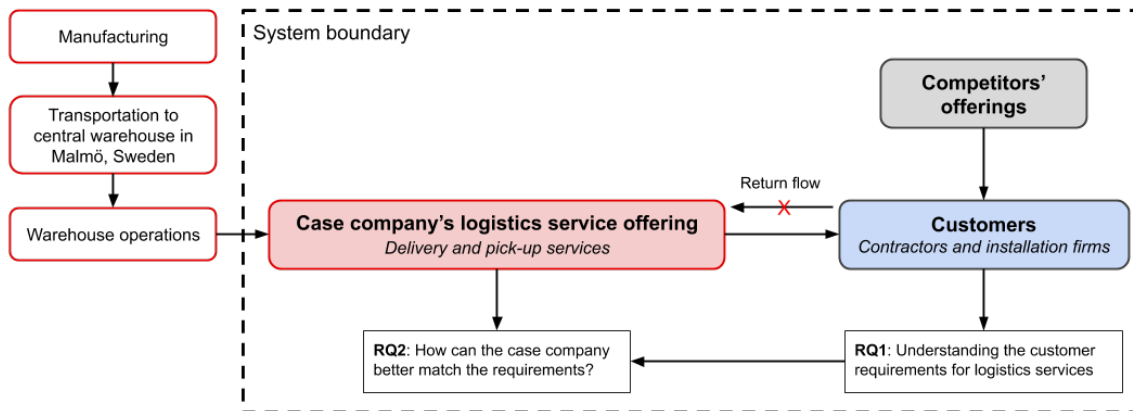


Figure 1.1: System boundary for the case study

1.6. Thesis outline

Chapter 1. Introduction

In this chapter, the reader is introduced to the study and the case company is presented. The study is motivated, the purpose of the study is presented and research questions derived. Lastly, the chapter discusses the delimitations of the study.

Chapter 2. Methodology

In this chapter, the methodology used in the study is presented. The chapter describes the approach used, motivates the design of the study and selection of case units as well as describes how data was collected and analyzed.

Chapter 3. Frame of reference

In this chapter, the frame of reference is presented. The first section elaborates on customer service in logistics, with emphasis on different dimensions of logistics services. The second part elaborates on the concept of last mile distribution, including factors impacting requirements on logistics services. The final section discusses the nature of the construction industry including challenges, opportunities, and trends within the industry.

Chapter 4. Empirical findings

In this chapter, the results of the study are presented. An introduction to the Danish construction industry is presented, highlighting contextual factors that impact requirements and important services to offer on the market. Data on current and future customer requirements are then presented. The final section describes the case company's current logistics service offerings and capabilities.

Chapter 5. Analysis

In this chapter, the empirical findings are analyzed and compared to relevant literature. The chapter focuses on identifying current and future customer requirements and how the case company can better match these.

Chapter 6. Conclusions

In this chapter, the conclusions of the study are presented. The stated RQs are answered and contributions to theory and practice are summarized. Finally, suggestions for future research are presented.

2 Methodology

In this chapter, the methodology used in the study is presented. The chapter describes the approach used, motivates the design of the study and selection of case units as well as describes how data was collected and analyzed.

2.1. Research approach

This section presents the overall strategy used to approach the rather exploratory purpose of this study. More formal motivations and descriptions of the methodology will be described in later sections of this chapter. To study the current and future customer requirements on logistics service offerings, a four-step approach was designed, see Figure 2.1. The first two steps were 1) identifying key components of customer requirements and 2) mapping of current logistics services and capabilities. The findings from the first step were used in step 3 to analyze current and future requirements and factors impacting requirements. The results from step 2 and 3 were then combined in step 4 to analyze the match between the case company's logistics service offering and customer requirements.

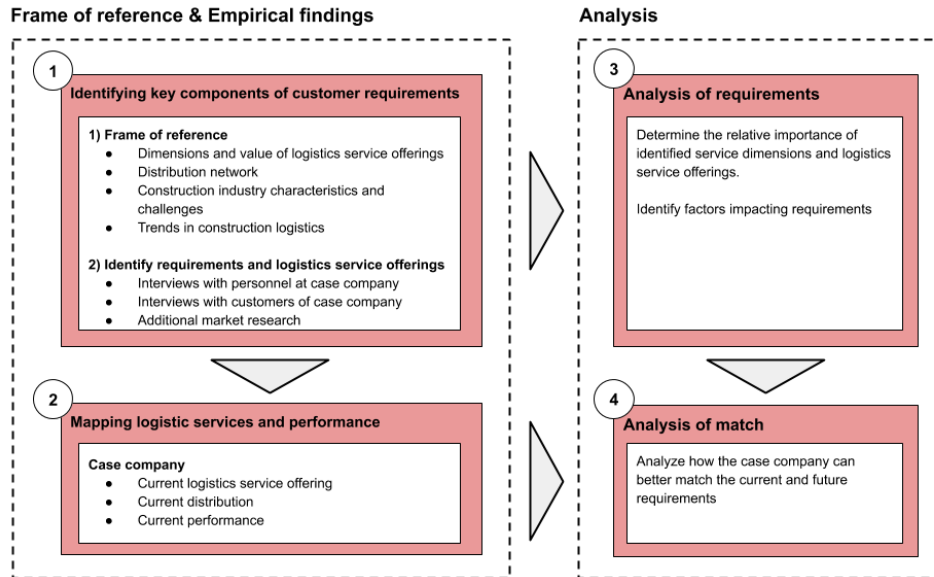


Figure 2.1: Description of the logical sequencing of the research

Step 1 - Identifying key components of customer requirements

In the first step, the frame of reference was established and data on requirements collected.

This was conducted as a process in two parts. First off, a search in primary sources was conducted on the topic. The literature search aimed at providing an understanding of service dimensions in logistics as well as creating a better understanding of the construction industry. The literature search was followed by interviews with personnel and customers of the case company. The purpose of the interviews was to establish an understanding about the market requirements as well as identify relevant logistics service offerings. In addition to the interviews, secondary sources were used to help identify logistics service offerings on the market.

Step 2 - Mapping the case company's logistics services and capabilities

In the second step, the current distribution network, capabilities and logistics service portfolio of the case company were mapped. Furthermore, the perceived performance of the case company, in terms of logistics services, was analyzed during this step.

Step 3 - Analysis of requirements

In the first part of the analysis, the most important components of logistics service offerings were identified based on the empirical results. Contextual factors impacting customer requirements were then further identified based on the results from the interviews.

Step 4 - Analysis of match

In the second part of the analysis, identified customer requirements on logistics service offerings were compared to the case company's current offering and capabilities.

2.2. Research strategy

When conducting research, it is important to select an appropriate approach for conducting the research within the given time frame. In general, when *what* and *how* questions are being researched, which is the case in this thesis, a favored strategy is the case study (Yin, 1994). According to Yin (1994), a case study is a good tool when the focus is on a present phenomenon within some real-life context and when the researchers have little control over events. Voss et al. (2002) describe case research as one of the most powerful research methods when there are historical descriptions of past and current events that have been concluded from different sources. Meredith (1998) presents three primary advantages with case research, originally derived by Benbasat et al. (1987).

1. The phenomenon can be studied in its natural setting and meaningful, relevant theory generated from the understanding is gained through observing actual practice.
2. The case method allows the questions of why, what and how, to be answered with a relatively full understanding of the nature and complexity of the complete phenomenon.
3. The case method lends itself to early, exploratory investigations where the variables are still unknown and the phenomenon not at all understood.

In this thesis, the objective is to answer the two questions; *what* are the customer requirements on logistics service offerings and *how* can the case company better match these requirements. In that sense, a case study is a suitable approach according to Meredith (1998). Voss et al. (2002) furthermore present a framework for how to choose a suitable research structure based on the primary purpose and characteristics of the research questions, see Table 2.1. Given the research questions, theory building is argued to be the most suitable approach for this study based on the presented framework. For this approach, Voss et al. (2002) suggest various case study structures. The choice of case study design will be further elaborated on in the next section.

Table 2.1: Matching research purpose with methodology (Voss et al., 2002).

Purpose	Research question	Research Structure
Exploration		
- Uncover areas for research and theory development	- Is there something interesting enough to justify research?	- In-depth case studies - Unfocused, longitudinal field study
Theory building		
- Identify/describe key variables	- What are the key variables?	- Few focused case studies
- Identify linkages between variables	- What are the patterns?	- In-depth field studies
- Identify why these relationships exist	- Why should these relationships exist?	- Multi-site case studies - Best-in-class case studies
Theory testing		
- Test the theories developed	- Are the theories able to survive the test of empirical data?	- Experiment
- Predict future outcomes		- Multiple case studies - Large-scale samples
Theory extension/refinement		
- To better structure the theories in light of the observed results	- How generalizable is the theory? - Where does the theory apply?	- Experiment - Case studies - Large-scale samples

2.3. Research design

2.3.1. Design of the case study

Yin (1994) describes research design as “*the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of a study*” (p.18). The research design should, at least, consider four aspects; what actual questions are to be studied, what data is relevant to answer the questions, how should the data be collected and how are the results going to be analyzed (Yin, 1994). Although a case study should follow a logic, there are no strict guidelines describing how to design them (Yin, 1994) and the design is allowed to be flexible (Höst et al., 2006). This means that the research questions and direction of the study can be adapted along the way if deemed relevant. This property was desired given the rather exploratory purpose of the study.

Although there is no distinct structure for designing case studies, there are many guidelines. An important factor for succeeding with case studies is defining the unit of analysis, i.e. what the actual case being studied is. Otherwise, the study risks embarking on the impossible journey of trying to collect everything (Yin, 1994). To guide the design, Yin (1994) suggests four different approaches that can be used. As illustrated in Figure 2.2, those are dependent on the two dimensions, single versus multiple and holistic versus embedded. The choice between a single and a multiple case study is much dependent on the question and context in which the phenomenon is to be studied. If understanding the case, whether single or multiple, requires studying sub-units, an embedded approach is to be used where input from several units are combined. If the case is considered with a single unit, the holistic approach is appropriate.

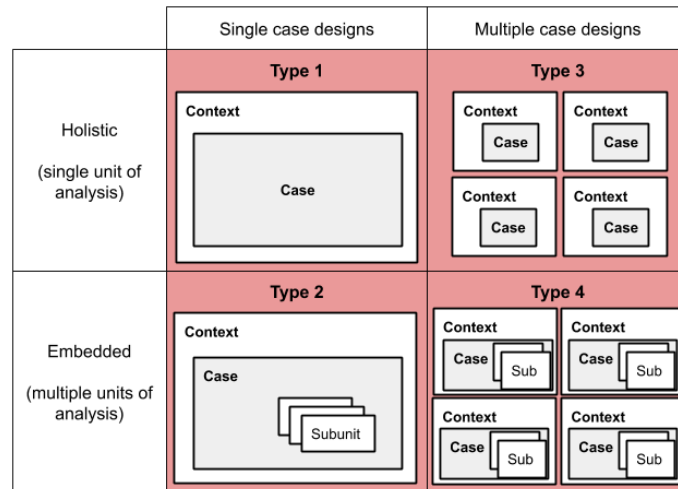


Figure 2.2: Basic case study designs (authors’ figure based on Yin (1994))

The stated RQs in this study impose studying two phenomenons, namely, *current and future customer requirements of logistics service offerings* and *how the case company can better meet these*. Studying this requires studying both the customer and supplier side, why the Danish construction industry can be argued to be the studied context. The individual sub-units are the involved companies; the case company itself, customers of the case company and competitors of the case company. The design selected in this thesis can thus be described as a single case study with multiple embedded units according to Figure 2.2.

In this thesis, the primary unit of analysis is to get an understanding of the current and future customer requirements on logistics service offerings in the Danish construction industry, illustrated in Figure 2.3. This was done by first establishing knowledge of the industry and identifying contextual factors impacting the requirements. Secondly, suitable service dimensions for evaluating the value of different logistics service offerings, and specific logistics services offered on the market, were identified. This involved taking into account that requirements might differ depending on the type of customer. The results were then used to answer how the case company can better match the requirements. How the analysis was carried out is described in more detail in Section 2.5.

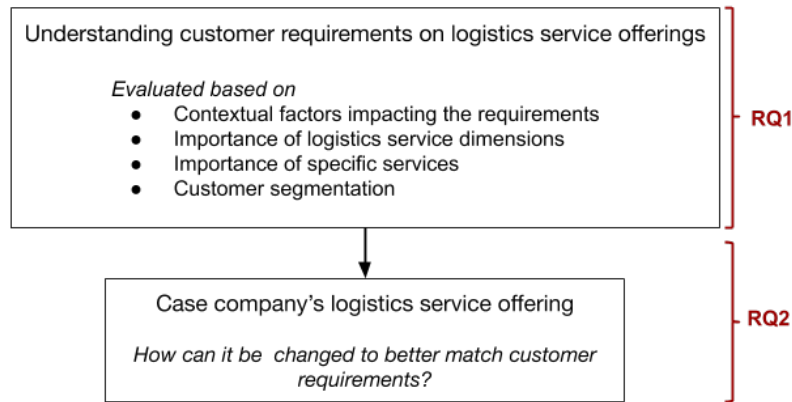


Figure 2.3: Unit of analysis

2.3.2. Choice of case units

When selecting case units, one can use theoretical sampling to select cases that are believed to be theoretically useful (Eisenhardt and Graebner, 2007). This approach was used to select the embedded units; the case company, customers of the case company and competitors of the case company.

In this process, discussions with experienced personnel at the case company led to the identification of nine relevant customers that due to their sizes and market positions would be relevant units to study. Assuming that these companies represent the market well is motivated when considering the consolidation in the Danish construction industry (Kristiansen et al., 2005). Kristiansen et al. (2005) describe that smaller actors specialized to survive during a consolidation period in the '90s, indicating that results from smaller firms are likely to be less general. The chosen customers were segmented into the two segments, contractors (five companies) and installation firms (four companies). Contractors are often project leaders at construction sites and coordinate the projects. They generally do more traditional construction work such as carpentry and setting concrete foundations. Installation firms conduct installations related to electricity, mechanics, plumbing, and ventilation. Based on initial discussions with the case company, the proposition was that contractors and installation firms could have different needs in terms of logistics services. All the nine customers were contacted and interviews were set up with four of them, two large contractors and two large installation firms. In addition, one smaller installation firm was interviewed in order to increase customer input.

Further on, five competitors of the case company were identified as relevant for the study. Similarly as for the customers, competitors were categorized based on if they mainly serve contractors (two competitors) or installation firms (three competitors). When analyzing competitors, only retailers were included. Brands that do not sell directly to end customer were not included. This distinction was made due to the fact that the retailers are responsible for the main part of the logistics services experienced by the customers. The studied competitors were selected based on their strong market positions and the perception that they drive the development of logistics services from the supplier side of the industry.

2.3.3. Description of case units

Information regarding the interviewed customers is presented in Table 2.2. For a description of the investigated competitors, see Table 2.3. Information about the case company is presented in the introduction in Section 1.2.

Table 2.2: Interviewed customers of the case company

Customers	Company description	Revenue [Million DKK]	Employees [In Denmark]
<i>Contractors</i>			
C1	C1 is the biggest contracting company in Denmark. They devise, plan and implement large-scale projects within infrastructure, energy and construction all over Denmark	12.000	6.500
C2	C2 is a nordic contractor that develops and performs all types of construction projects. The company has its head office in Norway, and has a businesses in all of Sweden, Denmark and Norway. The company mainly focuses on new construction of private and public real estate	5.400	N/A <i>1.000 in Nordic region</i>
<i>Installation firms</i>			
I1	I1 is one of Denmark's largest technical installation companies with focus on electricity, plumbing, ventilation, cooling, fire and security, infrastructure and energy services etc	2.400	2.000
I2	I2 is one of the leading mechanical and electrical companies in Denmark. The company primary focuses on technical services within electricity, mechanics, piping and plumbing, HVAC (heating, ventilation and air condition), building automation etc.	2.000	2.000
I3	I3 is a Danish mid-size technical installation firm mainly supplying the construction industry within the area of cooling. This covers all types of refrigerations plant and AC systems (Cooling of engineering and server rooms, comfort and ventilation cooling in building, heat pumps and industrial process cooling)	60	30

Table 2.3: Information about investigated competitors of the case company

Competitors	Company description	Revenue [Million DKK]	Employees [In Denmark]
<i>Mainly supplying contractors</i>			
SC1	SC1 is one of the largest retailers and distributors of building materials in the Nordic region. The company sells products within building material, tools and machines, painting, workwear & safety equipment, electricity & lightning and plumbing.	6.800	2.161
SC2	SC2 is a large B2B retailer supplying contractors in the construction industry within fastening, tools, building materials, chemistry and safety equipment	750	500
<i>Mainly supplying Installation firms</i>			
SI1	SI1 is a leading sourcing and service company in Denmark with a wide range of products within electricity, plumbing, ventilation, infrastructure, lightning, cables, tools and fastening.	3.400	770
SI2	SI2 is a large wholesaler and service company mainly supplying installation firms in the Danish construction industry with products within steel and metals, plumbing, VA, engineering, electricity, tools and fastening, chemistry and personal equipment for construction workers.	4.200	1.184
SI3	SI3 is a large Danish wholesaler supplying installation firms in the Danish construction industry within the disciplines of plumbing, electricity, tools, machines and ventilation.	3.000	700

2.4. Data collection

According to Höst et al. (2006), case studies can use various data collection methodologies such as interviews, observations and archive analysis. Interviews can be structured, semi-structured or unstructured where the former leans towards an oral questionnaire and the latter to a greater extent allows the interviewee to determine what is discussed. Observations consist of observing an event or process and document what is happening. Archive analysis consists of reviewing documentation that has been produced for any purpose other than the current research. A combination of archive analyzes and interviews was used in this study, with emphasis on the results from the interviews. A summary of how data was collected is presented with descriptions in Table 2.4.

Table 2.4: Summary of performed information gathering and data collection

Frame of reference	Description
Primary literature search	Conducted using sources from validated academic sources and journals. Relevant keywords were used to search databases such as EBSCOHost, Web of Science, Emerald and ResearchGate.
Data collection method	
Secondary and grey literature search	Information from industry reports and company websites was used to understand current market state and competitors offerings.
Interviews	<p>Interview guide was established based on frame of reference and previous data collection. Interviews were conducted with the following roles:</p> <p>Case company personnel</p> <ul style="list-style-type: none"> • Logistics manager / Logistics service manager • Sales, marketing and account managers <p>Customers of the case company</p> <ul style="list-style-type: none"> • Purchasing managers / Purchasing coordinator • Job-site manager / Job-site logistics manager
Questionnaire	Interviewees were asked to fill out a questionnaire including ranking the importance of each service dimension as well as perceived performance of the case company
Internal company data	<p>Data was collected from internal company information systems and company personnel. Data on the following topics was retrieved;</p> <ul style="list-style-type: none"> • Distribution network structure • Sales distribution data and delivery data • Logistics service performance

The data was collected by using a combination of exploratory literature search and interviews. When the primary literature search was finished, additional grey sources were researched (competitors' websites). To determine who to interview at the selected customers, qualifying criteria were decided upon. Interviewees should in some sense impact or influence the requirements on logistics services to qualify. In order to be able to identify

trends, the interviewees should at least have a couple of years of experience in the industry. With these criteria, potential interviewees ranged from roles such as purchasers, job-site managers, and logistics managers. A further limitation in the selection was the requirement that the interviewees speak English. This limitation was included as the authors wanted to reduce the risk of misunderstandings due to language barriers.

Nine interviews were conducted with personnel from the case company, before interviewing the customers. Seven of those nine interviews were conducted with experienced personnel from the marketing and sales departments and two with personnel responsible for logistics. Marketing and sales personnel were interviewed due to their proximity and relations to the market. Due to the case company's direct selling approach, the sales personnel have considerable insights into the requirements and discussions of the customers. The logistics personnel do, on the other hand, have a better understanding of the trade-offs and internal challenges for the case company related to logistics. In Table 2.5, the interviewees from the case company are presented. An overview of the interviewed customers is presented in Table 2.6. By interviewing personnel from the case company first, relevant logistics service offerings could be identified. These logistics service offerings were then discussed and ranked by the customers. In combination with results from grey sources, this resulted in the identification of fourteen relevant logistics services, later described in Table 4.5.

Table 2.5: Interviewees at the case company

Interviewee	Job Position	Primary business unit	Experience at Case Company	Experience in industry	Interview Session
R1	Key Account Manager	Installation	5 years	23 years	2019-03-12 1 hour
R2	Area Sales Manager	Installation	2,5 years	2,5 years	2019-03-12 45 min
R3	Regional Sales Manager	Contractors	2 years	8 years	2019-03-12 1,5 hours
R4	Project Account Manager	Contractors & Installation	8 years	12 years	2019-03-12 1 hour
R5	Key Account Manager	Installation	7 years	7 years	2019-03-13 1,5 hour
R6	Senior Key Account Manager	Contractors	22 years	22 years	2019-03-15 1 hour (Skype)
R7	Head of Key Account: Management & Engineering	Contractors & Installation	15 years	18 years	2019-03-18 1 hour (Skype)
R8	Logistics Expert	Not applicable (Logistics)	6 years	6 years	2019-03-22 1,5 hours
R9	Head of Logistics Sweden/Denmark	Not applicable (Logistics)	5,5 years	5,5 years	2019-03-22 2 hours

Table 2.6: Interviewed customers of the case company

Customer	Company type	Job position	Experience at Company	Experience in industry	Interview Session
C1	Contractor	Purchasing Manager	6 years	17 years	2019-03-25 1,5 hour
C2	Contractor	Project Manager	6 years	6 years	2019-03-27 1 hour
I1	Installation	Project Manager	12 years	12 years	2019-03-28 1 hour
I2	Installation	Purchasing Coordinator	2 years	31 years	2019-03-20 2 hours
I3	Installation	Foreman	5 years	15 years	2019-04-03 45 min

The interviews were set up in the form of semi-structured interviews with structured elements. Follow-up questions were used when assumed relevant (semi-structured approach) and each interview was concluded with the interviewee filling in a questionnaire (structured approach). In the questionnaire, interviewees were asked to rank the importance of each service dimension as well as perceived performance of the case company. In addition, customers were also asked to rank the importance of specific logistics service offerings. This setup was chosen as a trade-off between satisfying the exploratory nature of the study and improving comparability between interviews to increase validity and reliability in the analysis. An additional benefit of the structured questionnaire proved to be that it in some interviews stimulated interviewees to mention relevant information such as; *”I will answer this for the segment I’m mainly involved with [contractors] and then I will give it a four. But if I was to answer generally and include installation firms, I would give it a six.”* (Area sales manager regarding the importance of a service dimension). See Appendix A for the interview guides used in this study.

When performing interviews, it is important to consider how the data should be analyzed. To be able to analyze the collected data, one should document procedures, answers and observations. Ideally, interviews are recorded and thereafter transcribed. Doing so provides a good foundation for performing a valid qualitative analysis (Höst et al., 2006). To secure an objective data collection, all interviews were recorded in this study. Furthermore, both authors were present during all interviews but two. During the interviews, one author primarily focused on taking notes and the other on leading the interview. At the beginning of each interview, a description of the study was presented to the interviewee, including purpose, RQs, definitions of service dimensions and so forth.

As this study was performed in cooperation with the case company, conducting interviews with competitors was not considered a viable option for data collection. Information regarding the supplier market thus had to rely on grey literature (industry reports, competitors' websites) together with insights from the interviewed customers and case company personnel.

To study how the case company can better match the customer requirements, distribution and delivery data was collected from information systems and personnel of the company. Interviews with case company personnel included discussions on this topic. In the interviews with the logistics personnel, feasibility of implementing the identified logistics service offerings were discussed.

2.5. Analysis

The analysis can be either quantitative, qualitative or a combination of them both. Qualitative analyzes can be harder to establish validity in, due to their less quantifiable nature. However, a deeper understanding of a problem may be achieved. This study mainly relies on qualitative analysis. Qualitative analyzes should be conducted in four steps, collect data, encode data, group data and draw conclusions based on grouping. The data collection is described in the previous section above. When data has been collected and transcribed, it should be encoded. Encoding data means extracting relevant key elements from, for example, the interviews. Here one should not extract single keywords out of context, but rather highlight keywords in a given context. The coded data should then be grouped. In this stage, the coded text segments are grouped so that patterns can be identified and conclusions drawn. (Höst et al., 2006)

An important part during qualitative analyzes is thus the encoding of the empirical findings. The encoding process addresses the issue of traceability from collected data, for example, an interview answer. The encoding is the structured way of converting the collected data so that valid conclusions can be reached. It is important that the presented conclusions can be traced back to the collected data to reduce the subjective influence of the authors or interviewed individuals. The analysis should focus on finding important elements and patterns in the data (Höst et al., 2006).

The aim of this thesis's analysis was to follow the above-described structure of encoding when analyzing the collected data from the interviews. Respondents were categorized primarily according to industry perspective; contractor or installation. Both case company personnel, customers and competitors were categorized according to this. In the analysis, these two perspectives were compared against each other. Four interviewees from the case company were categorized to have both perspectives, namely the logistics personnel (R8 and R9), a project account manager (R4) and the head of key accounts (R7), see Table 2.5. Hence, when analyzing the questionnaire data based on the two perspectives, these

four interviewees were excluded. Their input was however used as valuable input regarding overall market requirements. In addition, the logistics personnel provided relevant insights on the internal capabilities of the case company and its logistics service offering. Table 2.7 presents how the interviewees were categorized when analyzing the questionnaire data. The described splits of the interviewees will be used throughout the report.

Table 2.7: Categorization of interviewees

Category of interviewees	Description of category	Case company interviewees	Customer interviewees
Contractors n = 4	Interviewees from case company that only sell to contractors Customers categorised as contractors	R3, R6	C1, C2
Installation n = 6	Interviewees from case company that only sell to installation firms. Customers categorised as installation firms.	R1, R2, R5	I1, I2, I3
Case company n = 9	Only interviewees from the case company. Both sales and logistics personnel.	R1 - R9	
Customers n = 5	Only customers. Both contractors and installation firms.		C1, C2 I1, I2, I3
All n = 14	All interviewees. Both customers and interviewees from case company, both sales and logistics personnel.	R1 - R9	C1, C2 I1, I2, I3

Collected data from the interviews was encoded in order to find common patterns regarding the requirements on logistics service offerings. The encoded data was then categorized and analyzed, primary based on seven service dimensions (presented in Chapter 3, see Table 3.2) in combination with contextual factors impacting the requirements. Based on the encoded data, the relative importance of each service dimension and specific logistics service offering was analyzed and evaluated. In order to establish the relative importance for each service dimension and specific service, a combination of using structured data from the questionnaire together with encoded relevancy from the interviews was applied. Although the sample size of fourteen interviews cannot be considered to provide statistically significant results in the questionnaire, it provided relevant information in combination with qualitative data from the interviews. The results from this first step of the analysis concluded in an indication of a number of services and service dimensions that could be important for a supplier to consider when developing logistics service offerings to customers on the Danish market. Additionally, it was further investigated how customer requirements could change in the coming years.

In order to answer the second research question, identified current and future customer requirements were compared to the internal capabilities and perceived performance of the case company. Based on the empirical results, the case company's perceived performance

within each service dimension was compared with the rated importance of the dimension. This resulted in an indication of where the case company could potentially focus its efforts. The feasibility for the case company to implement logistics service offerings identified to have the highest importance for each customer segment was then discussed.

2.6. Research process

The process in this study can be summarized in three main phases, presented in Figure 2.4. The individual phases are further described below.

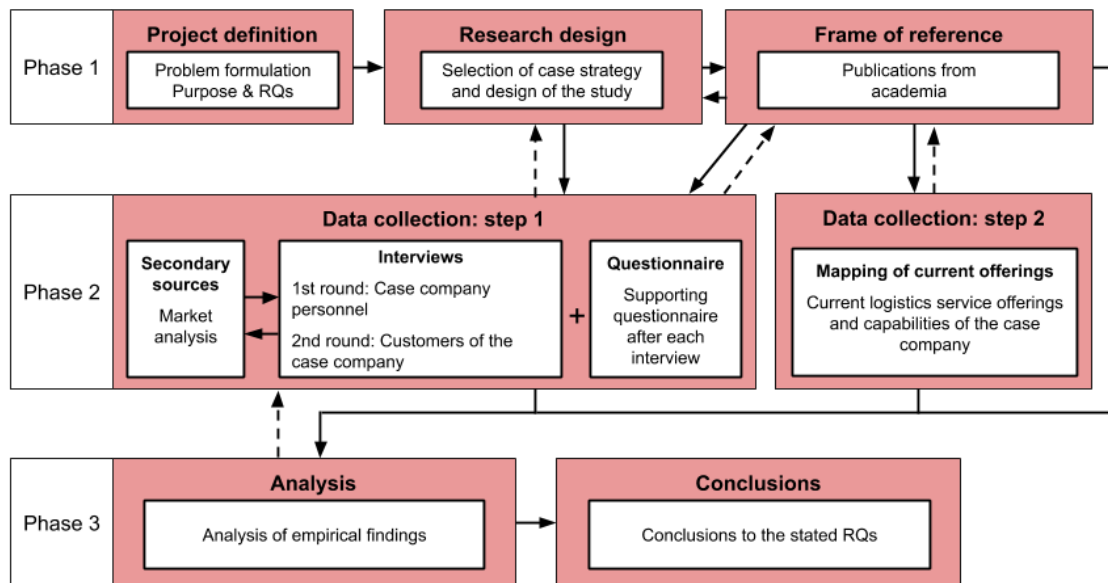


Figure 2.4: The research process

Phase 1 - Defining the study

January - February 2019

The study was initialized in January when the authors and the case company discussed the problem formulation and decided on an initial scope. Based on the discussions, an initial project plan was established, agreeing on the overall concepts, RQs, and methodology. The methodology was then further refined and the plan for the research process established. The next step was to initialize a more exploratory literature search to set the foundation of what was already known in the studied research field, focusing on understanding dimensions of logistics services and as well as the environment of the construction industry. Simultaneously, the data collection plan and interview guides were established.

Phase 2 - Collecting the data

March - April 2019

In the second phase, empirical data was collected. This included the first two steps in Figure 2.1. Interviews were conducted with selected interviewees and an additional investigation of market requirements using grey sources was carried out. Simultaneously, internal case company data was collected. During this phase, collected data was continuously analyzed and allowed to influence future data collection when deemed necessary. One such adaptation was the identification of the fourteen logistics services. They were identified after the first round of interviews and then included in the discussions in the second round of interviews with the case company's customers.

Phase 3 - Analysis and conclusion

April - May 2019

In the final phase of the project, the analysis was conducted on the full collected data. Current and future customer requirements on logistics service offerings were analyzed based on the empirical findings. The case company's current logistics service offering was then compared and evaluated to the identified requirements. Finally, indications of how the case company could change its logistics service offering to better match the requirements were identified and formulated.

2.7. Trustworthiness of the study

To analyze the quality of a case study, Yin (1994) refers to four common tests that should be conducted and kept in mind when designing and performing the study. Those are, construct validity, internal validity, external validity, and reliability. Construct validity refers to developing correct and valid measures to be used when studying a phenomenon. Internal validity refers to the validity of concluded causal relationships. External validity refers to the domain in which the findings can be generalized to other cases. Reliability refers to the ability to demonstrate that the operations of the study can be repeated with the same results. These tests apply to different stages of the study. See Table 2.8 for a summary of actions taken to ensure research quality in this thesis.

Table 2.8: Summary of actions taken to ensure trustworthiness of the study

Tests	Research design	Data collection	Data analysis
Construct validity	Analytical framework was established based on frame of reference. Relevant dimensions used in the study were identified based on literature, RQs and the case context.	Interview guide and questionnaire based on identified relevant dimensions and themes from analytical framework. Data collection in multiple steps allowed for continuous review of relevancy of used dimensions.	Transcription and encoding of data to identify and group patterns provide traceability of analyses and conclusions.
Internal validity	N/A	N/A	Patterns were analysed according to categorisations. Triangulation of data from different data collection methods; interviews and secondary/grey literature. Further compared to identified relevant information in frame of reference.
External validity	Documentation and motivation of relevance for investigated case company, customers and competitors	Documentation provided on interview guides, interviewees and included companies.	N/A
Reliability	Documentation of research approach, case selection, data collection process, analyzes and interview guides provided.	All interviews recorded and transcribed for traceability. All relevant data from interviews encoded and categorised in common database for the case study.	Data encoding, categorisation and analysis process described.

To ensure construct validity, the used dimensions, identified customer requirements, contextual factors and logistics services were constantly reviewed throughout the process by triangulating data. In terms of data collection, this study relies on the interviews and the questionnaire as the main sources of information. Interviews can be considered a good source of information due to their ability to provide insightful information focused directly on the studied topic. However, one should be aware of the associated risks. Poor questions run a high risk of introducing biases. Responses might be strongly biased based on the interviewee and, given low recall, inaccuracies may have significant impacts on results (Yin, 1994).

Furthermore, it's not uncommon that interviewees provide answers believed to suit the interviewer. Given the risks, it is of great importance to establish interview guides and validate the questions (Yin, 1994). To mitigate these risks, interviewees were selected so

that several perspectives should be represented in the samples. This was done through interviewing personnel of different roles (strategic, tactical and operational) from both contractors and installation firms. Further, personnel from both management, sales and logistics within the case company was interviewed. With this approach, the authors believe that a rather holistic view of the topic was achieved. To validate the questions, the interview guides were reviewed by the supervisor at the university as well as three employees (that were involved in the project) of the case company.

To ensure internal validity and understand relations between relevant factors, data was triangulated and patterns sought and compared to the frame of reference. Encoding and categorization of data allowed for identification of different factors' relevancy and relations based on code frequencies.

Low external validity is a risk when it comes to case studies, especially single ones (Yin, 1994). To achieve depth in the analysis the author's cooperated with a supplier of tools, equipment, and components in the construction industry. This approach allowed for efficient data collection. Existing connections with customers of the case company could be utilized to set up interviews and requirements could be studied from both the supplier and the customer perspective. When studying the case company's capabilities, the study was favored by access to the case company's internal data. This allowed for deeper understanding and a more detailed investigation. It is however also a limitation of the study as results might be less general. On the other hand, more details allow for better generalization of subsections and theory (Yin, 1994). Yin (1994) describes the importance of separation between generalization to theory and generalization to other cases. Case studies are often misunderstood since they are assumed to try to generalize findings directly to other cases. What case studies should instead do, and generally aim to, is to extend theory so that other cases can be better understood through analyzing their components and comparing with the theory. To ensure external validity, selected case units were motivated and documented.

Reliability of the study was ensured through documenting and describing the steps taken in the research. The research approach is described and selection of case and case units motivated. Interview guides are presented and data from the interviews recorded, encoded and structured in a case database. Results from the encoding and analyzes are presented in a structured and traceable way in the empirical findings. Results from the questionnaire are presented from the various perspectives of the interviewees.

3 Frame of Reference

In this chapter, the frame of reference is presented. The first section elaborates on customer service in logistics, with emphasis on different dimensions of logistics services. The second part elaborates on the concept of last mile distribution, including factors impacting requirements on logistics services. The final section discusses the nature of the construction industry including challenges, opportunities, and trends within the industry.

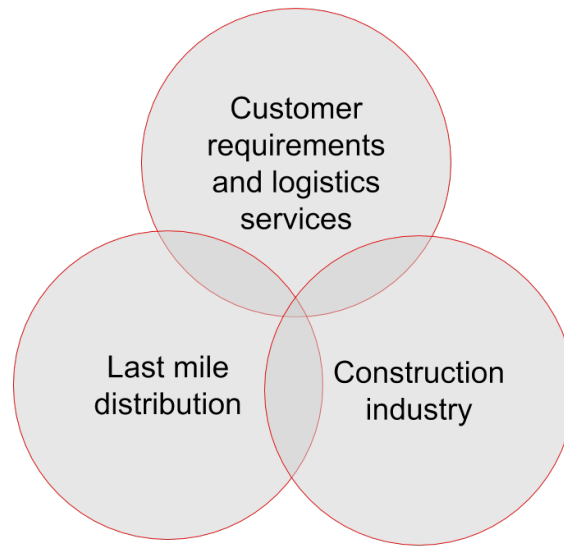


Figure 3.1: Research areas for the literature

A literature search was conducted to investigate available research related to the research questions in this thesis. This chapter aims to present a structured summary of this search and establish a knowledge foundation when going into this study. Figure 3.1 illustrates the main areas that are covered in the frame of reference.

3.1. Services in logistics

3.1.1. Logistics services

Managing logistics can be described as making sure customer requirements are met at the lowest cost. Logistics systems can thus be argued to have the purpose of satisfying customer needs by providing the right product in the right place at the right time. In traditional marketing, the 'place' in the Four P's model (product, price, promotion, and place) has received the least focus (Christopher, 2011). Logistics service as a mean of providing differentiation value and competitive advantage has however gained great importance more recently (Huttu and Martinsuo, 2015; Christopher, 2011). Some reasons contributing to this can be argued for. One reason is continuously increasing customer expectations in combination with more informed customers that are less attached to brands (Daugherty et al., 2019; Christopher, 2011). In industrial purchasing, additional customer service requirements are demanded due to an increased adoption of just-in-time (JIT) logistics systems. This trend towards service sensitive customers can be seen in both consumer and industrial markets alike (Christopher, 2011).

With this trend towards service focus, customers are likely to choose another supplier if, for example, a product is out-of-stock or deliveries are unreliable (Rushton et al., 2014; Christopher, 2011). Having a high service level is thus of great importance to businesses, and customer service is becoming an order winner across many industries (Jonsson and Mattson, 2016; Christopher, 2011). Given this relation to business performance, delivering excellent logistics performance has become a priority for many companies (Yazdanparast et al., 2010). This does, however, increase the pressure on suppliers, as an important dimension of customer service is time. Shortening lead times has become an important aspect of satisfying customer requirements across industries (Christopher, 2011). A well designed and utilized logistics system can create effectiveness and efficiency in various ways in an organization. However, to create value, it is important that the right variables and dimensions are prioritized. To decide which logistics services to have, it is important to integrate the logistics strategy with the other strategies of the organization. Furthermore, the strategy must be somewhat focused as it will not be able to support too many conflicting competitive dimensions (Jonsson and Mattson, 2016).

To prioritize the different dimensions, it's important to understand the concept of order winners and order qualifiers in a competitive landscape. Order qualifiers are variables and elements that serve the purpose of gate openers in the industry. Without those, the organization's products and services will not even be considered by the industry. Order winners are the variables and elements that determine if the customers choose the organizations products or services. An example of an order qualifying service could be that it is easy to place orders. Given that this criterion is fulfilled, order winning criteria could for example be the total price and flexibility of delivery conditions (Jonsson and Mattson, 2016).

What variables, features, and services that are order qualifying and order winning in an organization could vary across its different products. Furthermore, the criteria can vary across markets for the same type of product. Order qualifying and order winning criteria do also change over time. In general, new product features are often considered order winning at the beginning of a product life cycle and customers are likely to be willing to wait longer for the product at this stage. As time progresses and the product features become common on the market, they go from order winners to order qualifiers. In this setting, it is often price and differentiated customer service elements that become order winning (Jonsson and Mattson, 2016).

3.1.2. Dimensions of logistics services

Defining and measuring customer service, service quality, and customer value is no easy task and many definitions and models have been proposed (Seth et al., 2005; Woodall, 2003). Seth et al. (2005) conducted a review of eighteen proposed models for service quality and found that the service quality outcome is much dependent on situational factors such as service setting, time, customer need and so forth. They further identified that customers' expectations on specific services seem to change with factors such as time, number of encounters with the service and competitiveness of the environment. However, many of the models deal with the concepts of perceived and expected service to derive the delivered service quality (Seth et al., 2005). Commonly used dimensions of services were developed by Parasuraman et al. (1985) and called SERVQUAL. The presented dimensions by Parasuraman et al. (1985) were reliability, responsiveness, tangibles, assurance, communication, competence, credibility, courtesy, security and empathy. However, in logistics and when distributing products in industrial contexts, general dimensions of customer service are not always applicable or have proven to have poor predictive abilities. In industrial contexts, the service provider and customer are often physically separated and the services are considered to deal with things rather than people (Bienstock et al., 1997).

In general, logistics service elements such as availability of products, consistency, reliability of delivery, ease of order-placing and assurance could be sources of created value for customers (Fugate et al., 2010; Gil-Saura and Ruiz-Molina, 2011). A more detailed list of logistics service quality indicators was presented by Mentzer et al. (2001) and includes released order quantities, quality of information, ordering processes, accuracy, order condition, order quality, handling of discrepancies, timeliness and personal contact quality (Gil-Saura and Ruiz-Molina, 2011).

There are thus many variables that affect the perceived customer service level in logistics, and those are generally further dependent on factors such as situation and time. To deal with this complexity does Christopher (2011) summarize eleven key areas in which it is important to set the right expectations and standards between the supplier and customer in business to business (B2B) context, see Table 3.1. Based on the presented areas and

their descriptions have the authors of this thesis categorized them in dimensions of logistics services. The areas convenience of ordering, claims procedure and technical support are not included in the focus of this study and thus not categorized. An area that is not covered in the list is cost. What is the cost of the service allowed to be and how much is the customer willing to pay for the service? This is an important dimension in determining the service offering (Jonsson and Mattson, 2016; Rushton et al., 2014). Furthermore, experiences have shown that offering more delivery options could increase the willingness to buy (Hausmann et al., 2014). As these dimensions are not presented in Table 3.1, this study will not solely rely on those presented dimensions. The used categorization relies on seven identified dimensions, presented in Table 3.2.

Table 3.1: Categorized key areas to set expectations and standards in regarding logistic services, based on Christopher (2011)

Key area for standards	Description from suppliers view	Dimension of logistics service (author's categorisation)
Order cycle time	Time from customer order to delivery. Should be defined against customer's requirements.	Speed of delivery
Stock availability	Percentage of demand for a given line item (stock keeping unit) that can be met from available stock.	Availability
Order-size constraints	Can we cope with expected level of flexible JIT-deliveries and size of demand?	Flexibility
Ordering convenience	Are we accessible and easy to do business with? Do our systems talk to the customers?	Not included in focus of this study
Frequency of delivery	Flexibility of the response on customer requests. Can we deliver in specific time windows?	Flexibility
Delivery reliability	What proportion of total orders are delivered on time?	Reliability
Documentation quality	Error rates on invoices, delivery notes and other customer communications. How user-friendly is the documentation?	Reliability, Communication and information
Claims procedure	What are the causes for claims? How quickly do we deal with complaints and claims?	Not included in focus of this study
Order completeness	Proportion of orders delivered complete, i.e. no back orders or part shipments.	Reliability, Availability
Technical support	Support provided to customers after sales. Do we have standards for repairs?	Not included in focus of this study
Order status information	Can we inform customers at any time on the status of their order? How do we inform them?	Communication and information

Table 3.2: Identified service dimensions, authors table based on Christopher (2011), Jonsson and Mattson (2016), Rushton et al. (2014), and Hausmann et al. (2014)

Dimension of service	Description (customers view)
Speed of delivery	How long is the time from order to delivery (when material in stock)? How important are short delivery lead-times?
Reliability	How important is the accuracy of the delivery? <i>Right product, quantity, time, quality and documentation</i>
Communication and information	How important is communication and information about the delivery? <i>Order/delivery status, information on discrepancies, proof of delivery</i>
Flexibility	How important is it that supplier can provide flexible deliveries (e.g. JIT deliveries of smaller quantities)? How important is it with dedicated time-slots for deliveries?
Availability	How important is it that products are in stock and ready to be delivered at the point of order? How important is it to have inventory located at job-site?
Options	How important is it that supplier has flexible alternatives for pick-up and delivery options?
Cost	How important is cost of the service in relation to the quality of delivered service?

3.1.3. Setting customer service priorities

In order to be effective in the logistics offering should requirements be defined by the needs of the customers and based on the value it creates for them. Thus, customer research as well as benchmarking of competition are necessary studies to conduct to understand which variables and services that are order winners and order qualifiers in a given context (Christopher, 2011; Jonsson and Mattson, 2016). No two customers will have exactly the same service requirements. However, it is likely that customers can be categorized into some sort of groups or service segments. It is important to remember that it is the perception of the service that matters, not the internal measurement (Christopher, 2011). An approach in three steps is proposed by Christopher (2011) for doing this, presented below.

1. **Identify the key components of customer service as seen by customers themselves.** It is important to identify what factors influence the purchasing decisions at the customer, who makes the purchasing decisions and who influences the purchaser, i.e. understanding the underlying components of the customer demand. When this is established, research should be conducted to understand which dimensions of customer service are important.
2. **Establish the relative importance of these service components to customers.** With relevant dimensions of customer service identified, one should judge their relative importance. This can be done in several ways; 1) having customers rank dimensions from most important to least, 2) weight each dimension, 3) distribute a total set of points among the dimensions or 4) rank order of preference for pre-made combinations of dimensions or services. Each method does however have drawbacks; 1) does not provide relative importance of dimensions 2) respondents will tend to rate all responses as highly important 3) daunting task with a risk of resulting in arbitrary allocation 4) requires a pre-determined set of trade-offs and system to elicit the importance of individual elements.
3. **Identify clusters of customers according to the similarity of service preferences.** See if similar preferences appear among customers. Those could then be considered service segments. Can be done with cluster analysis if there is a sufficient number of respondents.

It is not uncommon that customers ask for better service than they actually need. Understanding which service level and services to offer is therefore not necessarily easy. Especially in a competitive environment. By comparing the own service performance to competitors' offerings, an indication of whether the own performance is adequate or not could be achieved. Offering too high customer service is likely to be unnecessarily costly. Offering too low customer service will reduce future competitiveness. Improving customer service does however have a direct impact on costs. Shorter delivery times could, for example, imply that stock has to be held in regional warehouses closer to the end customers. The costs of improved services generally follow the relation presented in Figure 3.2. Aiming for 100 % customer service is thus not economically feasible. Improved customer service can however also increase sales. Understanding how customer service impacts sales is very difficult. The relationship between customer service and sales is generally much less observable than the relationship between customer service and cost. If the service is improved to increase competitiveness, the effect will not be visible until later. And if the competitors also improve their services might no effect at all take place. (Jonsson and Mattson, 2016)

The relationship between sales and customer service can also be conceptually illustrated as an S-curve, see Figure 3.2. When service performance is low is an increase not expected to yield results on sales since the service performance is too poor on the market anyway. Where the curve is steepest is where the market expectations and competitors' offerings are. Improved customer service can, in this area, potentially yield a significant increase in

sales as it differentiates the supplier. Going beyond this differentiation point is, however, not expected to improve sales as the supplier is already differentiated. Doing so is therefore likely to be unnecessarily costly. (Jonsson and Mattson, 2016)

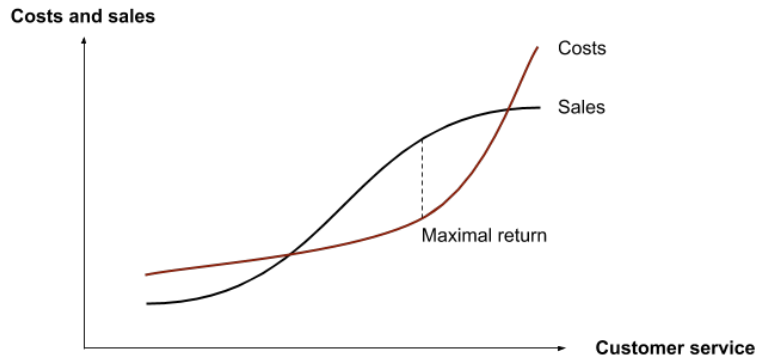


Figure 3.2: Conceptual model of the relationship between costs, sales and customer service (Jonsson and Mattson, 2016)

In order to offer the right services, it's important to understand which service dimensions are important for the customers and focus on improving the dimensions in which the company underperforms in. By identifying the importance of service dimensions, services that are overperforming can be identified. Suppliers should thus aim at offering services positioned in the diagonal of Figure 3.3. By identifying current performance and the importance of service dimensions, services can be compared based on how costly they are to offer and how much value they create for the customer.

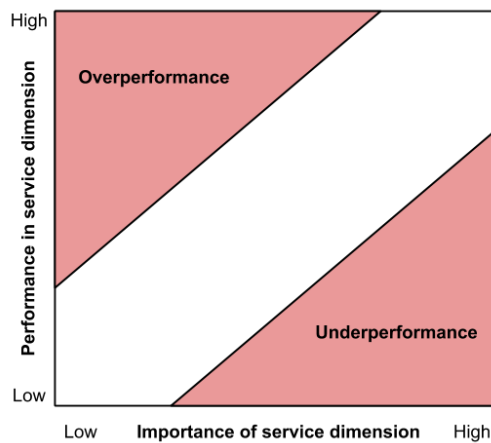


Figure 3.3: Performance matrix for customer service in logistics (Jonsson and Mattson, 2016)

3.1.4. Logistics service providers

As logistics isn't the core of many businesses, the distribution and logistics service is often outsourced to logistics service providers. Service providers can have different roles and provide many different services (Ajakaiye, 2012). Potential services include inventory management, warehousing, transport and value-adding services (secondary assembly, installation of products, etc.), information-related activities (tracking, tracing, etc.) together with support for redesigning the supply chain setup (Ekeskär and Rudberg, 2016). By providing these services can the service providers add value to their customers (Ajakaiye, 2012). Commonly used value-adding delivery services from service providers include direct transportation services, pick-up and delivery, picking and packing orders, payment of freight, customs clearance, track and trace, consulting services, labeling and consolidation of freights (Lieb and Bentz, 2005; Murpy and Poist, 2000).

3.2. Last mile distribution

Expectations on logistics service performance have arguably increased rapidly in the last decade (Daugherty et al., 2019). Industries such as retail have seen increased demands in e-commerce and online sales during the past years. These new ways of making business have imposed new and more demanding requirements on logistics and distribution. To satisfy the increasing customer demands, focus has been directed towards last mile distribution (LMD) research. LMD can be described as the final step of the supply chain in which goods are transported from the seller (e.g. warehouse location) to the customer (Hübner, Kuhn, and Wollenburg, 2016). Transitioning to new solutions requires evaluating current distribution network capabilities and customer service offerings. Given the high costs of LMD (up to 50 % of total supply chain cost) and changing customer demands, it has become increasingly important to understand the underlying needs of customer requirements (Vanelslander et al., 2013). The primary trade-off in this context is between costs and customer satisfaction (Rushton et al., 2014). Companies in the retail industry have focused on customer satisfaction since a competitive delivery service has become an important aspect of their value proposition.

3.2.1. Distribution network

In order to understand characteristics and opportunities within last mile delivery, it's important to understand design options for the distribution network. Chopra (2003) argues that the performance of a distribution network should be measured in two dimensions: *customer needs are met* and *the cost of meeting customer needs*. Meeting the customer need has a direct impact on the company's revenue while the cost will determine the profitability of the distribution network. Chopra (2003) suggests different types of design options for the distribution network. For instance, using direct delivery from the manufacturer site,

having intermediate warehouses using package carriers for the final delivery, or letting the customer pick-up the goods themselves at so-called pick-up points. The actual performance of the distribution network can then be measured based on, for example, response time, product availability, customer experience or order visibility (Chopra, 2003). An important aspect to consider when designing a distribution network is whether to have a centralized or decentralized structure of the distribution network (Ribas et al., 2019).

In general, a centralized structure leads to lower facility costs compared to having a centralized structure. This is often due to lower inventory costs (Ribas et al., 2019). A centralized structure can, however, result in higher transportation costs since the manufacturing site or central warehouse is located further away from the end-customer. Companies that consider customer service to be especially important can benefit from having a decentralized structure due to the competitive response time. Table 3.3 presents a comparison between centralized and decentralized network configurations with different types of carriers, evaluated based on cost and service level.

Table 3.3: Evaluation of configurations for distribution networks of goods (Ribas et al., 2019)

Network configuration		Cost			Service level	
Carrier		Inventory	Transport	Handling facility	Response time	Customer experience
Centralized	<i>3PL provider</i>	Medium	High	Low	Medium	Good
Decentralized	<i>3PL provider</i>	Medium	Medium	High	Short	Good
	<i>Distributor or retailer delivery</i>	Medium	Medium	Medium	Short	Good
	<i>In-store pick-up</i>	High	Low	High	Short	Medium

3.2.2. Factors impacting requirements on delivery of goods

Due to the increased online sales, much research within last mile distribution has turned its focus towards distribution in an omnichannel (OC) context (Hübner, Kuhn, and Wollenburg, 2016; Hübner, Kuhn, and Holzapfel, 2016; Lim and Srari, 2018; Vanelslander et al., 2013). OC is a multi-channel sales approach which involves creating customer satisfaction whether the customer shops online from a computer, on a mobile device, by telephone or in a store. In the study by Hübner, Kuhn, and Wollenburg (2016), they develop a planning framework for last mile order fulfillment in OC grocery retailing and elaborate on pros and cons with different design concepts. According to Hübner, Kuhn, and Wollenburg (2016), LMD contains four different characteristics, namely, delivery mode, delivery time, delivery area and returns. An overview of these characteristics is presented in Figure 3.4.

Delivery Mode		Home Delivery		Click and Collect		
		Attended	Unattended	In-Store	Attached	Solitary
Delivery Time	Velocity	Same Day	Next Day	Two or More Days		
	Time Slot	Specific		Undefined		
Delivery Area		Local	Regional	National	International	
Returns		No Return but Money-Back	Check and Return at Reception	CEP Return	Accept and Refund in Retail Outlets	
Last Mile Distribution						

Figure 3.4: Characteristics and design parameters for last mile distribution in omnichannel grocery retailing (Hübner, Kuhn, and Wollenburg, 2016)

The delivery mode can be divided into home delivery and click-and-collect (C&C), as shown in Figure 3.4. The choice between different delivery modes is largely dependent on the geographic situation. The C&C concept means that customers order goods online and then visit the store to pick up the goods themselves. This is one of the most dominant delivery modes and the obvious advantage is that the customers bear the full cost of the fulfillment of the last mile. The actual delivery, regardless of home delivery or C&C, is the only time the retailer comes in direct contact with the online customer, thus making it important in terms of customer relationships (Hübner, Kuhn, and Wollenburg, 2016). In this thesis, the concept of home deliveries will not be studied in specific but can be argued to have similar attributes and requirements as deliveries to construction job-sites, thus making it an interesting topic.

As Daugherty et al. (2019) discuss, the new area of customer impatience in the B2C context might spill over to the B2B market. Customers want faster and more reliable delivery options, whether they shop groceries online or making purchases for their business. The customers' requests for faster and more frequent deliveries do however make transportation and vehicle routing more complex for the service provider (Hübner, Kuhn, and Wollenburg, 2016; Christopher, 2011). The choice of what logistics services to offer is greatly dependent on what the customers require and especially what other competitors are offering. Today, same-day and next-day delivery can rather be seen as qualifying criteria than differentiating criteria. Companies should not expect to see any additional customer satisfaction when customers receive their products more than one day after ordering (Hübner, Kuhn, and Wollenburg, 2016). Because customers expect shorter lead times and flexible deliveries, a shifting trend in physical distribution among retailers using multiple sales channels is to have a higher degree of decentralized distribution set-up, rather than a more centralized structure (Kembro and Norrman, 2019).

Another trend within LMD is to use so-called delivery boxes for the final delivery (Hübner, Kuhn, and Wollenburg, 2016). A delivery box is often an isolated and secured box or container with a locking mechanism which is owned by the transport provider or supplier (Tiwapat et al., 2018). The box is placed at the customer's location, usually equipped with a smart locker giving access to the customer. After the customers have collected their goods, the transport carrier can pick up the box and reuse it. The concept of delivery boxes can be applied in any business and have great advantages for both the customer and the transport provider. The customer doesn't need to be present during the delivery and the transport provider is not limited by any time restrictions from the customer. An important factor to consider when utilizing this type of solution is however to have a sufficient way to inform the customer when the goods have been delivered (proof of delivery) (Hübner, Kuhn, and Wollenburg, 2016).

3.3. Logistics in the construction industry

3.3.1. Industry characteristics

The nature of the construction industry is undoubtedly complex. The main reason behind its complexity roots back to the high variability of construction projects and the large number of stakeholders involved. During the last decade, the construction industry has had a slow development and has suffered from both lack in productivity and high costs in comparison to other industries (Ekeskär and Rudberg, 2016; Sundquist et al., 2018). Because of the slow development in the industry, several researchers have questioned the effectiveness and functioning of the construction industry as well as its overall performance (Vrijhoef and Koskela, 2000; Bankvall et al., 2010; Fellows and Liu, 2012; Ekeskär and Rudberg, 2016). For instance, Josephson and Saukkoriipi (2007) conducted a study of waste in the industry and calculated that about 30-35 % of the production cost is direct waste. They also found that waiting time of constructions workers was close to 30 % and that none of the studied machines were utilized more than 50 % of the time. Thunberg and Persson (2014) highlight the poor performance in terms of deliveries, indicating that less than 40 % of deliveries are actually correct (right amount, right time and location, damage free and appropriate documentation).

In order to overcome the challenges in the construction industry, a common suggestion is to have better integration of business processes supported by principles from supply chain management (SCM) (Vrijhoef and Koskela, 2000; Ekeskär and Rudberg, 2016; Bankvall et al., 2010). According to Bankvall et al. (2010), SCM has become increasingly popular in both construction literature and practice, and numerous initiatives have been launched on this topic (e.g. Lean-thinking, JIT and joint-practices). Despite the increased awareness of potential benefits, SCM integration seems to be especially problematic within the construction industry. Fernie and Tennant (2013) describe the current state of SCM prin-

principles in the construction sector as "neither wide-spread nor fully adopted". Fadiya et al. (2015) argue that one major issue for realizing further development of these efforts is closely related to the linkage between the processes of supply logistics and site logistics. Site logistics involves material handling and physical flow planning while supply logistics is concerned with operations related to the acquisition, specification, transport, and delivery to the construction site (Fadiya et al., 2015). The misperception of these two areas and lacking understanding of how they relate to one another, have shown to create barriers in the development of logistics services within the industry.

In relation to Fadiya et al. (2015), Ying et al. (2014) point out that the effectiveness and efficiency of construction projects are greatly dependent on the combination of on-site and off-site logistics. They emphasize the importance of planning material deliveries and unloading among sub-contractors and site workforce. Vrijhoef and Koskela (2000) were early to discover that many of the problems occurring at the construction site, such as insufficient planning of deliveries, have their origin upstream in the supply chain. In order to improve the interface between site and supply chain, Vrijhoef and Koskela (2000) suggest four roles of SCM in construction to reduce buffers and lead times, presented in Figure 3.5. The roles differ depending on where the primary focus lies, whether it's on the supply chain, site or both.

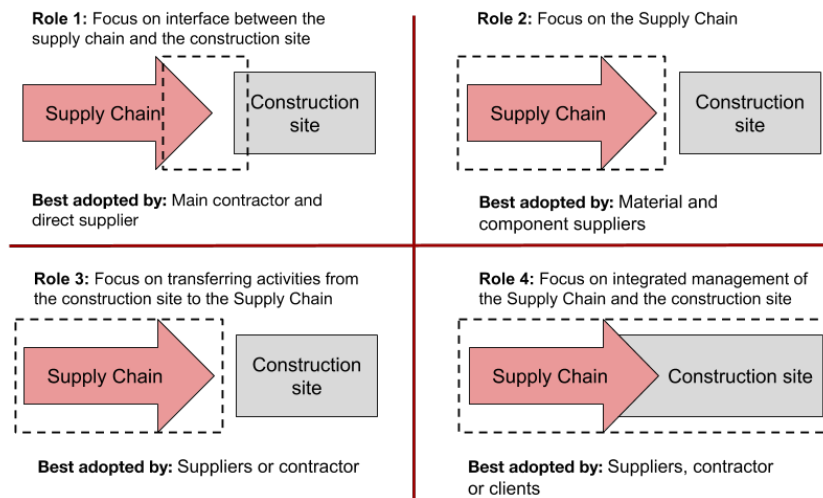


Figure 3.5: Four roles of supply chain management in construction (Vrijhoef and Koskela, 2000)

The first role presented by Vrijhoef and Koskela (2000) in Figure 3.5 focuses on the interface between the supply chain and the construction site, where the aim is to reduce costs and duration of on-site activities. A major consideration when applying this type of focus is to ensure dependable material and labor flows to the site in order to avoid disruptions. One

suggestion by Vrijhoef and Koskela (2000) is to focus on the relationship between the site (main contractor) and direct suppliers. The second role puts emphasis on the functioning of the supply chain itself where the primary focus is to reduce costs and lead-times in relation to logistics services. This type of focus is best adopted by material and component suppliers according to Vrijhoef and Koskela (2000). The third role includes transferring activities from the site to earlier stages of the supply chain in order to increase productivity and reduce costs. This type of focus is best practiced by suppliers or contractors. Finally, the fourth role involves letting the site production be integrated with the supply chain in terms of overall management and improvements. Suppliers, contractors or clients could initiate this type of focus. Vrijhoef and Koskela (2000) describe that these four roles are not mutually exclusive, and are often used jointly.

In general, a lot of research within construction logistics illustrates that lack of communication and coordination is seen as the primary reasons for poor supply chain performance (Love et al., 2004; Bankvall et al., 2010). Even though studies have identified key factors crucial for successful integration of the construction supply chain, very few companies have managed to succeed in this area.

3.3.2. Logistics challenges in construction

Behera et al. (2015) conducted a comprehensive study of the characteristics of the construction industry by going through research within the area between the years 2000-2015 in combination with observing clients, consultants, contractors, and suppliers. By investigating the connections between these, such as knowledge transfer, information exchange, financial and contractual relationships, they defined some major problems in constructions projects. Regarding deliveries from suppliers to the construction sites, the biggest problems were “deliveries are not in conformance with planning, wrong and defective deliveries, long storage period, awkward packing and large shipments” (Behera et al., 2015). Furthermore, Behera et al. (2015) argue that there is little coordination and collaboration between design professionals, suppliers, sub-contractors and contractors in projects. Lack of information sharing between the actors also contributes to the fragmentation which has a significant negative impact on performance. Figure 3.6 illustrates the phases of a typical construction project and the actors involved. Large construction projects can have a large number of sub-contractors, direct- and indirect suppliers involved which increases the complexity of coordinating and communicating deliveries to the job-site efficiently.

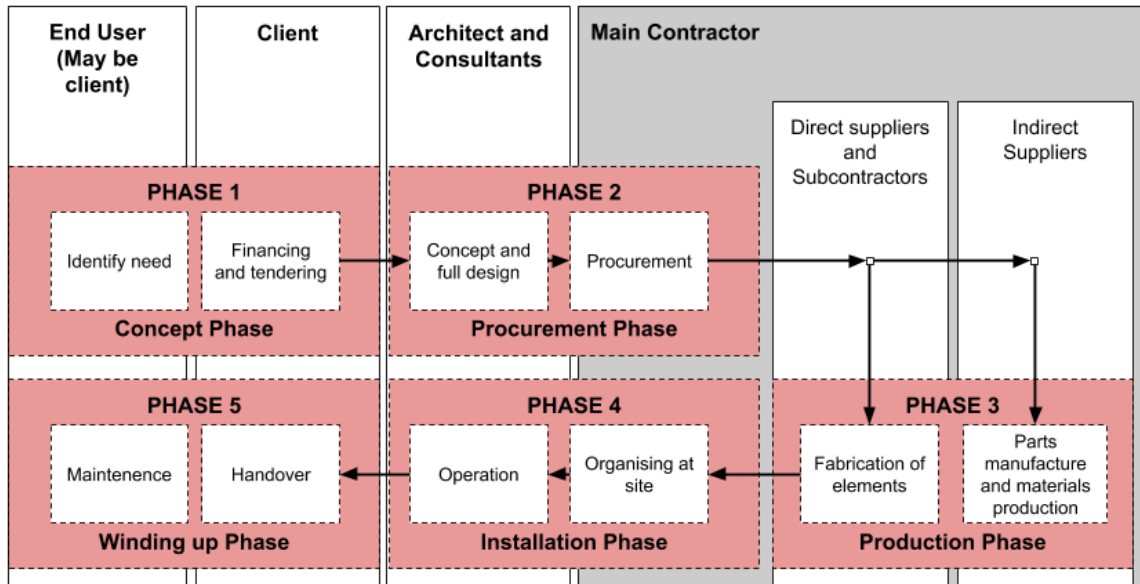


Figure 3.6: Phases and actors in a typical construction project (Behera et al., 2015)

According to Sundquist et al. (2018), improving performance in construction logistics is primarily dependent on two factors; handling the logistics problems on the construction site and improving supply logistics. Several researchers have shown that substantial improvements could be achieved by rearranging the site logistics, for example by outsourcing logistics operations to 3PL companies (Linden and Josephson, 2013; Ekeskär and Rudberg, 2016). Regarding supply logistics, research is somewhat scant and Sundquist et al. (2018) argue that further studies concerning the linkages between suppliers and transport providers need to be conducted. By reviewing relevant literature in the field of construction logistics, the authors of this thesis have identified some key challenges in the industry as a whole, shown in Table 3.4.

The three main challenges identified in Table 3.4 are, lack of supply chain progress, logistics problems at the site, and improving logistics performance. Each of these challenges are in some way affected by how deliveries are managed by the supplier. Time is often critical in construction projects and faulty orders causing production disturbance at the site can cause significant delays. For instance, Ying et al. (2014) argue that insufficient planning is the major reason behind logistics problems at sites, usually forcing site-managers to organize ad-hoc teams for unloading of goods, which inevitably creates scheduling conflicts. In a similar way, Love et al. (2004) and Behera et al. (2015) claim that lack of information sharing between different actors (e.g. contractor and suppliers) creates significant barriers in the process of planning for deliveries to the construction sites.

Table 3.4: Primary challenges in construction logistics

Challenge	Underlying cause	Source
Lack of supply chain progress	<p>Fragmented structure leading to lack of coordination</p> <p>Lack of trust and commitment among workers in the field</p> <p>Short-term focus on relationships/projects</p>	<p>Sundquist et al., 2018</p> <p>Ekeskär and Rudberg, 2016</p> <p>Bankvall et al., 2010</p> <p>Fadiya et al., 2015</p> <p>Fernie and Tennant, 2013</p>
Logistics problems on site	<p>Poor management of materials, equipment and tools</p> <p>Faulty purchasing strategy leading to a lack of formal and common procedures for purchasing</p> <p>Insufficient planning leading to ad-hoc initiatives</p>	<p>Vrijhoef and Koskela, 2000</p> <p>Linden and Josephson, 2013</p> <p>Ying et al., 2014</p> <p>Thunberg and Persson, 2014</p> <p>Behera et al., 2015</p> <p>Fadiya et al., 2015</p> <p>Frödell, 2014</p>
Improving logistics performance	<p>Lack of integration between on-site and off-site management</p> <p>Lack of information sharing between different actors</p> <p>Complexity related to the vast amount of actors involved in construction projects</p>	<p>Fadiya et al., 2015</p> <p>Vrijhoef and Koskela, 2000</p> <p>Sundquist et al., 2018</p> <p>Ekeskär and Rudberg, 2016</p> <p>Bankvall et al., 2010</p> <p>Bengtsson, 2018</p>

3.3.3. Trends in the construction industry

Due to an ongoing urbanization trend, construction companies need to find new logistics solutions for their material deliveries in large cities (Janne, 2018). As of 2018, 82,2 % of the population in Northern Europe lived in urban areas. The corresponding figure counts to 87,9 % in Denmark (United Nations, 2018) and during 2010-2017 the share has increased in the majority of Danish municipalities (Byggeri, 2017). The fact that a majority of all construction projects are located in urban areas creates great difficulties in terms of transportation of materials to the sites. Carriers need to find solutions for how to handle problems regarding space limitations, environmental concerns, noise restrictions and accessibility (Janne, 2018). Several authors have proposed different types of construction logistics solutions in order to improve delivery services. For instance, Ekeskär and Rudberg (2016) and Sundquist et al. (2018) discuss the benefits of implementing JIT-solutions within construction logistics while Fadiya et al. (2015) propose better information and communication technology as a potential source for better execution of deliveries.

A recent trend for deliveries to construction sites in urban areas is to use so-called construction logistics centers (CLC) (Janne, 2018). A CLC can be seen as a consolidation center where goods from multiple suppliers are centralized and then transported to the construction site in one shipment. By coordinating deliveries through CLC, the number of deliveries to the site can be reduced significantly and thus the number of times on-site personnel has to handle delivered material can be reduced (Janne, 2018). In Table 3.5, a summary of identified logistics trends in the industry are presented. These trends could be important for suppliers to consider when developing their logistics service offering.

Table 3.5: Identified trends in construction logistics

Trends	Source
<p>Conservative industry Several authors argue that the construction industry is more conservative than other industries and that SCM initiatives have been shown to be more difficult to integrate.</p>	<p>Bankvall et al., 2010 Fernie and Tennant, 2013 Sundquist et al., 2018</p>
<p>Faster and more frequent deliveries Need for better integration between suppliers and main contractors.</p> <p>Problems related to large and uncoordinated deliveries have increased the need for smaller and more frequent deliveries (JIT-delivery).</p> <p>Regarding the on-going urbanization trend, suppliers need to have solutions on how to handle deliveries in city environments.</p>	<p>Fadiya et al., 2015 Ying et al., 2014 Hübner, Kuhn, and Wollenburg, 2016 Behera et al., 2015 Janne, 2018 Huttu and Martinsuo, 2015</p>
<p>Need for better information technology There is an urgent need to have better information sharing between contractors, sub-contractors and suppliers.</p> <p>Lack of planning and uncoordinated deliveries force suppliers, transport providers, and contractors to develop sufficient tools for how to communicate accordingly.</p> <p>This involves capturing trends related to increased online ordering, tools for tracking the delivery etc.</p>	<p>Fadiya et al., 2015 Behera et al., 2015 Ekeskär and Rudberg, 2016</p>

3.4. Development of the analytical framework

In this chapter, the importance of logistics services has been highlighted. Demands on logistics services are increasing and services can be required to both qualify for, and win deals. Based on the studied literature has an analytical framework been developed, presented in Figure 3.7.

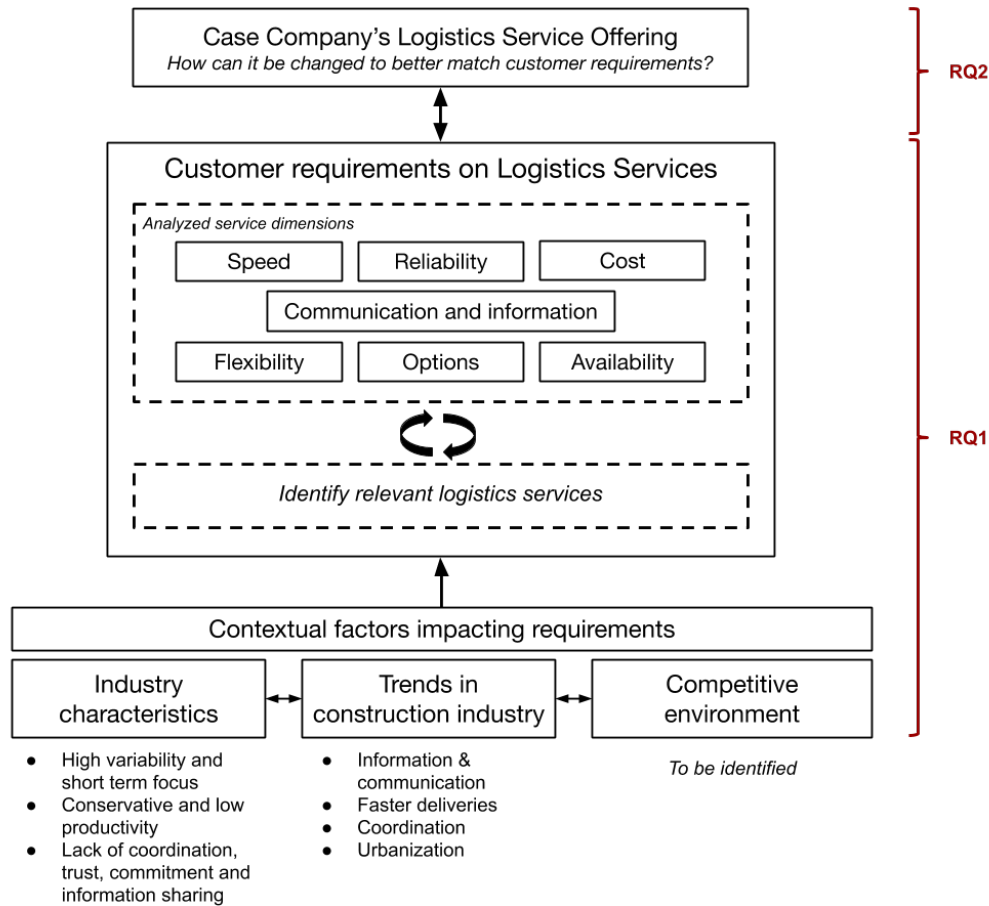


Figure 3.7: Analytical framework

The purpose of developing the analytical framework was to guide the future research of this thesis. The main elements retrieved from the literature were the seven identified service dimensions, previously presented in Table 3.2. These service dimensions had a primary role during the interviews with the case company as well as with the case company's customers. Interviewees were asked to elaborate on the importance of each service dimension with the aim of identifying key components of the current and future requirements on logistics service offerings. Based on this, important aspects of service offerings could be identified.

To compare the case company's logistics service offering to the customer requirements, it was further important to identify and evaluate specific services in relation to the service dimensions.

In order to understand the requirements for logistics service offerings, one must also understand contextual factors that might impact the requirements. Contextual factors can, for example, be specific characteristics in the Danish construction industry, logistics trends in the industry as well as influences from a competitive landscape. In other words, factors that could influence how a customer in the industry might require different types of services depending on the situation. Contextual factors identified from the literature were used to confirm empirical findings on contextual factors impacting customer requirements.

To answer RQ2, the foundation presented in the analytical framework, i.e. understanding the dimensions of requirements as well as contextual factors, was used to discuss how the case company could adapt their service offering in order to meet the customer requirements on the Danish market.

4 Empirical findings

In this chapter, the results of the study are presented. An introduction to the Danish construction industry is presented, highlighting contextual factors that impact requirements and important services to offer on the market. Data on current and future customer requirements are then presented. The final section describes the case company's current logistics service offerings and capabilities.

The presented data and information in this chapter is based on the conducted interviews or taken from internal data of the case company, if not stated otherwise. The findings are in part presented through figures and tables. In the figures and tables, interviewees are categorised according to two different splits. Each interviewee is categorised as a employee of the case company or as a customer of the case company. Furthermore, each interviewee was categorised to represent either contractors or installation firms. Employees of the case company that work with logistics or represent both segments were excluded in the second categorisation. Answers from customers and case company personnel are thus mixed in the second segmentation. This categorisation is used throughout the report. We encourage the reader to revisit Section 2.5 and Table 2.7 for detailed information and motivations on how interviewees and their responses are categorised.

4.1. Contextual factors in the Danish construction industry

Several characteristics of the construction industry were identified to impact customer requirements on logistics service offerings. Interviewees described that standardization of processes is hard to achieve due to the unique requirements of each project. Plans are seldom followed due to high dependency between different actors on job-sites and a general lack of planning. A summary of identified industry characteristics is presented in Table 4.1.

Despite a booming construction market in Denmark (Byggefakta, 2018), profit margins were described to be low. A margin of 4 % is considered good and many companies have lower margins. One explanation for this situation is that the available workforce in the industry is limited. Salaries have increased due to the high demand on construction projects (European Commission, 2018). Several interviewees described personnel to be the main driver of costs. Cost of logistics services are often evaluated in relation to cost of unproductive personnel, at least from managerial level. The shortage of personnel in the industry is partly explained by a retiring generation that is not replaced by an educated younger generation (European Commission, 2018). Given the low margins, much focus is directed towards minimizing wasted time of workers. Furthermore, time pressure from

Table 4.1: Summary of identified and categorized industry characteristics (based on interviews)

Category	Industry characteristics	Described reasons
Processes	It is difficult to standardize processes.	Each project is unique. Short-term focus on processes and supply chains.
	Coordination is challenging.	Construction projects involve many actors. Jobs often have dependencies between them.
Culture	Purchasing is highly decentralized. On-site personnel decide what to purchase and from whom.	Workforce in the industry is limited. Providing personnel with autonomy is used as a measure to increase commitment.
	Relationships, friendships and loyalty have strong impact on purchasing.	Product and brand preferences are strongly dependent on relationships. Low degree of digitization. Personal communication over phone or in person dominates.
Planning	It is difficult to plan. Plans are frequently changed.	Many actors are involved in projects. Poor planning among on site personnel.
	High focus on costs. Sensitive to pricing.	End customers pressure on cost and time in projects. Margins are low in the industry.

end customers and clients is increasing on construction projects. Accepting tighter time schedules has thus become a prerequisite for winning projects on the Danish market. It is therefore important for both contractors and installation firms to focus on reducing costs to achieve profitability. The purchasing coordinator at I2 stated that *"if a product is two pennies cheaper, we will go with it"*.

C1 and I2 described that centralization of purchasing has the potential to reduce costs through volume discounts. However, they described the balance between decentralization and centralization to be challenging. The culture of decentralized purchasing is strongly rooted in the industry and centralization is believed to decrease commitment among personnel, since their responsibility decreases. Purchasing is currently often conducted over the phone and based on relationships. Changing this culture was considered difficult among the interviewees on a more managerial level. The current solution used to regulate purchasing is to set up frame agreements with suppliers and advise personnel to use these when purchasing. How strictly personnel is enforced to follow these frame agreements does however vary between companies.

Although it is a conservative industry and the culture was described to hard to change, some trends related to the studied customer requirements were identified. Seven trends in the industry were identified from the interviews. Those are presented in Table 4.2. The trends are listed based on how often they were discussed to impact requirements on logistics service offerings. Two trends were discussed by more than 50% of the interviewees. All interviewees representing the installation business, both customers and personnel at the case company, discussed the impact retailers' (competitors) logistics service offerings have

on requirements. They argued that the large retailers play the distribution game, meaning that they differentiate through high availability of products and offer advanced logistics services at competitive prices. It was argued that the retailers have spoiled the market by doing so. For example, I2 described that the retailers *"will do anything for us"*. More information regarding specific logistics services on the market is presented in section 4.2. The second trend, which was especially prominent in the installation business, is that planning ahead time of specific jobs on site seems to be shrinking. This is partly linked to the trend with the retailers offerings. When retailers offer high availability and fast deliveries, the incentive for planning ahead decreases. In combination with an already poor ability of planning in the industry, this drives reduced planning horizons.

Table 4.2: Identified trends in the construction industry and encoded relevancy for requirements (based on interviews)

Identified trend	All (n=14)	Contractor (n=4)	Installation (n=6)	Mentioned reason for trend
Retailers in the industry play the distribution game	79%	50%	100%	To meet changing customer demands. Differentiation strategy.
Planning ahead time of jobs on site is becoming shorter	64%	25%	83%	Retailers play the distribution game. Faster processes in construction and installation due to increased efficiency. Preferred to postpone planning due to large dependency between jobs of on site.
Number of construction projects is increasing, especially in urban areas	29%	50%	33%	Strong demand on the Danish construction market. Increased urbanization.
Environmental regulations are become stricter	29%	50%	17%	Government regulations.
Increased demand for value added services (pre-assemble, pre-cut, etc.)	21%	0%	33%	Higher pressure on cost and time in construction industry. Outsourcing of risk and time consuming activities.
Contractors and installation firms become involved earlier in the projects (drawing and planning stage)	14%	0%	33%	Complexity of construction projects is increasing. Usage of digital tools such as BIM has increased, enables greater detail planning earlier in the projects.
Emphasis on consolidation of purchased volumes is increasing	14%	25%	17%	High cost pressure in the industry.
Relevant according to more than 50% of all interviews				
Relevant according to between 25% to 50% of all interviews				

Project characteristics

Each construction project is unique and does thus have varying requirements. Factors such as the location of the construction site, phase of the project, number of actors involved and specific specifications are all causes for unique situations and requirements. Due to this uniqueness are the requirements on logistics services and required materials also unique

in many cases. Several interviewees described that an exact determination of required products and materials seldom can be done before the specific situation has been observed.

Installation firms described that they generally require a wider range of products in their work than contractors do. Furthermore, installation workers do often not inspect the site of a job more than one day in advance. Orders are commonly not placed before this inspection has been done. When ordering the goods, it is not uncommon that the workers expect the delivery before 7AM in the morning the next day. The contractors described that they generally can plan ahead better. For example, C2 described that they plan most of their product needs two to three weeks ahead and order a week ahead.

Furthermore, the location of the construction site was discussed to impact requirements on logistics and deliveries. Space is often a limitation when building in urban areas. Inventories cannot be held on site and deliveries of larger product and material volumes must thus aim to follow just-in-time principles. Having suppliers hold inventory and perform value added services is thus preferred from the customers' point of view. Coordination of this is however considered to be no easy task as many actors are involved.

Deliveries in cities are commonly limited by the traffic situation and regulations. On a visited job-site of C2 in central Copenhagen did the main drop-off point for deliveries only have space for one larger truck at the time, while the job-site receives 40 to 50 deliveries each day. To mitigate the congestion, a road was closed to traffic between 9AM to 3PM each day and used for deliveries to the construction site. Similar construction sites were described in other interviews. For example, in some cases, deliveries were only allowed to arrive during the night in the city center of Copenhagen. A further complication is the fact that buildings and constructions are built on site. Due to this, the layouts of sites often change as projects progress. For example, a visited construction site of I2 was located at an airport. This particular construction site was initially located on the land-side of the airport. As the project progressed, it entered air-side. This shift meant that all personnel and deliveries on the site had to go through airport security.

Challenges related to the number of actors operating on the construction site were frequently brought up during the interviews. For instance, C1 and I2 described the issue of planning when jobs often are dependent on the work of other actors. Many jobs on sites have to be performed in sequence. As inventory capacity on sites is limited, materials cannot be ordered until it is known when it will be needed. Building information modeling (BIM) is a popular tool to use for handling the complexity of projects and digitizing the drawings. Digital modeling allows for greater detail in planning, traceability of material and utilization of a time dimension in the drawings. Several interviewees believed that this kind of tool has the potential to improve performance in planning and purchasing while reducing waste in the industry. However, it is generally only the main components of constructions that are currently modeled according to C2. Planning potential for specific installations can thus be limited even when using digital tools such as BIM. A summary

of identified project characteristics and their indicated impact on requirements on logistics services is presented in Table 4.3.

Table 4.3: Summary of identified project characteristics and their indicated impact on requirements and performance of logistics services (based on interviews)

Project characteristics	Discussed impact on requirements and performance of logistics services
Location of project	<p>If in urban areas Often limited space, more regulations and traffic congestions during mornings and days. Often higher demand for JIT-deliveries. More common with special setups for deliveries. Expectations on fast and flexible deliveries.</p>
Available space on site	<p>If space available Often preferred to have sufficient inventory on site to handle fluctuations. Inventory often stored in containers. If limited space Often more important with JIT deliveries.</p>
Regulations	Regulations are often project and situation specific. More common with regulations in urban areas. E.g. dedicated time slots for deliveries, noise regulations and access regulations.
Number of actors involved	<p>If many actors Common with issues related to the deliveries at site:</p> <ul style="list-style-type: none"> • Carrier cannot find correct person to deliver to or drops of at wrong location/container. • Planning on site becomes more difficult due to dependency between actors.
Changing layouts of sites as projects progress	Causes difficulties for carriers to find correct drop off locations. Changing abilities to hold stock on site.

Product characteristics

As most projects are unique, product requirements can vary greatly. Four broad definitions of product types were identified during the interviews; construction materials, installation materials, tools, and consumables. The product types are further presented in Table 4.4. In the table, general requirements on logistics services are further indicated.

C1 described that it is mainly large deliveries of construction materials that have to be strictly coordinated. For example large deliveries of concrete. Those deliveries often require much communication and synchronization with the workers on site. For the other product types, requirements on deliveries are described to vary a lot depending on situation. If there is available space on site, it is common to order in larger quantities to receive discounts. Tools and consumables are often stored in containers on site. Given the lack of planning, it is however not uncommon that urgent needs arise for these products anyway. In those situations, it's always preferred to order an express delivery compared to having workers unable to work or driving to the stores themselves.

A characteristic described as common for installation materials, tools and consumables was that they are generally offered by multiple suppliers. Substitute products can thus in most cases be supplied by another supplier with short notice. I3 described cases where they

Table 4.4: Identified product types and general requirements on logistics services (based on interviews)

Product type	Description	Discussed requirements on logistics services	Mainly purchased by		Offered by case company
			Contractor	Installation	
Construction material	Material such as concrete, steel, plaster or entire prefabricated modules (e.g. bathrooms). Can be custom made for projects.	Generally bought in larger volumes and planned weeks or months ahead. Especially if custom made. Material such as concrete can require JIT deliveries with high coordination as it must be ready to be used directly upon delivery.	X		
Installation material	Products mainly used for electric installations, plumbing and ventilation. Products range from steel beams for cables to pipes for plumbing and specific components, e.g. fastenings. Often high requirements on specific sizes, fits and angles. Needs can be very situation dependent and it is thus often hard to specify the exact requirements before the actual job has been inspected.	Larger installation materials such as steel beams and pipes are often inconvenient to transport due to length, weight, volume or low density (e.g. pipes). Due to late inspection of what installation materials are actually needed for the specific job, it is often considered important to be able to order late and have delivery early next day when the workers start.		X	X
Tools	Products ranging from screwdrivers to large concrete drills.	Generally lower demand for fast deliveries as tools are used over longer periods of time and often stored on job sites. Express orders occur mainly due to breakdown or theft of tools.	X	X	X
Consumables	Products such as screws and drill-bits. Low value products generally bought in bulk and usage is not planned for specific jobs.	Inventories often held in sufficient amounts on sites. Can however despite the low value be critical. Since exact requirements on quantities are seldom planned for can shortages occur, requiring fast deliveries.	X	X	X

have changed suppliers of installation materials based on logistics service offering, since deliveries were not fast enough. When the supplier had been changed for one order, they had to continue using the supplier for the rest of the job to make sure the installation materials fit together. With construction materials, it's not always that easy to change supplier with short notice as lead times can be longer, especially if the material is ordered with custom project specifications.

4.2. Identified logistics services on the market

Based on the interviews with case company personnel and additional market research, fourteen logistics services were identified as potentially relevant to offer on the Danish market. These are presented in Table 4.5. The service offerings are primary categorized between delivery services and pick-up services. A delivery service is defined as a delivery of goods directly to the customer's job-site while a pick-up service is defined as letting the customer go to a store and pick up the goods themselves.

Table 4.5: Definition of specific logistics service offerings

Logistics service offerings	Description
Delivery services	
<i>Next-day-delivery</i>	A customer places an order on a weekday and gets it delivered the day after approximately between 10.00 AM - 4.00 PM
<i>Next-day-delivery Pre 10.00 AM</i>	A customer places an order on a weekday and gets it delivered the day after before 10.00 AM
<i>Next-day delivery Pre 7.00 AM</i>	A customer places an order on a weekday and gets it delivered the day after before 7.00 AM
<i>Night Delivery</i>	A customer places an order on a weekday and gets it delivered during the night (often unattended delivery)
<i>Express Delivery (1-3 hours)</i>	A customer places an order and gets it delivered within 3 hours
<i>Dedicated time-slot delivery</i>	The customer has the opportunity to decide when goods are to be delivered. For example, next day between 10.00 - 11.00 AM.
<i>Container solution</i>	The supplier offers to place a container at the job-site where the customer can store goods. These containers can be equipped with smart locks in order to utilize unattended deliveries.
<i>Weekend Delivery</i>	Supplier offer delivery during the weekend (Saturday/Sunday)
<i>Crane Delivery</i>	Offering unloading of large and heavy goods at the construction site. For instance assist the customer to have goods delivered to a specific floor in a construction building by using a vehicle equipped with a crane.
Pick-up services	
<i>Pick up from store within 1 hour</i>	Order and pick-up at suppliers store within 1 hour (during opening hours)
<i>Pick up from store next morning from 7.00AM</i>	Order on a weekday and pick-up at suppliers store from 7.00 AM next day
<i>Weekend open store</i>	Having stores open on Saturdays/Sundays
<i>24/7 open stores</i>	Having stores open 24 hours a day
Other services	
<i>Later cut-off time than average (4PM)</i>	Cut-off time indicates the latest hour of the day the customer have to order the goods in order to have them delivered the next day.

A market overview based on the fourteen identified logistics services is presented in Table 4.6. The data shows the official logistics service offerings from the case company and each competitor. All studied competitors are retailers, distributing products from multiple brands. The results shows that all competitors offer a broad spectrum of logistics services.

According to some interviewed customers (e.g. I2 and I3), the competitors of the case company are doing anything they ask for in order to fulfill the customers' needs. The competitors in Table 4.6 were described to be differentiating on logistics service offerings. By utilizing their large networks of stores as distribution nodes for the last mile deliveries of goods, the competitors are able to offer fast express deliveries. It was also described during the interviews that the competitors are likely offering some services below break-even price in order to gain market shares.

Table 4.6: Overview: Logistics services offered by competitors

Companies		Case Company	Supplying Contractors		Supplying installation firms		
			SC1	SC2	SI1	SI2	SI3
General Information	Stores in DK / Utilizing stores as distribution nodes for delivery	8 / NO	72 / YES	30 / YES	9 / YES	45 / YES	50 / YES
	Turnover in DK (Million DKK)	343	6.800	750	3.400	4.200	3.000
	Employees in Denmark	150	2.161	500	770	1.184	700
	Size of product portfolio (Items)	7.000	500.000	60.000	215.000	130.000	400.000
Logistics Services	Next day delivery - (10AM - 4PM)						
	Next day delivery - Pre 10AM						
	Next day delivery - Pre 7AM						
	Night Delivery						
	Express Delivery (1-3 hours) in all of Denmark		1-2 hours	2 hours (30 min in CPH)	1-2 hours	1-2 hours	1-2 hours
	Dedicated time-slot delivery						
	Container solution						
	Pick up from store within 1 hour				24/7 pickup from WH	30 min	
	Pick up from store next morning 7AM						
	Weekend Delivery						
	Weekend open store					In CPH	In CPH
	24/7 open stores		In CPH				
	Crane Delivery						
	Later cut-off time than average (4PM)		7 PM		6 PM	5-6 PM	5-6 PM

	N/A		Service offered		Service not offered		Can be arranged
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4.3. Requirements on logistics service offerings

4.3.1. Current and future requirements

"I just had a meeting with one of the key account customers [installation firm] regarding a very large construction project in Copenhagen. The first thing the customer said in the meeting was: 'Do you have better deliveries?'" (R1)

R1 is responsible for the relationship with several key customers within installation in the Copenhagen area. He described that many of the customers are demanding high performance in terms of deliveries and logistics services in order to even qualify for projects. He highlighted services such as early morning deliveries and deliveries during the nights to be of the highest importance. The importance of those services was also confirmed by the interviewed installation customers. Several other interviewees from the case company also described increasing demands from the installation firms.

Case company personnel responsible for the relationships with contractors did however not experience the same pressure on logistics service offerings from their customers. Contractors are usually satisfied with receiving the delivery sometime during the next day, as long as it is within working hours (workers usually leave the sites between 2-4PM). This information was confirmed by both interviewed contractor customers. Next-day delivery is considered a qualifying criterion in the industry as a whole and included as the standard delivery time in most frame agreements with suppliers of standard products or materials. However, general consensus among all the interviewees was that it is common that requirements are varying depending on situation and type of project.

In the supporting questionnaire, all the interviewees rated how important the logistics service offering is as part of the total product offering and how likely they believe it is that customers change supplier based on the logistics service offering. The results are presented in Figure 4.1. During the interviews, all customers confirmed that the logistics service offering is an important part of the total offering and that they do partly choose supplier based on offered logistics services. Regarding consumables, C1 and I3 described that if a supplier cannot deliver they simply go to another. Availability for this product type is generally high among the suppliers. C2 described that logistics is key for successful construction projects and that suppliers have an important role in this. I2 believe importance of logistics services will increase and that this in turn will increase the need for them to cooperate with suppliers in the future. In this scenario, suppliers would become more integrated in construction projects.

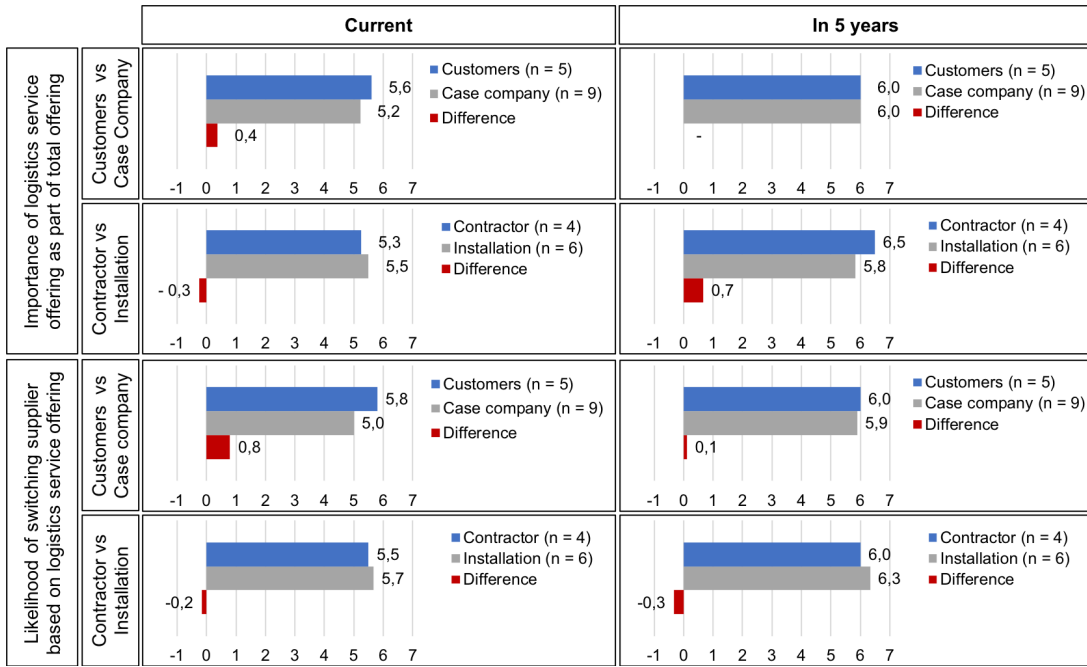


Figure 4.1: Rated importance of logistics services and the likelihood of changing supplier based on logistics service offering

In Figure 4.2, the importance of each service dimension is indicated. The data is divided into three categories. The top chart shows the average answers from all fourteen interviewees. In the second chart, a comparison between responses from the case company and the customers is presented. Finally, in the third chart, the answers are divided based on the interviewees' perspective, i.e. contractor versus installation. In the third chart are customers and selected case company respondents responses aggregated. The results in the figure indicate that no service dimension will be considered less important in five years.

During the interviews with personnel from the case company, it was commonly described that the requirements on logistics services have become tougher. One of the main reasons discussed for this trend was that the supplier market. The large retailers in the industry have invested heavily to differentiate on logistics services. This is believed to have made the customers used to high service levels and they have thus begun to expect them. I2 described that these retailers constantly approach them with discussions on how they can improve their logistics service offerings. I2 orders approximately 60 % of their products from four or five of the larger retailers and their expectations are thus influenced by the services that the retailers offer. The case company does not supply more than 7-8 % of total spend on tools and materials in construction projects. This push from retailers is believed to further have amplified the characteristic of poor planning in the industry.

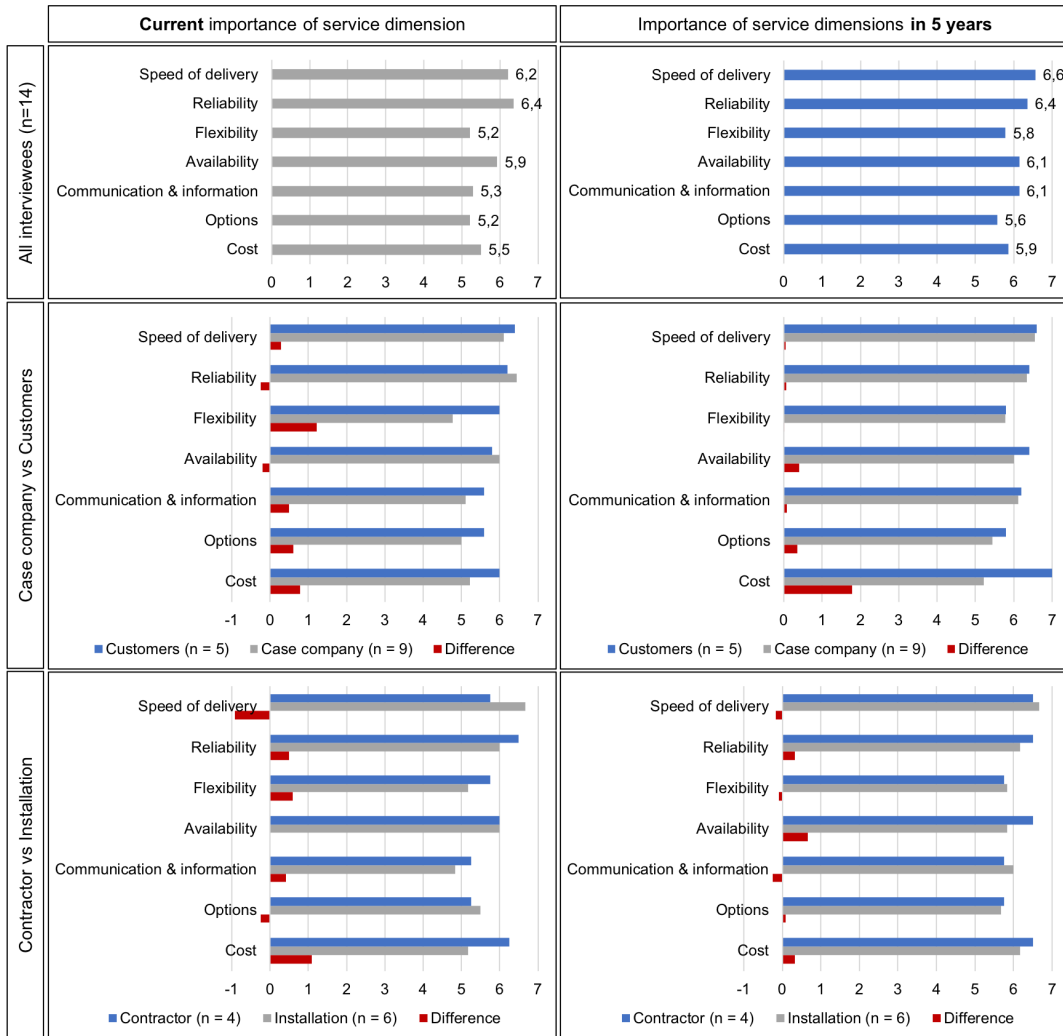


Figure 4.2: Rated importance of service dimensions from different perspectives

In Table 4.7, encoded trends from the interviews are presented. The trends are categorized based on the seven service dimensions and their relevancy was encoded based on the share of interviewees discussing the trend. The most commonly discussed trends were related to the increased importance of earlier and faster deliveries and the increased importance of availability on the job-site through container solutions. During the interviews, it was commonly described that new innovations are usually first adopted by electricians. The electricians then influence the other installation businesses before the trend reaches the contractors. I2 confirmed that electricians and other installation businesses usually adapt to new technologies the fastest, such as ordering via online channels and smart devices.

Table 4.7: Interview data: Identified and encoded trends categorized per service dimension

Service dimension	Identified trend	All (n=14)	Contractor (n=4)	Installation (n=6)	Mentioned reasons for trend
Speed of delivery	Importance of deliveries before 7AM is increasing	79%	50%	83%	Retailers play the distribution game. Heavy traffic in city areas during mornings and days. Spillover effect from requirements in B2C markets.
	Importance of express deliveries (within 1-3h) is increasing	57%	25%	67%	Retailers play the distribution game. Faster processes due to increased efficiency. Spillover effect from requirements in B2C markets.
	Importance of night deliveries is increasing	57%	50%	67%	Retailers play the distribution game. Becomes more common to work during nights. Heavy traffic in city areas during morning and days. Workers want material before start of day (~6AM).
Reliability	Time schedules for projects are becoming more precise	43%	75%	33%	Increased use of digital technologies, such as BIM. Increased cost and time pressure from end customers.
	Complexity and variability in delivery requirements are increasing.	43%	25%	50%	Stricter access regulations to construction sites. Limited space on construction sites in cities.
	Reliable information on arrival time and deviations is becoming more important	36%	25%	17%	Time schedules for projects are becoming stricter. Increased time and cost pressure on projects. Reduce wasted time by workers.
	Unattended deliveries become more common	29%	0%	33%	Stricter access regulations on sites. Demand for deliveries before workers arrive in morning. Beneficial for both carrier and worker.
Flexibility	Increased demand for deliveries within dedicated timeslots	43%	50%	33%	Deliveries only allowed during certain time intervals. Increased focus on wasted time and materials.
	Importance of flexible delivery services is increasing	43%	0%	50%	Retailers play the distribution game. Spillover effect from requirements in B2C markets.
Availability	Importance of availability at jobsite (e.g. container solution) is increasing	57%	50%	50%	Increased focus on wasted time.
	Emphasis on consolidation of volumes is increasing	21%	25%	33%	High cost pressure in industry.
Communication & information	More orders and communication through online channels	50%	25%	83%	Buyers consolidate their volumes and get discounts through online channels. Reduced error rates and disagreements compared to traditional orders over phone.
	More orders through smart devices and apps	43%	25%	67%	Reduced error rate compared to orders over phone.
	Transparency and information sharing is becoming more important	29%	0%	33%	
Options	Importance of having flexible service offerings is increasing.	43%	0%	50%	More complexity in construction projects cause more versatile needs. Stricter regulations for access to sites.
	Increased demand for specific drop-off locations on site	29%	25%	50%	Increased focus on waste of time. Retailers play the distribution game.
Cost	Standard services are becoming free of charge.	29%	25%	50%	Retailers play the distribution game. Retailers include distribution in product price.
	Pressure on cost efficiency in the construction industry is increasing	29%	25%	33%	Low margins in the industry. Cost and time pressure from end customers.
	Non-standard services offered under break even price.	21%	25%	33%	Retailers play the distribution game to gain market shares.

Relevant according to more than 50% of all interviews
 Relevant according to between 25% to 50% of all interviews

4.3.2. Importance of identified logistics services

In Table 4.8, the rated importance of each service is presented. The results show how the interviewed customers have ranked each service on a seven-point scale. The relevancy of offering each service was further indicated through the encoding of all interviews held with both case company and customers. The number of interviewees discussing the service as potentially relevant to offer in the industry was mapped. As each interviewee was not explicitly asked to elaborate on each service, interviewees that did not discuss the service do not necessarily deny that the service is relevant to offer. The five most frequently discussed services were next-day delivery pre 7AM, express delivery, container on site, night delivery and next-day delivery pre 10AM.

Table 4.8: Customer ratings of logistics services and encoded relevancy from interviews

Importance for suppliers to offer logistics services according to customers (1 = very low degree, 7 = very high degree)	Service discussed as relevant to offer (in % of interviews)		
	All (n=14)	Contr. (n=4)	Inst. (n=6)
Night delivery	64%	25%	83%
Next day delivery (Pre 7AM)	86%	50%	100%
Late cut-off time (later than 4PM)	29%	0%	50%
Express delivery (1-3 hours)	86%	100%	83%
Order and pick-up from store within 1 hour	7%	0%	17%
Order and pick-up from store next morning	14%	25%	17%
Container with stock on site	71%	75%	67%
Next day delivery (Pre 10AM)	50%	50%	67%
Crane delivery of larger goods	14%	50%	0%
24/7 open stores	14%	0%	17%
Weekend open stores	14%	0%	17%
Dedicated time-slot delivery	29%	50%	0%
Weekend delivery	14%	0%	17%
Next day delivery (10AM – 4PM)	21%	25%	0%

■ Installation (n=3) ■ Contractors (n=2) ■ Difference

The importance for a supplier to offer night deliveries was rated 7/7 by all installation firms, i.e. important to a very high degree. Customers described that night deliveries have several benefits for both the service provider and receiver of the goods, especially in urban areas. Traffic is for example much lighter during the night, why delivery routes can be carried out both faster and more reliable. Furthermore, work on the construction site is not obstructed

or interrupted and needed materials are on site as the workers start their day. This was described as especially beneficial for the installation workers as they often require many different tools and components in their work. If they do not have the materials on site in the morning, they run a risk of being interrupted and lack components or materials. Similar arguments were presented for the benefit of the service next-day delivery pre 7AM. However, workers typically start at 6AM, why the services are not identical. Installation customers described that their workers often inspect tomorrow's job-tasks (if it's on the same site) before going home, and do not order required products until then. Offering a late cut-off time was therefore mentioned as important.

Containers with stock on site were discussed to be helpful to manage unexpected situations and poor planning related to availability of products. It was described as beneficial for both the service provider and the construction worker if used correctly. Service providers do not need to find someone to sign the delivery and can simply drop it off in the right container. The workers do not have to interrupt their work to handle the receiving order.

4.4. The case company's logistics service offering

4.4.1. Logistics service offering and perceived performance

The official services offered by the case company are presented in Table 4.9. However, some interviewees from the case company explained that they in some cases are able to offer additional logistics services to key customers. For example, a key account manager explained that they are going to pilot next-day delivery pre 7AM for a construction project in Copenhagen. Another account manager mentioned that they actually offer express deliveries from their stores. With this service the customers can have goods delivered within 3 hours. This service is however far more expensive than what competitors are offering and it's not a standardized service at the case company. As it can only be ordered via customer service (not online for example), several sales managers were however not aware that this express service exists. In addition, the stores are rather small as of now and cannot hold sufficient amount of stock in order to offer express delivery as a standardized service.

It was further described that the case company is offering crane deliveries but that the demand for this service is low. Most orders, except for long goods such as some installation materials, are delivered in parcels or boxes, why the need for crane deliveries is relatively low. Furthermore, two interviewees described that there is a need to have dedicated time-slot deliveries for some construction projects. The case company is usually able to customize such delivery solutions. However, handling a dedicated time-slot delivery is time-consuming for the personnel. Someone needs to oversee the whole process and coordinate it manually in order for it to work. If the demand for this type of service were

Table 4.9: Case company’s current logistics service offering

Logistic Services	Description	Shipping cost
1. Click & Collect	Order online before 2:00 PM and pick-up at the store within 1 hour	Free shipping. If product is out of stock in store, customers have the option to have it delivered to the store the next day for 160 DDK
2. Standard Delivery	Order before 4.00 PM on a weekday for delivery within 2 working days.	Free shipping for online orders over 1000 DDK Otherwise, 160 DDK
3. Next-day-delivery		
<i>Next-day-delivery</i>	Order before 4:00 PM on a weekday and get the delivery the next day between 10.00 AM - 4.00 PM.	Free shipping for online orders over 1000 DDK Otherwise, 160 DDK
<i>Next-day-delivery pre 10AM</i>	Order before 3.00 PM on a weekday for delivery before 10AM next morning	Online orders: 300 DDK Ordering through customer service: 460 DDK
<i>Pick-up from 7AM at store next day</i>	Order before 4.00 PM on a weekday and pick up from store from 7.00 AM next morning	Free shipping for goods over 1000 DDK Otherwise, 160 DDK

to increase, it would be a major challenge for the case company according to the logistics personnel of the case company (R8 and R9).

In Figure 4.3, the interviewees rating of the case company’s performance are presented. The left figure shows how the customers perceives the case company’s performance in each service dimensions versus how interviewees from the case company perceives the performance. In the right figure, the answers have been categorized based on the interviewee’s perspective (contractor versus installation). Actual measured performance of the case company for 2018, in terms of key performance indicators, is presented in Table 4.10.

Table 4.10: Key performance indicators for the case company’s performance

KPI	Name	Performance	Description
CPOi	Customer Order Perfect Internal	98,4 %	% of customer orders with actual goods issue date as initially planned, i.e. ship the products from the warehouse as planned.
CR	Carrier Reliability	97,5 %	Service level of the carrier. % of orders delivered on time, complete without any mistakes.
CPOi * CR	Actual delivery performance	95,8 %	% of orders delivered perfect according to plan.
ATS	Availability to Standard	98,2 %	Products are available at the warehouse for customer according to plan.

4.4.2. Distribution in Denmark

The case company’s current set up for the distribution of goods in Denmark is illustrated in Figure 4.4. Orders are being processed through customer service, sales personnel or online, and sent to the to the central warehouse located in Malmö, Sweden. The product portfolio stored at the central warehouse amounts to approximately 7000 unique products.

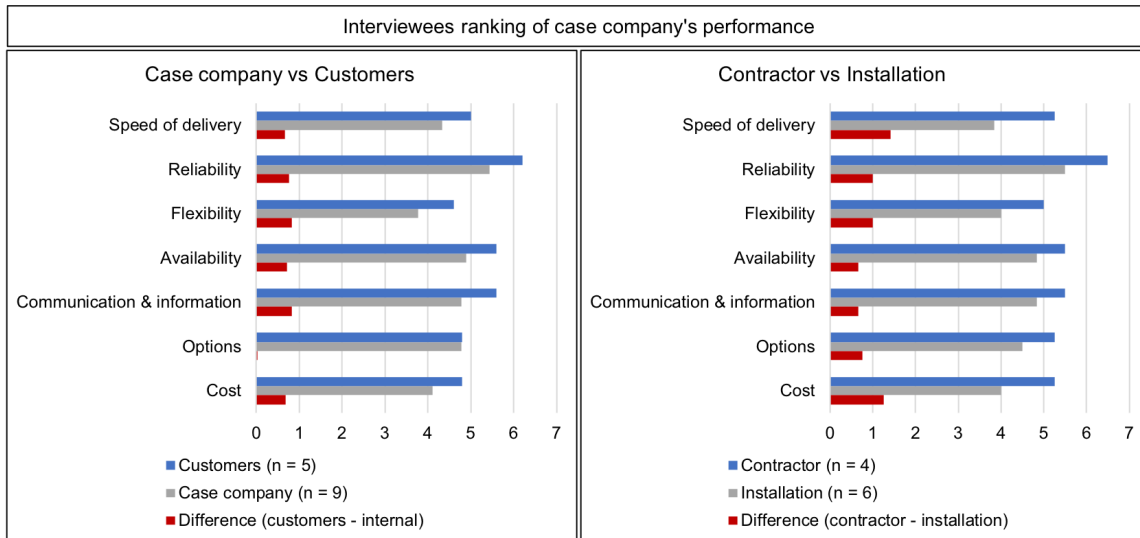


Figure 4.3: Ranking of the case company's performance per service dimension

From the warehouse, the case company is using a 3PL provider as a carrier for the final delivery. The goods are shipped by the 3PL to a central terminal, located in Taastrup, Copenhagen, before distributed out to the customers or the case company's stores (see Figure 4.4 for the location of stores). The transport time from the central warehouse in Malmö to the terminal in Taastrup is approximately one hour. From the central terminal, the goods are either shipped to other terminals across Denmark, to the case company's stores or directly to the customer. The case company is currently not utilizing the stores as distribution nodes for deliveries, except for customer pick-ups. Instead, all customer orders are delivered from the central warehouse in Malmö.

4.4.3. Potential for improving the logistics service offering

When interviewing the internal logistics personnel (R8 and R9), opportunities and challenges related to implementing new logistics services offerings on the Danish market were discussed. A summary of this is presented in Table 4.11. In general, the logistics personnel had a positive attitude towards improving the case company's logistics service offering. For instance, they thought that standardizing next-day delivery pre 7AM will be important, and feasible, to implement. The currently used 3PL provider is offering this service as an option. The main barrier for implementing it would be the carrier's charged cost for the service.

Implementing express deliveries was considered to be associated with more challenges. To begin with, it would require distribution nodes closer to the end customers. Currently the stores are not used for this purpose, why all deliveries depart from the warehouse in Malmö.

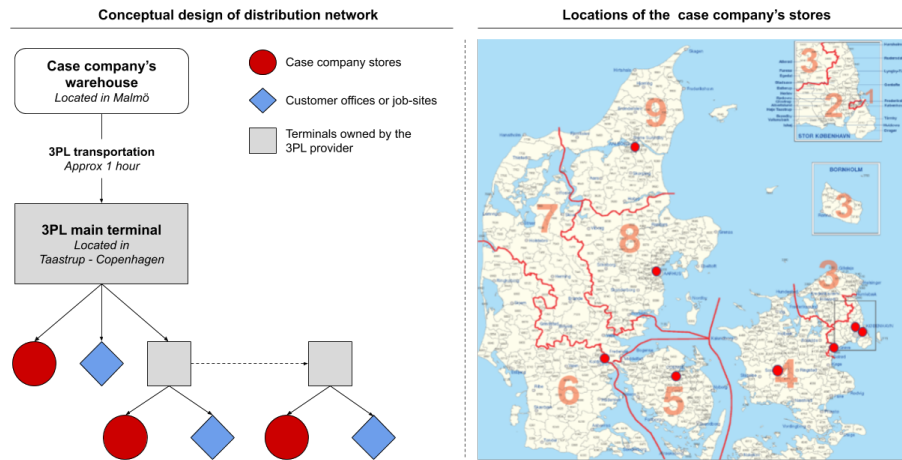


Figure 4.4: Current distribution setup and location of stores in Denmark

As only driving across the bridge from Malmö to Denmark takes approximately one hour, standardizing express deliveries was not considered feasible with the current distribution network. A potential solution would be to utilize the network of stores in Denmark for this purpose. As previously mentioned, the stores are however currently too small to hold sufficient inventory. It would require a thorough product segmentation analysis on which products to hold in the stores for this service. Services related to having weekend open stores and later cut-off time were considered to be less relevant, mainly due to the high costs of having warehouse personnel work longer or including more shifts.

Furthermore, some organizational factors were described to hinder the case company in its pursuit to provide better services on the Danish market. For instance, the Danish market is part of a larger region in the organizational structure of the case company and does not have an own logistics department or function. This was described to sometimes limit them when trying to implement new logistics service offerings. As logistics is not in focus in the case company's global strategy, new logistics initiatives on the Danish market often have to be synchronized and approved on higher regional level. During the interviews, it was indicated that communication between marketing, sales and logistics is at times insufficient and conducted rather informally without rigid procedures for information sharing. This was believed to be a potential constraint for successful development and improvement of logistics service offerings.

When implementing and adapting services, the global IT department has to be involved to make the necessary changes in the IT systems, such as the enterprise resource planning system or the web shop. This dependency was further described to impede the development of logistics service offerings through lock-in effects in IT systems. For example, it was described that some IT systems set high barriers for integrating new or additional service

Table 4.11: Feasibility of implementing logistics services according to internal logistics personnel (R8 and R9)

Logistics services currently not offered	Potential for implementing	Limitations for implementing
<i>Next day delivery pre 7AM</i>	The case company already has this delivery service to their stores, opportunity to expand. Current carrier offer this service. SI2 offers the service and uses same carrier.	Cost of service at carrier.
<i>Night delivery</i>	Current carrier is offering this service. SI2 offers the service and uses same carrier.	Cost of service at carrier. It will be important that the customers are the ones taking the risk since goods are delivered unattended.
<i>Express delivery (1-3 hours)</i>	Utilize stores as distribution nodes in order to offer faster and more flexible express deliveries. SI2 offers the service and uses same carrier.	Need for better product segmentation in the stores in order to use them as distribution nodes. Current space in stores is limited. Need for better internal communication about promoting this service to customers.
<i>Dedicated time slot delivery</i>	Integrate this as a standardized service in the internal ordering system.	Challenge with capacity for the carriers, affecting their normal route. Limitations with only using one transport provider.
<i>Container with stock on site</i>	The case company have implemented this solution for some customers in Sweden. Opportunity to use current knowledge of implementing this on the Danish market.	Internal challenge: Who should be responsible for setting up this service on a larger scale, who takes the cost? Challenge related to how the delivery should be managed without signature, need for better digitized solutions.
<i>Weekend open stores</i>	Not considered important.	
<i>24/7 open stores</i>	Not considered important.	
<i>Later cut-off time than average (after 4PM)</i>	Expand distribution network in order to have later cut-off time. Utilize stores for this.	Considered very expensive to have warehouse personnel work longer (more shifts, overtime etc.)

providers. All regional markets must use the same system to integrate carriers, and in this system, it is very expensive and inflexible to integrate new carriers or service providers. The potential for integrating an additional carrier to handle, for example, express deliveries from stores was thus described to be limited with the current system.

5 Analysis

In this chapter, the empirical findings are analyzed and compared to relevant literature. The chapter focuses on identifying current and future customer requirements and how the case company can better match these.

5.1. Understanding current and future requirements

5.1.1. Requirements are dependent on contextual factors

Several characteristics of the industry were found to impact customer expectations and requirements on logistics service offerings. Those were presented in Table 4.1. When comparing the identified industry characteristics from this study to characteristics identified from other literature, see Table 3.4, it can be seen that many of the highlighted characteristics are similar. Previous studies, briefly presented in Section 3.3, have generally been conducted from the perspective of coordinating entire construction projects. This study has the perspective of an individual supplier (the case company). Since similar characteristics have been identified, it is indicated that these characteristics provide related to logistics for both actors on the construction sites and suppliers in the industry.

Short-term focus in projects, lacking standardization of processes, conservative culture, lacking commitment among personnel, insufficient planning and complexity related to the number of actors involved were described as challenges in both literature and empirical findings of this study. Those challenges share a common theme, namely that they distinguish the construction industry from many other B2B industries. The characteristics all describe challenges hindering standardization of activities and routines. In most other B2B industries, higher levels of standardization and continuity can be achieved. In the manufacturing industries are, for example, often the same products delivered in the same quantities to the same place for a longer period of time. Under such circumstances, it is easier to plan ahead and purchasing can be handled in a more centralized and automated way. Christopher (2011) states that expectations on service levels shall be set together with the customers. This is a more feasible task when a certain level of standardization and continuity is present. However, within the construction industry, almost every project is unique and thus has unique requirements. Given the low standardization in the industry, requirements on logistics services often become situation dependent. Framework agreements do generally only contain certain standard alternatives for deliveries, and it is often up to the on-site personnel to decide what actual products and services that are to be chosen.

The location of the project, available space on site, regulations, number of actors involved, and changing layout of the site as projects progress, were all project characteristics identified to create situation dependent requirements (see Table 4.3 for an overview). The location of the project was described to impact requirements in multiple ways. It can be argued that requirements are generally more demanding if the site is located in an urban area. In general, urban sites have less space to store inventory which creates higher demand for JIT deliveries. Both Ekeskär and Rudberg (2016) and Sundquist et al. (2018) suggest implementing JIT solutions to reduce logistics problems on site in urban areas. Findings in this study do however suggest that there are factors limiting the success of such services. Traffic is much worse in urban areas, especially in the Copenhagen area. This limits the reliability and timeliness of JIT deliveries. It was described that time slots are seldom met even when agreed upon. At the urban construction site of C2, it was further described that the available space is utilized fully in order to have as few deliveries as possible. This was due to two main reasons. The drop-off point at the site had very limited capacity, and deliveries interrupt the workflow. A potential solution for this is to utilize construction logistics centers (CLC) to consolidate volumes from multiple suppliers (Janne, 2018). This kind of solution, where volumes from several suppliers are consolidated, were however not used or mentioned by any of the interviewees in this study. Hence, suppliers in the Danish construction industry cannot expect that these types of solutions are utilized by their customers. Instead, they have to handle coordination directly with on-site personnel themselves or rely on their carrier to do so. Restrictions and regulations presented by Janne (2018) were, however, identified to impact deliveries in this study as well. A described restriction in the literature that was not mentioned by any interviewee was the environmental concern. Although several interviewees agreed that environmental regulations have and will become stricter in the industry, no interviewee believed that they have significant impact on requirements on deliveries.

Based on the discussion above, contextual factors can be argued to impact requirements on logistics service offerings and restrict the possibility to plan. Ying et al. (2014) argue that insufficient planning is the major reason behind logistics problems on site. Insufficient planning results in ad-hoc initiatives that disturb the workflow. This phenomenon was confirmed during the interviews. Many of the interviewees did however describe that the poor planning is not only a result of the complex nature of the construction industry. 64% of all interviewees and 83% of interviewees within installation described that planning horizons are shrinking. The main reason for this was described to be that the large retailers are differentiating themselves with their logistics service offerings. By offering fast express deliveries, night deliveries, 24/7 open stores and late cut off times, in combination with high product availability, the need for planning is reduced. Large retailers can thus be argued to make customers used to not have to plan their purchasing.

Since these services are already available on the Danish market, efforts to get workers to plan their purchasing better and improve coordination of deliveries are likely to fail. If other

suppliers, such as the case company, do not follow the large retailers and improve their service offerings there is a risk that customers see their offerings as outdated. The argument can thus be made that also smaller suppliers need to have flexible logistics service offerings, high availability and fast deliveries to be able to handle the ad-hoc customer demands. Especially if the supplier offers installation material and consumables, as demands are already more ad-hoc for these product segments (see presented findings in Section 4.1 and Table 4.4).

5.1.2. Current requirements

The current requirements will be discussed by using the three-step approach for service segmentation presented by Christopher (2011) in Section 3.1.3. First, key components of customer service will be discussed. Secondly, the relative importance per service component, in combination with a segmentation of customers, will be elaborated on. Step 2 and 3 in the three-step approach will thus be combined. This analysis will be based on the seven service dimensions identified in the literature and the fourteen identified logistics service offerings from the empirical results.

Identified key components of customer service

Speed of delivery

Speed of delivery was seen as one of the most important components of the logistics service offering. Due to an ongoing change in the industry, with tighter time schedules, reduced planning horizons and a competitive landscape, offering fast deliveries can be seen as a qualifying criteria. For instance, more and more customers expect to be able to order a product during a weekday and have it delivered early in the morning the next day.

Reliability

Both literature and the empirical results indicate that reliability has a high degree of importance from a customer perspective. The likelihood for changing supplier was found to be high if customers cannot rely on a supplier to deliver the right goods, at the right location, at the right time. This might sound obvious, but can be argued to be an interesting finding given the nature of the industry. Considering that purchasing in the construction industry was described to often be based on relationships, the finding is not necessarily expected. Furthermore, as the number of construction projects on the Danish market is increasing, offering high reliability is a key component of the service offering. Especially in large cities where regulations are becoming stricter.

Flexibility

The results from the interviews highlight a current trend in the market. Suppliers are required to have a high degree of flexibility, partly due to the fierce competition in combination with a high focus on wasted time in construction projects. Customers today are

expecting their suppliers to offer services such as express deliveries and dedicated time-slot deliveries when asked for.

Availability

Both literature and the empirical results state the importance of having a high availability of products in stock. In general, this is seen as a basic requirement on the market, and one that all suppliers are aware of. More focus has however been directed towards job-site availability, such as storing goods in containers at the site. Due to the high pressure on construction projects and the poor planning, having available stock on site can have significant impact on the overall productivity. In addition, suppliers are able to carry out unattended deliveries by having containers at the site. This enables the carrier to better plan their vehicle routing while the complexity related to coordinating deliveries can be reduced. A common constraint is however limited space at the job-sites. When space is limited, suppliers are seldom allowed to place their own container on site if they are not supplying products or materials in sufficiently large volumes. This is often the case in urban areas.

Communication & information

Lack of communication and information sharing is described by Behera et al. (2015) and Love et al. (2004) as one of the main reason behind logistics problems in the construction industry. The empirical results from this study confirm that poor information regarding when and where the delivery is supposed to arrive causes great difficulties for the customers. Interviewees described that more and more orders are being placed online or through apps. By ordering online error rates were argued to be reduced, compared to the traditional orders over the phone. As they become used to these digital services, customers expect demand better and more user-friendly online services for purchasing orders.

Options

Offering flexible delivery and pick-up options was considered to be an relevant component of the total logistics service offering. Customers do however not necessarily value that suppliers have as many options as possible. But, suppliers need to have a sufficient number of options for delivery and pick-up of products available to be chosen as a supplier. The demand from a customer can vary a lot from day to day and because of the retailers' large investments in logistics services. Due to them, customers have become used to having a great variety of services available. Whether the customers want to pick-up the goods on their way to work, have them delivered within 1 hour to the site or have them the next morning, the large retailers are prepared to fulfill their needs.

Cost

In general, construction companies on the Danish market were described to be cost sensitive. Customers are today expecting that standard logistics services, such as normal next-day delivery, are free of charge. However, most customers are willing to pay extra for special services when they have urgent needs, such as express deliveries. Wasted time

within the construction industry has previously been discussed as a major cause for lack of productivity. The cost for construction workers to go to the store and buy the goods themselves is more expensive than ordering an express delivery. Thus, there is an incentive to pay extra for such services. At least from managerial level.

Customer segmentation and relative importance of service components

Christopher (2011) states that it is likely that customers have different requirements on logistics services. Two such customer segments have been identified in this thesis, namely contractors and installation firms. The results presented in Figure 4.2 in Section 4.3.1 indicate that the requirements within different service dimensions vary between the two customer segments. It should be mentioned that none of the service dimensions were ranked lower than 5.1 on a 7-point scale, indicating that all the service dimensions are important for both customer segments. Based on this, it can be argued that all seven studied service dimensions contribute to the overall perception of the logistics service offering. However, there is a risk that customers rate everything as important when asking them (Christopher, 2011). Other methods for rating that could have been used were presented in Section 3.1.3. Those were however discarded due to that they either hide the relative importance or run a high risk of yielding arbitrary results due to too high complexity. Thus, we argue that the used method of collecting the importance scores with a seven point scale is relevant, but recognise that one should be careful when interpreting the relative differences as most dimensions received high scores and the sample size is limited. The findings and relative differences will thus be interpreted as indications.

Within installation, the single most important dimension was speed of delivery, ranked 6.8, followed by reliability and availability, both ranked 6.0 (see Figure 4.2). Regarding contractors, reliability was considered the most important aspect of a logistics service offering, ranked 6.5, followed by cost (6.2) and availability (6.0). Considering the largest gap between the two segments, contractors seems to be more cost sensitive than installation firms (6.2 vs 5.1). On the contrary, installation firms seems to demand higher flexibility (5.8 vs 5.1) as well as faster deliveries (6.8 vs 5.8) than contractors. This is in line with the answers from the interviews where the customer requirements were described to be more demanding within the installation field. Especially regarding faster and earlier deliveries.

To get a understanding of how the requirements for specific logistics service offerings might differ between the two customer segments, a weighted importance of each of the fourteen identified services was calculated. The result of the analysis is presented in Table 5.1. The weighted importance (WI) of each service, split for contractors and installation, was calculated by combining customer rating (CR) and the individual relevance (R) per service, i.e. $WI = (CR + R)/2$. The degree of relevance has been converted from *% of interviewees mentioned the service as important* to a seven-point scale, according to the intervals presented in Table 5.1. The results indicate that the three most important services to offer within installation are night delivery, next-day delivery pre 7AM and express delivery.

Table 5.1: Weighted importance of specific logistic service offerings

Logistics Service Offering	Customer Rating		Relevance Scale		Weighted importance		Relevance Scale	
	Contr.	Inst.	Contr.	Inst.	Contr.	Inst.	Based on the % of interviewees expressed service as relevant	
Night Delivery	5.5	7	2	6	3.8	6.5	7	86 - 100 %
Next day pre 7AM	6	6	4	7	5	6.5	6	72 - 85 %
Express Delivery	5	5.33	7	6	6	5.7	5	58 - 71 %
Late cut-off time	4.5	5.67	1	4	2.8	4.9	4	44 - 57 %
Order and pick-up from store within 1 hour	4.5	5	1	1	2.8	3	3	30 - 43 %
Container solution	3.5	4.67	6	5	4.8	4.9	2	16 - 29%
Next day pre 10AM	5	3.7	4	5	4.5	4.4	1	0 - 15 %
Order and pick-up next morning at store from 7AM	3	4.67	2	2	2.5	3.4	Weighted Importance Average score based on the customer rating and relevance scale 5 - 7 (High Importance) 3 - 5 (Medium Importance) 1 - 3 (Low Importance)	
Dedicated time-slot delivery	6	2.33	4	1	5	1.7		
Crane delivery	4.5	3.33	4	1	4.2	2.2		
24/7 open stores	3.5	3.33	1	1	2.3	2.2		
Next day delivery (10AM-4PM)	5	1.7	2	1	3.5	1.4		
Weekend open stores	2	2.67	1	1	1.5	1.9		
Weekend Delivery	3	1.67	1	1	2	1.4		

For contractors, the three most important services are indicated to be express delivery, next-day delivery pre 7AM and dedicated time-slot delivery.

The analysis presented in Table 5.1 indicates that requirements on logistic service offerings do in fact differ between the two segments. For instance, the need for dedicated time-slot deliveries was weighted to have high importance for contractors and low importance for installation firms. Main contractors often have more overall responsibility at the job-sites, compared to installation firms, and are therefore more involved in the coordination of deliveries. For instance, projects located in urban areas often have restrictions for specific time-intervals when deliveries are allowed, making dedicated time-slot deliveries especially important in those cases. The same goes for crane delivery, which is a service seen as more important for contractors. Installation firms are less likely to order products that have to be delivered with a vehicle crane-equipped vehicle. Late cut-off time was, however, considered to have higher importance within installation than for contractors. Installation firms are often poor planners, which could explain why late cut-off time is considered more important for them.

5.1.3. Future requirements

The empirical results in chapter 4 indicate that the customer requirements on logistics services will increase in the future. The fierce competition on the market, driven by large

retailers, is described to be one of the main reasons behind the change in requirements. The large retailers differentiate on logistics and serve a large share of the market. Jonsson and Mattson (2016) describe that services and service levels offered by competitors generally influence customer expectations. It can thus be argued to be important for other suppliers in the Danish construction industry to adapt to the development of the large retailers in order to stay competitive. For instance, Table 4.1 indicates that both contractors and installation firms will be more likely to switch suppliers based on logistics service offering in five years compared to now. In addition, there is an underlying cost and time pressure from end-customers. This pressure forces construction companies to accept tighter time schedules for projects. To be able to deliver on these promises, jobs have to be carried out more efficiently. To increase efficiency, construction firms must inevitably increase pressure on their suppliers.

The results in Figure 4.1 further indicate that logistics service offerings will be increasingly important in relation to the total offering in 5 years. This trend is seen among both contractors (importance score increased from 5.3 to 6.5) and installation firms (importance score increased from 5.5 to 5.8). An interesting observation is that the importance seems to increase greatly among contractors, whom are currently less demanding. This could potentially be explained by the description of how trends are adopted in the industry. New innovations and services usually start among electricians and then move on to other installation businesses before being adopted by contractors. This could explain why contractors believe their demands will increase more than installation firms. When studying competitors service offerings in Table 4.6, it can be seen that competitors mainly supplying contractors offer more or less the same services that those supplying installation firms do. I3 further described that they do not believe that these large retailers can serve them (installation firms) with faster or better services than they already do today. That the installation segment perceives itself as more or less fully served in terms of logistics service offerings could explain the indicated catch up in requirements from contractors.

In Figure 5.1, the importance of each service dimension now versus in five years is presented. The result indicates that the importance will increase for most service dimensions in the coming five years and remain unchanged for a few. Contractors will continue to require high reliability while demanding higher availability and speed of delivery. Further, it is indicated that high speed of delivery will continue to be considered a qualifying criterion within installation, while the dimensions cost and communication & information will be increasingly important. Due to the fact that all service dimensions are considered relatively important, it is however difficult to draw any distinct conclusions. Further uncertainty is added in this analysis due to the requirements dependency on contextual factors.

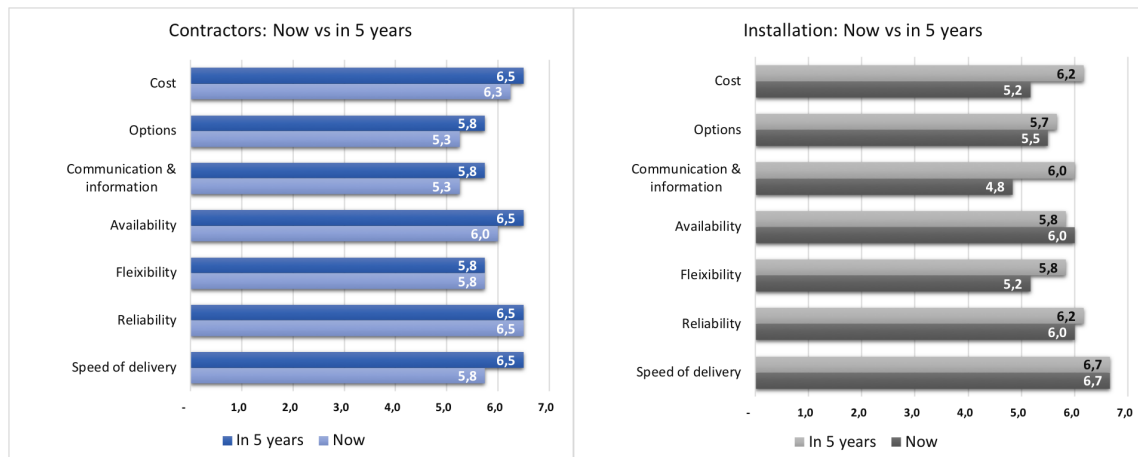


Figure 5.1: Importance of service dimensions: now vs in five years

Jonsson and Mattson (2016) describe that order winners and order qualifiers are likely to change over time. As time progresses, order winners become order qualifiers. This phenomenon was observed in the installation field. Services such as express delivery and night delivery, which can be seen as order winners today, were argued to become order qualifiers in the future. Jonsson and Mattson (2016) argue that when this change occurs, the price often becomes an important order winning criteria. This would indicate that competing on the cost dimension (price) will be of greater importance the coming years ahead. This indication holds true when studying Figure 4.2. All interviewed customers rate the cost dimension to be of the highest importance (7/7) in five years.

The empirical results further indicate that construction companies will impose stricter policies in the future to prevent personnel from leaving the job-site during the workday. For instance, I3 mentioned that they have received an order from managerial level to always order everything to the job-site. However, it is in general common for construction workers to go to the store and buy goods. Based on both interviews and literature (e.g. Hübner, Kuhn, and Wollenburg, 2016), the option pick-up from store is popular among customers and the demand for this is thus unlikely to disappear in the coming years ahead. This was confirmed by several interviewees, describing that stores will continue to be an important part of the logistics service offering. Yet, more pressure is likely to be focused towards the supplier's ability to deliver goods to the job-sites. The analysis presented in Table 5.1, in combination with the encoded trends in Table 4.7, indicates that demand will be higher for services that imply delivering to the job-sites. Services related to longer opening hours for the stores or pick-up options received much lower weighted importance than services related to deliveries to the job-sites. No store-connected service was calculated to have a weighted importance higher than medium. A majority of the interviewees believed that demand

for next-day deliveries before 7AM, express deliveries, night deliveries as well as container solutions on site will increase (see Table 4.7). This could be seen as a further argument that customers will require the suppliers to handle the majority of the distribution of goods to the job-sites in the future.

5.2. Match between the case company’s logistics service offering and customer requirements



5.2.1. Current match


Important services are not offered

By comparing the current logistics service offering (Table 4.9) to the identified importance of each service in Table 5.1, it can be seen that services considered to be of high importance to offer are not offered by the case company. This is highlighted in Table 5.2. Four services were identified to be very important by either contractors or installation firms. These were night delivery, next-day delivery pre 7AM, express delivery and dedicated time-slot delivery. The case company offers none of these services in its official service offering.

Table 5.2: Comparison of the case company’s current service offering and weighted importance of services

Logistics Services	Service offered by case company	Weighted importance 1 = lowest importance, 7 = highest importance	
		Contractor	Installation
Night Delivery		3,75	6,5
Next day pre 7AM		5	6,5
Express Delivery		6	5,65
Late cut-off time		2,75	4,85
Order and pick-up from store within 1 hour	✓	2,75	3
Container solution		4,75	4,85
Next day pre 10AM	✓	4,5	4,35
Order and pick-up next morning at store from 7AM	✓	2,5	3,35
Dedicated time-slot delivery	✓	5	1,65
Crane delivery	✓	4,25	2,15
24/7 open stores		2,25	2,15
Next day delivery (10AM-4PM)	✓	3,5	1,35
Weekend open stores		1,5	1,85
Weekend Delivery	✓	2	1,35

 = offered
  = can be arranged

 Most important services are not offered

When discussing the importance for the case company to offer services such as night deliv-

eries, the answers from the customers were slightly ambiguous. I2 expressed that they do not know if it is important for the case company to offer these services. The argument was that the case company seldom is one of the main suppliers in projects, due to its product range. This was confirmed in the interviews with the case company. Internal personnel at the case company stated that the case company seldom provide more than 7-8 % of the products purchased on a job-site. I2 purchase 60 % of their products from four to five large retailers and are thus highly dependent on these retailer's logistics service performance. Combining these statements, it can be argued that it is of greater importance for a supplier to offer higher service levels if the supplier provides a larger share of goods sold to a project. As the share of goods sold to a project increases, the dependency on the supplier increases. Thus, it seems like requirements on logistics services increase too. However, interviewees within the installation segment expressed a general high demand for faster, and especially earlier deliveries, regardless of the share of goods sold. I3 further expressed that the case company needs to implement faster deliveries for the installation materials. These slightly contradicting statements further indicate that the requirements are dependent on contextual factors. Customers are operating in different environments and do thus have different requirements. The contradictions could also be dependent on the fact that interviewees have different positions, some more strategic and some more operational. How these different roles could impact the view on requirements is however not further analyzed in this thesis.

Perceived performance varies between customer segments

In Figure 4.3, it can be seen that interviewees within installation rate the performance of the case company as worse than contractors. This is the case in all seven service dimensions. This is in line with the finding that demands are higher within the installation segment. However, the analysis in Section 5.1.2 indicated that contractors are more cost sensitive. Both segments are currently offered the same price for the same services. Yet, installation perceives the performance of the case company as worse within the cost dimension. A potential explanation for this observation could be the fact that installation firms more often require early deliveries. Those deliveries are charged with higher prices, see Table 4.9. It is thus likely that this could explain why installation firms perceive the case company's offering as more expensive.

Using the performance matrix presented by Jonsson and Mattson (2016), the perceived performance of the case company was analyzed in relation to the rated importance of each service dimension, see Figure 5.2. To define over- and underperformance, a deviance of one point (on the seven-point scale) between perceived performance and rated importance was used.

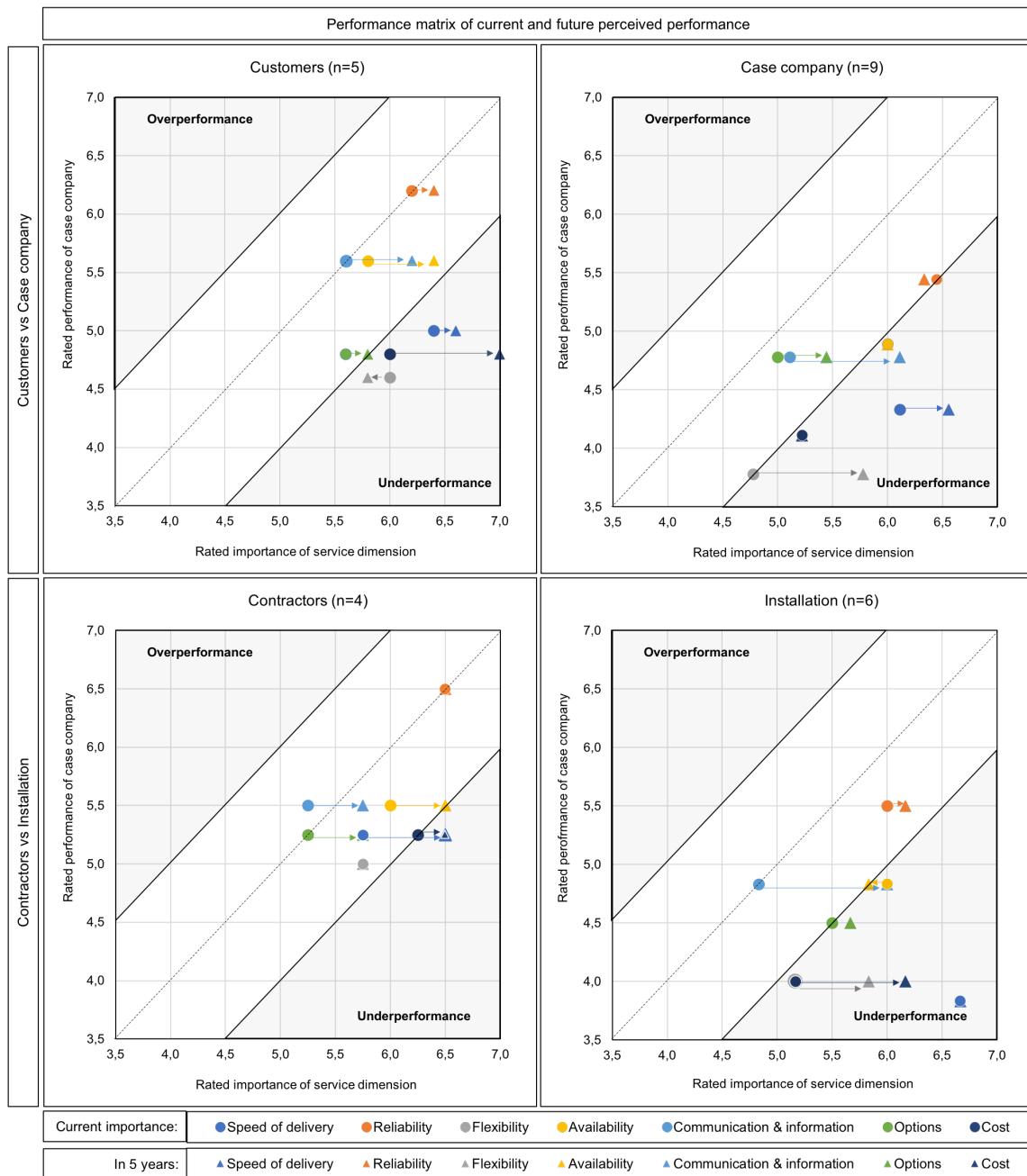


Figure 5.2: Perceived performance of the case company compared to current and future importance of service dimensions

Figure 5.2 shows that interviewees representing contractors did on average rate the case company's current performance within one point from the importance score for all dimensions. Hence, current performance can be argued to be within the expectations of the contractor segment. The dimension with the highest deviance between perceived performance and importance was cost, bordering to underperformance. The case company is however perceived to have high reliability, which is in line with the high importance of the dimension. When asked if the case company was underperforming in any way compared to competitors, the answers from C1 and C2 was that the case company is not, given the products they offer.

Interviewees within the installation business do quite clearly rate performance of the case company lower, see Figure 5.2. Communication and information is in line with expectations and reliability is considered satisfactory. Performance in all of the other five service dimensions does however border to underperformance. Interviewees within installation do quite clearly point out speed of delivery as the weak point of the company, with a deviance of 2.8 points. This indicates a potential gap to fill for the case company. The company should thus first and foremost improve performance in the dimension speed of delivery, to improve the current match with customer requirements.

5.2.2. Future match

To investigate the future match, the case company's current service offering and performance is compared to the average rated future importance of each service dimension. It should, however, be stated that customer expectations change with factors such as time, number of encounters with the service and competitiveness of the environment (Seth et al., 2005). Perception of current performance is thus likely to be a poor indicator for perceived performance in five years, given that the service offering is unchanged. The analysis can however be used to provide an indication of a best-case scenario.

The results in Figure 5.2 indicate that contractors, given maintained perceived performance, still would consider the case company's performance more or less in line with expectations. However, performance in several dimensions would border to underperformance. In the dimensions cost and speed of delivery, the case company would be considered to underperform even in a best-case scenario. Studying the answers from interviewees within installation, it is seen that performance would become insufficient in the three categories: speed of delivery, flexibility and cost. When studying only the customers answers (combined for interviewed contractors and installation firms), it can be seen that cost will become a critical dimension for the case company to address. Interviewees described that retailers already offer several of their services below break-even price. The analysis in Section 5.1.3 confirms the indication that offering competitive prices of services will become more important in the future.

5.2.3. Suggestions for improving match

Vrijhoef and Koskela (2000) present four focuses that can be applied when improving logistics performance in the construction industry, see Figure 3.5. Based on the products offered, the case company can be considered a material and component supplier in the industry. In this role, Vrijhoef and Koskela (2000) recommend to focus on the own supply chain to reduce cost and lead times. Cost and especially lead times (speed of delivery), were two of the dimensions where the performance of the case company was considered worst. Focusing on the own supply chain can be further argued to be the best approach given the lack of coordination and planning in the industry and on sites. This lack of coordination and planning has, in this study, been indicated to increase the importance of shorter lead times.

Several authors, e.g. Jonsson and Mattson (2016), Christopher (2011), and Seth et al. (2005) state that offered services and service levels have to be analyzed in relation to the competitors on a market. The case company is a rather small player on the Danish market, as can be seen in Table 4.6. The competitors have larger product portfolios, more employees and more stores. While the case company differentiates on high quality products and a direct selling sales force, the retailers differentiate themselves on logistics service offerings. For instance, all studied competitors offer express deliveries in all of Denmark. In some regions, they guarantee delivery within one hour. A reason enabling the retailers to have express deliveries is that they utilize their network of stores as distribution nodes. Most of the competitors also have their own (or dedicated contracted) fleet for handling the distribution. An interesting topic in this context is that SI2 uses the same 3PL provider as the case company does. This indicates that the delivery services offered by SI2 could potentially be offered by the case company.

Jonsson and Mattson (2016) state the importance of having a logistics strategy incorporated in the business strategy. When setting this strategy, the focus should be on some key dimensions of logistics services. Focusing on too many dimensions at once is likely to become too costly as dimensions can be contradicting. Logistics is not in focus in the business strategy of the case company and the aim is to follow the market, but not be innovators. A part of this strategy is that logistics should bear its own costs. Contradicting dimensions of service are in this case likely to be improving services and service levels without increasing the prices of the services. Increasing the prices of services is likely to reduce sales as the market is indicated to be price sensitive and used to competitive prices on logistics services.

Given the competitors on the market and the focus of the business strategy, it is not realistic to suggest that the case company should aim at gaining a competitive advantage through its logistics service offering. The company should however aim to close the current gap to competitors. Current conceptual positions of the case company and competitors are, based on the empirical findings, mapped in Figure 5.3. As Jonsson and Mattson (2016)

describe, it is important to focus on the most important service dimensions when closing the gap. Furthermore, Christopher (2011) suggests that customers be segmented based on service requirements. As the customer segments contractors and installation firms have been identified to have different requirements, there is a potential to segment the logistics service offering according to this split. A general suggestion to the case company is thus to investigate how this segmentation can be utilized in the logistics service offering.

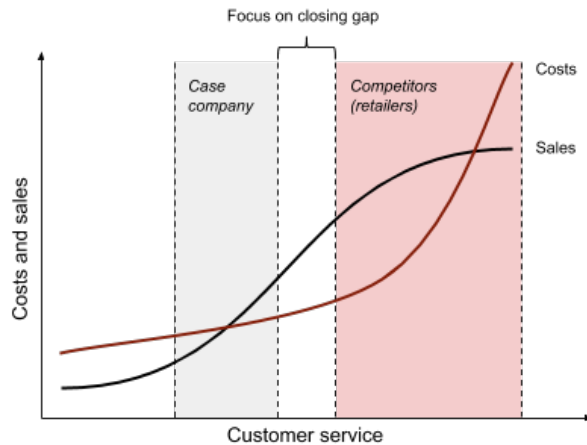


Figure 5.3: Conceptual positioning of the case company and competitors (authors' figure based on Jonsson and Mattson (2016))

Improving current match

Among contractors, current performance was considered more or less in line with requirements and expectation. In the installation business, the performance in the dimension speed of delivery was however considered poor. To improve the current match, it is thus argued that the case company should focus on improving the match within the installation segment, by improving speed of delivery.

The case company was identified to not offer services indicated to be of high importance on the market, see Table 5.2. These services are night deliveries, next-day delivery pre 7AM, express delivery and dedicated time-slot delivery. Furthermore, container solutions on site received a relatively high importance score in both segments. Given that the case company generally holds a small share of the total spend in construction projects, it was discussed that separate containers for the case company's products often are not desired due to space limitations on sites. Given the suggestion that the case company should focus on the installation business, dedicated time-slots for deliveries is not suggested as this service was indicated to be of low importance in this segment. Installation firms seem to have much more ad-hoc requirements for fast deliveries. Often, they want to order late and receive the goods early in the morning. The remaining three services (night delivery, next-

day delivery pre 7AM and express delivery) could all improve the match between the case company's logistics service offering and these requirements. Night delivery and next-day pre 7AM delivery received the highest importance score in the installation segment but can be argued to satisfy similar needs. Considering that night deliveries were not considered equally important for contractors, and that feasibility of implementing next-day delivery pre 7AM was considered higher, next-day pre 7AM is further evaluated. Next-day pre 7AM delivery and express delivery were both considered important to offer among both contractors and installation firms. Those services are thus argued to be the most important ones to offer in order to close the gap to competitors on the market.

The feasibility of implementing new logistics services were earlier presented in Table 4.11. Currently, all deliveries are distributed from the central warehouse of the case company, located in Malmö (Figure 4.4). Offering express deliveries from Malmö would be more or less infeasible as it takes the carrier approximately one hour to just drive across the bridge to Denmark. Given this distance, the case company would need distribution nodes in Denmark. The most relevant solution for this was argued to be utilizing the existing network of stores, as competitors do. Support for this solution can be found in Table 3.3 by Ribas et al. (2019), where it is argued that using a decentralized network configuration enables shorter response times and good customer experience. However, several limitations for this solution were described in the interviews. Stores are currently small and would not be able to hold larger inventories. It would further require a comprehensive product segmentation analysis on what to hold in stock in the stores, to not risk greatly reducing availability. Ribas et al. (2019) further describe that the cost of handling inventory could greatly increase. Given the described limitations, it is not suggested to offer standardized express deliveries in the short-term perspective.

Next-day pre 7AM delivery seems to be more feasible to implement. This service is already utilized for pick-up from stores from 7AM and the used carrier offers this service to job-sites as well. The only described limitation for this was that it is more costly than the currently offered service next-day delivery pre 10AM. Implementing the service is likely to increase the perceived performance of speed of delivery, which is of high importance to the company, especially within installation. To improve the current match, the case company is thus suggested to implement next-day deliveries pre 7AM.

Reliability was the dimension that the company was perceived to perform best in. This dimension was further considered to be of high importance to the customers. By studying the measured performance indicators, see Table 4.10, it can be seen that reliability of the case company's deliveries is 95.8% perfect order deliveries. As reliability is considered to be of high importance and the strong card of the case company, it is important to maintain high reliability when implementing new services. Offering next-day delivery pre 7AM could potentially prove challenging for reliability as it requires faster handling and transportation from the carrier. It is advised that the company monitors the perceived

and measured reliability of new services, and how they might affect reliability of existing services.

Improving future match

Within a five year horizon, there is more room for improving the match with customer requirements. Indications on requirements are, however, more uncertain and the competitive environment is likely to change (Jonsson and Mattson, 2016). The analysis in Section 5.1.3 indicates that services related to deliveries will be the most important to offer in five years. Focus on wasted time of workers is expected to increase. Contractors are indicated to have higher requirements within five years and installation firms will expect fast and early deliveries. As order winning services become order qualifiers, offering competitive prices on services is likely to become of great importance.

The results in Section 5.2.2 indicate that the case company should focus on improving its performance in the dimensions speed of delivery, flexibility and cost. A service that is likely to improve perceived performance in the two first dimensions (in addition to the suggested implementation of next-day pre 7AM delivery), is express deliveries. Express deliveries were disregarded when suggesting improvement for the current match due to several limitations. In the long run, it should however be more feasible to offer express deliveries by utilizing stores. By studying the location of the case company's stores in Figure 4.4, it can be seen that they are strategically located across Denmark. Utilizing them, or at least a few of them, as distribution nodes would greatly reduce the distance to customers across Denmark, compared to only delivering from the warehouse in Malmö. However, as described in the analysis for improving the current match, the company needs to carefully analyze what products to hold in the stores. It would further be required to conduct an analysis on which stores to utilize as distribution nodes, and how to implement this service with the carrier.

If no solution is found for utilizing stores, for example due to limited inventory space, there could be a possibility to utilize 3PL services for more regional inventory handling of popular products. This solution is described by Ribas et al. (2019), and would enable short response times and good customer experience, see Table 3.3. However, this alternative is not further analyzed in this study.

As demands are indicated to increase from contractors, it will likely become more important to not only focus on the installation segment in the future. Dedicated time-slot delivery is a service considered to be of high importance within the contractor segment. The identified urbanization trend, increasing the need for JIT deliveries (Ekeskär and Rudberg, 2016; Janne, 2018; Sundquist et al., 2018), is further indicated to increase demand of the service in the future. Implementing dedicated time-slots for deliveries could thus increase the perceived performance of the case company. This service can already be offered by the case company but is not part of the standard offering and requires a lot of manual work to

synchronize. The service is however described to seldom be requested as of now, according to case company personnel. In Table 4.4, it was further indicated that JIT deliveries and dedicated time-slot deliveries are more important to offer when supplying construction materials, which the case company does not. The suggestion is thus to monitor demand for dedicated time-slot deliveries, but not implement the service as a standard alternative before sufficient demand is expressed from the customers.

To improve the future match, the case company is suggested to investigate the potential to implement express deliveries in their official offering. Given the indicated increasing importance of the cost dimension, it will however be important to offer this and other services at competitive prices. The current business strategy of the case company states that logistics should bear its own costs. As express deliveries are likely to be more costly than current services, and customers are less willing to pay for logistics services, this could prove conflicting. Jonsson and Mattson (2016) suggest that improved customer service can increase sales, depending on how the competitors act. To evaluate if the implementation of express deliveries has the potential to increase sales, further investigation will however be required. Given the fact that all studied competitors already offer this service, it can however be argued that this potential is rather low. Implementing the service is thus rather a way of following the market in order to not fall behind, than a way of gaining a competitive edge.

To summarize, a suggestion to the case company is presented in Figure 5.4. The suggestion highlights how the case company could proceed with its logistics service offering, in order to close the gap to identified current and future requirements. Suggested primary focus is to first evaluate the opportunity to standardize next-day delivery pre 7AM. Even though night delivery was considered to be important according to the analysis, much of the value is considered to be captured from offering pre 7AM deliveries. In the coming five years, the case company is suggested to evaluate the alternative of implementing express deliveries as well as monitor the demand for dedicated time-slot deliveries.

	Improve current match	Improve future match	
Night delivery	✗	✓	▶ Much of the value from night deliveries is believed to be captured by offering pre 7AM deliveries
Pre 7AM delivery	✓	✓	▶ Evaluate opportunity for implementing pre 7AM delivery to improve current match
Express delivery	✗	✓	▶ Evaluate opportunity for implementing express delivery to improve future match
Dedicated time-slot delivery	✗	✓	▶ Low current demand for case company products. Monitor future demand

✓	Evaluate opportunity to implement
✗	Not prioritized for the case company
✓	Monitor demand

Figure 5.4: Suggested road-map for the case company

6 Conclusion

In this chapter, the conclusions of the study are presented. The stated RQs are answered and contributions to theory and practice are summarized. Finally, suggestions for future research are presented.

The purpose of this thesis was to create a better understanding of 1) what current and future customer requirements are on logistics service offerings in the Danish construction industry, and 2) how the case company can better match these requirements. The study identifies and analyzes the relative importance of seven service dimensions and fourteen specific services. The importance of each dimension and service is studied for two customer segments, namely contractors and installation firms. Below are the conclusions to the two RQs of the study presented.

6.1. RQ1: Understanding customer requirements

What are the current and future customer requirements on logistics service offerings in the Danish construction industry?

Identification of current customer requirements

Interviewees in this study perceive that the logistics service offering is an important part of the total sales offering from a supplier. Just how important it is, does however vary between customer segments on the Danish market. A key finding from this case study is that customers can be segmented based on their requirements on logistics service offerings. In general, installation firms are more demanding in terms of fast and flexible deliveries. Contractors were found to be more cost-sensitive. Offering advanced logistics services is thus indicated to, as of now, have a higher business value among installation firms compared to contractors. Contractors are in general more satisfied with standard next-day deliveries than the installation firms.

The study indicates that speed of delivery, reliability and availability were the three service dimensions identified to be of greatest importance within the installation segment. The three most important services to offer were identified to be night delivery, next-day delivery pre 7AM and express delivery. When serving contractors, the most important service dimensions were reliability, cost and availability. The three most important logistics service offerings were indicated to be express delivery, next-day delivery pre 7AM and dedicated time-slot delivery.

Identification of future customer requirements

Looking ahead five years, requirements on logistics service offerings are indicated to increase. Customers will be more likely to change suppliers based on offered logistics services. Current demanding requirements from the installation field are believed to spill over to the contractors. In the future, the service dimensions speed of delivery and availability are likely to be of higher importance for contractors. This indicates that their requirements will become more similar to those of the installation firms. Among the installation firms, speed of delivery will continue to be one of the most important components of the logistics service offering. At the same time, importance of the service dimensions cost, flexibility, and communication and information seems to increase.

Regarding specific services, demand is likely to increase for services related to deliveries to the job-sites. From managerial level, there is an ambition within both customer segments towards increasing the usage of the fast and flexible delivery services that are available on the market. Although the cultural resistance in the industry is strong, stricter policies that restrict job-site personnel to leave the job-site are likely to contribute to this transition. Finally, the Danish construction industry seems to become even more cost-sensitive in the future. This could be explained by the indication that the installation firms are well served from the large retailers on the market. Currently order winning services are likely to become order qualifiers in five years, why competition on price is indicated to increase.

Requirements on logistics service offerings are dependent on contextual factors

The identified current and future requirements above are general indications and patterns from this study. However, the study identifies three levels of contextual factors that are indicated to impact the requirements on a more situational basis; industry, project and product characteristics. The industry is characterized by, for example; short-term focus, limited standardization, lack of coordination, conservatism and relationship-based culture, highly decentralized purchasing and lack of planning. Furthermore, the location of the project was found to have a large impact on requirements. These are all factors that impact the customer requirements on logistics services. Although the contextual factors are not directly connected to the research question, we believe it is important to highlight that the customer requirements can be situation specific. Thus, the requirements might not always follow the patterns described in the sections above.

6.2. RQ2: Improving the match between the case company's logistics service offering and customer requirements

How can the case company's logistics service offering be changed to better match the current and future customer requirements?

The findings in this study show that the case company could improve the match with current and future requirements on logistics services by implementing fast and early deliveries to customer job-sites. Given the competition on the market, and the logistics strategy of the company, the company will most likely not achieve a competitive advantage by improving the match. However, it could be important to close the gap to competitors on the market to remain competitive. Importance of logistics service offerings is considered high and is indicated to increase in the future. If the requirements on the market are not monitored and responded to, there is a risk of losing competitiveness. As demands are indicated to be different between the two customer segments contractors and installation firms, a general suggestion for improving the match is to evaluate if, and how, this segmentation can be utilized in the logistics service offering.

Improving current match

To improve the current match, the case company could focus on improving speed of delivery. Demand for this is high in the installation segment. To do so, it is suggested that a business case for offering the service next-day delivery pre 7AM is established and evaluated. The service is indicated to be valuable to offer within both the installation and contractor segment.

Improving future match

To improve the future match, it will likely be important for the case company to focus on improving performance in the three service dimensions speed of delivery, cost and flexibility. To do so, the company is suggested to investigate the business case for implementing express deliveries. Similarly to next-day pre 7AM deliveries, express deliveries are valued by both customer segments. Implementing the service is however likely to be more challenging than implementing the next-day pre 7AM delivery. To offer express deliveries, distribution nodes located closer to the customers will be required.

6.3. Concluding discussion

Customer requirements, segments of customers, and important services to offer were identified in this study. One finding was that requirements are often dependent on contextual factors and individual purchasers. In such an environment, it can be challenging for suppliers to offer satisfying logistics services.

The large retailers, supplying a large share of the market, have adapted to these contextual factors. They encourage short planning horizons by offering fast and flexible deliveries at competitive prices. They combine these services with high availability on a large range of products and late cut-off times. The findings from this study indicate that these service offerings have a substantial influence on the customers' general expectations and requirements. Customers in the Danish construction industry set their requirements and expectations based on which services and service levels they are offered by the large retailers on the market.

It is however not certain that the retailers can continue to develop their offerings with the same rate as in the past years. Retailers were, for example, described to already do anything installation firms ask for and to not be able to offer them much more in terms of logistics services the coming years. By studying the retailers offerings, see Figure 4.6, it can indeed be argued that, for example, deliveries within 30 minutes in Copenhagen is an offering that will be difficult to improve. When this limit is reached, the competitive edge of these services will diminish over time.

The question then becomes: will the retailers be able to continue to offer these services below break-even prices? Trends from the B2C industries could give some insights into this matter. Free deliveries and returns have been core elements of several e-commerce giants' business models. This could however be about to change. Due to the high costs of providing these free services, it has been questioned whether these business models are sustainable. Several large B2C retailers have recently introduced delivery fees on some previously free services and stricter regulations on returns (Östgren, 2019). This could indicate a shift in the trend.

How the requirements on logistics service offerings in the Danish construction market develop, and how the large retailers proceed with their service offerings, is hard to tell. It will, however, likely be of high importance for suppliers in the industry to monitor the development and how it affects customers' expectations and requirements. In other B2B industries, service levels can often be agreed upon with customers in a more standardized way (Christopher, 2011) as there is a certain level of continuity in the operations. Given the low standardization, highly decentralized purchasing, short planning horizons and uniqueness of products in the construction industry, it is a time-consuming task to eliciting the right service levels for specific customers and projects. By offering advanced logistics services, the large retailers in the Danish construction industry have embraced the industry's characteristics and utilize them to gain competitive advantage. As their currently order winning services become more commonly used by customers on the market, they could become order qualifiers. Understanding the customer requirements and responding to changes will therefore likely become vital, even for smaller retailers on the market.

6.4. Limitations

This study is of a rather exploratory nature. It has relied on a moderate number of interviews rather than many survey answers. This enabled us to, for example, identify fourteen potentially relevant services that the interviewed customers could later rank. However, as only interviewees were asked to fill in the supporting questionnaire, the number of respondents are limited. The significance of the results from the questionnaire is thus low. Especially since the interviewees are then further segmented in the analysis.

When responses were segmented according to customer group (contractor or installation firm), answers from selected case company personnel were included. This was done due to the limited number of customer interviews (five interviews). This segmentation is presented, discussed, and motivated in methodology chapter, but is none the less a limitation of the study. Ideally, a sufficient amount of customers would have been interviewed and then only customer answers would have been presented. This was however not feasible during the time frame of the study since finding interviewees willing to dedicate their time proved challenging.

Another limitation related to the limited number of customer interviews is that the interviewees held positions with different strategic, tactical and operational focuses. This was beneficial as it gave a more holistic view of the customer requirements. Given the limited sample size, large weights are however attributed to each interviewee. Especially since they hold different positions and thereby represent different perspectives. Ideally two interviewees with different perspectives would have been interviewed per customer. However, doing so was, with the same motivation as above, not feasible during the time frame of the study.

The study furthermore suggests the case company to implement new services. Doing so is associated with higher costs but could also increase sales (Jonsson and Mattson, 2016). The potential effect on sales from implementing the suggested services have, however, not been investigated in this study. If the case company decides to follow the suggestions, it should conduct such analyzes and establish business cases to analyze the associated costs and potential gains. In this study, a broader spectrum of services and service dimensions has instead been analyzed, and areas to focus on and investigate further have been provided.

6.5. Contribution to theory

This study contributes with an understanding of what the current and future customer requirements are on logistics services in the Danish construction industry, what contextual factors affect them, and how they differ between two studied customer segments. It highlights important service dimensions to consider related to logistics service offerings and indicates which logistics services that are important to offer from a supplier point of view.

The study compiles research and findings from several authors in the areas of customer requirements and logistics services, distribution and the construction industry. Previous studies on logistics in the construction industry have generally had the perspective of the construction firms, focusing on how they can improve their performance or manage their supply chains. This study does instead analyze the competitive environment from a supplier's perspective in the industry. It focuses on creating a better understanding of what the current requirements actually are, and how they are likely to change in the coming years. It does not, like many previous studies, focus on what they should be to improve the productivity of construction projects.

To have this perspective, it was necessary to maintain a holistic approach throughout the study. Previous literature has generally focused on specific challenges to identify opportunities for improved productivity, e.g. Janne (2018), Sundquist et al. (2018), Fadiya et al. (2015), Huttu and Martinsuo (2015), and Ying et al. (2014). The holistic mapping of customer requirements and the market environment in Denmark is thus, in itself, a contribution from this study. For example, the study identifies cultural and contextual factors that impact the requirements. Although not specifically asked for in the RQs, it was necessary to create an understanding of these contextual factors to answer the RQs in a more nuanced way. An interesting finding is the indication that it is the logistics service offerings from the suppliers, mainly the large retailers, that have the strongest influence on how customer requirements change. It is not necessarily the endeavor for increased productivity among the construction firms that drive change.

Furthermore, Daugherty et al. (2019) recently called for more research on how demanding requirements on logistics service offerings in the B2C industries spill over to the B2B markets. Although this study does not directly attempt to answer this question, it could provide some relevant insights. Expectations on logistics services are in this study found to be highly dependent on what is available to the customers in those markets. Due to the highly decentralized purchasing structure of the industry, it can further be argued that these expectations are set by individuals rather than organizations. With this argument, and the demanding requirements observed in this study, there could be reason to assume that requirements could indeed spill over from the B2C to B2B environments. At least when purchasing is as highly decentralized as in the Danish construction industry.

6.6. Contribution to practice

The case company benefits from the study through a mapping and better understanding of the market landscape, and its position in it. Requirements for remaining competitive in this landscape are highlighted, suggestions for relevant services to investigate further have been presented and focus areas have been identified.

Although the suggestions are specific for the case company, the used approach and results in this study could be utilized by other suppliers. For instance, the results indicate that logistics plays an increasingly important role in relation to the total product offering. This result, in combination with the finding that customers seem to become more willing to switch suppliers based on the logistics service offering, could suggest that not only the large retailers should incorporate logistics in their business strategy, but also smaller suppliers.

Furthermore, this study identifies trends within the industry that could be valuable for both the case company and other actors on the market. For instance, requirements on logistics services are indicated to increase in urban areas. Demand for JIT-deliveries and dedicated time-slot deliveries will likely increase in these city areas. This is primarily due to regulations and stricter policies for projects located in urban areas, and an increased focus on wasted time in construction projects. Construction workers will likely not be allowed to leave the job-site to go and pick-up or buy goods themselves. Instead, more focused will be directed towards suppliers' ability to deliver the majority of all products needed for a project to the job-site.

6.7. Suggestions for future research

As discussed in Section 6.5, this study is conducted from a supplier's perspective. The study identifies a demand for advanced logistics services on the Danish market, especially fast and early deliveries directly to job-sites. In terms of logistics, the Danish market can be argued to be very competitive. These findings present several interesting areas for future research. Both from a market strategy perspective, and a supply chain perspective.

From a market strategy perspective, the current strategy of the case company can be argued to be of interest to analyze further. The company differentiates on product quality and a direct selling approach. It owns the entire supply chain except for the final transportation to customers and the company's own stores, which is handled by a contracted carrier. Ribas et al. (2019) argue that a strategy that instead utilizes distributors or retailers for the distribution, could reduce transportation costs and increase response time (see Table 3.3). Given the current product differentiation strategy, the case company does however not consider this to be a viable option. In this study, the current strategy has thus been considered a fix parameter. It would be interesting to study how suppliers, like the case company, could act from a more strategic perspective. On markets with high competition and requirements on logistics service offerings, there might be better strategies than the one currently employed by the case company. As this study shows, the Danish construction industry could be a suitable case for conducting such a study. It should be of interest for future research that such a relevant market has been identified. Considering the local nature of the construction industry, results could be different when studying construction industries on other geographical markets. Furthermore, this study has identified several

contextual factors that could be relevant for such a study, and services that could be relevant to offer to remain competitive on the market.

From a supply chain perspective, it would be of interest to study how implementation of the identified relevant services could impact the upstream logistics network of suppliers. As Figure 1.1 illustrates, investigating this to any greater extent has not been attempted in this study. As demand on the Danish market is directed towards faster and earlier deliveries directly to job-sites, requirements on internal logistics functions will likely increase. For example could warehouse operations become more challenging. Inventory is expected to be held by suppliers to a greater extent, response times shortened, and the role of the store might change. Simultaneously, a larger share of orders are received through online channels, see Table 4.7. The importance of sufficient information systems and omni-channel logistics will thus likely increase. Researchers such as Fadiya et al. (2015), Behera et al. (2015), and Ekeskär and Rudberg (2016) have previously identified increasing importance of information technology in the construction industry. Kembro and Norrman (2019) conclude that the development of omni-channel logistics and information systems will be fast the coming five years. They state that this development will present several opportunities for researchers to explore challenges and present solutions to them.

The larger retailers in the Danish construction industry have advanced towards this omni-channel approach; integrating online channels, stores and central warehouses with large product ranges. How should smaller players on the market handle this change? In this study, it was for example considered infeasible for the case company to offer standardized express deliveries from stores, given the current logistics setup. Given the competitive environment, it could prove an interesting case for the above suggested future research to study challenges, implications, and potential solutions for suppliers in the Danish construction industry.

Besides the above suggested focuses for future research, we acknowledge that the results in this study need to be complemented and tested by further research, to increase external validity. The current results rely on deeper understanding from a few case units and would benefit from research on larger sample sizes. A survey approach could be relevant for this purpose. Due to the local nature of the construction industry, it would furthermore be of interest to investigate if the results apply on other geographical markets as well. It could be that contextual factors on those markets create other requirements on the logistics service offerings.

References

- Ajakaiye, O. (2012). “The Role of Logistics Service Providers in the Logistics Firms’ Supply Chain”. URL: <http://hj.diva-portal.org/smash/get/diva2:535677/FULLTEXT01.pdf>.
- Bankvall, L., L.E. Bygballe, A. Dubois, and M. Jahre (2010). “Interdependence in supply chains and projects in construction”. In: *Supply Chain Management: An International Journal* 15 (5), pp. 385–393. DOI: /10.1108/13598541011068314.
- Behera, P., R. Mohanty, and A Prakash (2015). “Understanding construction supply chain management”. In: *Production planning and control* 26.16, pp. 1332–1350. DOI: /10.1080/09537287.2015.1045953.
- Benbasat, I., D. Goldstein, and M. Mead (1987). “The case research strategy in studies of information systems”. In: *MIS Q* 11 (3), pp. 369–386. DOI: /10.2307/248684.
- Bengtsson, S. (2018). “Coordinated construction logistics: an innovation perspective”. In: *Construction Management and Economics*. DOI: /10.1080/01446193.2018.1528372.
- Bienstock, C., J. Mentzer, and M. Bird (1997). “Measuring physical distribution service quality”. In: *Journal of the Academy of Marketing Science* 25.1, p. 31. ISSN: 1552-7824. DOI: 10.1007/BF02894507. URL: <https://doi.org/10.1007/BF02894507>.
- Byggefakta (2018). *Trends for Byggebranchen 2014-2018*. URL: <https://www.byggefakta.dk/trends-for-byggebranchen> (visited on 04/12/2019).
- Byggeri, Dansk (2017). *Urbaniseringstendenser i danske kommuner*. Dansk Byggeri. URL: <https://www.danskbyggeri.dk/media/30680/urbanis-2449384.pdf> (visited on 05/06/2019).
- Chopra, S. (2003). “Designing the distribution network in a supply chain”. In: *Transportation Research Part E: Logistics and Transportation Review* 39 (2), pp. 123–140. DOI: /10.1016/S1366-5545(02)00044-3.
- Christopher, M. (2011). *Logistics & supply chain management*. 4th ed. Financial Times Prentice Hall. ISBN: 9780273731122.
- Daugherty, P., Y. Bolomey, and S. Grawe (2019). “The new age of customer impatience: An agenda for reawakening logistics customer service research”. In: *International Journal of Physical Distribution and Logistics Management* 49 (1), pp. 4–32. DOI: /10.1108/IJPDLM-03-2018-0143.
- Eisenhardt, K. and M. Graebner (2007). “Theory Building from Cases: Opportunities and Challenges”. In: *Academy of Management Journal* 50.1, pp. 25–32. DOI: /10.5465/AMJ.2007.24160888.
- Ekeskär, A. and M. Rudberg (2016). “Third-party logistics in construction: the case of a large hospital project”. In: *Construction management and economics* 34.3, pp. 174–191. DOI: /10.1080/01446193.2016.1186809.
- European Commission (2018). *European Construction Sector Observatory, Country profile Denmark*. (Visited on).
- Fadiya, O., P. Georgakis, E. Chinyio, and C. Nwagboso (2015). “Decision-making framework for selecting ICT-based construction logistics systems”. In: *Journal of Engineering, Design and Technology* 13 (2), pp. 260–281. DOI: /10.1108/JEDT-07-2011-0047.

- Fellows, R. and A. Liu (2012). “Managing organizational interfaces in engineering construction projects: addressing fragmentation and boundary issues across multiple interfaces”. In: *Construction management and economics* 30.8, pp. 653–671.
- Fernie, S. and S. Tennant (2013). “The non-adoption of supply chain management”. In: *Construction management and economics* 31.10, pp. 1038–1058. DOI: /10.1080/01446193.2013.830186.
- Frödell, M. (2014). “Organisation of purchasing and buyer-supplier relationships in large construction companies”. PHD Thesis, Department of Civil and Environmental Engineering, Chalmers University of Technology. URL: <http://publications.lib.chalmers.se/records/fulltext/199434/199434.pdf>.
- Fugate, B., J. Mentzer, and T. Stank (2010). “Logistics Performance: Efficiency, Effectiveness, and Differentiation”. In: *Journal of Business Logistics* 31.1, pp. 43–62. DOI: 10.1002/j.2158-1592.2010.tb00127.x.
- Gil-Saura, I. and M. Ruiz-Molina (2011). “Logistics service quality and buyer-customer relationships: The moderating role of technology in B2B and B2C contexts”. In: *Service Industries Journal* 31.7, pp. 1109–1123. DOI: 10.1080/02642060903100380.
- Hausmann, L., N. Herrmann, J. Krause, and T. Netzer (2014). *Same-day delivery: The next evolutionary step in parcel logistics*. URL: <https://www.mckinsey.com/industries/travel-transport-and-logistics/our-insights/same-day-delivery-the-next-evolutionary-step-in-parcel-logistics> (visited on 03/29/2019).
- Höst, M., B. Regnell, and P. Runeson (2006). *Att genomföra examensarbete*. Narayana Press.
- Hübner, A., H. Kuhn, and A. Holzapfel (2016). “Distribution systems in omni-channel retailing”. In: *Business Research* 9 (2), pp. 255–296. DOI: /10.1007/s40685-016-0034-7.
- Hübner, A., H. Kuhn, and J. Wollenburg (2016). “Last mile fulfilment and distribution in omni-channel grocery retailing: A strategic planning framework”. In: *International Journal of Retail and Distribution Management* 44 (3), pp. 228–247. DOI: /10.1108/IJRDM-11-2014-0154.
- Huttu, E. and M. Martinsuo (2015). “Differentiation value through services in a manufacturer’s delivery chain”. In: *Service Industries Journal* 35.14, pp. 763–782. DOI: /10.1080/02642069.2015.1080692.
- Janne, M. (2018). “Construction Logistics Solution in Urban Areas”. Licentiate Thesis No. 1806, Linköping Studies in Science and Technology. URL: <https://liu.diva-portal.org/smash/get/diva2:1200736/FULLTEXT01.pdf>.
- Jonsson, P. and S. Mattson (2016). *Logistik: Läran om effektiva materialflöden*. 3:2. Studentlitteratur. ISBN: 978-91-44-11077-6.
- Josephson, P. and L. Saukkoriipi (2007). “Waste in construction projects. Need for a new approach”. In: *FoU-väst, Göteborg*. URL: https://www.cmb-chalmers.se/wp-content/uploads/2015/10/waste_construction.pdf.
- Kembro, J. and A. Norrman (2019). “Exploring Trends, Implications, and Challenges for Logistics Information Systems in Omni-channels: Swedish Retailers’ Perception”. In: *Forthcoming publication in: International Journal of Retail and Distribution Management*.
- Kristiansen, K., S. Emmitt, and S. Bonke (2005). “Changes in the Danish construction sector: the need for a new focus”. In: *Engineering, Construction and Architectural Management* 12 (5), pp. 502–511. DOI: /10.1108/09699980510627180.
- Lieb, R. and B. Bentz (2005). “The Use of Third-Party Logistics Services by Large American Manufacturers: The 2004 Survey”. In: *Transportation Journal* 44 (2), p. 5.

- Lim, S. and J Srai (2018). “Examining the anatomy of last-mile distribution in e-commerce omnichannel retailing: A supply network configuration approach”. In: *International Journal of Operations and Production Management* 38 (9), pp. 1735–1764. DOI: /10.1108/IJOPM-12-2016-0733.
- Linden, S. and P. Josephson (2013). “In-housing or out-sourcing on-site materials handling in housing?” In: *Journal of Engineering, Design and Technology* 11 (1), pp. 90–106. DOI: /10.1108/17260531311309152.
- Love, P., I. Zahir, and D Edwards (2004). “A seamless supply chain management model for construction”. In: *Supply chain management: an international journal* 9.1, pp. 43–56. DOI: /10.1108/13598540410517575.
- Mentzer, J., D. Flint, and G. Hult (2001). “Logistics service quality as a segment-customized process”. In: *Journal of Marketing* 65.4, pp. 82–104.
- Meredith, J. (1998). “Building operations management theory through case and fieldresearch”. In: *Journal of Operations Management* 16.4, pp. 441–454. DOI: /10.1016/S0272-6963(98)00023-0.
- Murphy, P. R. and R. F. Poist (2000). “Third-Party Logistics: Some User Versus Provider Perspectives”. In: *Journal of Business Logistics* 21 (1), pp. 121–133.
- Olsson, P. (2018). “Purchasers and suppliers role in product development, Guest lecture by Centigo”. PowerPoint presentation. Lund University, Industrial Purchasing MTTN75, 2018-11-12.
- Östgren, Kalle (2019). *Trendbrottet bland jättarna i e-handeln: ”Är detta slutet på en era?”*. URL: <https://www.market.se/nyhet/trendbrottet-bland-jattarna-i-e-handeln-ar-detta-slutet-pa-en-era> (visited on 05/06/2019).
- Parasuraman, A., V. Zeithaml, and L. Berry (1985). “A Conceptual Model of Service Quality and Its Implications for Future Research”. In: *Journal of Marketing* 49, pp. 41–50.
- Ribas, I., A. Lusa, and A. Corominas (2019). “A framework for designing a supply chain distribution network”. In: *International Journal of Production Research* 57.7, pp. 2104–2116. DOI: /10.1080/00207543.2018.1530477.
- Rushton, A., P. Croucher, and P. Baker (2014). *The Handbook of Logistics and Distribution Management*. Fifth. Kogan Page. ISBN: 9780749466282.
- Seth, N., S. Deshmukh, and P. Vrat (2005). “Service quality models: a review”. In: *International Journal of Quality & Reliability Management* 22 (9), pp. 913–949. DOI: /10.1108/02656710510625211.
- Sundquist, V., L. Gadde, and K. Hulthén (2018). “Reorganizing construction logistics for improved performance”. In: *Construction management and economics* 36.1, pp. 49–65. DOI: /10.1080/01446193.2017.1356931.
- Thunberg, M. and F. Persson (2014). “Using the SCOR model’s performance measurements to improve construction logistics”. In: *Production Planning and Control* 25.13-14, pp. 1065–1078. DOI: /10.1080/09537287.2013.808836.
- Tiwapat, N., C. Pomsing, and P. Jomthong (2018). “Last Mile Delivery: Modes, Efficiencies, Sustainability, and Trends”. In: *2018 3rd IEEE International Conference on Intelligent Transportation Engineering*. DOI: /10.1109/ICITE.2018.8492585.
- United Nations (2018). *World Urbanization Prospect - Population of Urban and Rural Areas at Mid-Year (thousands) and Percentage Urban, 2018*. United Nations. URL: <https://population.un.org/wup/Download/> (visited on 02/18/2018).

- Vanelslander, T., L. Deketele, and D. Van Hove (2013). “Commonly used e-commerce supply chains for fast moving consumer goods: comparison and suggestions for improvement”. In: *International Journal of Logistics Research and Applications* 16.3, pp. 243–256. DOI: /10.1080/13675567.2013.813444.
- Voss, C., N. Tsikriktsis, and M. Frohlich (2002). “Case research in operations management”. In: *International Journal of Operations and Production Management* 22 (2), pp. 195–219. DOI: /10.1108/01443570210414329.
- Vrijhoef, R. and L. Koskela (2000). “Case research in operations management”. In: *The four roles of supply chain management in construction* 6.3, pp. 169–178. DOI: /10.1016/S0969-7012(00)00013-7.
- Woodall, T. (2003). “Conceptualising ‘Value for the Customer’: An Attributional, Structural and Dispositional Analysis”. In: *Academy of Marketing Science Review* 12.
- Yazdanparast, A., I. Manuj, and S. Swartz (2010). “Co-creating logistics value: a service-dominant logic perspective”. In: *The International Journal of Logistics Management* 21 (3), pp. 375–403. DOI: /10.1108/09574091011089808.
- Yin, R. (1994). *Case study research: Design and methods*. second. SAGE Publications.
- Ying, F., J. Tookey, and J. Roberti (2014). “Addressing effective construction logistics through the lens of vehicle movements”. In: *Engineering, construction and architectural management* 21.3, pp. 261–275. DOI: /10.1108/ECAM-06-2013-0058.

A Interview Guides

Interview Guide - Case Company

Name:

Position at company:

Experience at company [Years]:

Experience in industry [Years]:

Date:

Opening questions

1. How would you describe that requirements on logistics service offerings in the industry are changing?

Challenges and opportunities related to logistics services

2. What do you think are the biggest challenges, related to deliveries to the job-site, for your customers?

What responses have you seen on the market to mitigate these challenges?

3. What are the primary logistics challenges for the case company when delivering to customers according to you?

4. What opportunities do you see for the case company to improve their logistics service offerings?

5. What limitations and obstacles do you see for improving your logistics service offerings?

Trends

6. Looking back 5 years, what trends have you seen that have affected customers requirements on logistics services?

- *Technological? (Technological innovations/developments offered on the market)*
- *Organizational? (How they organize around projects and purchasing)*
- *Regulatory? (New regulations that impact their logistics)*
- *Environmental? (Environmental concerns impacting the delivery)*

7. Looking forward 5 years, how do you believe customer requirements on logistic service offerings will change?

- *What are the reasons for this?*
- *What solutions do you want to see to meet these requirements?*

Information and communication

8. From the point the customers order until they receive the goods, what information do you think is most important to receive as a customer?

9. Do you believe that your customers' needs for logistics services are communicated efficiently throughout case company's internal organization? *(If not, how could it be improved?)*

Case Company performance

10. If you compare the case company with other suppliers (competitors), how well do you think he case company performs in terms of logistics services?

11. Do you know any specific logistics services competitors offer that the case company does not?

Ending note

12. Do you believe it will be important to expand and improve your company's logistics services in the coming years ahead? If yes, in what way?

13. Is there anything else that you would like to add related to the topic that has been discussed?

Interview Guide - Customers

Name:

Position at company:

Experience at company [Years]:

Experience in industry [Years]:

Date:

Opening questions

1. How can logistics services create value for you or your company?
2. How would you say that requirements on logistics services are changing in the industry? *Why are they changing?*
3. What are the most important elements of logistics services according to you?

Challenges and opportunities related to logistics services

4. What challenges related to logistics do you experience in your company or role?
5. What are the main problems you face related to deliveries of goods from suppliers?
6. What opportunities do you see for suppliers to improve their logistics service offerings to mitigate these challenges?
7. Can you give examples of recent improvements in logistics services that has made your or your organizations work easier?

Trends

8. Have you seen any trends or developments in the market that have affected your organization's expectations on logistics services during the last 5 years? How have they affected the expectations? (*e.g. Technological, organizational, regulatory or environmental*)
9. Looking forward 5 years, how do you believe requirements on logistics services will change in the construction industry?

- *What are the reasons for this?*
- *What solutions do you want to see to meet these requirements?*

Perception of case company's services

10. What is the most common issues you experience with deliveries from the case company and their logistics service offering?
11. If you compare the case company with other suppliers, in what logistics services are they underperforming?
12. What logistics services (that you value) do competitors offer that the case company does not?

Additional questions if time is available

Delivery and information

13. What communication and information problems do you experience related to deliveries?

Ordering and purchasing

14. In what way do you impact purchasing decisions at your company?
15. If you conduct purchases, who influences you and in what way?
16. How can services related to logistics influence your decision of purchase?

Ending note

- 13 (17). Do you have any additional thoughts or comments regarding what has been discussed or the topic in general?

Questionnaire - For all interviewees

Service dimensions (Now)

To what degree are the following dimensions important in terms of logistics services?

1 = Very low degree , 7 = Very high degree

	1	2	3	4	5	6	7
Speed of delivery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication & Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Options	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

To what degree is the logistics service offer important as part of the total offer when buying products?

	1	2	3	4	5	6	7	
Very low degree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very high degree

(For customers) How likely are you to choose supplier based on suppliers' logistics service offerings?

(For case company) How likely do you think the customers are to choose supplier based on suppliers' logistics service offerings?

	1	2	3	4	5	6	7	
Not likely at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very likely

Service dimensions (In 5 years)

To what degree would you say that the following parameters are important in 5 years from now, in terms of logistics services? 1 = Very low degree , 7 = Very high degree

	1	2	3	4	5	6	7
Speed of delivery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication & Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Options	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

To what degree is the logistics service offer important as part of the total offer when buying products? (In 5 years)

	1	2	3	4	5	6	7	
Very low degree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very high degree

(For customers) How likely are you to choose supplier based on suppliers' logistics service offering? (in 5 years)

(For case company) How likely do you think the customers are to choose supplier based on suppliers' logistics service offerings? (In 5 years)

	1	2	3	4	5	6	7	
Not likely at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very likely

Performance of the case company

How would you rank the case company's performance in terms of logistics services based on the following dimensions?

	1	2	3	4	5	6	7
Speed of delivery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication & Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Options	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Importance of different logistics services (Only asked to customers)

Rate the following logistics services based on how important think it is for suppliers to offer the service.
1 = Very low degree, 7 = Very high degree.

Logistics Service offering	Rate 1 to 7
Night Delivery	
Next Day Delivery (10.00-16.00)	
Next Day Delivery Pre 7.00	
Next Day Delivery Pre 10.00	
Express Delivery (within 1-3 hours)	
Dedicated time slots delivery	
Container with stock on site	
Order and pick-up at store within 1 hour	
Order and pick-up at store next morning	
24/7 open stores	
Weekend open stores	
Weekend delivery	
Late cut off time (later than 16.00)	
Crane Delivery of larger goods	