



CHALMERS
UNIVERSITY OF TECHNOLOGY

Trend spotting of needs within B2C & B2B goods deliveries in Sweden

Meeting future needs of goods delivery with technical solutions

Master's thesis in Quality and Operations Management

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Abstract

The way to handle deliveries has been stagnant without any major changes in the last years. At the same time e-commerce is growing rapidly and new technologies are emerging that could change this. Within the B2C sector demands are being raised and within the B2B sector it is becoming more and more important to have full visibility in their supply chains. Understanding the different needs, both current and future, that exists in both sectors are therefore of necessity to evolve the supply chain operations.

Because of increasing demands and emerging technologies the thesis has investigated future needs in deliveries within both the B2C and the B2B sector. In order to achieve this purpose data has been gathered through a literature study, a market analysis, a kano survey and interviews. As a result from the literature study and the kano survey a framework consisting of the most impactful factors has been constructed to more easily structure the results within these areas. These factors are: flexibility, speed, reliability, visibility and digitalisation. The data shows that visibility and digitalisation are enablers for improvements within flexibility, speed and reliability. These three factors are in return effecting delivery time and delivery location which are linked to the B2C and B2B sectors.

The needs that are seen in the B2C sector are speed, reliability and inconvenience in home deliveries. Within the B2B sector they are speed and reliability. The solutions found that meet these needs are smart post boxes and AI. Smart post boxes are located near the customers homes providing the same flexibility regarding when to pick up the delivery as the service points today but also enables home delivery to be a viable option. AI has the potential to help companies with optimising routes and capacity. In order for AI to work to its fully potential real time visibility is needed. Real time visibility provides more data and increases the data quality which enhances the accuracy of the AI.

Keywords: Customer needs, Deliveries, Supply chain, Visibility, Real time tracking, Delivery methods, B2C, B2B

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1

Introduction

This thesis is conducted in collaboration with Centiro solutions. The given task was to investigate whether real time tracking of deliveries were something that would create value in the future of deliveries of physical goods. Since real time tracking of deliveries is a technical solution and not a need, the study aims to find the future market needs for deliveries and thereby investigate what technological solutions are needed to fulfil the needs.

1.1 Background

A customer need can be defined as "Problems that customers intend to solve with the purchase of a good or service" (Business Dictionary, 2019). The needs change over time as the product or service improves and more services or features are added to the product, the customers expectations follows. Meaning that services or features that are seen as attractive might develop in to being expected services or features over time (Bergman & Klefsjö, 2010).

New technologies are emerging at a high speed. With the rapid development there are crucial decisions that the companies must take in order to survive on their market. The companies must decide how to respond to new emerging technologies since there is a risk that the established product, service or solution could become outdated. If this is the case, and the established companies fail to commit to the new technologies, business can be lost to newcomers that builds their company around the new technologies. (Birkinshaw, 2018)

In today's competitive market an increased focus on services have become important for companies to develop a good customer experience. Today customers have many options regarding different service packages and it has therefore become vital for companies to develop services that stands out and fulfils the customer needs (PostNord, 2019).

According to Cárdenas et al. (2017), e-commerce is a consumer driven economy. Deliveries has therefore become more important than ever since it is a good way to differentiate oneself from the competitors. Investments in new solutions for delivery is therefore a vital part for the retailers in order to stay competitive in the market. (Lim et al., 2018).

The market is changing rapidly within the retail industry. This is because of the change in customer's online behaviour. E-commerce have had a huge growth the last decade and online shopping has been increasing yearly at a high rate, which has resulted in a 25 % yearly increment for the last ten years for e-commerce within the B2C sector. This increment of deliveries has caused problems for companies working with services concerning delivery, especially within the area of home deliveries and in the last mile. (van Duin et al., 2016)

Companies often measure delivery performance using different KPI's looking at speed, and delivery precision (Peng & Lu, 2017). Flexibility is used for measuring the delivery performance and can contribute to increased customer satisfaction. (Beamon, 1999) Visibility, or rather the lack of it, is one of the biggest issues today in the supply chain (Cassidy, 2018). Digitalisation and the concept data driven supply chain is a result of more and more collected data. This way the collected data will plan and control the supply chain.

Deliveries is often associated with speed. However success in last mile delivery is also connected to the convenience for customers through adaptability. Especially today when customers are expecting to a greater extent to decide where, when and how to get their delivery (DHL, 2018b). In Sweden the most popular delivery method is delivery to service points. This is likely linked to the want for flexibility to pick up their package when suited (PostNord, 2019).

Speed is considered to be an important aspect in delivery performance. As mentioned above Peng and Lu (2017) breaks down delivery performance into two main indicators, speed and reliability. Lead time is another word for speed and has been found to be an important factor for the buyer, supplier and Third Party Logistics companies (TPLs) (Sohn et al., 2017).

Reliability is the other main indicator for delivery performance besides speed mentioned by Peng and Lu (2017). From a kano survey reliability was considered a must-be quality for some parties (Sohn et al., 2017). One factor that have become very important is closing the ETA-window (Estimated time of arrival). It is appreciated from a customer perspective to know more precise when their delivery will arrive. In order to do so continuous updates are used today in order to inform the customer when to expect the delivery. In last mile delivery a few companies has started to use real time tracking visualised for the customer. This is today mostly done for home deliveries, especially with food deliveries (Shiner, 2018).

Visibility in supply chains is a crucial aspect in order to gain control of the supply chain. In order to create visibility in the supply chain and to make improvements to a companies capabilities and strategies collection of data is a necessity. Collecting data is seen as the first step to move towards a new trend called data driven supply chain (Cassidy, 2018). Data collection on location, weather, traffic, natural disasters and more are the enablers for the supply chain to become data driven.

Data driven supply chain is a potential future where data collection and data han-

ding is the key enabler (Yu et al., 2018). Making the supply chain data driven means that you plan and control your supply chain through collection of data in real time and moving towards digitalisation in the supply chain area.

Centiro Solutions is a company selling and supporting a cloud-based supply chain software used for transport management, supply chain visibility, e-commerce fulfilment, reverse logistics and service delivery. Their customers are companies within both the B2C and B2B sector and mostly handles last mile deliveries.

There is of high importance to find solutions for deliveries that provides great value for the customer. Therefore Centiro have an interest in exploring future possibilities for new technologies. Having knowledge of a possible future means that you are ready to enhance their solution with regard to how the market might develop over time, and how the needs might change for B2C customers as well as B2B customers.

1.2 Purpose

In a market where customer expectations are constantly changing there is a need to find new solutions to fulfil customer expectations. Expectations can also differ depending on the line of business in the B2B sector and between B2B and B2C. Therefore the purpose of this thesis is to explore future needs for deliveries in the B2C sector and the B2B sector and to explore possible technologies that could fulfil these needs. This is done by looking into solutions for the physical distribution of the packages but primary how to meet the needs that will arise in the future.

1.3 Research questions

In order to achieve the purpose of this thesis three research questions have been formulated which when answered will result in fulfilling the purpose.

As the Kano model states the needs changes over time, attractive qualities for a service or a product becomes one-dimensional qualities and soon must-be qualities (Bergman & Klefsjö, 2010). To understand how the future needs of a product or service will develop over time it is vital to understand and use the current needs and the current attractive qualities as a basis for future needs. It is therefore of importance to understand current and possible future needs to find solutions. In order to structure the work with needs, a framework of important factors will be constructed for easier evaluation. This motivates the research question:

RQ1: What are the current customer needs for deliveries of goods within the B2C sector and the B2B sector and how can they translate into future possibilities?

Today new technologies are being developed at a rapid speed. In the future these technologies could change society and bring new possibilities for companies working

in all areas. In established industries it is crucial how you respond to new technologies that could make the current established product, process or solution obsolete. There is a risk of losing to newcomers in your area if you fail to commit to the new technology whilst newcomers build their company around it (Birkinshaw, 2018). It is therefore vital to understand what technologies and trends that are emerging and what possible future solutions there are. This motivates the second research question:

RQ2: What technological solutions are needed to support the future needs?

Today many companies are using computer systems that cannot handle the amount of data that is being created, as well as systems that are not suited for their purpose (Grable & Lyons, 2018). It can also be a complex task to change an already implemented computer system. This could lead to barriers implementing new technologies that could enhance the efficiency in deliveries. If those aspects are identified, solutions to realise the implementation can be investigated. Implementing new technologies into the area of supply chain will be costly. Which party that is responsible for implementing what in this development is uncertain today. This motivates the research question:

RQ3: What are the means for realising the implementation of new technologies in deliveries?

Implementation of new technologies and new solutions in the field of deliveries and in the supply chain has an impact on Centiro. It has the potential to bring forth new possible functions in their solution in order to meet their customers' needs and gain competitiveness. The voice of customers in different industries can show where to put focus in the nearest future. This motivates the research question:

RQ4: What are the future possibilities for Centiro with regard to their customers?

1.4 Limitations

The focus of the thesis is to explore future possibilities and solutions within the supply chain. Therefore the report will not in detail go into the technical requirements of these solutions. Focus is on how the technology could be used.

The report is structured in five themes that works as a red thread throughout. These are flexibility, speed, reliability, visibility and digitalisation. This means that other aspects such as regulations and environmental issues are not the main focus of the report but is brought up in the themes. Visibility is more than just real time tracking and knowing the location. It also includes traffic, weather conditions and more. In order to narrow down the scope the main focus on visibility is on tracking.

The main focus considering geographical aspects is on Sweden. This is because the data from the kano survey are in a majority from swedish respondents and a majority of the interviews were held with swedish companies. Solutions being used and tested in other countries are however brought up in the report.

2

Method

This chapter presents the research strategy and research design and method of the study. For the study, an inductive approach have been used. The thesis were based on a literature study, Kano survey, interviews and a market analysis of current delivery options. The research is of both qualitative and quantitative nature and a mixed research strategy was therefore used.

2.1 Research Strategy

An inductive study was carried out, meaning that a theory was built on the findings from the thesis (Bryman & Bell, 2015). The six step method, presented by Bryman and Bell will be used. The method suggests that the research starts with research questions ends in a conclusion and in between there is an iterative process. In the iterative process you tighten your specification of the research questions and collect additional data outside of the initial data collection to answer the questions (Bryman & Bell, 2015). The six step method is illustrated in detail in Figure 2.1. Both qualitative and quantitative data were collected in order to answer the research questions. Different data sources were therefore used and therefore triangulation is done. Triangulation means that more than one source of the data is used in order to study an area and check for validity (Bryman & Bell, 2015).

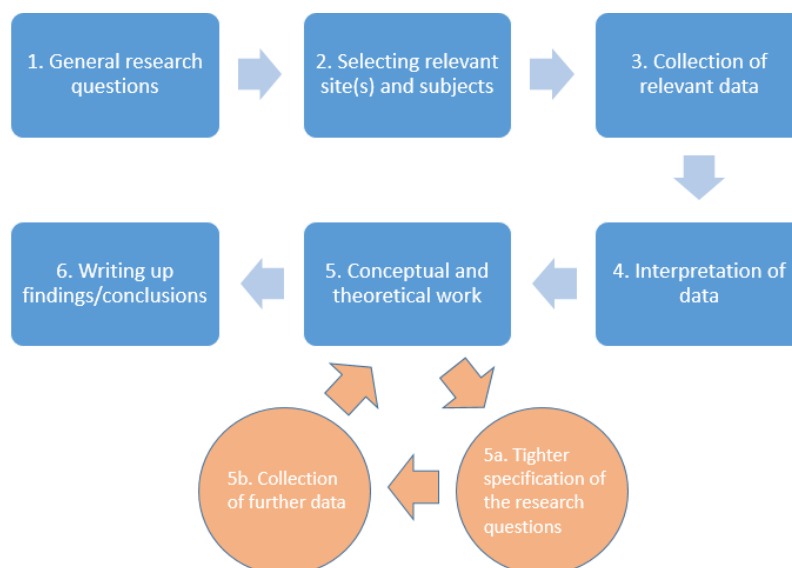


Figure 2.1: Six Step Method

2.2 Research Design and Method

This section will present how the research was designed and executed. It will include how the literature study was carried out, how a market analysis was performed, how the kano survey was designed and how the interviews were planned and carried out. A short description of the company who took part in the interview and the interviewee's role at the company is also presented. The literature study, the kano survey, the market analysis and interviews served as data for the analysis. The analysis was done with an inductive approach, meaning that conclusions were drawn from the data collected. The research design is illustrated in Figure 2.2.

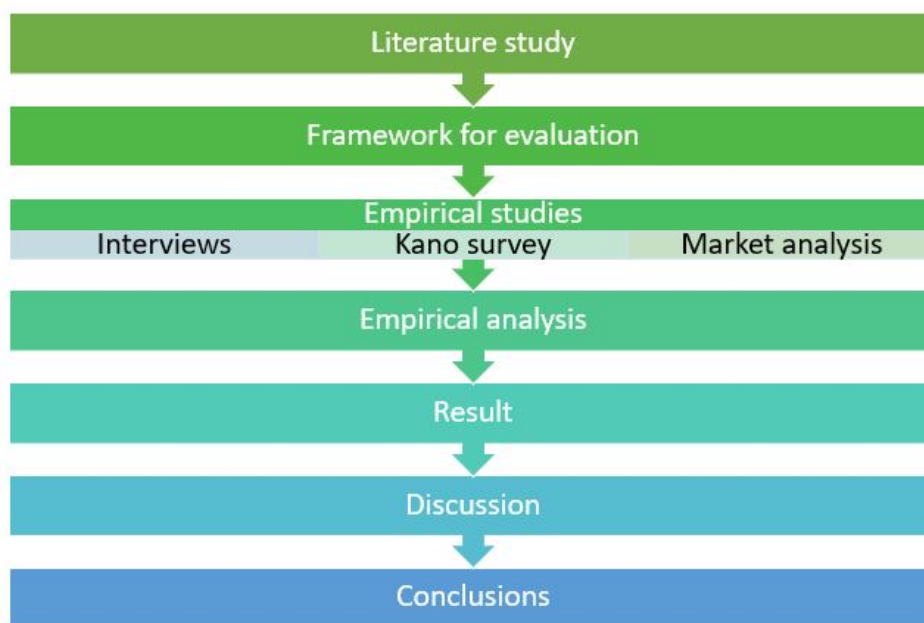


Figure 2.2: Research Design

2.2.1 Literature study

Data were collected by a literature study, were previous research within the area were studied and used as a basis for the interview questions, a customer survey and as a basis for the discussion. The literature consisted in a majority of published papers received through searches in the Chalmers library but also reports published by logistics players in the market. Since the six step method were used new data was added throughout the project and the research questions was revised continuously.

2.2.2 Framework for evaluation

In order to to get a structure when working with current and future needs a framework for evaluation was constructed from the literature study. This framework

serves as a way to easier describe the factors that effects satisfaction within both B2C and B2B customers. The evaluation framework consists of five factors and two major themes regarding delivery. The factors were linked to certain categories which made it possible to construct the framework accordingly to those categories. The framework was used when constructing the empirical studies, result and discussion.

2.2.3 Empirical studies

The empirical study consists of a market analysis of the current range of delivery options, a Kano survey and interviews with 6 different companies working with deliveries. The result from the empirical studies are presented in chapter 2.2.4.

2.2.3.1 Market analysis

A market analysis was done in order to understand the current range of delivery options. Research was done on the websites of different companies offering delivery. 100 retailers in different line of business were studied. The lines of business were chosen in order to have a broad set of different industries within e-commerce. The retailers involved were then chosen randomly to fit into these lines of business.

The analysis consisted of number of delivery options, number of carrier companies, how fast is standard delivery, how fast is it possible to get the delivery, is collect at store a possibility, is home delivery a possibility and is delivery to smart box a possibility. The retailers were categorised according to their line of business in order to make comparisons between the retailers in those segments through tables. The mean values in the tables are rounded off to the nearest percent. In order to get coherent and fair results, the same postal address in the city of Gothenburg was used when the study was conducted. For some companies data points are missing due to it not being presented explicitly. This results in that some of the graphs presented has different amounts of retailers.

Two of the companies providing home delivery with visualised real time tracking were tested and evaluated further. These companies are referred to as Company A and Company B. Both of these companies are relatively new players on the market and work with last mile delivery. Both deliveries tested were sent to the same postal address in case there could be any differences depending on the delivery location.

2.2.3.2 Kano survey

A customer survey was conducted in order to get an understanding on how different attributes of deliveries impacted the customer satisfaction. In order to do this the survey was performed as a kano survey and was constructed with one attribute linked to two questions, one functional and one dysfunctional. The attributes tested in the kano survey comes from findings from the literature study. The attributes is linked to the factors in the framework and results from the kano survey tightened the framework. By doing this the attributes could be categorised to what extent they were impacting customer satisfaction (Mikulic & Prebezac, 2011). Apart from

categorising the attributes the satisfaction coefficient (SC) and dissatisfaction coefficient (DSC) was calculated according to the equations in Figure 2.3 & 2.4 (Sohn et al., 2017). The survey went through several iterations and a focus group was used to examine the survey before it was distributed out through several social media outlets and thereby randomly selected. The focus group consisted of 5 fellow students that did not have previous knowledge about the subject. The number of respondents were 72 but due to some technical errors there were 68 responses for four of the attributes. The four attributes this concerns is: real time tracking of delivery in short time span, real time tracking of delivery in long time span, visibility before ETA-window short time span and visibility before long time span. The four missing respondents could not have changed the categorisation of the attribute, but could have slightly changed the satisfaction and dissatisfaction coefficient.

The categorisation of the attributes is done by pairing the answers on the functional and dysfunctional questions according to the kano evaluation table, and then categorise the attributes after the the most frequent category (Sohn et al., 2017). The possible answers are: I like it that way, I expect it that way, I am neutral, I can accept it that way and I dislike it that way. The possible categories for the attributes are: Attractive quality (A), One-dimensional quality (O), Must-be quality (M), Indifferent quality (I), Reverse quality (R) and Questionable quality (Q) (Mikulic & Prebezac, 2011).

$$SC = \frac{A + O}{A + O + M + I}$$

Figure 2.3: Equation to calculate the satisfaction coefficient

$$DSC = \frac{O + M}{A + O + M + I}$$

Figure 2.4: Equation to calculate the dissatisfaction coefficient

2.2.3.3 Interviews

In total 6 interviews were held at 5 different companies. The questions for the interviews arose from findings during the literature study but also results from the customer survey. The five factors of the framework consisting of: flexibility, speed, visibility, reliability and digitalisation worked as the skeleton in which the questions would correlate to one or more of these themes. The questions asked were in majority the same but some of the questions changed dependent on what the focus of the company was and in what industry and segment they worked in. At the end of the interview the interviewee was asked if there was anything that they wanted to add, giving the interviewee a chance to fill in if they felt something of value was missing. Interviews were held both in person and through skype or telephone, where in person was done to the extent it was possible geographically. During the interview notes were taken but the interview was also recorded if there was consent in order to

be able to go back and listen to the interview again. The results from the interviews are presented in 4.3. Answers from the interviews were summarised and is presented according to the five themes mentioned above. When more than one interview was held at a company the combination of those interviews were summarised under the same section.

2.2.3.4 Companies

In this section a short description of the companies that the interviewee is working at is presented as well as the companies which just was a part of the market analysis. The role of the interviewee is also briefly described. The companies will be assigned a letter and when mentioned will be referred to as said letter. The companies are also briefly introduced in Table 2.1.

Company	Industry	Position of interviewee
Company A	Home Delivery	No interviewee
Company B	Home Delivery	Business developer
Company C	Carrier e-commerce	Product owner
Company D	Carrier B2B	IT-manager, Supply chain
Company E	Construction	Hired consultant, digitalisation
Company F	Manufacturing	System owner & Manager, aftermarket

Table 2.1: Brief description of the companies

Company A

The company is working home deliveries with last mile delivery. They work with date-based deliveries meaning that the customer decides the date that the delivery will occur. The delivery time is during the evening.

Company B

The company is working with last mile delivery to the consumer's residence. They are operating in Sweden, Norway and Denmark. They work with date-based deliveries, meaning that the customer decides the date that the delivery will occur. The time of delivery is on evening between 6 pm and 10 pm. The size of the packages they deliver are limited to 20 kilograms. They currently cover 70 % of Sweden with their service. The interviewee worked at the company with business development in the home delivery area.

After the interview, some information about smart boxes was lacking and four questions was sent out to the interviewee via e-mail. The results from these questions are presented in Section 4.3.1.1.

Company C

The company's focus is on e-commerce within B2C sector. They also have some B2B but not from the office where the interviewee is working. Their strength is in cross-border transportation and the main areas are USA and Australia. Everything

that is used in the supply chain is outsourced to other parties such as fleets and hubs. The company is still responsible throughout the chain and to the end-consumer. The interviewee is working as a product owner and with evaluating new products and solutions. The evaluation is from a technical perspective and how these solutions would fit into their chain and what it would cost.

Company D

The company works globally with transportation. They are working both in the B2C and B2B sector but the interviewee works within the B2B sector of the company. The company works with transporting goods to warehouses where they outsource their last mile delivery to carriers. The interviewee works as a manager in IT in the Supply chain department of the company.

Company E

The company works in the construction industry with equipment such as tools and machinery and delivering these to the construction sites. The goods is transported with external carriers to their customers, meaning that they do not own any transportation vehicles themselves. The interviewee from the company is hired to work with digitalisation at the company. Two separate interviews were held with this interviewee.

Company F

The company works in the manufacturing industry. They have both internal transports and buys in transports from third party logistics companies. Most of their transports works on a set schedule. During the interview two interviewees from the company participated. The first works a system owner in the logistics department. The second works in the aftermarket in close contact with their customer to satisfy the needs in their stocks.

2.2.4 Empirical analysis

The result from the empirical studies are presented in this chapter. Only the parts that were most relevant to the study was presented. The result is summarised and presented in connection to the five factors for evaluation found from the literature study.

2.2.5 Results, Discussion & Conclusions

The results are set up so that each of the research questions presented in Section 1.3 are answered in the order presented. The answers to the research questions are based on the results that is presented from the literature study, interviews, market analysis and kano survey.

The discussion is set up so that the subsections under the research questions in results are discussed. Therefore current needs and possible future needs are firstly discussed. This leads into new technologies and solutions to meet the needs discussed

earlier. The discussion ends with development drivers, challenges, further research and possibilities presented for Centiro.

The conclusions is drawn from the result of the study.

2.3 Ethics

When the interviews were held four main ethical principles were taken into consideration. Harm to participants were the first principle, where the participants had the right to be anonymous during the interviews. All of the respondents in the kano survey was also anonymous. The second principle were lack of informed consent, meaning that the participants were informed of what the result of the research were to be used for. The third ethical principle that were taken into consideration during the thesis was invasion of privacy where the participants had the ability to not answer questions or to stop the interviews at any time. The last ethical principle was to avoid deception, the purpose of the research and what the answers would be used for were clearly stated and followed. (Bryman & Bell, 2015)

2.4 Trustworthiness

Majority of the research is of the qualitative nature which means that the quality of the research or trustworthiness will according to Bryman and Bell (2015) be assessed by four criterias: credibility, transferability, dependability and confirmability.

Credibility is seen as internal validity and is the criteria for how valid the research is. In order for the research to have credibility it is important to minimize losses and miss-interpretation of answers during interviews. This was done by either recording, if possible, or documenting the answers in writing. Transferability is the ability to draw general conclusions on a topic from the research. The thesis is conducted at one company, however the findings should not just be applicable to said company. The literature study will serve as a way to draw general conclusions. Dependability is to what extent the research can be recreated. In order to achieve this every step of the research is documented and made assumptions are clearly stated. Confirmability is the criteria that measures objectivity in the research. With qualitative data there is a need for interpretation. Minimizing the objectivity is done by including all authors in the interpretation of the data as well as using supervisors both at Centiro and Chalmers.

3

Literature study

This chapter presents the result from the literature study made. The literature study is used as a base for the framework of factors evaluation, empirical study, the result and discussion. The literature study consists of previous research within the field of study and is linked to the research questions of the study.

3.1 Current state

During 2018 there was a 15 % growth of e-commerce in Sweden, bringing e-commerce at 9,8 percent of the retail sales (PostNord, 2019). Millennial consumers is the generation that have been growing up during the rapidly technological development. This generation does not only use and adapt to new technologies within the supply chain management, they also expect companies to make use of these new technologies for their benefit. They expect visibility, speed, accuracy, selection, reliability, sustainability and economical delivery. (Vyas, 2016)

Millennial consumers can be divided into two different groups with different expectations on their deliveries. The first group is customers living in urban areas, this is the most demanding customer group and they are expecting the delivery to arrive when and where they need it. They expect the delivery to adapt to them and not the other way around. The second group consist of customers living in rural areas, this group expects close communication about when the delivery will arrive and where they can go to collect their goods.(Holgerson, 2017)

Drivers that have a great impact on the increase in e-commerce and the consumer behaviour are technology development as well as global reach, reduction of cost, no constraints in opening hours, lower inventories, home deliveries and high degree of availability. (Turban, 2018)

3.1.1 Customer requirements on deliveries

Today, consumers are more urbanised, connected and shops online more than before. They have high expectations on the products and services that are provided for them. The online shopping experience is strongly connected to making the last mile delivery fit the customers expectations. Last mile delivery experience is strongly connected to the number of delivery options and the provided time window for delivery.(DHL,2018b)

Consumers want to be able to select the delivery method that fits them the best. More than 8 out of 10 consumers find the freedom of choice important when it comes to delivery method and it can be one of the determining factors when selecting where to make the purchase. Having the ability to select delivery method is more common in urban areas than in rural areas. Although freedom of choice is important, speed is one of the factors connected to customer satisfaction (PostNord, 2019). When the same study were carried out in 2017 four out of five customers stated that it is important to be able to choose the delivery method used, but only 53 % were able to choose their latest delivery. The importance of choosing once delivery method can also be translated into transactions and money, because 29 % have decided not to go through with a transaction because of the lack of choice of delivery and 18 % have chosen another company to order from because of the lack of preferred delivery method (PostNord, 2018).

Regardless of if goods are consumed in a physical store or online, the focus on the customer experience have increased. Customer focus is vital in order to survive on the market today. The customer today is getting more and more comfortable with making purchases when, where and how they like. Their expectations on the deliveries and payment options are constantly getting higher and companies therefore have to lie at the forefront regarding rising trends within these areas in order to be able to compete (PostNord, 2018), (PostNord, 2019).

Providing the customer with delivery status is something that the customer are expecting, if this is not provided customers tend to be very dissatisfied. 89 % of the customers think that it is important to be able to track the delivery status of the products while 84 % thinks that it is of great importance to get a specific delivery date for their order. Although 89% of the customers thinks that it is of great importance to have the ability to track their delivery, 45% of the customers does not use this service, 22% checks on their delivery once, the remaining percentage checks on the delivery status between 2-5 times during the delivery. One of the reasons for not checking on the delivery status is that many apps provide this service automatically and the customer does not actively have to look it up themselves. Customer does not only want to know when, where and how their delivery is to be delivered, they also want to be notified if the delivery is delayed.(PostNord, 2019)

The most important thing for consumers when it comes to deliveries is information about the delivery and how the goods are being delivered. Nine out of ten people believes that it is important that the companies communicate the status of the delivery. However when asked how many times the consumers looked up their delivery status it did not seem so important. Arne Andersson, senior advisor at PostNord says that "Consumers wants to know when the item is coming not just follow the item during the delivery. It is therefore important for companies to communicate this already in the checkout". This quote is directly linked to the fact that 4 out of 5 answering PostNord's survey answered that it is important that there is a given date for when the delivery shows up. (PostNord, 2018)

Independent on what industry you are in, customers expectations on the delivery process is constantly increasing and real time tracking is becoming more important as the digital supply chain develops. A survey made by UPS showed that 50 % of the respondents thought that tracking was essential, a must-be quality, and 47 % thought that tracking of the shipment was a nice extra feature, attractive quality ('The Digitalization of the Supply Chain', 2018).

3.1.2 Delivery methods

The most common way of delivering goods in Sweden is delivery to service points. This is something that works well and there is no sign of this changing. The high popularity in collecting goods at a service point today is likely to be connected with that the customer can pick their goods up when it fits them the best, many people do not like to spend time in their home waiting for a delivery. Another delivery alternative that is very common is home delivery without quittance. Today, groceries are delivered either by home delivery or by "click and collect" via the local store. (PostNord, 2019) A detailed overlook over how consumers prefer to get their delivery compared to how they got their delivery can be seen in Table 3.1 (PostNord, 2018), (PostNord, 2019).

Consumers today have a very low willingness to pay concerning home deliveries. In 2017 only one out of ten said that they would pay 50 SEK in order to get their delivery to the door within a 2 hour time-span rather than collecting the goods at a service point. It is the flexibility consumers feel with collecting the goods when it fits their schedule in combination with that it is cheaper that makes them prefer service points. (PostNord, 2018)

The importance of keeping a good communication between the customer and the carrier is increasing, this is connected to delivery precision. The accepted time window for delivery is decreasing and customers do not want to be kept waiting in their homes (Holgersson, 2017). Failed deliveries is one of the main issues with home deliveries since that will result in a re-delivery of the goods which is costly. These failed deliveries happens when the customer is not at home. When this happens the carrier will try to deliver the goods several times more before it is either transported back to the shipper or to a terminal where the customer can pick it up. This has the risk of resulting in a lot of costly rework (van Duin et al., 2016). To solve this problem there are solutions like lockers, parcel drop boxes and collection at service points (López, 2016).

Even if there is an increasing trend for home deliveries, the number is not very high compared to other delivery methods. As shown in Table 3.1, the majority of the customers still prefer to pick the goods up at a service point compared to the other alternatives tested in the survey.

Delivery method	Actual 2017	Actual 2018	Preferred 2018	Gap 2018
Service point	61%	66%	39%	-27%
Physical store	2%	2%	1%	-1%
Package dispensers	1%	1%	4%	3%
Home delivery, day	2%	4%	3%	-1%
Home delivery, evening	1%	2%	11%	9%
Postbox	24%	18%	28%	10%
Outside your door	5%	3%	10%	7%
At work	0%	0%	1%	1%

Table 3.1: Current delivery methods from 2017 and 2018 compared to how consumer wants their delivery in 2018

3.1.2.1 Special cases

Consumers prefers different delivery methods depending on the type of goods. For example with ungainly goods like groceries and goods that are not easy to carry, consumers are more likely to want it delivered to their door during the evening (PostNord, 2018). Depending on the goods customers also tend to have different requirements regarding home delivery and delivery to a service locker or service point. A high volume and the weight of the goods have a big impact on how the customer look at the importance of home delivery. This concerns goods like consumer goods, household products and furniture etc. (López, 2016)

It can also differ depending on the country, Holgersson discusses how the trend for deliveries is developing in Sweden compared to UK, where e-commerce is more common. In the UK, home deliveries were previously the most common way of delivery but as e-commerce were growing deliveries moved from home deliveries to service points, and now post boxes are the most common form of delivery in the UK. In Sweden on the other hand, the development have moved from post boxes to home delivery. He talks about the importance of delivering goods to where the customer is and that home deliveries might not be the most efficient type of delivery, instead he talks about smart post boxes placed where the customer visits often (Holgersson, 2017).

3.1.3 Company perspective on deliveries

The relationship between the buyer, supplier and third party logistics service provider (TPL) is common to analyse in order to understand service quality. A study carried out by Sohn et al. (2017) uses a Kano survey to make an assessment on how these three different players in the market sees different attributes concerning service quality. In this study the buyer was a manufacturer of semiconductors. A Kano survey is a way to measure the effects of functions towards satisfaction and dissatisfaction. The attributes can have five different effects: attractive quality, must-be quality, one-dimensional quality, indifferent quality and reverse quality. The attributes are categorised in these segments depending on the relationship between a function and

customer satisfaction. The study consisted of 30 attributes divided into different factors and further divided into three categories: outcome quality, process quality and capability quality. A clear majority of the attributes was categorised as a one-dimensional quality by buyers, suppliers and TPLs meaning that the customer satisfaction is proportional to how fulfilled the function is.

An interesting takeout from the study is that both visibility attributes: equipped with tracking system and real time delivery tracking were one-dimensional. What stood out the most in the study was that outcome quality was seen as a must-be quality amongst buyers whilst it was more one-dimensional amongst suppliers and TPLs. Outcome quality concerns reliability, condition, cost reduction and lead time. The only attribute seen as a must-be quality by all parties was lead time. (Sohn et al., 2017)

Delivery performance factors is a way for companies to choose their suppliers. It is unclear what the effects is of a high degree of delivery performance but it could result in a higher price and more orders (Peng & Lu, 2017). Peng and Lu (2017) describes delivery performance as two main indicators, reliability and speed, which is then broken down to four indicators: on-time delivery rate, early delivery accuracy, late delivery accuracy and delivery speed. Often you have to make a trade-off between reliability and speed since shorter lead times has an impact on the reliability.

In a competitive setting it has become crucial for businesses to cut cost and be more efficient in order to survive in the market. A mean to achieve this is using the Just-In-Time (JIT) principle which means that the shipments are small and frequent, often from domestic suppliers. The shipments should be just enough in size until the next shipment. In order to achieve this a change must be made in the logistics providers transportation network (Mo & Cook, 2018).

3.1.4 Tracking technologies

Radio Frequency Identification and Detection (RFID) and Global Positioning System (GPS) are different technologies that can be useful when tracking goods in real time. GPS is a good way to keep track of the goods during transportation. RFID can be used to identify objects with a RFID tag through a RFDI reader. This way you can know what object is in a package. Together they can be effective in logistics because you can follow a shipment with GPS and the RFID does not allow wrong deliveries. If you connect these together in a system you can send data in real time (Prasanna & Hemalatha, 2012). Combining the two can grant a lot of data since you will get discrete data from the RFID tags and continuous data from GPS (Lam & Ip, 2019).

5G networks are on their way to becoming a reality. Several disruptive technologies will be included in the 5G network and some will help increase location accuracy. The 5G network is reported to have an accuracy from ten meter to one meter in 80 % of the occasions, whilst indoors the accuracy is even better than one meter.

The 5G network will make the network more dense and will create more device to device communication. These two things will result in the possibility to implement something called cooperative localisation in the 5G network. Cooperative location will reduce the delay where the device connects with nearby base stations which is a necessity in order to achieve control in for example autonomous vehicles (Zhang, P. et al.,2017). 5G has the potential to create new tracking devices and tags that could be used in logistics. It has the possibility to make real time tracking possible both indoors and outdoors, and maybe even on a global scale. One of the revolutionary things with 5G is the possibility to tailor it to your needs by doing something called network slicing. Depending on the user it could be more interesting with download power, low-latency or low power consumption (DHL, 2019).

3.2 Future supply chain trends

Experts believe that the volume for e-commerce will double by 2022, this will in turn increase the expectations on the delivery methods and handling of higher flow of packages. The service points will probably not be able to meet the increased volume and new delivery methods are needed. Home deliveries need to be more convenient and there will be a need for "package dispensers", large post boxes close to our homes or alternatively to leave the packages outside the door. It is important that companies adapt to the rising trends regarding delivery methods, since the delivery methods offered to the customer can determine if the customer selects to purchase goods from them or from a competitor. (PostNord, 2019).

The key drivers for success in the past decades have been efficiency, standardisation and low cost. Today, and in the future this is not enough. Digitalisation is now vital to be able to compete on the market, the main drivers for this change is the technological development but also the customer group called "digital natives" which needs change according to new technology since they have the ability to adapt to these new technologies rapidly. (Bamberger, V., 2017)

A big issue that companies face regarding this change is struggle of using old systems and complex processes that keeps them from keeping their competitive edge. Instead of fighting the new technologies they need to renew and decide what new technologies to focus on and use to their advantage. (Bamberger, V., 2017)

There are four big trends that characterises logistics 4.0. These are:

New methods for physical transportation: Autonomous vehicles, handling robots and drones provide great value for the companies that have adopted to this new technology.

Data automation and transparency: Digitisation contributes to a greater amount of data, which enables companies to optimise route networks, optimise the number of trucks and tracking deliveries in real time. This type of real time data enables new disruptive technologies like omniscient control towers (that delivers end to end visibility within the supply chain), artificial intelligence and augmented reality.

Digital platforms: This is the most disruptive change that enables companies to easily manage their shipments.

New production methods: New production models like additive manufacturing and 3D have an impact on how the logistics system will be built up. This revolutionising ways of manufacturing enables a more decentralised business model which requires last mile customisation. (Bamberger, V., 2017)

3.2.1 Delivery methods in the future

The demands of the urban consumers will continue to increase in regard to convenience, flexibility and cost. Looking at how the goods is transported today, not much have changed during the last 30 years except from fuel efficiency and tracking technology. Drones for example have many potential benefits both in speed and flexibility of the delivery, and it is autonomous (Vyas, 2016). In a report by (DHL, 2018b) it is stated that there are four areas that the logistic companies must consider in order to keep their competitiveness and meet expectations from the customers. These are: Localised delivery networks, Flexi-delivery solutions, Seasonal logistics and Evolving technologies. Evolving technologies is presented in Section 3.2.2, the others are presented below.

Localised delivery networks:

The urban customer are moving towards demanding faster and more flexible deliveries. This requires delivery networks to become more localised and shift the supply chain focus from regional to last mile deliveries. If companies are working closer to the cities the possibility of using environmentally friendly carriers increases, this also goes alongside pollution-regulations in city centres. (DHL, 2018b)

Flexi-delivery solutions:

Industry experts state that a successful last mile delivery is not only connected to speed but connected to delivering convenience through adaptability. Customers are beginning to expect to be able to select when, where and how goods are to be delivered. There are several flexible solutions already developed like two way logistics performed via smart boxes. In Spain they have developed something called Citibox which offers the ability for drop of and pick up arranged by smartphone. These boxes can be installed in apartment buildings. Lockers placed in locations visited often offers a high level of flexibility since the customer can pick the goods up when it is suitable for them. (DHL, 2018b)

Seasonal logistics:

E-commerce have increased a lot for regional and commercial holidays like black Friday, valentine's day, mother's day and Christmas. These seasonal increases in volume can only be handled in increase of efficiency, for example by hiring extra personnel. This is something that tends to be very expensive. (DHL, 2018b)

To increase the competitiveness within deliveries, companies should develop their operations to be more flexible, automated and allow for data management. There is a difference in the requirements depending on the market, this means that companies do not have to be successful in all three areas but need to adapt to the needs

of their chosen market (DHL, 2018b)

In the reports "e-barometern årsrapport 2017" and "e-barometers årsrapport 2018" conducted på PostNord they asked consumers in Sweden how they would want their deliveries in the future. The respondents could choose several alternatives as being preferable. The different ways of delivery, percentages from the years 2017 and 2018 and the difference between the years are presented in Table 3.2 (PostNord, 2018), (PostNord, 2019).

The customers who most frequently buy goods online wants their deliveries to a locked box near their residence and their delivery to show up the same day as the order is placed. In order to keep the growth within e-commerce it is therefore important for e-commerce companies and logistics players to bring forth these delivery methods. When it comes to new technology enabling new ways of delivery people under 30 years and men are more willing to use these. This concerns drones, automated vehicles and one-time codes. (PostNord, 2018)

Ways of delivery	2017	2018	Increment
Locked box near your residence	42%	58%	16%
Delivery the same day as the order is placed	35%	55%	20%
Package dispensers	24%	36%	12%
Delivery where you are in one hour	11%	35%	24%
Delivery via automated vehicles	18%	29%	11%
Delivery via drones	13%	23%	10%
Delivery into the house through a one-time code	13%	16%	3%
Delivery to your car via the trunk	10%	13%	3%

Table 3.2: How swedish consumers wants their delivery in the future

Amazon in the UK and the USA is currently offering one-day delivery, same-day delivery during the evening and in some cases in UK a 2-hour delivery. All of these options are dependent on where you live and is also available for certain items. Naturally it is less items the shorter time you want to wait. In some locations these alternatives are not an option. (Amazon, 2019a), (Amazon, 2019b)

More and more devices are being integrated and connected to each other. This is something that can be used in logistics to improve the service quality for the customers but can also be more environmentally friendly and result in cost savings for both retailers and for the third party logistics companies. One of the main areas where connectivity can be used is for deliveries to your home. Smart locks which can allow for the delivery to be placed in your home without anyone being home and the possibility to leave packages in the trunk of your car. This would result in less failed deliveries and as a result less delivery attempts which would lead to cost saving and less gas emissions. As with anything connected there are risks with data security. With these delivery methods there are also trust issues that needs to be overcome and an integration problem because of different systems in need of communication between each other. (DHL, 2018a)

3.2.2 Data Driven Supply Chain

One of the biggest issues today in supply chains is the lack of visibility. Real time tracking was before seen as the goal, now it is seen as the starting point for a development to increase capacity and match tighter time windows. By collecting data when tracking goods, decisions can be made more quickly and be used for decisions in the future (Cassidy, 2018). Collection of data has the possibility to create insight for improvements in capabilities and competitiveness. This can be done through using collected data for control and planning, watching inventories and optimise production for manufacturers. Big data analytic is a quite new concept which currently is not used to its full potential. With the use of big data, supply chain management could move into being data driven (Yu et al., 2018). Many companies have the routes for last mile delivery planned manually which is very time demanding. There are technologies like geo-map reading where real time traffic information, artificial intelligence and cloud computing is used to plan the routes. This system is also able to find alternative routes if needed. This new technology can help to improve last mile efficiency by 20-40 % (DHL, 2018b). Without visibility in the supply chain you lose sight of the full picture of the supply chain, meaning that you are not in full control at all time. Collecting data is of necessity in order to be in control of your chain and therefore also make better decisions (Cassidy, 2018).

Big data is defined as data that the standard computing systems cannot deal with because of its high volume, velocity and variety. Another aspect has recently been introduced which is veracity. Veracity means noise in the data that make it difficult to find the data that is of use and what data is of non importance. Traditional data analytics is not enough to handle big data and therefore a concept known as predictive analytics has been brought up to be able to handle big data (Grable & Lyons, 2018). Some issues regarding privacy with data collection and protection is considered a challenge with using big data. In order to make the most of the technology it is important to share data between different providers (DHL, 2018a).

Machine learning is another process that can be used to gain valuable insights in real time. This works with algorithms that learns from the data that exists in the system and new data that is collected. The system can then find patterns in the data and make assumptions and predictions based on the patterns found in the data. Every outcome makes the system learn more and gives it more accuracy. Machine learning could therefore be used to make real time decisions based on historical and current data (Grable & Lyons, 2018). Artificial intelligence (AI) is an enabler for making advanced predictions based algorithms. Big data enables together with processing power the possibility for these predictive algorithms to calculate and plan for unexpected demands, seeing trends and could save money by solving problems with overstocking and out-of-stock related problems. There are some challenges with AI. It will require a lot of investments in computing power, employee skills and a massive amount of data. It is also a risk that regulations could put up resistance (DHL, 2018a).

3.2.3 Autonomous Deliveries

Technological advancements are ongoing concerning automotive vehicles and drones. These advancements makes it possible to make deliveries without human interaction (Kay, 2016). As mentioned there are a lot of problems with home deliveries because of people not being home when the delivery is carried out (van Duin et al., 2016). Having driver-less deliveries makes it possible to complete deliveries at better times for the customers at home since smaller payloads can be delivered without being costly. Today logistics providers uses large payloads and calculated planned routes to minimise the cost. This is one of the issues to why home deliveries fail, because of the inconvenience for the customers. With the advancements in automated vehicles and drones it is a possibility that the entire logistics operation has to advance with it. A possibility is to set up a new logistic network that consists of more but smaller distribution centres that is located near the homes. In this case a distribution network would only serve the consumers located nearby and the delivery from the centres would be fully autonomous from warehouse to the door (Kay, 2016).

The big retailers are looking to use the air to improve the home delivery efficiency with drones. However droids travelling by land are also in the process of development. These are also set to fix the big problem that is home deliveries. Last mile delivery has become the biggest problem in the supply chain because of the growth in e-commerce that has made the last mile delivery more important. There are issues with both solutions since there are a lot of regulations that applies to drones since they are airborne, and droids have to to operate in a non-controllable environment with pedestrians and other various obstacles on the sidewalks. Different autonomous solutions comes with different benefits and areas of problem, therefore it is likely that not only one technology will be part of the future of last mile delivery (Gaskill, 2017). Drones could be useful for last mile deliveries in rural areas where there are minimal access but also in order to make deliveries faster in bigger cities. There are some barriers regarding drones, for example some regulations that does not allow drones to be out of sight from the controller, hacking the drones is a potential threat and if a lot of drones will be moving in the air it needs to be integrated in the airspace network. Commercial tests of drones have been carried out by different parties but none has shown a return of investment when using it for deliveries (DHL, 2018a).

DHL mentions in their trend radar about possibilities with robotics and automation in the area of logistics. The need for more productivity and efficiency due to e-commerce can somewhat be solved with the help from technologies in this area. The areas where robotics and automation can be used is for example with loading and unloading trucks. It could relief workers from these tasks as well as optimise the loading and unloading patterns. Robots can also be used for deliveries both individually but also as assistance together with delivery workers. The main challenges in this area are the problems with possible regulations and ethical issues that could arise with the use of robotics. Last mile deliveries could be fully automated in the future with drones and robots travelling on the sidewalks. This could be a mean in order to achieve same day deliveries and also to increase the efficiency in an ineffi-

cient area as last mile delivery. Using automation as transport could also result in less gas emissions. Hacking could be a problem because of the vehicles connectivity and malfunctions in the software could result in severe accidents. There are also some issues with how regulations are formed in different countries which could effect how it can be implemented depending on the country. (DHL, 2018a)

In an article written by Heinrich et al. (2018) they describe their prototype of a autonomous vehicle performing last mile delivery with the use of a robot arm putting the parcels in boxes placed outside as a storage system. This was tested in an outside environment with the vehicle obeying some traffic rules and avoiding obstacles. The researchers successfully managed to create an automated delivery in a controlled environment using the robotic arm and a separate storage system placed outdoors.

4

Empirical analysis

In this section the result from the empirical data collection will be presented. A short overview of how goods are delivered today, results from a survey sent out to consumers about their experience and needs with deliveries and finally results from interviews with different parties working with logistics. The interviews are summarised and thus is considered to be analysed as well.

A framework for evaluation will be used to easier structure the empirical data and analysis. Flexibility, speed, reliability, visibility and digitalisation will serve as the five factors that construct the framework. Two major themes that were used to construct the attributes linked to the factors in the kano survey were delivery location and delivery time. As mentioned in Section 2.2 the factors stems from the literature study as well as results from the kano survey. The

4.1 Current range of delivery options B2C

This section presents the results from a market analysis of existing delivery services offered on the market today. The market analysis is connected to the factors for evaluation presented in section 5.1 The results are presented in ten graphs looking into retailers in different line of business. Here only the factors flexibility, speed and reliability are used since information on visibility and digitalisation are not provided through the method used for collecting data.

4.1.1 Flexibility

This part of the empirical analysis covers flexibility in regard to delivery location and the number of delivery options, flexibility in regard t delivery time and number of carrier companies offered and what type of delivery that is offered (service point, home delivery, smart box). They are evaluated between different line of businesses. The results for the flexibility evaluation can be seen in Figure 4.1-4.4. In the graphs each line of business is presented separately. For number of delivery options and number of carriers the mean value in the line of business is presented. For offering of home delivery and delivery to a smart box the percentage in that line of business is presented.

The health and beauty sector offers the highest level of flexibility in all categories mentioned above with a mean value of 5 delivery options offered and is in the top

4. Empirical analysis

of number of different carrier companies offered. They are also leading compared to other lines of business in regard to offering home deliveries and deliveries to smart box. Most lines of business are offering between 2-3 delivery options and delivery companies used.

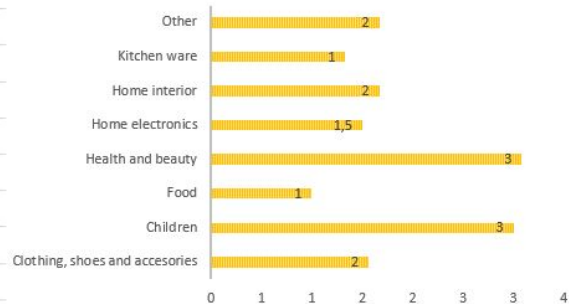
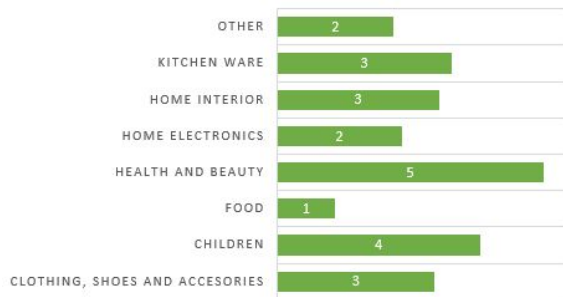


Figure 4.1: Mean value of delivery options between different line of business **Figure 4.2:** Mean value of carriers offered within different line of business

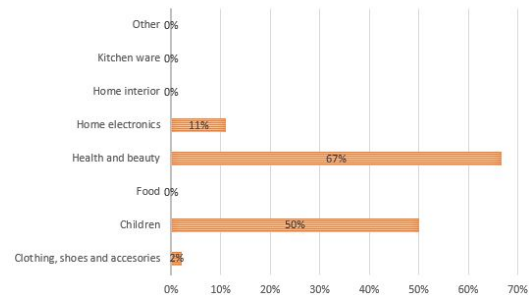
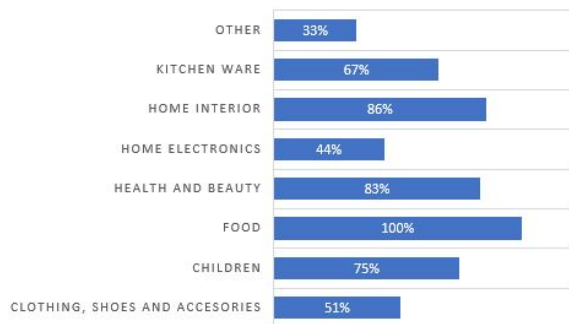


Figure 4.3: Percentage of companies within different line of business offering home delivery **Figure 4.4:** Percentage of companies within different line of business offering delivery to a smart box

The result showed that almost all companies are offering different options regarding delivery time. Most companies are offering standard and express delivery. But for companies offering home delivery or delivery to smart box there is a possibility for the customer to select different time slots and day for delivery.

4.1.2 Speed

This part of the empirical analysis covers the the aspect of delivery time in regard to speed offered as standard delivery and express delivery.

In figure 4.5 the percentage of retailers standard delivery time offered amongst the companies investigated is shown. The standard delivery time that have the greatest percentage amongst other delivery times offered is 1-3 days with 19% followed by 1-2 days that is offered by 16% of the companies. Looking at 4.8 where the percentage distribution of the line of businesses that offer the different delivery times is shown.

For standard delivery between both 1-3 and 1-2 days there is a wide spread in line of businesses offering these alternatives for delivery. Looking at the 4.6 the express delivery option most commonly offered amongst the companies investigated was delivery within 1 day that 31% of the companies offered, followed by 1-2 days that was offered by 28% of the companies and 1-3 days offered by 19 % of the companies. In Figure 4.7 delivery within 1 day is dominated by the food sector but also health and beauty. For express delivery within 1-2 days and 1-3 days there is a spread between the different lines of businesses.

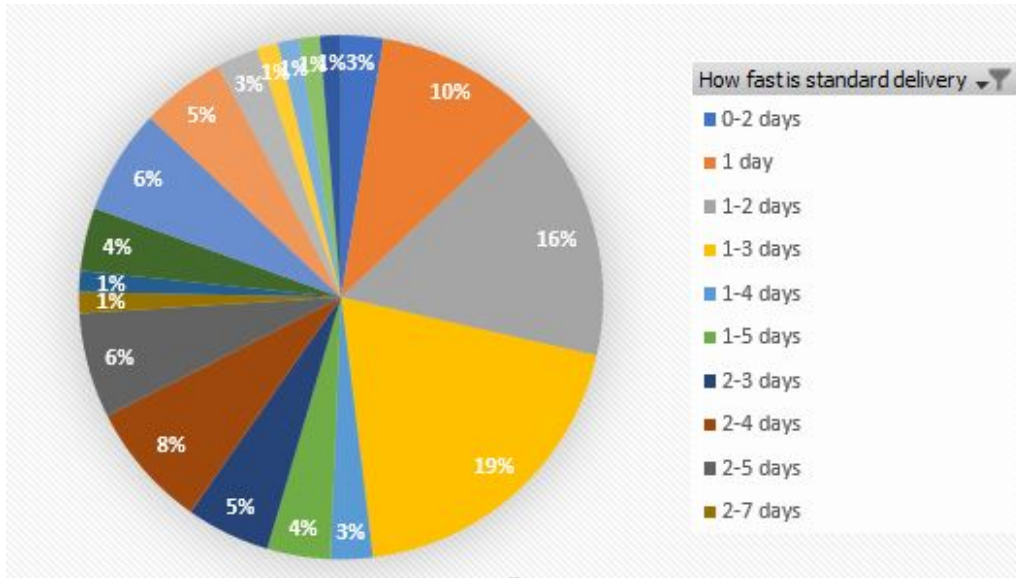


Figure 4.5: Percentage of retailers offering different times for standard delivery amongst all retailers investigated

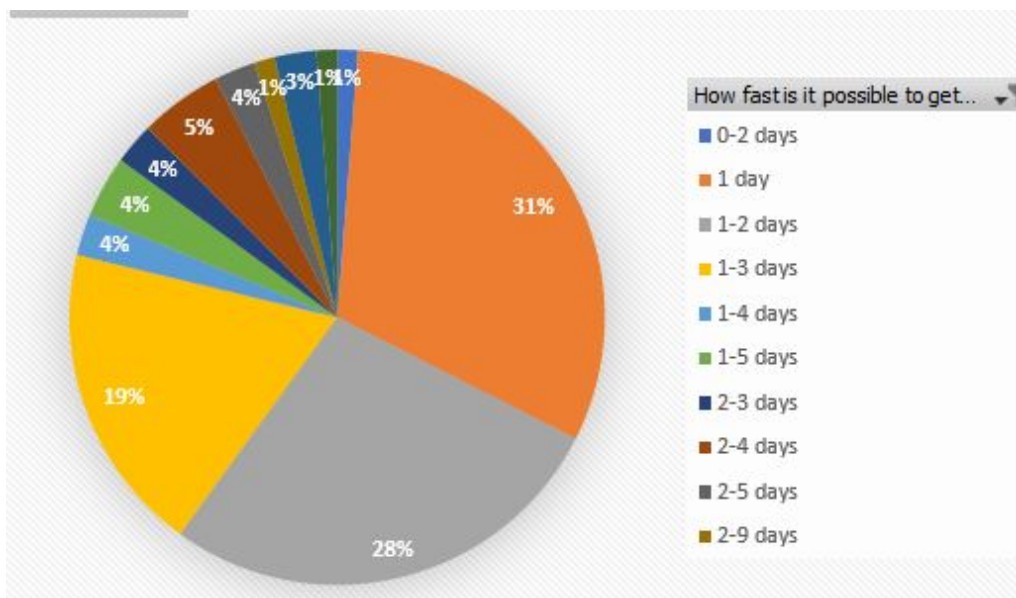


Figure 4.6: Percentage of retailers offering different times for express delivery amongst all retailers investigated

4. Empirical analysis

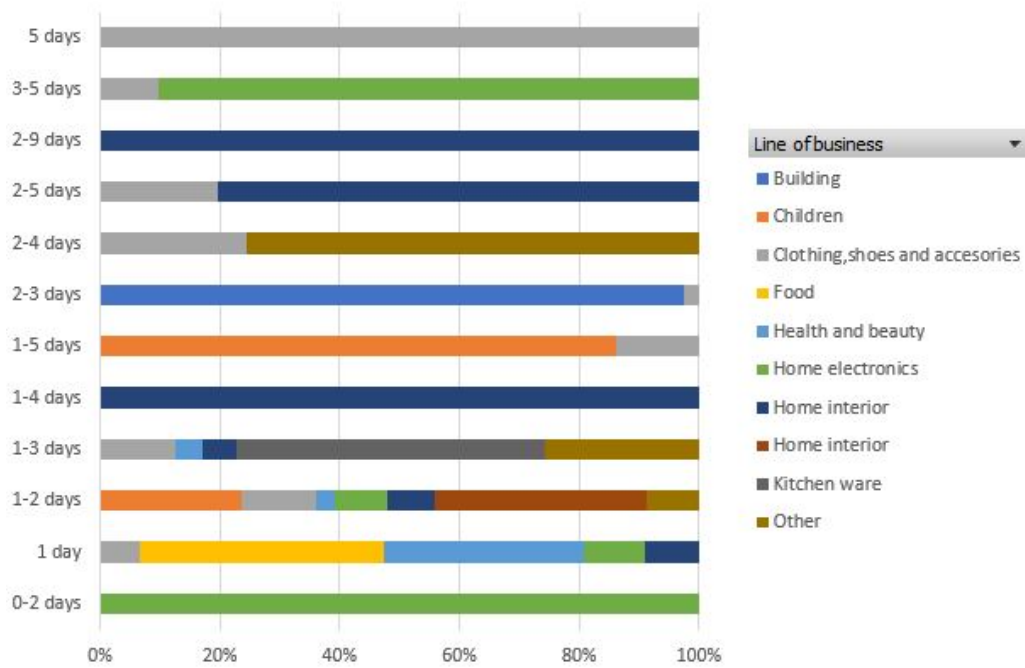


Figure 4.7: Percentage distribution amongst different line of business with regard to fastest possible delivery time offered

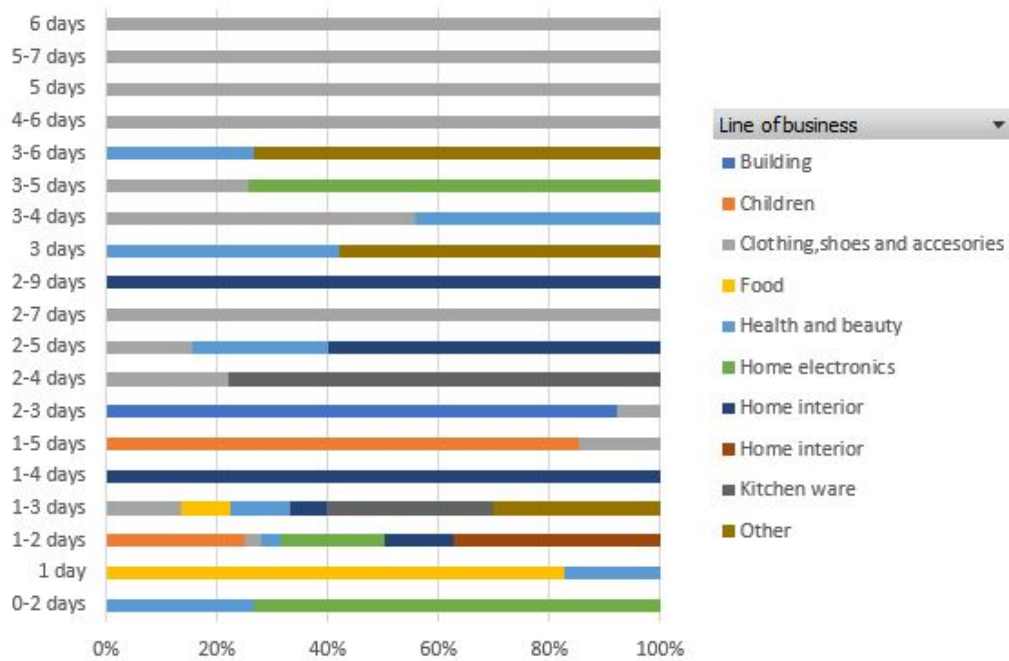


Figure 4.8: Percentage distribution amongst different line of business with regard to standard delivery time offered

4.1.3 Reliability

As can be seen in Figure 4.9 the mean value of delivery time with express delivery within home electronics and health and beauty offers same day delivery. The rest of

the companies offers express delivery between 1-2 days. For standard delivery time about 50 percent of the companies offers a delivery precision of 1 to 2 days as can be seen in Figure 4.10.

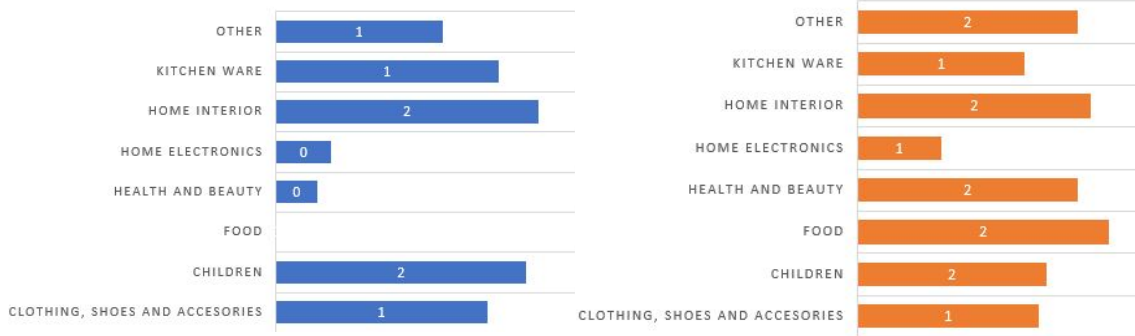


Figure 4.9: Mean value of speed in express delivery between different line of business
Figure 4.10: Mean value of speed in standard delivery between different line of business

4.1.4 Study of new options for home deliveries

During the last year there have been an increase in e-commerce sites to offer home delivery as a option for delivery. Two of the carriers used for home delivery have been tested and compared.

Company A, offers the customer the ability to select a time slot for delivery when the order is placed. The options that the customer faces are time slots from Monday to Friday between 5pm - 10pm. Before 12pm on the same day as delivery the customer is given a choice to select a shorter time span and to shorten the ETA window to 1 hour or more, to select a shorter time span for delivery the customer have to pay an extra delivery charge. Whether a more specific time slot for delivery is selected or not the customer receives a text with an exact anticipated time for delivery. After 5pm the customer have the ability to follow the order on a map, where a constantly updated delivery time and how many deliveries that are before yours is presented. Company A also offered the customer the ability to select if the goods could be delivered outside the door or not, meaning if the customer is not home to meet the delivery it is left outside the door instead of taken back.

Company B, offers the customer to select a time slot between 6pm - 10pm on weekdays when the order is placed. Information about delivery time is not offered to the customer before the time slot for delivery starts and expected time for delivery is given in time spans of 30 min when the slot for delivery begins and is continuously updated if there is a delay. During the delivery, the customer can follow the carrier on a map and see how many deliveries that is before their delivery.

4.2 Kano survey

The kano survey shows what the attributes were categorised as according to the respondents. Not a single attribute was categorised as a must-be quality but one of them were considered to be a reverse quality meaning that the more you fulfil this the more dissatisfied the customer will be. This was the option to have the goods left outside of your door. The two attributes that gave the highest satisfaction when fulfilled are two attractive qualities, speed (same-, next day delivery) and real time tracking of delivery in short time span. With attractive qualities the dissatisfaction coefficient tends to not be that high which can be seen in the results. The one-dimensional qualities, delivery on time and notifications when delays occur, is interesting. Satisfaction in one-dimensional qualities is proportional to how it is fulfilled which can be seen with the high numbers both in the satisfaction coefficient (SC) and the dissatisfaction coefficient (DSC). These two attributes also has the biggest difference between the SC and DSC meaning that it makes the most difference if it is completely fulfilled or completely unfulfilled. Four out of the 13 attributes asked about were classified as indifferent means that it does not impact the satisfaction or dissatisfaction at a high degree. The attribute overfull service point is categorised as indifferent and gets a 0 on both SC and DSC. The two indifferent qualities regarding flexibility gets quite high numbers in satisfaction but is still classified as indifferent. To see more detailed results on all attributes, categories, SC and DSC, see Table 4.1 and to see the spread in categorisation between the respondents for each attribute, see Appendix A.

Attribute	Category	SC	DSC
Speed (same-, next day delivery)	A	0.77465	-0.02817
Flexibility-delivery time	A	0.53521	-0.14085
Visibility before ETA- window short time span	A	0.62121	-0.21212
Real time tracking of delivery in short time span	A	0.76119	-0.23881
Visibility before long time span	A	0.59091	-0.36364
Real time tracking of delivery in long time span	A	0.76119	-0.34328
Option of choosing home delivery	I	0.29032	-0.09677
Overfull service point	I	0.00000	0.00000
Flexibility regarding delivery location, consumer goods	I	0.47826	-0.08696
Flexibility regarding delivery location, ungainly goods	I	0.41791	-0.04478
Delivery on time	O	0.69014	-0.52113
Notificitations when delays occur	O	0.50000	-0.75714
Option to have goods left outside the door	R	0.43902	-0.43902

Table 4.1: Results from Kano Survey

4.3 Interviews

In this section results from the interviews carried out will be presented. Interviews were held at company B,C,D,E and F, company A were only involved in the market analysis and thereby not involved in this section. Interviews from each company will

be presented under five factors for evaluation from section 5.1: flexibility, speed, visibility, reliability and digitalisation.

4.3.1 Company B

Flexibility:

The company allows changes to the delivery time up until 3 pm the same day as the delivery is planned. However they cannot provide changes to the delivery location because of legal issues. Routes are planned in the afternoon at the same day as delivery, just 2-3 hours before the time slot for delivery. The goods are then sorted in different Geo-zones with the help of a sorting code and a route optimisation system to plan the fastest route. This can be a challenge since they are delivering goods to a wide geographical area, and not only the major cities. To be able to compete with stores, deliveries needs to be available during the same time as the stores opening hours. This also includes deliveries on weekends, they are not offering this today but they are looking to expand and deliver on weekends as well. This will also make the capacity more even over the week days since mondays are usually the day where the highest capacity is needed. They are not offering return service today, this is because the low willingness to pay extra for the customer for having returns picked up at their home. Another hinder to overcome regarding returns picked up at their homes is the capacity problem. It is difficult to have full capacity in the trucks if they are to pick up returns as well. They have a collaboration right now with a big company building apartments. In this collaboration they introduce smart boxes into the apartments.

Speed:

Speed have a strong connection to the customer having a positive experience of the delivery. To be able to deliver goods as fast as possible the routes are planned 3 pm-3.30 pm on the same day as the delivery, only three hours before the time slot for delivery starts. Depending on what time the customer place their order and if the goods are stored in a warehouse close to the delivery hubs of the company, goods can be delivered on the same day. Sometimes the goods are sent to the hubs by another delivery company and sometimes it is the company themselves transporting it to their hubs. If they are the ones that are picking up the goods they are working with transportation between cities during daytime or night-time to be able to deliver within the delivery window either at the same day or the day after.

Visibility:

The customer receives information about a more exact ETA slot when the window for delivery starts, sometimes before but only if the retailer sends it to the customer. During the time window for the delivery, the customer have the ability to follow the carries on a map to see where their delivery is. The interviewee believes that the function of customer having the ability to track their delivery does not add so much more value than transparency. It is also seen as a "wow-factor". The company themselves uses the tracking to monitor their network of carriers. By doing this they can see potential delays and stop them by redistribute packages amongst trucks during the delivery.

Reliability:

The company works with the monitoring process mentioned above in the visibility part in order to work for delivery on time within the ETA-window. If a delivery is going to be late they send out an sms notifying the customer that there is a delay. They are working with predicting delays and if they have one carrier running late and one running early they can coordinate so that delays do not occur. This is managed manually by a monitoring central. They do not have a system that stops customers from choosing a certain date for delivery. Therefore they have partners that can help with deliveries if they are over their capacity, sometimes delays can occur because of this.

Digitalisation:

They already work with system that optimise their routes for the deliveries during the evening. Using AI is of interest in the future to get rid of some of the manual corrections on errors in postal addresses and other information when their system optimise their routes. AI could also be used to remove the manual monitoring of the trucks during the delivery. In the future the interviewee sees potential to remove this manual work. It is hard to know what capacity is needed especially when their service is a new option at a retailer. Using predictive analysis in order to predict the capacity need is therefore of interest in the future for the company.

4.3.1.1 Additional information on smart boxes

Today the smart boxes in the collaboration is owned by the residential building company. However in the future it is planned that the tenants will own them. There will not be one smart box per resident. Instead they will be shared amongst them. If one box is used for a delivery it will only be that resident who can open it. Today it is only aimed to be used by the company for deliveries but in the future more carriers will gain access to the smart boxes for home deliveries. The smart boxes will not replace the current post boxes as long as the smart boxes are shared amongst the residents.

4.3.2 Company C

Flexibility:

Currently they are working with providing different delivery options for the customer, the number of delivery options provided is dependent on what the local postal service provides. They would like to expand the number of delivery options, by collaborating with new local carriers. In the future they would also like to offer the customer the ability to make changes in the delivery after the order is made. Changes like delivery location, delivery time and delivery type are something that the customer values. In order to do this the interviewee believes that the packages themselves has to be digital. Today the logistics system is very static with the route of every package being set from the start and difficult to change during the delivery. If the package itself was digital the system could be more dynamic and changes could be made in real time.

Speed:

On the route from United Kingdom to Australia it is planned to start with same day and next-day delivery. This results in some challenges that needs to be met.

A better view over the supply chain is important in order to quickly respond to delays. This is of course important in other routes as well. Because of the need for transportation by airplane it will change how they need to book their airplanes. The goods has to be on an airplane just a couple of hours after the order has been processed. This will result in a higher cost for them since in order to have a high priority they need to pay more.

Visibility:

They are currently offering the customer the ability to get continuous updates on the delivery status of their goods. Ideally they would like to be able to have real time updates but their partners are using old systems that cannot provide this. The ability to track the goods is more important for the supplier company rather than for the customer, since the customer's main concern is if the goods shows up on time. The interviewee would like something trackable, for example a RFID-chip, instead of labels. However it would be costly since chips are way more expensive than labels. It is therefore a huge step to move away from the system with labels. A possible solution of an ecosystem with re-usable chips is mentioned as a way to reduce the cost.

Reliability:

The most common questions from end-customers is where their goods are when there is a delay. Customers tend to not be interested in the process rather than that the goods shows up in time. In order to minimise the amount of cases where customers call in to ask about delays they try to as early as possible gain information about delays and reach out to the customer.

Digitalisation:

When asked about how the company works with digitalisation the interviewee tells us that they do not work with digitalisation themselves. Since they are outsourcing everything and does not own any of the physical flows in the supply chain. The transportation providers that they source there transportation to are not currently evaluated by how digitalised they are. They are more interested in how frequent they can give tracking updates as well as their response time. The interviewee says that this often correlates to how digitalised the provider is. There are some possibilities in the future concerning big data analytics and predictive analysis. The interviewee says that it will not have a big impact but will play its role in future logistics. For example it could be used to make better estimations and allow them to act quicker on possible delays. Greater possibilities is seen in Internet of Things. There are some challenges in order to reach a state of a higher degree of digitalisation. Collecting data can be hard with carriers not providing enough data. Other data points that could have an effect on the delivery are often lacking, for example weather conditions. A more dynamic system where the package is digital instead of using labels as today would allow for more data to be collected in real time, however the interviewee says that it is not likely in the near future. In the short-term it is better to focus on improving the data that you can collect today. The static system that is logistics today causes challenges within digitalisation as well. The routes and the path of the goods is predetermined from the start and it is difficult to make changes along the way. So even if it was possible to gain insights during the delivery it is not so much you can do. If the system becomes more dynamic you can make

changes in real time.

4.3.3 Company D

Flexibility:

Today they are not offering the customer to make changes to their delivery in regard to location, delivery time or delivery method. This have to do with the system being static and not dynamic. Only in special cases changes can be made where it is agreed upon from the start. They work with standardised processes to fulfil their customer's needs but often tailor their solution to the customer. The interviewee says that in the B2C sector there is a need for flexibility because the market demands deliveries on evenings and weekends. More "fancy" service is required in the B2C sector compared to the B2B.

Speed:

They are currently not working with same or next day delivery, this is an area that they want to improve in. there is a trade-off for the customer regarding speed and cost since it is more costly to order express delivery than regular delivery. For example deliveries within life science such as medicine transport cost is often not a factor and they can deliver it faster.

Visibility:

Today they are working with notifications like sms and e-mail. The customers can follow their shipment through a hyperlink but in the future they want to have more transparency towards the customer on which carriers are used during the transportation. Since they are working mostly with B2B customers it is of high importance for them to deliver the goods within the given ETA-window since it can otherwise cause problems for the customer. The interviewee believes that it is of great importance to update the customer about the delivery status and if there is a delay. To be able to do so they need need to be better at tracking the delivery. The interviewee does not see a need for real time tracking but a need for more frequent updates. The interviewee mentions geofencing as a way to know when shipments are crossing borders and gather milestone updates.

Reliability:

It is of high importance to stick to the given ETA-window. It is especially interesting when working with manufacturing companies and when delivering spare parts. The company are working with fixed appointments for the outsourced carriers when they are to pick up deliveries. In order to close the ETA-window and deliver within it it is important to find the correct network of carriers in all areas they operate in. In the B2B sector it is focus on the performance such as reliability.

Digitalisation:

Using devices and integrating different networks in order to collect data makes digitalisation an interesting field. Technology is developing rapidly and predictive analysis is something that the interviewee thinks is interesting. Something current that is happening is that more companies are changing from hard copies when it comes to documents to making them more digitalised. This saves a lot of time. When it comes to RFID-technology, blockchain and moving from the static system with labels the interviewee believes that it is not for now.

Outside of the five themes the interviewee believes that there is potential in automated vehicles. The interviewee says that the technology exists and that it is more political decisions that could challenge the use of the technology.

4.3.4 Company E

Flexibility:

In the construction industry it is very important to be flexible, it is one of the major challenges. Renters of machines and tools in the construction industry are forced to be flexible in order to compete. If it is not flexible enough it could result in that buyers instead of renting buys the equipment themselves. It is of great importance to build dynamic solutions in the supply chain. They want to look over their availability around the country. If they can understand where their equipment must be located they can improve this. They also want to improve their internal deliveries to their hubs in order to achieve the flexibility needed. This is currently done by changing their supply chain channels more like a retailer meaning they want to strengthen their hubs.

Speed:

The majority of the customer want the goods as fast as possible and some of the customers want the goods within a pre-decided delivery window. They are always trying to deliver as fast as possible but the standard delivery is within 24 hours. When deciding what delivery company that gets to deliver the order this is the most important factor that they are looking at, if they can match the speed requirement from the customer. Many companies deliver their goods on milk rounds, the goods can either be delivered in the end or in the beginning of the planned route which makes the delivery precision to imprecise since the time window for delivery at constructions sites is quite low.

Visibility:

Visibility and tracking is of high importance to be able to have a dynamic system in the supply chain. Customers that want the goods as fast as possible appreciate having the ability to track the goods while customers that have a decided time slot for delivery does not care for it to much, only if there is a delay. Visibility in real time would, according to the interviewee, allow the company to work with route planning and loading planning. This can be used to make use of more capacity on the trucks that are used. You could visualise all the trucks on a map with the location and have a colour scale on the trucks showing what capacity that is available in the trucks.

Reliability:

According to the interviewee reliability is everything. If you are ten minutes late it ultimately leads to a 24 hour delay on paper, which either results in dissatisfied customer or fees depending on how the contract with the customer is formulated. It has become more common that the contracts involves fees for late deliveries. The entire profit from a delivery could go to waste because of a small delay. Measuring delivery precision is of importance. They both measure it between the agreed delivery time to the confirmation of the delivery and between the wanted delivery time

from the customer to the confirmation of the delivery. It is also interesting to look at the difference between these, because if there is a big difference it can be of value to see if there is a gap between what the market wants and what they can offer. Delivery precision is not just measured in time, it is also measured in cost and to what extent the correct goods is on the delivery. It is important to measure what deviations there are concerning all these areas. In the near future, the interviewee believes that there will be more regulations on gas emissions and that you need to measure delivery precision in gas emission in order to follow these new regulations.

Digitalisation:

During different seasons of the year there are different machines and tools that are being used. Currently they are watching for example the weather and historical data in order to know when the season shifts for machines and tools. With AI this could be done without the manual work. The AI could gather data and learn patterns from example weather conditions. The A constant problem today in the supply chain is missed events. The AI could help with sending automatic warning flags to a system. The interviewee mentions the term data capture. This means that the quality of the data is important. You can collect a lot of data but if you cannot trust the data it is of no use. A lot of errors today is because of human impact, it is therefore important that the technologies that people use to capture data is easily available and user friendly so that the data is trustworthy.

Outside of the five themes mentions differences in how deliveries is handled depending on the geographical location of the delivery. In the north in Sweden they cannot deliver at the same speed as in other regions of Sweden. This is because of their carrier not being able to offer this service. Because of their location, customers in the north are understanding when it comes to delivery time but if they could choose they also want their delivery just as quickly as the rest of Sweden. The company has several hubs around the country that has a stock on itself. Instead of sending from the central warehouse if they have the correct machines and tools available they can more quickly deliver it from a hub that is located more closely. The interviewee mentions that a possible solution for this is to make sure that the hubs are stocked on the most common machines and tools in order to be able to fulfil most deliveries from the hubs instead of sending it from the central warehouse.

4.3.5 Company F

Flexibility:

The company works with daily transportations from their central warehouse in Belgium. If there are emergencies which requires them to quickly response to a lack of stock they can arrange more transports. In this case they often arrange through flights since cost is not an issue since its likely more expensive to wait for the delivery. Because of the daily transportations there is not really a need for flexibility according to the interviewees.

Speed:

According to the interviewees companies can live with longer deliveries as long as their on time. Their customers often plan their transports so that a high speed is

not of necessity. If there are emergencies speed is of importance. Since it could be that a product is out of stock and stopping the workflow at their customer. In this case cost is not a problem to get the transportation done as fast as possible.

Visibility:

They work with milestone updates in order to know the location of the delivery. These milestones can be used both by the company themselves and their customer. Real time tracking is not something that they are using. They feel it is something that neither they or their customers need. They say that you want to know how far the delivery is but you do not monitor the deliveries at all times. Seeing the milestones is enough to get an understanding of where it is. The trust that the delivery will be there in time is high and its when delays that occur that you are more interested in the location. It could be of interest in emergency deliveries where it needs to be delivered as quickly as possible. However they mention that since it is delivered as possible the customers know this and may not be concerned to see how it moves from point a to point b.

Reliability:

As mentioned under speed the most important thing according to the interviewees is that the delivery is on time. The trust between them and their customers is that they can have a good delivery precision. It is also a competitive edge. With the continuous transportation you make sure to have marginals in stock so a possible delay does not hurt the production. The biggest problem that they have right now is that they cannot produce to meet the demand on every product. They therefore in order to know which products are most crucial and to which customers.

Digitalisation:

With AI and predictive analysis the interviewees says that is a question of cost. Because that most of the deliveries end up on time they do not see a need to use this. The one occasion that it could be of use is for deliveries at sea. It can be weeks between the milestone updates so you do not have a lot of data between these periods. Today it is handled by calling them and checking in if there are any questions but this is a problem. If they were to use AI they would likely buy the service from an external provider instead of developing a system for themselves.

Outside of the five themes the interviewees believes that information will become more and more available. You could optimise how data is shared between companies and customers. Problems with this is that customer question who will own the data and if the data can be accessed by parties that they do not want to share data with. It is a trust barrier that must be crossed. They also believe that information will be commodity that you can buy and sell. One of the interviewees mentions that the demands from consumers in the B2C sector will have an impact on increasing demands on B2B deliveries. Next day deliveries on standard products is likely but will be challenging for their industry since it increases the complexity. A final remark is that industries are slow and that it can some time for new technologies and trends to become a reality and implemented.

5

Results

This section will present the results from the literature study, kano survey, market analysis and interviews. In the chapter Empirical analysis the empirical data was presented accordingly to their specific part of the data collection. In this chapter the results from these data collections and the analysis of the data is used to answer the four research questions stated.

5.1 Factors for evaluation

In order to evaluate current and future needs within the B2C and B2B sector factors for evaluation were taken out and categorised. This worked as framework for the report. The first iteration of the framework stems from the literature study where factors have been categorised into different categories where the factors are considered to belong together under one category. The categories and factors can be seen in Figure 5.1. The categories are further described below individually. In the descriptions it is stated whether or not the category with the factors are kept in the final state of the framework.

	B2C	B2B
Category	Factors	
Visibility	Visibility Traceability	Visibility Traceability
Speed	Speed	Lead time
Reliability	Reliability Accuracy Time window for delivery	Reliability Delivery precision Condition of goods
Flexibility	Delivery adapt to customer Selection	
Digitalisation	Digitalisation	Digitalisation
Sustainability	Sustainability	
Cost	Economical delivery	Cost reduction

Figure 5.1: Initial framework for evaluation

Flexibility

In the literature study flexibility in regard to delivery options (selection), delivery location and delivery time (delivery adapt to customer) is seen as important. Therefore flexibility was chosen as a factor of evaluation. This factor was not seen as important within the B2B sector in the literature study. Despite that, it was used to evaluate needs within the B2B sector to hinder gaps in the result.

Speed

Speed and lead time is in the literature study described as important factors within deliveries. Both speed and lead time is very similar, therefore speed was chosen as a factor for evaluation.

Reliability

Reliability can in the literature study be seen as delivery precision and the condition of the goods. If a company can provide the customer with a more precise delivery time or time window, then it will help to build trust therefore delivery precision is seen as a part of reliability. Since the condition of the goods does not have a direct connection to the physical flow of the delivery it is not considered in this study.

Visibility

In the literature study visibility is seen as an important factor for delivery where tracking of goods, traceability, plays a big role. Therefore visibility was chosen as a factor of evaluation.

Digitalisation

Digitalisation is today seen as an important development for many actors on the market as well as the customer. Therefore it is seen as a factor for evaluation in this study.

Sustainability

Sustainability can be seen as an important factor to evaluate. This is however more linked to the carriers rather than the physical flow. It is also considered to be too broad to dive into. Therefore sustainability is not included in the final framework.

Cost

Cost is seen in the literature study as an important aspect for customers and companies. However there is a low willingness-to-pay for extra features in regards to deliveries. It is therefore seen as a barrier for development rather than a need and is therefore not included in the final framework.

This ultimately gives the five categories for evaluation that the final state of the framework consists of. These are: flexibility, speed, reliability, visibility and digitalisation.

5.2 Needs within deliveries B2C

This section will answer RQ1: *What are the current customer needs for deliveries of goods within the B2C sector and the B2B sector and how can they translate into future possibilities?* with regards to the five themes and the B2C sector.

Many actors on the market state that one of the greatest drivers of e-commerce is the millennial and urbanised consumer, this customer adapts to new technology fast and expect companies to integrate this technology into their supply chain. Whether it is the customer or the technological development that are the drivers of e-commerce can therefore be hard to determine, it goes hand in hand.

One thing is clear, the end customer today have high expectations on the delivery. E-commerce is a rapidly growing market and to be successful, companies need to be very service minded and make the lives of their customer easier in order to retain their competitive edge (Cárdenas et al., 2017). It is important to offer good service from purchase to delivery in order to provide a complete shopping experience. The customer wants to be able to select how, when and where their delivery should arrive meaning companies need to offer different types of delivery and return options for the customer (PostNord, 2019).

5.2.1 Flexibility

In the conducted Kano survey three attributes regarding flexibility is categorised as indifferent. It is an interesting takeout from the survey that flexibility regarding delivery location still has a decent high satisfaction coefficient which means that it is considered to be attractive or one-dimensional according to several respondents. According to PostNord's e-barometer for the year 2018 35 % responded that they in the future want their delivery where they are located in one hour (PostNord, 2019). Many customers are interested in flexibility regarding delivery location, PostNord and the Kano survey suggests that it may be split in needs within the population. Today, the percentage of companies offering home delivery as a delivery option lies between 33-100 % depending on the line of business. The percentage of companies offering delivery to smart box is quite low and only existing within some lines of businesses. The most common delivery alternative, that is also offered as standard delivery free of charge in most cases is delivery to the closes service point or to the customers postbox if the package is small enough.

The option of choosing home delivery was categorised as an indifferent attribute. This was interesting since the satisfaction coefficient also was quite low meaning that it does not have a big impact on the level of satisfaction. In reports from PostNord you can see a trend that people want more home delivery, as seen in Table 3.1, which you cannot see in the Kano survey. Here people seem to be more neutral about it or accept it either way. In PostNord's reports you can see that the percentage of people wanting home delivery is still quite small even though it is increasing, which could correlate to the results in the kano survey.

Flexibility in regard to delivery time is also important. The market analysis showed that almost all companies are offering different options regarding delivery time. Most companies are offering standard and express delivery. But for companies offering home delivery or delivery to smart box there is a possibility for the customer to select different time slots and day for delivery. The Kano survey showed results on how customer viewed flexibility regarding delivery time. Contrary to the attributes concerning location this was categorised as an attractive quality, however with a quite low satisfaction coefficient for being considered attractive. Flexibility in time can be seen as something that creates competitive advantages but it increases satisfaction less than other attributes considered to be attractive qualities. It is however clear that flexibility in regard to time is more important than flexibility in regard to location in terms of satisfaction, since both the satisfaction- and dissatisfaction coefficient is higher regarding time.

Company C want to allow customer to make changes during the delivery regarding time and location in the future. The company is aligned with what the customer considers an "attractive quality" regarding the time factor. Company B allows for changes to be made before 3 pm the same day. To allow this they plan their routes close to departure, which opens up possibilities to match change requests regarding time according to customers wants. They see problems with changing the delivery location during the delivery because of legal issues. Making changes during the delivery has the potential to be the future when both companies interviewed are willing to provide it and consumers wants it. It suggests that companies are taking into consideration that flexibility is something that the customer values.

5.2.2 Speed

Except from flexibility, delivery time can be connected to speed. In the conducted analysis of current range of delivery options many companies are offering express delivery between 1-2 days or 1-3 days and standard lies between 1-2 and 1-3 days for many companies. It is interesting that the highest percentages of standard and express delivery lies between 1-2 or 1-3 days.

Speed of the delivery has shown to be a very attractive aspect of delivery, both in the survey made by PostNord and in the Kano survey about deliveries carried out during the study this is shown as an attractive quality. Companies like Amazon offers same day or even two hour deliveries on specific items in major cities in the UK and the US (Amazon, 2019a), (Amazon, 2019b). Today, many companies are offering standard domestic deliveries between 2-5 days or express deliveries between 1-2 days. In the Kano survey carried out you can see that same day and even next-day delivery is seen as an attractive quality with a high satisfaction coefficient but also a low dissatisfaction coefficient. This all means that it is currently not something that customers in the B2C sector demands, it is rather something that can create competitiveness for the logistics players.

Company C is just now starting, on the route between the UK and Australia, with same day and next-day delivery. Because they are working with the end-to-end supply chain and have a focus on cross-border deliveries it is more difficult to provide this service. It is possible but it is costly and causes a trade-off between speed and cost for the customer. Company B has their majority of deliveries done as same day and next-day deliveries. Because they only deliver during the evening they can focus on transporting packages between hubs during the day or the night. This allows them to quickly get their products out to the customer. Both of the B2C companies believes that speed is important for customer satisfaction which is aligned to the results of the Kano survey conducted.

5.2.3 Reliability & Visibility

Today the mean value of the ETA- window companies are offering within the different line of businesses studied lies between 0, 1 or 2 days for express delivery and 1 or 2 days for standard delivery. The customer wants to know when the delivery will arrive. In fact, 84 % of the customers would like to know what date their delivery will arrive according to Postnord's E-barometer 2018 (PostNord, 2019). In order for the customer to follow their order companies are offering different types of tracking services. This is a way for the customer to anticipate what day their delivery will arrive by getting updated information on how far away the order is geographically and to get a perception on if the delivery is on time or not. Most companies offer continuous updates on their deliveries but there are some start up carrier companies that have started to track their delivery in real time in the last mile delivery, as shown in Section 4.1. The customer thinks that it is of high importance to have the ability to track their delivery, but many customers tend to not use this service at all or just once during the delivery.

In the Kano survey visibility and real time tracking both in a short and long time span were considered as an attractive quality. Real time tracking in a short time span also has as high number in the satisfaction coefficient, almost as high as same day, next-day delivery. This can be linked to that people want companies to communicate the status of the delivery but as mentioned before not many are using this sort of service continuously. This can either be seen as the customers finds satisfaction in that it exists or that it is just something they believe they want but does not really need. An exact delivery date could remove the need for a service that continuously updates the customer. If an exact delivery date is used instead of continuous updates it is important that the delivery is reliable to not create dissatisfaction.

Delivery on time is according to the Kano survey considered as a one-dimensional quality. This results in satisfaction and dissatisfaction depending on how it is fulfilled. Both coefficients are therefore quite high and in this case they are noticeable high regarding satisfaction. It is therefore important that the delivery is on time. Without continuous updates, obstacles or sudden changes during the delivery it will be impossible for the customer to have knowledge if the delivery is on time or not.

It will as a result lead to dissatisfaction if the delivery shows up late without them knowing about it. Therefore notifications when delays occur is of importance. This is shown in the Kano survey due to its coefficients and it being categorised as an one-dimensional quality. The most noticeable thing is that this attribute has, by a big marginal, the highest dissatisfaction coefficient amongst the attributes tested in the Kano survey. So even if you use a more exact date for delivery and drop the continuous updates it is important to notify the customers if there is delay mostly to avoid dissatisfaction but also to avoid customer calls asking where their packages are.

Company C further strengthen the theory that consumers are more interested in when the package is showing up rather than the process. Most of the questions that comes to the surface from customers are regarding delays, which fits the results from the Kano survey with the high dissatisfaction if the delivery is not on time and the customer does not get notified about the delay. This is something that the company is well aware of, since the interviewee mentions the importance of finding possible delays early in order to notify the customers. Because Company B works with home delivery they have a different approach to ensure delivery on time. They believe it is important to get the delivery on time and has therefore a monitoring central where they can see if a truck is behind or ahead of schedule. They can then communicate with these trucks to meet up and give more packages to the one ahead and less to the one behind. Sometimes this is not enough to ensure that the delivery time is met, this is often because of lack of capacity. The two companies Company C and Company B are dealing with visibility towards the customer in different ways. The prior works with continuous updates but would ideally that they are in real time. They use continuous updates because the customers are more interested in when the package does not show up rather than how it is transported. The latter of the companies works with tracking in real time and shows the transportation on a map that the customer can follow. The interviewee at that company said that id does not really add any value except from the transparency. They use it more as an extra feature to create excitement. The results from the Kano survey shows that visibility and real time tracking both within a short time span and a long time span is considered to be attractive qualities. Both PostNord's survey and the interviews suggests that it is not that important to follow the transportation during the delivery for the customer. When you look at how low the dissatisfaction coefficient in the Kano survey is for these attributes you can see that it is likely that it is a feature that creates excitement but is not the most important for the customers.

5.2.4 Digitalisation

Company C are not working with digitalisation at all because they do not own any of the physical flows in the chain. They however see great potential in future technologies such as big data and predictive analysis in order to make better estimations and allow for quicker responses to deviations. In order for this to reach its full potential the interviewee mentioned that the logistic system as it is has to change from a static system to a dynamic system, meaning that the packages themselves are digital and therefore information on the delivery of the package can be changed.

Another company that is working with digitalisation is Company B. They have a system that optimise their delivery routes. Just as the prior company they believe that predictive analysis and AI is of interest in the future, especially for predictions. The two companies interviewed works with digitalisation in different ways because of their differences in how they own the physical flows in the supply chain. Even though they work differently they both see potential in usage of big data, AI and predictive analysis in order to get better predictions and estimations in different areas. This could therefore be seen as an area of interest for companies to look into.

5.2.5 Special cases

Depending on the the type of goods and where the customer lives geographically the needs can differ. The type of goods have a big impact on how the customer prefers the delivery. Looking at ungainly goods like furniture and groceries etc, the customer prefers deliveries being delivered to their home (PostNord, 2018). Therefore companies that are working within these sections need to develop a good solution for home delivery of goods in regard to speed and delivery precision which has been shown to be of importance in the kano survey.

Goods that need quittance cannot be delivered to the post box or be left outside the customer's door. It needs to be delivered to a service point or by home delivery with signature. The needs can also differ depending in what country the customer lives in and if the customer lives in an urban area or a rural area.

5.3 Needs within deliveries B2B

This section will answer RQ1: *What are the current customer needs for deliveries of goods within the B2C sector and the B2B sector and how can they translate into future possibilities?* with regards to the five themes and the B2B sector.

5.3.1 Flexibility

In the construction industry, as said by the Company E, flexibility is very important. Especially when you are working with renting equipment the option of buying the equipment instead exists for the customers. Handling the amount of flexibility in the industry requires according to the company construction industry could be improved by optimising where equipment is located in hubs so that they do not have to send so much equipment from their central warehouse. Company D says that they do not offer any changes during their deliveries. They do allow it if it is agreed upon prior to the delivery. A standardised process is used which can be customised according to the customer Flexibility according to them is not a priority to work with because their customers are more interested in performance when it comes to lead time and reliability. Company F does not have a need for flexibility because of daily transportations. The amount of transportations allows them to on a daily basis decide what to deliver according to a schedule which means that flexibility is

not a requirement for them.

This shows that the need for flexibility within the B2B sector is dependent on what industry it concerns. It is likely that different industries and companies prioritise different aspects. Even though Company D says that they do not allow changes during delivery they still work with flexibility in the way that they customise their standardised process. They work in a more modular way, switching modules in a standardised interface, meanwhile Company E is controlled by more by the customers and have to work more with flexibility. Company F works more with reliability and delivery precision which removes the need for flexibility in their industry.

5.3.2 Speed

Speed is of high importance within the construction industry, it is one of the most important factors that Company E are looking at when selecting what company to handle the delivery. This is because most of their customers wants their delivery as fast as possible. Company D is working with both standard delivery and express delivery. They mention the trade-off between speed and cost and speed is dependent on what the customer are willing to pay. Here they mention for example that deliveries in life science, such as medicine transports, the cost is not often a factor and speed is essential and they can therefore deliver it faster. Company F states that speed necessarily is not of that high importance because their industry is more focused on delivery on time for their planned standard deliveries although the importance of speed changes if there is a part needed to hinder production stops his is very costly, in this situation the aspect of delivery cost is of low importance since the cost for production stop is much higher. The need for speed is different when looking into these three companies within the B2B sector.

From the Kano survey by Sohn et al. (2017) you could see that the buyer considered lead time to be a must-be quality whilst lead time was considered an one-dimensional quality amongst the Third party logistics company. This shows a gap between what different players in the supply chain believes are important in deliveries. The study used a manufacturer as the buyer which means that this is not necessarily true for other industries. However looking at the interviews it is clear that speed is important in the construction industry and life science for example.

5.3.3 Reliability

In industries where there is a high dependence on the goods being delivered within a specific time window the consequences of goods not being delivered on time can be very negative and cause delays for the customer for example on a production site where inventories are low or at a construction site where there is need of equipment being there on time. Company D, E and F all states that reliability and delivery precision is the most important aspect of the delivery. Within the construction industry the time window for delivery is very short, 30 minutes in most cases as stated by Company E, if the delivery do not meet the time window for delivery the goods

can not be delivered until the next day and in most cases a delay leads to a fee depending on the contract. Reliability is also very important for companies within the manufacturing industry. Company F states that it is the most important aspect to consider. Having a good delivery precision builds trust and is considered to be a competitive edge.

An interesting outcome from the Kano survey made by Sohn et al. (2017) is that buyers sees reliability as a must-be quality. In the interview with Company D the interviewee stated that reliability is basic attributes that needs to be fulfilled and it is of high importance to meet the given ETA-window, and this is especially important within the manufacturing industry.

5.3.4 Visibility

Company E and Company D speaks about different needs for visibility. Company E speaks about the possible benefits of visibility in real time. That it could lead to potential visualisations of for example location and current capacity on their trucks and could be used for optimisation. They have also heard from their costumers that they are interested in being able to follow their delivery more in detail, especially when it is ordered to be delivered as fast as possible. Company D does not see the need for customers to be able to track their delivery in more detail and in real time. Instead they want more frequent updates that they can forward to their customers. The interviewee spoke about having the ability of tracking in the matter of updates when the carrier enters a goal on the way, using different Geo- zones would be very useful. Company F is aligned with the believes of Company D regarding visibility. They do not see the need for the customers to be able to follow their delivery at all times. The kano survey from the study by Sohn et al. shows that buyers, suppliers and TPL's all sees visibility as an one-dimensional quality meaning that the satisfaction is proportional to how it is fulfilled.

Having more visibility in the supply chain allows for more data to be collected. The data is vital to move towards a data driven supply chain and using big data, AI and predictive analysis (Yu et al., 2018). These technologies can be used just as within the B2C sector to for example optimise planning and make changes in real time. This could in return benefit both speed, flexibility and reliability (Cassidy, 2018). Visibility is therefore an enabler to improve in areas where there are needs.

5.3.5 Digitalisation

Digitalisation is considered to be interesting to both Company E and Company D. The latter believes that integrating networks together will be of great interest. They do however not see in a near future RFID-technology and thereby moving from the static system. Predictive analysis is a technology which is brought up as well as interesting in the future. Company E brings up AI which can be used in the same way as predictive analysis to understand patterns and take decision based on historical and real time data. They also mention the importance of the data quality. Meaning

that if the data you collect cannot be trusted it is hurting rather than helping to use it. Company F does not see a need for it except for possible on their deliveries over seas. It is a matter of cost and that it will be too expensive compared to the value they can gain from it.

As mentioned earlier in Section 5.3.4 moving towards a more data driven supply chain and digitalisation is dependent on real time visibility. In order to make these technologies and digitalisation more integrated into the supply chain and last mile delivery you will need a continuous flow of data that visibility enables (Yu et al., 2018).

5.4 Technology and solutions to meet the needs

This section will answer RQ2: *What technological solutions are needed to support the future needs?*

5.4.1 New technologies

Today you can get discrete data from RFID technology and continuous data from GPS (Lam & Ip, 2019). However in the near future the 5G network soon will be reality. According to DHL (2019) the 5G network has the potential to bring forth new tracking technology through new tracking devices and tags. Data collection through tracking devices has the potential to create possibilities in optimisation (Cassidy, 2018). The interviewees however clearly states that it is not just data on the location that is of interest. Data on weather forecasts and traffic alerts are mentioned by several interviewees as data of interest.

During the interviews several companies spoke about having to change the logistics system from it currently being static with labels to a more dynamic system where the packages themselves are more digital. This would make it easier to make changes during the delivery so that you could react to situations that your AI and predictive analysis will catch. With the static system you have to change the label at a hub somewhere making real time changes hard, according to Company C. Some of the interviewees did not believe in this in a near future. They instead believed that you could work with digitalisation without removing labels.

Automated vehicles such as automated trucks and drones are on the verge to becoming a reality in today's society. This technology has the potential to be used in logistics in order to handle deliveries during all hours of the day (Kay, 2016). Using automation means that you can re-route the truck in real time instead of updating a route for a driver which means that you lose a possible human error. The realisation of the 5G network will also help realise automated vehicles by reducing the delay between input and output meaning you will have better control over the vehicle (DHL, 2019).

5.4.2 Solutions to meet the needs

From the interviews and the Kano survey three major trends can be seen in the B2C sector. This is speed, delivery precision and delivery solutions close to the customer. In the B2B sector it is speed and reliability above all that stands out as important.

Delivery precision can be more fulfilled by closing the ETA-window. Predictive algorithms and big data is a way to do so. By using these tools you can improve your planning processes in order to meet the estimated time and making it more precise (DHL, 2018b). It can also be used to make decisions more quickly in order to respond to unexpected circumstances that could have an impact on the delivery. Optimisation in planning routes and capacity also helps meet the need of same day and next-day delivery. This is also done by using big data and predictive algorithms (Cassidy, 2018).

Flexibility is starting to become more important in the B2C segment as can be seen in the surveys by PostNord (2018, 2019) with increased importance of being able to choose your delivery method. It can also be seen in the kano survey regarding changes to delivery location and delivery time. Company C mentions that in order to make changes in real time the system has to be more dynamic, meaning that each package must be track-able. Company B mentions that visibility through tracking the trucks delivering the packages can help them adapt depending on how the vehicles are schedule wise. Just as with speed and delivery precision the solution to meet more flexibility is predictive algorithms. With this you can act quicker on changes, making precise changes in real time to fit the changes in the route (Cassidy, 2018).

Deliveries to a smart box near your residence is the most preferred delivery choice in the future for B2C customers according to the PostNord survey from 2018 (PostNord, 2019). The smart box works in the same way as a service point in the way that you can pick up the delivery when it fits the customers' schedule. The service point is the most used delivery method used today. The reason for the popularity with service points is the level of flexibility it provides. The same goes for smart boxes with the extra flexibility of having the pick-up location near the residence of the customer (PostNord, 2019).

5.4.3 Connection between the B2B and B2C sector with regards to the five identified factors

Through the literature study, interviews, market analysis and Kano survey a model showing the connection between the identified factors (flexibility, speed, reliability, visibility and digitalisation) and the B2B and B2C sector. This model is shown in Figure 5.2. The greatest distinction between the sectors is that B2C is linked to delivery time and delivery location whilst B2B is linked only to delivery time. Delivery location is in return only linked to flexibility whilst delivery time is linked to speed, reliability and flexibility. In the end even though you have different paths

from B2B and B2C the enablers for improvement in both sectors are visibility and digitalisation because they effect all three other factors which backwards leads back to both sectors.

The framework consisting of the five factors through evaluation has been reduced to three needs within the two major themes delivery location and delivery time. Visibility and digitalisation is evaluated as being the enablers for the three other factors from the framework. The model can therefore be divided into three areas: market sector, needs and enablers where the different market sectors have different needs regarding flexibility, speed and reliability, which in return is enabled by visibility and digitalisation.

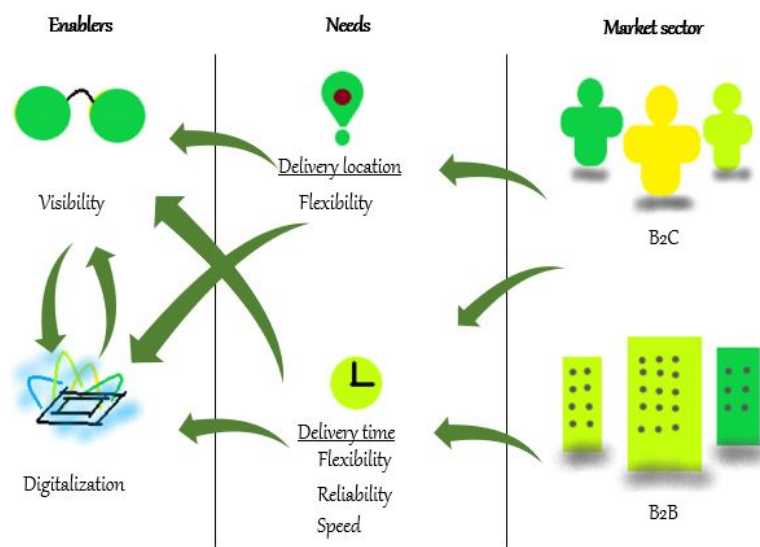


Figure 5.2: Connections between B2B and B2C sector and the five identified factors

5.5 Means for realising implementation

This section will answer RQ3: *What are the means for realising the implementation of new technologies in deliveries?*

5.5.1 Development drivers

It is unclear who should drive the development and implementation of the solutions needed to meet needs in the future. According to PostNord (2019) there is a low willingness to pay for the delivery amongst customers in the B2C sector. Therefore actors on the market are not interested in investing in new technologies.

Having the packages themselves be tracked or the truck that carries them be tracked results in different development. Company C mentions that they rather see that the

packages themselves are digital meaning that you would need a tracking device for each package. However the interviewee does not see this in the near future. Company D does not believe in making the packages digital but wants better data through tracking. Company E mentions that they want the ability to track trucks in order to visualise the trucks with location and capacity.

The collaboration between Company B and the resident building company is the current driver for smart boxes to be implemented. The interviewee in Company B also mentions that more carriers will be able to deliver to them in the future. The smart boxes will not replace the regular post boxes because they are shared amongst the residents. The interviewee says that this will not change as long as the boxes are shared.

5.5.2 Challenges

The technology to implement the solutions already exists. There are however some challenges that has prevented this from happening so far. The main challenges that can be seen is regarding the cost, data security and handling with big data.

In DHL's trend radar they mentions the threat of data security and hacking software. This concerns all sorts of data collection. Future technological solutions such as drones, other automated vehicles and smart post boxes consists of software that are exposed to the threat of hacking (DHL, 2018a). Company F mentions the barrier of trust when it comes to sharing information in cloud systems. This is something that to some degree prevents optimisation through data sharing. The big increase in data collection creates a new challenge. The analytics methods and current systems that are used by companies are not enough to handle big amounts of data. Predictive algorithms is a way to handle the data collection and big data (Grable and Lyons, 2018).

Several of the interviewees mentioned that cost is something that prevents the development. Company C mentions that it would be costly having for example a RFID-chip in every package sent. A possible solution mentioned by the interviewee was that an ecosystem with re-usable chips could be implemented which would require collaboration between all parties.

Company B is currently doing a collaboration with a resident building company where smart boxes are placed in the residents. The ownership of the boxes is currently on the building company. The interviewee mentions that in the future it is the tenants that should own them. Because it never has been tried before it can be challenge to find exactly who should take ownership of the boxes.

5.6 Possibilities for Centiro

This section will answer RQ4: *What are future possibilities for Centiro with regards to their customers?*

Centiro is working with planning deliveries in the matter that they select the carrier company most suitable for the delivery. In most cases their customers already have a few carrier companies that they are working with. Depending on the delivery, Centiro will select the carrier that is most suitable for that particular delivery. This is dependent on performance, cost or other variables. Centiro also works with updates regarding delays during deliveries by sending out signals warning for possible delays or other information customised for their customer.

Company C expresses that it is important for them to both collect more data and to be able to analyse it. This is because they would like to be able to react faster for possible delays. The interviewee believes that in the short term improving the data quality of the data collected needs to be improved. In the long term the logistics chain needs to move towards a more dynamic system and have the ability to track goods in real time and thereby enable quicker responses to delays and replanning of routes if something unexpected would happen during the way.

Company D would in the future like to have more transparency towards the customer. The interviewee also thinks that real time tracking is not necessary but having different Geo-zones to anticipate when the goods will arrive or to track delays would be of good use. For the future the interviewee also believes that AI is of great importance. A company that uses real time tracking on their carriers today are company B, they are monitoring their carriers through a monitoring central where they monitor delays manually and send out extra capacity if needed to hinder delays. They are talking about AI would be of great help in the future to help with both optimising the routes and to update routes in case of delays which is done manually today. Company E also believes that deliveries need to be more dynamic in the future. Tracking of goods is of very high importance within this industry both to create visibility, delivery precision and speed. They believe that AI could be used for sending out warnings if there is a delay. The data quality then needs to improve. Company F within the manufacturing industry have outsourced their supply chain and the most important factor of the delivery is in time. Visibility is important to have to assure that the delivery will be on time.

4 out of 5 companies interviewed sees visibility and AI as something of interest for the future. They does not necessarily see real time tracking as the one thing to increase the visibility but as mentioned earlier in the report is a good way to do so. Some of the companies mentions that data quality is of importance. Optimisation a majority of the companies are interested in but is not something that Centiro works with, they get that information from other parties. They check for possible deviations and sends out warnings for these to the customers. AI could be used for more than optimisation. In the case with Centiro you could use it for negotiations with carriers to get better deal and also to choose the correct carrier for the correct delivery to increase the margins.

6

Discussion

In this chapter the results are discussed. The areas for discussion are the same as the sections in the previous chapter Results. The discussion is also linked to the results presented in that section.

6.1 Needs within deliveries B2C

This section will present discussions on the five themes with regard to needs and new solutions in the B2C sector.

6.1.1 Flexibility

The customer do not want to adapt to the delivery, they want the delivery to adapt to their schedule. There is an increasing trend on the market for home deliveries during evening time, but still a lot of people tend to be sceptical of having their goods delivered to their homes. Delivery to service point is still the most common way of delivering goods, 66 % of all deliveries are delivered to a service point. Many people still prefers it that way, shown in a survey made by Postnord 2018, 39 % of the participants would prefer to pick the goods up themselves at a service point (PostNord, 2019). Although there is a gap between actual and preferred delivery to service point there are still many people that prefers it that way. There can be several different reasons for this, one reason might be that this delivery alternative is often offered as the standard delivery alternative that is free of charge for the customer or that the package did not fit into the mailbox at the customer's home and was thereby sent to the closest service point. Another reason might be that the alternative offers a high level of flexibility regarding pick up time, the customer have the ability to pick the goods up whenever it fits them the best and they do not have to adapt to their delivery in respect to time. One can thereby assume that the customer appreciates goods being delivered to their home, but they do not want to feel trapped in their homes during a specific time or time span waiting for a delivery.

This theory is strengthened by that many customers would prefer to have the goods delivered to a locked post box near their residence, to cover today's need there is a need for a 64 % increase to meet the preferred level of delivery to post box. Of course this alternative is not possible for goods larger than the post box, but if we glance into future solutions there are solutions that covers these needs that are starting to appear on the market. Delivery to smart boxes close to the customer's

home might soon become a reality for many consumers. This is also the preferred choice for deliveries in the future according to PostNord's survey (PostNord, 2019). There are several companies that provides lockers where the customer can pick their goods up, these boxes are often placed close to stores or warehouses. There are several actors on the market that are talking about having smart boxes in connection to the customers home, In Spain they have started to install smart boxes in apartment buildings (DHL, 2018b). Bring is also talking about how the future deliveries might look like and they are discussing an increasing trend of using smart-boxes for deliveries, and believes that smart boxes in connection to the customers home is the future of deliveries (Holgersson, 2017). Of course the infrastructure for it is missing and needs to be built before this can become a reality but the market for it is mature. One of the companies interviewed in the study, Company B, have started a pilot project in collaboration with one of the leading companies for construction of housing and residential areas in Sweden for deliveries to smart boxes in connection to the customers home. If this is offered to the customer it might just be a matter of time until customers will demand this type of delivery as standard.

6.1.2 Speed

As mentioned in the result, speed can be seen as an attractive quality today, depending on the line of business. In the Kano survey, same day and next-day delivery has a high satisfaction coefficient and is categorised as attractive. Looking at the market analysis it can be seen that depending on what you are purchasing you can expect a wide variety in how fast it can be delivered. It is likely that it because of high competition in these line of business that has caused the delivery time to go down all the way to same day delivery.

Looking at the situation today where the most common delivery time for express delivery is between 1-2 or 1-3 days, the same as for standard delivery depending on the line of business. Express and standard delivery time is not necessarily taken from the same companies, but safe to say is that the health and beauty sector is dominating speed of delivery. Within this sector it is important for companies to offer the same speed of the delivery as the competitors. Companies within the clothing, shoes and accessories have a wide spread in offered speed of standard and express delivery. Since there is a wide spread and many companies within this sector offer a longer delivery time than 1-2 or 1-3 days companies within this line of business could use speed of delivery to stand out against their competitors.

The Kano model is dynamic and changes over time and needs can change categorisation. Attractive qualities that creates competitiveness for a company could later be considered one-dimensional or must-be because the customer has been getting used to the attribute. So even if same day and next-day delivery is creating a lot of satisfaction today and does not create so much dissatisfaction if it is not available, that could change over time, both lowering satisfaction and increasing dissatisfaction if not fulfilled. Because of the changing nature in the Kano model it is likely

that in a couple of years it will not longer be seen as attractive and will likely be seen as a must-be quality. This has already shown in segments such as food and health and beauty as seen in the market analysis.

6.1.3 Visibility & Reliability

In the result from the study from PostNord it was stated that tracking of goods were important for the customer, but many customers does not use this function at all, or just one time during the delivery (PostNord, 2019). The question is if this service would be needed at all if a more exact delivery date or time would be provided for the customer. For delivery to a service point or to a post box at the customer's home, a specific delivery date might be enough. However for home delivery a more specific time span for delivery or even an anticipated more exact time for delivery is needed. It is important not to forget the service perspective here. The customer might not have the need to know where the goods is geographically but they might still appreciate getting updates about the delivery since it builds trust and ensures the customer that there will not be any delays. Having the ability to track the goods in real time might therefore not be necessary for the customer but it might be a way to have that extra for the customers.

There is high dissatisfaction according to the kano survey if the delivery is not on time. It seems that reliability and delivery precision is of high importance since Company B and Company C also mentions how important it is to be on time and if there is a delay to communicate this clearly to the customer. It is therefore important to put focus on achieving a high quality in delivery precision for deliveries in the B2C sector.

6.1.4 Digitalisation

Company B and Company C, both working in the B2C sector, sees great potential in AI and predictive analysis. Company B has a system for route optimisation. The interviewee mentioned that some manual labor is required to fix minor errors which means that there are some areas that can be improved. Foremost it is the ability to make quick decisions on the spot which is essential to make sure you can match the ETA-window in same day and next-day deliveries which for example Company B are working with. As discussed in Section 6.1.2, same day and next-day delivery will likely be less of an attractive quality in the future since it is already starting to be more of a must-be in the food and health and beauty segments. More and more line of businesses will likely see an increased pressure in delivering the service of same day and next-day delivery. In order to meet these new requirements predictive analysis is a way to make sure to meet the delivery time by avoiding delays.

6.2 Needs within deliveries B2B

Within the B2B sector the needs can differ depending on the industry. A big difference within the different industries is for example the cost aspect. In some industries

a low cost is the most important factor when in other industries there are other factors that is of highest importance. Another big difference is flexibility where some industries does not require flexibility while others demand it.

6.2.1 Flexibility

It is clear from the results that flexibility is not the most important factor in the B2B sector, with some exceptions. Often B2B deliveries are carefully scheduled, which removes the need for flexibility, both regarding time and location. Company F in the manufacturing industry says that because of their scheduled deliveries on a daily basis there is not really a need for flexibility at all, unless there are urgent emergencies. However in the construction industry, as Company E talks about, the companies delivering to construction sites needs to be more flexible because of a more customer controlled business. One could argue that one a general level flexibility is much less important in the B2B sector than in the B2C sector, but some industries are in need of it as well.

6.2.2 Speed

Speed is of high importance within the construction industry, it is one of the most important factors that Company E are looking at when selecting what company to handle the delivery. This is because most of their customers wants their delivery as fast as possible. Company D is working with both standard delivery and express delivery. They mention the trade-off between speed and cost and speed is dependent on what the customer are willing to pay. Here they mention for example that deliveries in life science, such as medicine transports, the cost is not often a factor and speed is essential and they can therefore deliver it faster. Company F also mentions that in some cases the cost of the delivery is not of importance. In the manufacturing industry this is more for emergencies where production could shutdown without a certain part or product. Otherwise Company F mentions that speed is not so important for their customers as long as the delivery is on time.

Speed should be considered important in the B2B sector on a general level. The survey by Sohn et al. (2017) shows that buyers sees lead time as a must-be quality. In the manufacturing industry it may not be the most important but other companies in the B2B sector believes that speed is a necessity.

6.2.3 Reliability

Company D, E and F all agree that reliability and delivery precision is one of the most, if not the most, important factor in deliveries within the B2B sector. There are different time windows of delivery in different industries as stated by the interviewees, but they all agree that it is important to meet the set time of delivery. The kano survey conducted bu Sohn et al. (2017) states that reliability is a must-be quality as well. All data points to that reliability is the first factor to look at in order to increase satisfaction and build sustainable relationships with customers.

6.2.4 Visibility

Having visibility in the supply chain does not, when listening to the interviewees, be of interest regarding monitoring their transportations throughout the chain. They also do not see any reason for their customers to be interested in following the shipments they are sending. Company E however finds it more interesting because of the possibility to visualise where each shipment is and showing more data such as capacity. It is likely that they find it more important because of the need for more adaption and flexibility in the construction industry where there is more uncertainties.

What visibility could do is provide more data for the companies. This data is needed to work with AI and move to a more data driven supply chain (Yu et al., 2018). Because it is important to work with bot speed and reliability there is a need for more visibility in the supply chains for companies in the B2B sector.

6.2.5 Digitalisation

There are some mixed responses from the companies working in the B2B sector. Company F does not see a need for AI unless in certain areas which is not enough to invest in the technology. This could likely be translated to the manufacturing industry as whole because they have daily schedules for deliveries and trust that the deliveries will be on time. The manufacturers that works with the JIT principle and does not have an extra stock could however have some use for AI in order to avoid delays at all cost since it can be costly. Being able to predict and make better optimisations and decisions is of interest for third party logistics and construction. This is likely because there is more uncertainty in these industries than in the manufacturing industry.

6.3 New technologies

Tracking trucks or goods might not be the complete solution to the current and future needs in the supply chain. The function of tracking in itself is not what is interesting according to the interviewed companies. However the technology is required to use more advanced technologies such as big data, AI, machine learning and predictive analysis. Using tracking as a way to gather data points is a necessity to allow these technologies to work (Yu et al., 2018). By tracking trucks or the goods itself in your supply chain you can gain access to the current location of a specific delivery in real time. Having all these data can then in return be used with these more advanced technologies for purposes suited for the company. So even though tracking deliveries may not be of interest for the customers it has the potential to enable the companies to work with technologies that can give competitive advantages in the end benefit the customer as well.

Today you have the possibility to use GPS and RFID to track goods in real time. Unfortunately most of today's systems implemented in companies cannot handle

the big amount of data that is collected. In order to work with the concept big data you can use predictive algorithms which are a way of handling the amount of data (Cassidy, 2018), but one should also develop the IT-infrastructure in the company to be able to work with great amounts of collected data. In a near future 5G networks will be a reality. This new technology has the potential to be used in tracking. Co-operative location will reduce delay in communication between devices which could help increase location accuracy for devices. Its primary use may however be to achieve better control over autonomous vehicles (Zhang, P. et al.,2017). Being able to tailor the 5G network, by using what is called network slicing, according to your own needs is also something that could help in the area of tracking. In regards of tracking it could for example be interesting to focus on low-latency, meaning that you have a lower delay between the input and output in your system. According to DHL (2019) the realisation of the 5G network also has the potential to bring forth new tracking devices and tags.

Predictive analysis is a working way that has been brought to light by the growth of big data. The society becomes more and more connected with each other and devices are often linked to each other, meaning that data is created in a huge rate. Dealing with this amount of data is impossible for both humans but also the standard computer systems that are in place today. Predictive analysis has the potential to optimise the routes in both an end-to-end supply chain as well as in the last mile (Cassidy, 2018). With data points such as current location, weather forecasts, traffic alerts coming into the system in real time, predictive algorithms could make decisions on route changes in real time that would decrease the lead time or avoid delays. It also has the potential to increase the capacity use by finding goods that could be delivered via the same fleet more easily.

6.4 Solutions to meet the needs

There is three major trends that will likely have a big impact on future deliveries within the B2C sector. These trends are speed, delivery precision and delivery solutions close to the customers home. Speed and delivery precision is also important within the B2B sector.

In order for companies to fulfil the need of delivery precision there is a need to close the ETA-window, offering a time span between 2-5 days is just not precise enough for the customers. For companies to be able to offer the customer a more exact time or day for delivery by the time they place the order they need to use tools that can help them to anticipate an expected delivery time. To do so they need to work with big data and predictive algorithms. By doing this they can plan routes based on previous data for the same route (DHL, 2018b). Optimising the planning gives a possibility to close the ETA-window because you have the ability to deliver faster. You will gain more precision by being able to act quicker when facing crucial decisions regarding the delivery (Cassidy, 2018). To be able to collect this type of data carries need to be tracked.

Same day and next-day delivery is a current need that likely will grow and in the future become standard for deliveries. This requires good optimisation in planning routes in order to match the speed required to match this need. Capacity usage is also another important aspect to increase. If you can increase your capacity usage you can send out more deliveries at once. In order to achieve greater optimisation and capacity usage predictive analysis is of great use (Cassidy, 2018). As mentioned earlier in the discussion this tool can make decisions in real time with several inputs from collected data both historical and data collected in the moment. With this you will have the possibility of succeeding with same day and next-day deliveries. Another solution that can help achieve same day and next day delivery is automated vehicles. Automation in transportation leads to more hours during the day that deliveries can occur which in return means that the potential of delivering packages more quickly increases. In order to match the increase in capacity regarding transportation, the capacity in warehouses must also increase. Therefore automation in both transportation and warehouses needs to be implemented together.

As mentioned, new delivery solutions like smart post boxes for delivery close to the customers home might soon become a reality for many customers. This type of solutions offer the customer flexibility in regard to pick up time and location. Of course this is only applicable on consumer goods. Heinrich et al. (2018) has tried a prototype of an automated vehicle putting parcels into boxes placed outside without any manual interference. This shows that there are possibilities to automate deliveries to smart boxes without any human interaction from the warehouse to the smart box.

Flexibility is starting to become more important in the B2C segment as can be seen with the increased importance of being able to choose your delivery method, but also in the kano survey regarding changes to delivery location and delivery time. Changes in location and time of the delivery provides new challenges for the logistics players. The routes in which the packages are delivered are set when the fleet takes off according to the interviews with Company B and Company C. In order to handle changes both concerning time and location the route must be able to update in real time when change requests come in. This is where AI comes in. Manually changing routes in real time is difficult to handle with all the data coming in. Instead a system which can handle the data and optimise new routes in real time is a solution that could resolve this challenge.

In Section 6.3 the advantages of changing to a more dynamic system in order to handle changes in real time during the delivery was mentioned. It was also mentioned that there was an interviewee who did not believe that this was in the near future. There is a possibility to use predictive analysis and act on it in real time without having the packages digital themselves. If you track the trucks instead of the packages you can still make changes to for example the route of the truck if needed. In this way you can use AI and predictive analysis to act on sudden changes, weather conditions, traffic stocking and more, without changing from the system with labels on the packages. Making the most out of these new technologies would probably still

require a change from labels to make packages more digital but tracking the trucks gives enough real time visibility to make use of predictive analysis. As mentioned earlier real time visibility is the enabler to improve both speed and reliability but also flexibility.

6.5 Development drivers

The growing trends on the market today are soon to become a reality. It is clear that there is a need to meet these growing trends with the technological solutions needed, but what actor in the supply chain drives the development? Who has the responsibility to drive the development towards a more dynamic system. Or, who is willing to do so. Today the supply chain is dominated by a static system that is not flexible, not digital, not visible and delivery precision is not very precise. The technology is already here, but since there is such a low willingness to pay for delivery from the customer, actors on the market are not willing to invest in this new technologies.

Of course companies need to adapt to the customer and market needs, and even if the customer tend to be more satisfied if the delivery is fast, precise, and delivered directly to the customers home, many customer might still select the delivery option that is free of charge. If we look at the development that customers expect the retailers to offer several delivery alternatives, chances are that customers will select to purchase goods from the retailer that can offer the best delivery option to the best price if they are selling the same or similar products at the same price. If retailers are starting to offer different delivery options to the customer, the choice is up to the customer what delivery company that gets to deliver their goods.

If retailers are using delivery options as one way of competing with other retailers, making the customer select what delivery option they prefer at a price that they are willing to pay it puts pressure on the delivery companies to offer the services that the customer prefers. Can competition between suppliers force implementation of new technologies? Since there are start up companies on the market today offering home delivery or delivery to smart boxes etc that have implemented these new technologies, larger delivery companies might therefore lose customers over time if they are not willing to do so as well.

It has earlier been discussed whether or not the package should be tracked or the transportation vehicle the packages are delivered in should be tracked. This could have an effect on who actually brings forth this technology to the market. If the vehicle that transports the goods is tracked then naturally the development and implementation of said technology used becomes the responsible of the carriers since they own the means of transport. However, even though they may be interested in visibility as well it is companies like for example Construction industry who is keen to have real time visibility who has to put pressure on the carriers to be able to provide this service. In the end it will be the carriers who can provide solutions that can give real time visibility that will keep and get new customers. If the package itself is going to be tracked this moves the responsibility away from the carrier. In-

stead it would have to be the sender of the package that also provides the technology that allows for real time visibility. It could be anything from having a RFID-chip in every package to new solutions that can come forth with the new 5G network. Fourth Party Logistics B2C mentioned in their interview that if such a solution with a RFID-chip with every package there is a need for an eco-system where these chips are reusable. Otherwise this solution will be hard to implement since the cost will likely be considered to high in contrast to the benefits.

This leads to the question, who should pay for it? Depending on what method is used to track and enable visibility the cost will fall under the party that has to drive the development and implementation. The most likely case in the near future is that the transportation vehicle will be tracked. This is because the static system that is in place today does not have to change. It will also provide If the trucks are tracked it would mean that the implementation of the technology needed for real time visibility will be the carriers responsibility. The chain that starts the need for implementation starts with the customer. The customer, both in the B2C and the B2B sector want plenty of alternatives that they can choose from when it comes to transportation. This puts pressure on the suppliers and retailers to be able to provide the customer with alternatives that suits their needs. The suppliers and retailers also want to be able to be in control of their chain and wants more visibility. The carriers that can provide the alternatives that the customer wants and fulfil the needs of the suppliers and retailers will therefore survive on the market. In the competitive setting that exists for carriers, especially today when new carriers has emerged using new technology, they need to implement new technology. The cost for this will therefore most likely be placed on the carriers but the other option for the carriers is most likely to lose business. Obviously more technology integrated into the solution and a higher cost for the carriers will also result in a higher cost per delivery for the suppliers and retailers which in the end might end up as a cost for the customer. The system as it is today may therefore not change so much, but the cost for all parties is likely to be a bit higher.

The development of smart post boxes are close. There are currently smart boxes that already exists, but these are located at certain locations similar to how service points works. Company Home delivery B2C has started up a collaboration with a residential building company to implement smart boxes for deliveries in apartment building. The reason for this collaboration to implement this solution is to test how the smart boxes could improve how the home deliveries can be carried out. In the beginning it will only be company Home delivery B2C who delivers packages to these smart boxes but it is likely that more carriers will join in. Collaborations like these are a good way to drive implementation of solutions that could benefit all parties. The residential building company will gain something different and unique in their residential and home deliveries will be easier to execute for Home delivery B2C. If the test is a success it is likely that more smart boxes will appear in or near apartment buildings and that several carriers will provide delivery to them as well. According to Home delivery B2C it is the residential building company that owns the infrastructure, or the physical boxes. However the plan is that the tenants will

own them.

6.6 Challenges

Cost, data security and handling big data are some of the challenges that is preventing the implementation of the solutions. The technology needed is already in place and these challenges needs to be overcome in order to realise the solutions.

As always when working with data collection there are issues concerning data security. Threats of hacking is something that needs to be taken into consideration. Drones and other automated vehicles are targets for hacking and could for example be re-routed or turned off. The same problem exists for smart post boxes. If they are hacked or someone gets hold off data that can open up these boxes it is easy to steal without any questions. Working with data security is therefore a necessity in order for these technologies to be implemented.

As mentioned before the current systems in place at companies cannot handle the amount of data that is collected. In order to work with AI, new analytics methods must be used. New data systems that can handle the data amount is of need, but as stated by Grable and Lyons (2018) predictive algorithms is a way to handle big data. Investing in a new data system could be expensive. There is a possibility in using external companies which provides ERP-systems. These providers are likely to see the potential in creating analytics into their systems that can handle big data and take decisions. This way the companies does not have to invest in internal new computing systems.

Cost is a challenge because of its unclear nature on who should pay for the development and implementation. As discussed above in Section 6.5 the cost the most likely scenario is that the carriers has to implement the solutions because the visibility in location will come from the tracking of their trucks. Because of pressure from suppliers and buyers it is likely, as stated earlier, that their other option is to lose business. However there are some uncertainties if that is the full truth. A possible solution is to share the cost between different parties through partnerships. For example the carriers could have systems that supports tracking devices whilst the suppliers takes the cost around the devices used. This will however create other challenges. The cost around improving the supply chain and last mile delivery is one of the biggest leap that stands in the way for development.

There are some challenges when it comes to the implementation of smart boxes. The biggest is likely to be if there is enough space for smart boxes in and around housings. In apartment buildings it can already be quite crowded with the regular post-boxes. Just as they are doing in the pilot project with smart boxes, the boxes will likely be shared amongst the residents. However if that is the case it is impossible to replace the post-boxes. Another possibility would be to replace them with smart boxes completely. That would require each resident to have a dedicated smart box for them. No matter if its sharing or dedicated boxes space will still be an issue.

6.7 Possibilities for Centiro

Both within the B2C sector and the B2B sector the need for speed and delivery precision was important. Visibility has been connected to increase both speed and delivery precision in this thesis. To cover the customer requirements on deliveries Centiro should look into how to work with increasing visibility. 4 out of 5 interviewed companies were interested in increasing the visibility in the supply chain and implementing AI into their operations. It is not the need for real time tracking but the data acquired from it that could be of use for Centiro. It has the potential to lead to more deviations that can be found during deliveries which can give more warnings but foremost more reliable warnings. Visibility in the supply chain and real time tracking is something that should be of interest for Centiro as well since they can improve their service with this increase in data just as much as carrier companies and retailers.

The interviewed companies also spoke about the quality of the data. Today the quality can differ and it can be hard to know if the data is true. More data could improve the quality, but you also need to be better at sorting through the data and understanding it. In other to work with for example AI you need to understand the data that works as the input otherwise you will not gain anything of value from using it. Working with the quality of the data should therefore be of high value for Centiro.

Since there is a large possibility that the implementation of new tracking technology like tracking of carriers or usage of geo-zones will be forced as a consequence of a competitive setting between the different carrier companies. There is a need for a system that can handle the larger amount of data that will be collected with this new technology and this opens up great possibilities for Centiro you can use and interpret the data for the benefit of their customers.

In the B2C sector smart boxes has been mentioned as a possible solution to fix the need for improvement regarding waiting time with home deliveries. However this will not affect Centiro in any way since the only thing that happens is that the end location changes from service points to smart boxes. It is likely that a change in delivery location will not change anything for Centiro.

6.8 Looking further into the future

Today autonomous vehicles are not quite ready. For personal use it is however likely in a near future. What is more towards a future further away is autonomous deliveries. Smart boxes is likely to be the future for home delivery within the B2C sector. The tests with an autonomous truck delivering to boxes without human interaction shows that there is potential for autonomous deliveries (Heinrich et al., 2018). Within the next 15 years it is possible that all deliveries to the homes are carried out by autonomous vehicles to smart boxes completely removing the need for consumers to stay at home at a certain time and also allows for deliveries to be carried out during the entire day.

A more futuristic solution regarding automation is to have delivery robots on the delivery trucks that delivers single packages. The truck would drive to a location near several delivery locations and send out these robots. In this way you can make deliveries to several locations at the same time instead of driving to each of the location. If a change is made to the location these robots could directly get this information and change its destination. This would allow for changes up until the end of the delivery as long as it is in range for the robots. Having small delivery robots could also fit the solution with smart boxes but could also deliver to the doorstep.

7

Conclusion

7.1 General

Based on the result and discussion from the study three main needs were found to be most important within future needs for deliveries within B2C. These needs were reliability, speed and removing inconvenience in home deliveries. Within the B2B sector the needs were reliability and speed. Depending on the line of business the importance of speed differed. Reliability was unanimously mentioned as important and often considered the most important aspect of the deliveries. Within the manufacturing industry speed is not as important as long as the deliveries are on time. The two main needs in the B2B sector are speed and reliability, however in the construction industry flexibility is of importance. This should be treated as more of a special case rather than a commonality, but important to take notice of working in this industry.

The technological solutions needed to meet the needs of deliveries are AI and deliveries to smart post boxes close to costumers' homes. The AI has the potential to make optimisations of capacity, routes and more in real time. To make AI work and more accurate, real time tracking of the carriers used in deliveries are of need to increase the visibility both also moving away from a static system into more of a dynamic, not fully dynamic but a step on the way. Increasing the visibility also leads to an increment in data collection and improvements of data quality. From the interviews it was clear that the first step towards a better supply chain according to companies is the quality of the data. To increase this not only does visibility need to be improved but there is a need of understanding the data in order to handle it correctly.

In order to implement new technologies to allow for AI, carrier companies have to integrate tracking into their transportation vehicles to cope with the competitive setting on the market. There is also a need for new digital solutions or systems that can handle the increased data amount. The most likely case is that the static system in the supply chain with labels will remain and thereby the trucks has to be tracked. The implementation of tracking technology in the trucks is likely going to be forced through a competitive setting in which the carrier companies are operating in.

Smart post boxes is the best possible solution to fix the current inconvenience with home deliveries. Collecting packages at service points are today the most common

way because of its flexibility regarding when customers can pick their goods up. Smart post boxes will grant this flexibility as well while simultaneously provide home delivery which is wanted amongst consumers. The solution with smart post boxes also has the potential to be combined with more technologies in the future such as automated vehicles which could improve the efficiency.

7.2 Centiro

New tracking technology and real time tracking increases the visibility in the supply chain. Centiro gains some possibilities with a more visible chain. Since Centiro sends out warnings that is dependent on data on such things as location more visibility means more reliable warnings in the system for the customers. More data also has the potential to increase the overall data quality. Data quality is of importance in order to work more precise with AI. How well the AI performs is dependent on the quality of the data used as input for it. Increasing data quality and understanding it should therefore be of interest for Centiro and more visibility is the enabler.

Smart post boxes is the most likely solution to fix the need for removing inconvenience with home deliveries in the B2C sector. It is clear that this does not affect Centiro. Changing from a majority of deliveries to a service point to more deliveries to a box placed near customers' homes does not change anything for Centiro. This is because it is merely a change in the end location for many deliveries, which does not have a noticeable impact on how Centiro operates.

7.3 Further research

In this report the main focus within visibility has been on tracking and data on location. It is clear that complete visibility in the supply chain is much more than location. From interviews other aspects such as weather, condition and traffic has been brought up. For deliveries within for example the food industry it is also important with temperature. A possible continuation of this research is to look into more aspects of visibility and if the same solutions could be applied or if other solutions are of need.

The current collaboration with setting up smart boxes inside residents will likely have gather data on customer satisfaction, delivery success and more. It would therefore be of interest to look into how the pilot project with the smart boxes has worked out and make an assessment on the possibilities for an expansion of smart boxes across the country of Sweden.

8

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A

Appendix 1

Attribute	A	O	M	I	R	Q
Speed (same-, next day delivery)	54	1	1	15	1	0
Flexibility-delivery time	33	5	5	28	0	1
Visibility before ETA- window short time span	32	9	5	20	1	1
Real time tracking of delivery in short time span	38	13	3	13	0	1
Visibility before long time span	24	15	9	18	0	2
Real time tracking of delivery in long time span	32	19	4	12	0	1
Option of choosing home delivery	17	1	5	39	9	1
Overfull service point	0	0	0	43	28	1
Flexibility regarding delivery location of consumer goods	28	5	1	35	2	1
Flexibility regarding delivery location of ungainly goods	25	3	0	39	4	1
Delivery on time	23	26	11	11	0	1
Notificitations when delays occur	7	28	25	10	0	2
Option to have goods left outside the door	7	11	7	16	27	4

Table A.1: Spread of number of respondents categorising the attributes