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The potential of using digital lockers as a delivery and return method for online purchasing of clothes

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This Master Degree Project in Logistics and Transport Management was written in the spring of 2017 at the School of Business, Economics and Law at the University of Gothenburg. The thesis is equivalent to 30 higher education credits.

The authors of the thesis send their wishes to their supervisor Sharon Cullinane who has been helpful with giving feedback and thoughtful insights.

Abstract

This thesis was written with the purpose of investigating the potential for using digital lockers as a last mile delivery method for e-commerce of clothes. Moreover, the thesis also aims at determine how online shopping of clothes and last mile deliveries affect the travel behaviour of the customers. The thesis focuses on Swedish consumers and their experience from purchasing clothes online, together with their preferred delivery methods in the future. The product category clothes was chosen for the reason that it is the largest product category of the physical product bought online in Sweden and online sales of clothes is increasing.

In order to analyse the potential for digital lockers, literature was collected in the fields of last mile deliveries and customer travel behaviour, in addition a web-based survey aiming at consumers and their perceptions in regards to last mile deliveries is done by the researchers of this thesis. The survey was sent out to students at the University of Gothenburg and Chalmers. In total 353 respondents replied to the survey and out of those 281 responses were complete. The survey contained 42 questions arranged in different categories according to topics and was made through a web-based program, Survey Monkey. The survey included questions for both students who had bought clothes online and students who only had bought clothes in physical stores during the twelve last months. Therefore, a logic in the program allowed the respondents to skip questions that were irrelevant to them and thus reduced the number of questions each respondent had to answer.

The results from the survey and the analysis reveal that there is a potential for digital lockers to be used as a last mile delivery method, due to the advantages digital lockers have compared with other last mile delivery options. Such advantages would be less time in a queue due to the automatically retrieval and decreased demand of workforce to deliver the parcels. Another advantage is the wider time span and the possibility to collect the parcels depending on where the digital lockers are located. Furthermore, it is found that the location of the digital lockers is of great importance in order for the digital lockers to become successful. Such locations would be areas where there is a high density of people passing by, like high traffic commuting stations or shopping malls. Found from the survey, residential areas were considered as the most suitable locations to install digital lockers. The disadvantages of digital lockers are the investment and maintenance costs together with issues in regards to permission of where to locate them.

In terms of how e-commerce impacts on the travel behaviour of the customers, it is concluded that there is a connection between the way customers travel and how the clothes are delivered. The way the customers travel influences how they prefer to have their parcels delivered or where they prefer to collect them. The delivery method chosen is also influenced by customers travel patterns and their daily routines. It is therefore, according to this thesis a double-directed relation between travel behaviour and delivery methods of clothes bought online.

Key words: Last mile deliveries, digital lockers, e-commerce of clothes, customer satisfaction, customer experience, travel behaviour.

Table of contents

1. Introduction	7
1.1 E-commerce and e-commerce of clothes.....	7
1.2 Last mile deliveries.....	8
1.3 Problem description.....	9
1.4 Purpose of the thesis and research questions.....	10
1.5 Delimitations	11
2. Literature review	12
2.1 E-shoppers' preferences on delivery and returns	12
2.1.1 E-shoppers' preference on last mile delivery.....	12
2.1.2 E-shoppers' preference on returns	14
2.2 Last mile delivery options	14
2.2.1 Last mile delivery classification	14
2.2.2 Home delivery.....	17
2.2.3 Click and collect	18
2.2.4 Comparing last mile delivery methods	20
2.3 Digital lockers.....	23
2.3.1 Actors involved in locker implementation.....	23
2.3.2 Locker manufacturers	23
2.3.3 Digital lockers in Sweden	24
2.3.4 Digital lockers outside Sweden.....	26
2.3.5 Lockers owned by e-retailers	29
2.3.6 Locker location	29
2.3.7 Benefits and limitations of the locker solution	30
2.4 E-commerce's impact on customer travel behaviour	34
2.4.1 E-commerce and customer travel behaviour.....	34
2.4.2 Trip chaining.....	35
3. Method and methodology	37
3.2 Research process.....	37
3.2.1 Observations	38
3.2.2 Survey	38
3.3 Data collection.....	40
3.3.1 Primary data	40
3.3.2 Secondary data	41
3.4 Data analysis.....	42

3.5 Validity, reliability and generalizability	42
4. Analysis	43
4.1 E-commerce of clothes	43
4.2 Problems with last mile delivery	45
4.3 Delivery methods.....	47
4.3.1 Delivery methods used at last occasion	48
4.3.2 Preferred delivery methods for next purchase	50
4.3.3 Comparison of delivery methods used at last occasion and preferred delivery methods for next purchase	52
4.3.4 Customers' preference on delivery methods.....	54
4.4 Returns.....	55
4.5 Digital lockers.....	56
4.6 Customer travel behaviour.....	59
5. Conclusion.....	61
5.1 Results of the research questions.....	61
5.2 Concluding remarks and future research	64
References	65
Appendix A	70

Figures

Figure 1: Classification of delivery options to home	15
Figure 2: Click and collect options	16
Figure 3: Classification of click and collect system.....	17
Figure 4: Share of click and collect sales	18
Figure 5: Ratings for motivation to use digital lockers.....	58

Tables

Table 1: Comparisons of different delivery methods.....	20
Table 2: Amazon pick-up location and related delivery options in UK.....	21
Table 3: The prices and delivery speed for different delivery solutions at Amazon UK.....	22
Table 4: Digital lockers outside Sweden.....	27
Table 5: Comparison of digital lockers and traditional courier deliveries.....	31
Table 6: Summary of pros and cons of each delivery methods.....	32
Table 7: Reasons for purchasing clothes online.....	43
Table 8: Reasons for purchasing clothes in a physical store.....	44
Table 9: Aspects that could make the respondents do online shopping of clothes instead of buying them in a physical store.....	45
Table 10: Problems experienced when purchasing clothes online during the 12 last months.....	45
Table 11: Delivery problems encountered in the last 12 months.....	46
Table 12: Whether the current delivery methods is a barrier for buying clothes online.....	47
Table 13: Normal pick-up time/delivery time of the parcels.....	47
Table 14: Delivery method used at the occasion the respondent bought clothes online.....	48
Table 15: Reasons for choosing the specific delivery method at the last occasion.....	48
Table 16: Reason for choosing the delivery method.....	49
Table 17: Methods the respondents would prefer to use.....	50
Table 18: Reasons for choosing the specific delivery method if it was optional.....	51
Table 19: Reasons for choosing a specific delivery method in the future.....	51
Table 20: Preference of delivery method in the future, based on which delivery method used at the last occasion.....	52
Table 21: Preferred delivery method for clothes bought online.....	55
Table 22: How the last return was carried out.....	56
Table 23: Reason for using digital lockers.....	57
Table 24: Location of digital lockers.....	58
Table 25: Mode of transport based on delivery method at last occasion.....	60

1. Introduction

In this chapter, background information of e-commerce in general and e-commerce of clothes is explained together with the importance of last mile delivery methods in regards to customer satisfaction. After this a problem description is provided before stating the purpose and research questions of this research. At the end of this chapter, the delimitation of the research is given.

1.1 E-commerce and e-commerce of clothes

According to Cole (2017) e-commerce is short for electronic commerce and indicates the practice of purchasing and selling goods or services, transferring funds or data via electronic devices, mainly internet. The transactions can be done in either business to business (B2B), business to consumer (B2C), consumer to consumer (C2C) or consumer to business (C2B).

Based on Business News Daily (2015), e-commerce was initiated firstly in the 1960s through electronic data interchange (EDI) on value added networks (VANs). Since then e-commerce has been evolving. Increased availability access to internet attracted companies like Amazon and eBay to start businesses related to the internet. Later on social media channels started to become popular and have become important drivers of e-commerce. This growing market has attracted many companies with different business models to start or expand their business. According to Business News Daily (2015), in 2013, the sales generated from e-commerce reached \$1.2 trillion globally. Until then there were approximately one billion internet users in the world, among those 40% do online shopping.

The fast development of e-commerce and the sales generated accordingly are to a large extent due to the people's increasing accessibility to the internet according to Ecommerce Foundation (2016). In Europe internet penetration and internet usage keeps increasing. In 2015 the internet penetration in Europe was 75%, for EU28 the internet usage was a bit higher with 81.5% of the population, excluding persons aged between 0-14. All Scandinavian countries were found in the top ten list of internet penetration in 2015. The internet usage and penetration is as high as 92% in Sweden (Ecommerce Foundation, 2016).

Based on Ecommerce Foundation (2016), online retailing and e-commerce continue to grow in Europe. It is calculated that about 57% of all European Internet users are engaged in online shopping. The total turnover for European e-commerce increased by 13.3% in 2015 compared to traditional and general retailing which increased by 1% only.

In Sweden e-commerce also keeps increasing (JDA Software Nordic AB and Centiro, 2016; PostNord, 2016; PostNord, Svensk Digital Handel and HUI Research, 2017). The centre for Retail Research reports that the Swedish online market grew by 15.5% in year 2015 and was expected to grow even more, by 16.4% in 2016 (JDA Software Nordic AB and Centiro, 2016). The real numbers for 2016 was however 16% growth and the total turnover of all e-commerce in Sweden grew from 50 billion Swedish kronor in 2015 to 58 billion Swedish kronor in 2016 (PostNord et al., 2017). 75% of all Swedes in the ages of 18-79 purchase online during an average quarter in 2015 and the Swedish sales in total accounted for EUR 6.5 billion in 2015 (PostNord, 2016). Ecommerce Foundation (2016) reports that the Swedish share of the European B2C e-commerce market was 2.1% in 2015.

The clothing category is the largest group of online sales for products, followed by Media & Entertainment and Information Technology. Online sales of clothes and footwear counted for approximately 33% of total B2C sales in 2014-2015 according to Google Barometer (2016 cited in Ecommerce Foundation 2016). It was estimated that online sales of clothes would increase by nearly 20% in 2015 and it was expected that the Swedes would spend 928 million euros on clothing bought online in 2015 (Ecommerce Foundation, 2016).

In line with this, it was reported by PostNord, Svensk Digital Handel and HUI Research (2016) that clothes and shoes was the most frequently bought items online in Sweden during the third quarter of 2016. In the survey made by TNS Sifo webpanel stated in (PostNord et al. 2016), 35% of the respondents that participated replied that they bought clothes and shoes online. Looking at the summary of 2016 PostNord et al. (2017) it is reported that the category for online sales of shoes and clothes grew by 8% during 2016 and the turnover was 9.1 billion Swedish kronor. That is equivalent to 14% of the total sales of shoes and clothes in Sweden during 2016. Compared to the traditional and physical retailing of clothes, the online retailing stayed strong throughout the year. Most frequently bought online is clothing for women (22%), followed by men's wear (12%) and clothing for children (8%). Furthermore, 6% of all clothes and shoes bought online during 2016 were from another country (PostNord et al. 2017).

However most of e-shoppers who buy clothes online send something back. According to BBC (2016), a survey with 1000 participants reveals that 56% of the people return their purchased clothes bought online within the last six months. The figure is even higher for women's clothes. It is found that two thirds of the e-shoppers who buy women's clothes online within the last six months send at least one article back to e-retailers, therefore the return rate is as high as 63% (BBC, 2016).

1.2 Last mile deliveries

Most of physical products sold online need to be delivered to customers in one way or another. The delivery operation is called last mile delivery for e-commerce (Xu, Ferrand and Roberts, 2008). Last mile is a metaphor that is used to describe goods moving from a fulfilment centre where the fulfilment proceeds to the final destination. It specifies on the final part of the product's trip before it reaches to the customers (Prospress.com, 2014).

Customers are motivated to purchase online because they feel it is more comfortable buying products at home rather than going to physical shops. Most likely there could be a combination of beneficial factors that attract them to choose online shopping. These factors can be such as ease of payment, home delivery and return processes (PostNord et al. 2017). According to Morganti, Seidel, Blanquart, Dablanc and Lenz (2014), delivery services offered by e-retailers are the underlying factors that affect customers' choice of doing online shopping. Therefore last mile delivery services are important for further enhancing e-commerce. Based on Prospress.com (2014), last mile delivery has been elaborated by many e-commerce companies since it can be a way to lock in customers and make them loyal. A good last mile delivery policy could help companies to differentiate themselves from others (Joerss, Neuhaus and Shröder 2016). However last mile delivery has also been a big challenge for the e-retailers and many have failed for this reason (Xu, Ferrand and Roberts, 2008). If these factors are not managed well, customers could become dissatisfied (Prospress.com, 2014).

According to Morganti et al., (2014) customers tend to have issues in regards to the last mile deliveries of their parcels. Issues mentioned by the respondents are delayed deliveries, parcels left outside place of residence unattended, problem with tracking parcels during delivery and the price of delivery is being too high. According to JDA Software Nordic AB and Centiro (2016), 50% of the respondents participating in an online survey made by YouGov, replied that they experienced some problems when purchasing goods online during the last 12 months. The same report also reveals that more than half (58%) of all respondents report that they are likely to switch to another retailer if they encounter delivery issues. A similar result was revealed by PostNord et al. (2017) in a survey done by Kantar Sifo webbpanel in 2016. According to the results from the survey, about a fifth of the respondents stated that they had a problem with at least one delivery and half of these respondents are likely to choose another retailer when ordering in the future. Most of the respondents replied that the item they ordered got delivered too late. Twenty percent of the respondents answered that they did not get the item they ordered at all. Based on Xu, Ferrand and Roberts (2008), a research done by DTI (UK department of Trade and Industry) in 2001 showed that the reason why 34% of the respondents have negative impressions on online shopping is due to bad delivery schedule. Morganti et al. (2014) also states that some customers find it troublesome in collecting parcels at collecting point located far away.

Customers nowadays have high expectations of delivery service. This is something e-retailers and logistics companies should consider in order to fulfil the demand of customers with different backgrounds (PostNord, 2016). A good last mile solution for online shopping should not only benefit the delivery process for both customers and other parties involved, but also could provide a good solution for returns (Bring, 2015).

From city logistics perspective, last mile deliveries are one of the inducers that result in commercial vehicles running throughout the city area. This type of delivery is driven by mainly e-commerce in B2C market according to Iwan, Kijewska and Lemke (2015). The biggest problem with last mile delivery is due to a significant fragmentation of the orders. Generally customers buy small amount of products, yet require fast delivery. To cope with customers' demand and become competitive, transport services are required to be fast, thereby the considerations regarding vehicle loading space are dismissed (Iwan, Kijewska and Lemke 2015).

1.3 Problem description

Based on what have been stated in regards to increase of internet usage, increase of products being bought online and last mile deliveries, it becomes evident that both retailers and logistic companies need to carefully consider how their last mile deliveries take place and will be in the future. It is proven by several authors and sources, like Joerss, Neuhaus and Shröder (2016) and Prospress.com (2014) that the last mile deliveries are essential to make the e-shoppers satisfied. Stated by PostNord (2016), the customers' expectations keeps increasing in regards to the delivery of the products being bought online. Today's customers are expecting more flexible and fast deliveries and the delivery methods the customers can choose among could be a trigger for choosing a specific e-retailer (Bring, 2015). In the Nordic countries the most common delivery methods for e-commerce are to collect the parcels at collection points, get the parcels delivered to the place of residence or in the mail box (Bring, 2015). The delivery method digital lockers is also starting to increase, especially in Denmark,

according to Bring (2015). In other parts of Europe the digital lockers have become a popular last mile delivery method (Forslund, Hildingsson, Levin, Lindberg and Rhawi, 2016). However in Sweden this delivery method have not taken off yet (Forslund et al., 2016). Seen from several sources there are certain benefits with digital lockers compared to other delivery methods for e-commerce. Digital lockers does not require any staff for the customers to collect their parcels and thus have the potential to reduce the queuing and waiting time when collection parcels, especially during peak hours (Xu, Ferrand and Roberts, 2008).

In regards to the increase of e-commerce, e-shoppers in the Nordic countries are purchasing more often on the internet, some of them buy online as frequently as several times every month. According to Bring (2015) the consumers who purchase online several times each months, is likely to grow in the future (Bring, 2015).

Since clothes is one of the most frequently bought product categories out of physical products of online sales (PostNord et al., 2016), this product category requires a large portion of the last mile deliveries for e-commerce. In addition to this, as stated by BBC (2016) much of the clothes bought online is eventually returned for several reasons. This stresses even further need for transportation of the sold clothes when they are being returned.

With the increase of e-commerce and the enhanced demand for last mile deliveries as the backbone of this research, it is evident that there is a future demand for last mile delivery solutions that are both efficient to e-retailers, logistic companies and appealing to the customers. There could potentially be many solutions that meet those qualifications, but more specifically in this research the focus will be on digital lockers as a solution to tackle the growing demand of last mile deliveries from the customers' point of view. Based on this, next section in this chapter specifies the purpose and research questions to be investigated in this research.

1.4 Purpose of the thesis and research questions

E-commerce is a broad concept that is employed in many industries, while in this thesis, e-commerce of clothes is the target industry and the delivery methods of online purchased clothes is the focus. The purpose of this research is thereby to investigate the potential for digital lockers to be used in Sweden, with a focus on customers' opinions and views of different delivery methods. Therefore, the first research question to be further investigated is:

- 1) What is the potential of digital lockers as a last mile delivery solution and a reverse logistics solution for e-commerce of clothes in Sweden?

Evaluating the potential of digital lockers is the main research question of this research based on the purpose. However, the authors believe that the potential for digital locker is related to the travel behaviour of the customers. Customer travel behaviour is closely connected to the last mile delivery methods e-shoppers use to collect their parcels. The transport mode they choose to use and the routes they travel to get to the collection locations are influenced by how customers travel. Linked to this, it is essential to investigate the impact of e-commerce of clothes and delivery methods on customer travel behaviour as an underlining understanding. Thus, the second research question is:

2) What impact will e-commerce of clothes and delivery methods have on how customers travel, meaning their travel behaviour in Sweden?

1.5 Delimitations

This research is delimited to e-commerce of clothes for several reasons. First of all e-commerce of clothes is one of the largest product categories bought online, in terms of sales. Secondly, the characteristics of clothes is similar to many other product categories, like make-up products, books, electronics etc. in terms of delivery options. However, in regards of returns, these product categories are likely to differ from clothes. Nonetheless, the researchers believe that some of the results from this research, regarding the delivery methods, could be transferred to other product categories with similar characteristics like clothes. Yet, no other product categories besides clothes are covered in this research.

The focus is also at the last mile delivery of e-commerce and the different delivery methods used for delivering clothes bought online from a customer's point of view. This means that the results for this research are based upon the customers' opinions and no interviews with any retailers or logistic companies have been done. Even though retailers, logistics companies and other players like city authorities have a close connection to this topic, these actors will not be focused upon, rather they are shortly summarised under chapter 2.3.7.

The population of this thesis is delimited to university students that study in Sweden. However, the sample only includes students studying at the universities found in Gothenburg. Yet, the researchers have no reason to believe that students living in Gothenburg differ from students attending other universities in other cities in Sweden in terms of shopping and travel behaviour. To clarify this, there is no proof of that the behaviour among students should differ, the researchers believe that most of the universities and schools at bachelor and master level is found in quite populated cities, or at least in the vicinity of such.

2. Literature review

Since this thesis focus on e-shoppers and their preferences, this chapter starts with e-shoppers' preferences on last mile delivery and returns. The customers' opinions are also crucial to the success of any delivery method. Furthermore, last mile delivery options and especially digital lockers are explored to give the readers an overall understanding of the situation of digital lockers. The benefits and limitations of digital lockers are also specified. At the end of this chapter, e-commerce and last mile delivery options' impact on customer travel behaviour are explained.

2.1 E-shoppers' preferences on delivery and returns

Under this section customers' preferred delivery method for online shopping of clothes and the delivery problems they could encountered are stated. The return rate of online shopping of clothes and the reasons to the high return rates are also specified.

2.1.1 E-shoppers' preference on last mile delivery

According to Eurobarometer (2013 cited in Morganti et al., 2014), of physical products bought online, European e-shoppers mostly prefer to buy clothes and shoes. This category accounts for 48% of all product that require delivery service. The problems customers experienced are mostly from delivery rather than products. It is stated by Eurobarometer (2013 cited in Morganti et al., 2014) that 39% of e-shoppers had encountered at least one delivery problem; 15% of customers complain that parcels were delivered when no one is home; 13% of them are not satisfied because of delayed delivery; 7% of them think that the delivery price is too high; 5% of them are not satisfied because they can not track their orders; 3% of them complain that they need to pick up their parcels from a distant collecting point. However based on BITKOM (2013 cited in Morganti et al., 2014), in Germany customers have a different view of problems regarding e-commerce. Germany e-shoppers emphasis much more on delayed delivery; 29% of e-shoppers claims e-commerce on their bad experiences based on delivery delays; 20% of them stated that they had an unpleasant experience due to damaged goods.

Stated by Morganti et al. (2014), even though Germany has a good coverage of pick-up locations throughout the country, 90% of the online shoppers still prefer the deliveries of their ordered parcels to their home, while only 4% of them prefer to have their parcels delivered to parcel stations. In this thesis, the concept parcel station will be employed to keep consistency. Parcel station refers to several digital lockers being attached to each other. In addition to this, 3% of the online shoppers want to have their parcels delivered at work place and 3% would like to pick up the ordered products from central collection points (Morganti et al., 2014). In the report by PostNord (2016) it is also stated that there are differences between the Nordic countries in how the customers perceive the services they are offered when having their parcels delivered. An example of this is the Danes prefer having their parcels delivered to their homes, workplaces during work hours or parcel machines, also called locker solutions. Danes in general expect fast deliveries and see alternatives offering this as more valuable. Norwegians and Swedes are on the other hand preferring their mails and parcels being delivered to their mail boxes or collection points where they collect the parcels themselves. However, the mail boxes are usually limited in size and smaller in the Scandinavian countries. People living in Finland seem to be more patient compared to other inhabitants in the Nordic

countries and therefore see collection points as the best alternative when purchasing items online. The average time customers are willing to wait for their deliveries in the Nordic countries is 3.9 business days. Compared to this Danes tolerance level is only 3.4 business days and Finns have an average of 4.4 business days before they receive their orders (PostNord, 2016).

In line with this, based on PostNord (2016), Håkan Ericsson, the president and Group CEO of PostNord concludes that Nordic customers have high expectations of what the service should be like when purchasing items online. In the foreword of the report Ericsson explain that most customer nowadays expect fast and convenient deliveries. A high degree of flexibility in combination with the knowledge of when, how and where the parcels are being delivered seems like a standard to the customers in the Nordic countries. Similar results are found in the report from IMRG (2016a) which states that the customers in UK, who probably are the most experienced e-shoppers around the world seen from their average spending on e-commerce, expect both convenience and several choices when ordering online.

In the recent report by PostNord et al. (2017), the respondents have replied and expressed their view of different delivery options and methods. The majority of the customers of today expect a certain standard when purchasing items online. Most important to the customers is finding relevant information easily and having possibilities to choose among, especially payment and when the parcel is going to be delivered is important for the customers. According to PostNord et al. (2017), women find it more important than men to know when and where their parcels are going to be delivered. Among the respondents, 92% believe that clear information of when the delivery will take place is of great importance and 89% want to know how the parcel is going to be delivered before ordering. As previously discussed, PostNord et al. (2017) also states that choices of how the deliveries will take place is becoming more important for customers who are doing e-commerce. Four out of five respondents believe that they should have the possibility to choose how their parcels should be delivered, but only half of all respondents believed that they actually had the possibility to choose delivery method for the last purchase they made online. In the 18% of the respondents replied that they eventually chose another e-retailer because the one their first choice did not give them the delivery alternative they wanted from start. At their latest purchase, 43% of the respondents did not find the delivery alternative they wished to use (PostNord et al., 2017).

Click and collect alternatives are options that online shoppers can select besides home delivery (IMRG, 2016a). Stated by PostNord et al. (2017), when the Swedish customers were asked how they wanted their parcels delivered when doing click and collect, 37% responded collection points, 2% digital locker and 1% in the retailers' physical store. In addition to this, for the option of attended home delivery the respondents replied that they wanted parcels delivered during daytime (4%) and night time (10%). For the option unattended home delivery 31% of the respondents replied mail box delivery, 8% at their door and 2% at their place of work. However, the reality is different from what the respondents actually want. According to PostNord et al. (2017), when the respondents were asked how their most recently parcels were delivered the results were accordingly for click and collect: 60% at collection point, 3% the retailers' physical store and 0% at a digital locker. For the option of attended home delivery, 5% replied during daytime and 1% during night time. For the attended home delivery none of the respondents had their parcels delivered to their place of work, while 22% got their parcel at their mail box and 4% at their door. It is also revealed that 94% of the respondents were satisfied with their most recent delivery. However, Swedes tend

to purchase items that are not possible to delivery through the mail box. Therefore, collection points have become popular for the reasons that the customer can choose when and where they collect their parcels and thereby have less constraints in time and place (PostNord et al., 2017).

2.1.2 E-shoppers' preference on returns

As it is reported in PostNord et al. (2017), it is important for customers that the return process to be handled easily and free of charge. In some cases free returns of parcels is more important than free deliveries, 83% of the respondents replied that free returns are significant when ordering online, also 90% of the respondents believe that it is of great importance that information of how to return parcels is provided.

Based on a UPS survey in 2013, more than 50% of online shoppers had experience in returning their online orders at least once in most countries (UPS survey 2013 cited in Morganti et al., 2014). However, in Germany online shoppers purchase fashion in another way. They tend to order fashion items in different sizes and colours and return those that they do not prefer. Therefore, there is a high return rate in Germany. Based on BHV (2013 cited in Morganti et al., 2014), 77% of online shoppers have returned their online orders at least once. In regards to the online retailers, more than a third of all German distributors receive more than 20% of returns in general. Return rate for fashion products is the highest and reached 40% in 2013 (BHV 2013 cited in Morganti et al., 2014). The high return rate in Germany is to some degree driven by the free of charge return policy, especially in fashion products. Another reason for the high return rate is due to the specific payment mode in Germany. In Germany customers pay once they decide to buy the product. This means that online shoppers could order fashion articles with different colours and sizes and only pay for the ones that they decide to purchase. In contrary to German online buyers, French e-shoppers need to pay before they receive the ordered products. French e-commerce return rate is not even half of the return rate in Germany in 2013 (Kolbrück and Werner 2013 cited in Morganti et al., 2014).

2.2 Last mile delivery options

Under this section, information about last mile deliveries is elaborated. In the beginning of this section last mile delivery classification is introduced to give readers better understanding of last mile delivery. Since home delivery is a well-known last mile delivery strategy and also very competitive towards click and collect alternatives, home delivery together with its advantages and disadvantages are stated before click and collect options are elaborated. In the end of this section different delivery options are compared.

2.2.1 Last mile delivery classification

Last mile deliveries could be grouped into two major categories, attended deliveries and unattended deliveries. Unattended delivery is a last mile delivery solution to deal with the situation when no one is at home while the goods are delivered. Attended delivery method on the contrary dictates that a person will be present to receive the goods when it is delivered during the delivery window to receive the goods from the deliveryman (Xu, Ferrand and Roberts, 2008). The delivery could also be either secured or unsecured. Unsecured delivery is also called 'doorstepping' in the UK, which indicates that the parcels were left outside the

customers' house at locations that are preferably concealed. However, the parcels may get stolen or become damaged (McKinnon and Tallam, 2002).

There are several delivery alternatives to make the delivery secure while no one is at home.

- Home access system: deliveries to the customer's home could be carried out through home access system by giving the carrier internal access to customers' home or outbuildings. The prototype home access systems that piloted in the English Midlands use an electronic keypad connected with the telephone line by which the garage door can be opened and closed. There is a central server communicating with the keypad giving the carrier right to change the pin code after each delivery. After the door is closed, another code that confirms the delivery will be created by the keypad device. The customers receive confirmation by mobile or email directly afterwards (Rowlands 2001 cited in Fernie and Sparks, 2014).
- Local agency: carriers could also deliver the parcels to a local agency. The local agency will make a delivery to customers when they arrive home (Fernie and Sparks, 2014).
- Delivery boxes: For delivery boxes solution, boxes are owned by the retailers or delivery companies, who are in charge of filling the goods into the boxes at the distribution depot. The boxes will then be attached temporarily on the walls outside customers' home. The empty boxes or the boxes with returned goods will be collected by the delivery company on another collection round (Iwan, Kijewska and Lemke, 2015).
- Reception boxes: the parcels will be put into boxes that permanently are attached to the walls outside customers' home. The boxes can be opened by key or electronic codes. In figure 1, different delivery methods under which the carriers deliver the parcels directly to customers' home are categorized (Iwan, Kijewska and Lemke, 2015).

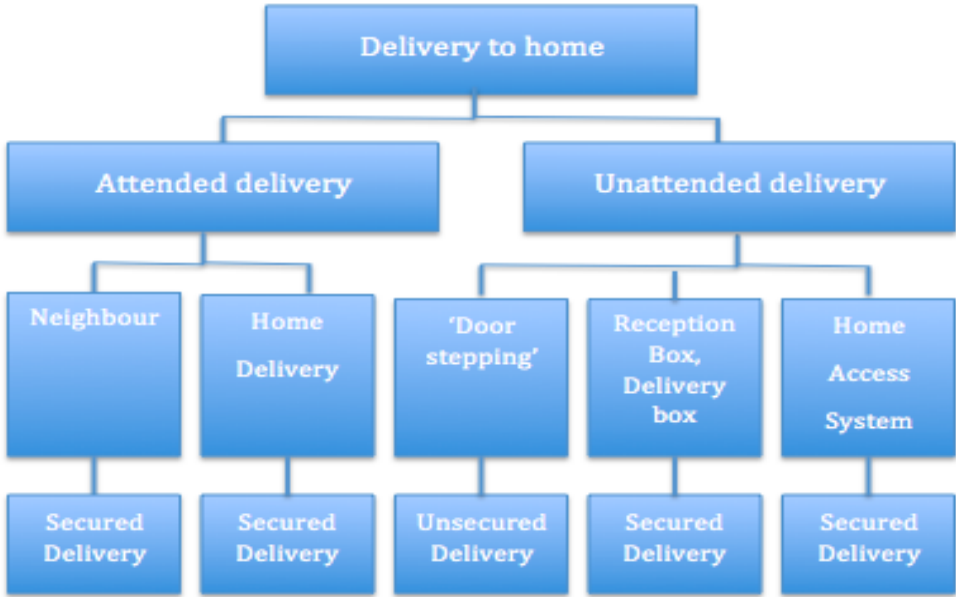


Figure 1: Classification of delivery options to home. Source: derived from Fernie and Sparks, 2014

Besides the methods mentioned above, the carriers could leave the parcels to a nearby collection point (Fernie and Sparks, 2014). Click and collect alternatives are effective alternatives to home delivery according to (IMRG, 2016a). Within click and collect there are in general four different types of delivery methods when customers buy items online. The four methods are in-store click and collect, in-store reserve and collect, parcel store and digital lockers. In-store click and collect refers to when the customer purchases something online, meaning paying for it directly but collect it at the retailer's physical store. In-store reserve and collect is on the other hand another option where the customers purchase the items online, but wait to pay until they collect it at the retailer's physical store. The concept parcel store means that the customer purchases the item online and pays for directly, but collects it at a location the customer has chosen. These locations are often smaller shops or gas stations, usually with very generous opening hours. Digital lockers, which is the last option for click and collect means that the customers buy an item and pay for it directly. The customers then choose a digital locker location that is accessible for most of the time, usually around the clock, every day. Such locations could be public areas like streets or train stations etc. The customers can the retrieve the parcel by either QR code or PIN code (IMRG, 2016a). To make it consistent in the text, parcel-store will be renamed to pick-up at collection points in the whole thesis. Moreover in-store click and collect and in-store reserve and collect will be together named pick-up at physical stores, because they are quite similar and customers need to collect at the same location, meaning retailers' physical stores.

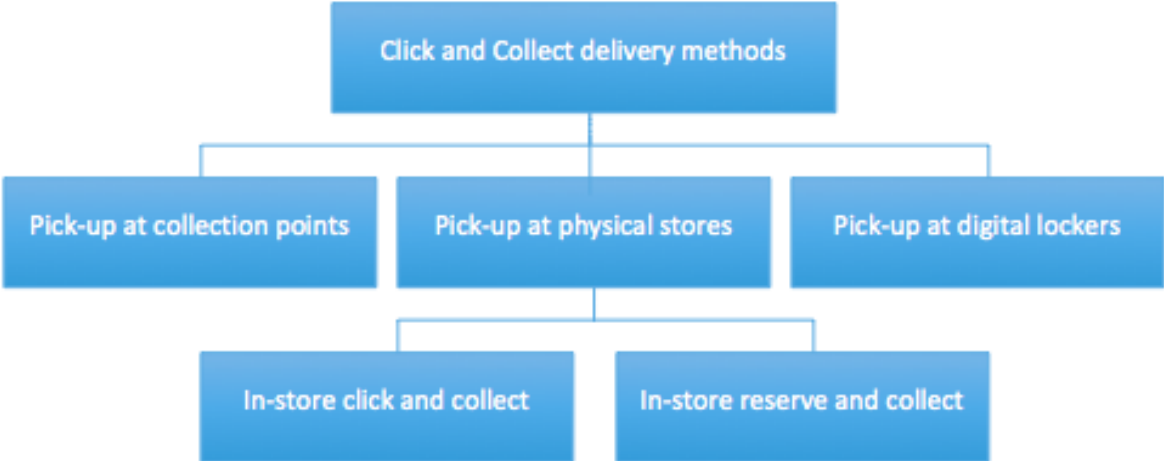


Figure 2: Click and collect options. Source derived from: IMRG 2016a.

In figure 3, different types of click and collect options are categorized. Collection point options can be both attended and unattended delivery. Among the three click and collect alternatives, pick-up at physical stores is attended delivery because e-shoppers need to collect their parcels at physical clothes stores which are existing premises. For the click and collect at collection point option, customers collect from the collection points like grocery stores, petrol stations, which are also existing premises. Therefore, the locker solution is the only unattended delivery option among the three click and collect options.

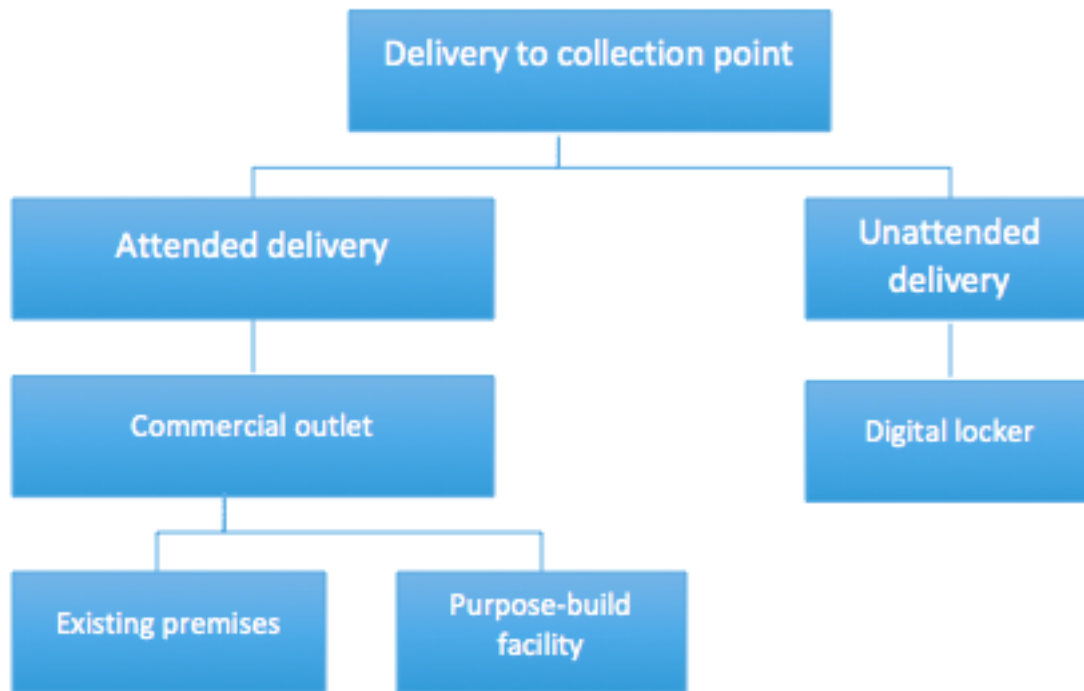


Figure 3: Classification of click and collect system. Source derived from: Fernie and Sparks, 2014

2.2.2 Home delivery

Home delivery is normally attended nowadays because it requires people to receive the goods at home based on the above-described theory. According to McLeod, Cherrett and Song (2006), home delivery has its barriers and thereby need other delivery alternatives to meet various customers demand. Research done by IMRG (2006 cited in McLeod, Cherrett and Song, 2006) suggests that customers could spend 120 minutes once the first delivery was missed. These 120 minutes were spent on making phone calls, waiting for deliveries, travelling themselves to carriers' depot to collect parcels, cancelling order, making claims, asking for compensations and rearranging delivery with another carrier. According to McLeod, Cherrett and Song (2006), a survey done in Winchester, UK with a total respondents of 387, revealed that the first time failed delivery rate is 25% for households that have in average twelve home deliveries within a year. The result also indicated that most of them react positively towards using local collection points when home delivery fails the first time and 83% of them state that they will consider using click and collect options. Based on Visser, Nemoto and Browne (2014), the customers sometimes find it difficult to stay at home and wait for their deliveries or the price is too high. For the carriers, they sometimes need to redo the delivery under the condition that the customer could not receive the parcel or the goods for the first time. This results in additional costs for the carriers.

Another difficulty with home delivery is the contradictory demand between e-shoppers and e-retailers in terms of last mile delivery. From city logistics point of view, home deliveries is the most problematic delivery method yet preferred by e-shoppers that prefer fast, arranged and reliable delivery service (Morganti et al., 2014). According to Fernie and Sparks (2014) e-shoppers want to have a short time window for the delivery so that they do not need to wait at home for so long time, yet the e-retailers or the contracted logistics companies wish to do the delivery around the clock so that they can utilize their capacity in the most efficient way. Based on Cullinane (2009) the wider the delivery window, the less the cost for the delivery

companies. The delivery cost will have an increase of 17-24% if the delivery window is changed from 3 hours to 1.5 hours. Totally eliminating the delivery window could save the companies between 27% and 37%.

Based on Xu, Ferrand and Roberts (2008), another problem with home delivery is that the time slots required by e-shoppers to deliver the products are uneven. A survey done by DTI (2001 cited in Xu, Ferrand and Roberts, 2008) with 317 e-shoppers in 2001 reveals that most of the e-shoppers prefer to have their products delivered between 6pm to 8pm from, with Thursday to Sunday being the most favourite delivery dates. This could incur huge imbalance on delivery capacity, meaning there will be a peak delivery demand during a short period, while the rest of the time, approximately 80% of the day time will be in low capacity demand. The reason why 6pm to 8pm is the most preferable delivery period can be explained by the space-time theory. According to (Thill and Thomas 1987; Kondo and Kitamura 1987; Nishii et al. 1988 cited in Primerano, Taylor, Pitaksringkarn and Tisato, 2007), space-time theory specifies that people are constrained both by space and time. Home and work are fixed in location and time, therefore other activities need to adjust to the location and time to home and work, meaning other activities revolve around home and work in terms of both location and the time period for work.

2.2.3 Click and collect

Click and collect represents the process whereby online shoppers could organize to collect their ordered parcels instead of having them delivered to home, work places or neighbours (IMRG, 2016a). The share of online sales completed by click and collect options has an obvious yearly increase since 2011 as shown in figure 4 (IMRG, 2016b). A survey from Kantar Sifo Webpanel regarding Swedish e-commerce delivery was made in 2016, found in PostNord et al. (2017). The result reveals that click and collect dominates e-commerce delivery market. Six of ten people select click and collect when they shop online. It is also found that 94% of respondents were satisfied with their latest delivery service. Customers with good delivery experience could spread the words to others in their network, which makes click and collect alternatives more attractive and full of potential (PostNord et al., 2017).

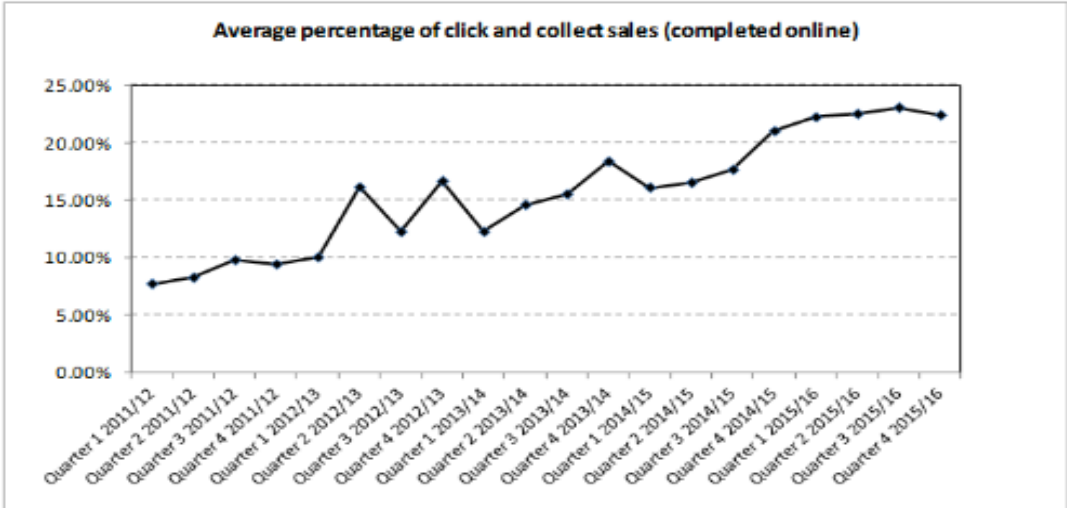


Figure 4: Share of click and collect sales. Source: IMRG 2016b

Click and collect alternatives are the growing methods for delivery service. All of them have lower cost than home delivery, because the parcels can be consolidated by these means and missed delivered can be avoided (Morganti et al., 2014). For example according to websites from several companies selling clothes and fashion in Sweden, it is possible to order clothes online and get them delivered to one of their physical stores free of charge (åhlens.se, 2017; lindex.se, 2017; ginatricot.com, 2017). For consumers, they are more flexible than home delivery. Because of these benefits, delivery networks were being set up and enlarged in European countries especially in North Europe. The number of lockers has also been increasing with a fast pace in Europe (Morganti et al., 2014).

According to Morganti et al. (2014), in Sweden logistics supplier PostNord provides around 5,000 distribution delivery points to end consumers across Sweden, Norway, Finland and Denmark. In Germany, the delivery service market is controlled by mainly five players, which are DHL/DAPG, Hermes (t), DPD, GLS and UPS. They in total have 36,000 pick-up points in Germany. In France, there are four main players that control the last mile delivery market with a total pick-up location of 18,000 (Morganti et al., 2014). The pick-up stations were well developed and 90% of population could reach them within 10 minutes' walking or driving tour (DHL 2009 cited in Morganti et al., 2014). More than 20% of the parcels were required to be delivered to pick-up stations. Pick-up stations are a well-developed substitute for home delivery in France (Morganti et al., 2014). Pick-up at collection points and physical stores could also drive customers to incremental spend while they come to pick up their ordered goods. An online shopper survey from UPS shows that 47% of the respondents have used pick-up at physical stores and among these 30% purchase something extra while they visit the stores to collect their parcels (IMRG, 2016a).

There are generally five reasons behind the development of click and collect methods. The following content is a revised version of IMRG (2016a).

- **Capacity:** Due to the dramatic increase in online shopping, there is a strong demand on online retail deliveries. However, traditional home delivery in UK could not fulfil surged demand. This shortage is more obvious especially during peak dates, such as Christmas and Black Friday. Unexpected extreme weather also challenges conventional last mile delivery methods. Driven by these, click and collect is deemed to be a structured solution that could release supply chain pressure in these occasions. Therefore besides adding on more delivery capacity, carriers have invested in the third party collection points and locker networks integrated with in-store retailer options, thus have created new last mile capacity (IMRG, 2016a).
- **Cost:** Business to Consumer (B2C) delivery has been a low profit business for many years; however, with yearly double-digit increase in home delivery, this market has drawn a lot of attention. Due to the increased home delivery costs, carriers start to seek other delivery options. Click and collect is more cost efficient compared with conventional home delivery because carriers could deliver multiple parcels to one single business address instead of multiple home addresses. Moreover, click and collect could avoid repeated delivery attempts, which also saves money for carriers (IMRG, 2016a).
- **Contingency:** UK carriers realize from experience that they cannot depend solely on home delivery, which could cause intense pressure on supply chain due to surged demand or extreme weathers. Click and collect alternatives give online shoppers other options that

they can choose from besides home delivery, compensate carriers' capacity shortage and thereby reduce carriers' risk in failing to provide last mile delivery service (IMRG, 2016a).

- Choice and convenience: Online shoppers, especially UK shoppers, prefer to have options that they can choose from to get their orders delivered when and where that is convenient to them (IMRG, 2016a).
- Customer experience: Customers experience can be better managed when they select to pick up their ordered goods from physical stores (IMRG, 2016a).

Based on JDA Software Nordic AB and Centiro (2016), even though click and collect keeps increasing in Sweden, nearly 56% of the respondents in a survey done by YouGov reveals that they had encountered a problem when doing click and collect during the last year. The most frequent answers to what happened were: long waiting time to collect my parcel (15%), staff were not able to find the parcel or it took very long time to locate it (13%) and the item I wanted was out of stock at the store I preferred to go to (13%) (JDA Software Nordic AB and Centiro, 2016). The three issues that customers complain about are related to pick-up at collection points and pick-up at physical stores. Long waiting time could occur for all click and collect options except for the locker solution.

2.2.4 Comparing last mile delivery methods

Based on the literature review, different delivery methods are explained in table 1 in order to clearly identify the advantages and disadvantages of each delivery method.

Table 1: Comparisons of different delivery methods.

Delivery Options	Attended home delivery	Reception boxes/Delivery boxes	Locker	Pick-up at collection points	Pick-up at physical stores
Information					
Who covers the last leg travelling of the ordered goods?	Delivery company/ E-retailer	Delivery company	Customer	Customer	Customer
Failed delivery	High	Virtually none	Virtually none	Virtually none	Virtually none
Delivery window	Fixed delivery hours	Delivery company operating hours	Delivery company operating hours	Collection point opening times	Store opening times
Times at which goods can be collected	Delivery company working time	24/7	24/7 or digital locker location opening time	Collection point opening times	Store opening times
Retrieval time for	Short	Very short	Very Short	Short-Long	Short-Long

customer					
Drop-off time	Long	Short	Very short	Very short	Very short
Initial investment	Low	High/Medium	Medium	Low/Medium	Low/Medium
Delivery costs	High	Low	Lowest	Lowest	Lowest
Secured/Unsecured delivery	Secured	Secured	Secured	Secured	Secured
Attended/Unattended delivery	Attended	Unattended	Unattended	Attended	Attended

Source: Derived from original by Iwan, Kijewska and Lemke 2015

To clarify the short retrieval time by using digital lockers comparing with pick-up at collection points or pick-up from physical stores, the authors conclude the following text. The first reason for this is that collection points and physical stores are manned; thereby customers sometimes need to queue to collect parcels, while digital lockers are automatic. Customers that select digital lockers as the collection address will be sent specific codes with specific time when they can retrieve their parcels, the lockers will be opened automatically when the codes are typed in. Another reason is that staff at physical stores or collection points need to check ID in order to control the security of the parcels. They also need to take the ordered goods to the customers, by this means queuing for parcel collection is unavoidable, especially during peak time. However there is no request to show ID when customers pick up parcels from digital lockers. This could potentially make pick-up at digital lockers easier and less time consuming.

A questionnaire with 83 respondents, who do online shopping, was done in Poland in 2015. The result reveals that the most important motivation for them to choose locker as delivery option are price (27%), availability 24 hours (23%), location (22%), time (18%) and parcel tracking (7%) (Iwan, Kijewska and Lemke, 2015). It is clear that price is the most importation motivation for the e-shoppers to use lockers. Therefore it would be interesting to compare the delivery prices of different delivery alternatives and check if locker solution is the cheapest delivery option. Amazon is a big company and their last mile delivery solutions are deemed to be successful in UK, for this reason the researchers of this research list their pick-up location and correspondent delivery options shown in table 2 The delivery prices for customers and delivery speed for different delivery solutions is shown in table 3.

Table 2: Amazon pick-up location and related delivery options in UK.

Pick-up location	Delivery options
Amazon locker	One-day or Standard Pickup
Pass My Parcel	Evening, Express, or Standard Pickup

Local collect	One-day or Standard Pickup
Doddle	One-day or Standard Pickup

Source: Amazon.co.uk 2017c

Table 3: The prices and delivery speed for different delivery solutions at Amazon UK.

Price per delivery for clothing	Free delivery	One-day delivery	One-day delivery for Amazon locker	Priority delivery	Standard delivery/ Standard (delivery to a pick-up location)	Express delivery	Same-day (evening delivery)
Prime members	Free (order of or exceed £20)	Free	Free	Free	-	£4.49 per unit	Free
Non-prime members	Free (order of or exceed £20)	£3.95	flat rate of £1.99 charged	£3.95	£3.99 per delivery on orders weighing up to 0.5kg and £4.75 per delivery on orders weighing above 0.5kg.	£8.99 per unit delivery	£9.99 per delivery
Delivery time	3 to 5 business days after dispatch	1 business day after dispatch.	1 business day after dispatch	2 business days after dispatch	1 to 2 business days after dispatch	Orders placed before the Express deadline to arrive by 13.00 the following day	Orders placed before the Same-Day (Evening Delivery) deadline to arrive on the same day, between 18.00 and 22.00.

Source: Amazon.co.uk 2017c

After comparing the prices of different last mile delivery alternatives, it is easy to find that one-day delivery solution with digital lockers is the cheapest compare to other alternatives

except free delivery option. In term of delivery speed, one-day delivery solution is also a good alternative because the goods will be sent one business day after dispatch.

2.3 Digital lockers

Digital lockers are the focus of this thesis among all the last mile delivery alternatives. In the beginning of this section actors that are involved in digital locker implementation are stated. In order to give readers comprehensive understanding of digital locker situations, digital lockers implementation in several countries are stated with particular focus on digital locker situation in Sweden. Digital locker location, which is crucial factor to drive the volume is also elaborated. In the end of this chapter digital lockers are compared with other last mile delivery options by a table. In that table, different delivery options' benefits and problems for customers, e-retailers, logistics companies and city authorities are disclosed.

2.3.1 Actors involved in locker implementation

There are many actors that are crucial to the implementation of the digital lockers. To implement digital lockers, delivery companies need to at first get support from local residents, the owner of the locations that the digital lockers will be placed and most importantly the local authorities in terms of getting permission and selecting of sites. Another important actor for the digital lockers to function efficiently is the e-retailer who is willing to add digital lockers as one of the delivery options to the customers when they shop online (Iwan, Kijewska and Lemke, 2015).

Parcel stations with lockers belong to the click and collect options for last mile delivery of purchased goods. Based on Ipc.be, (2017), locker system is one of the most popular ways for e-shoppers to collect and make returns of their parcels. According to UPS Pulse of the Online Shopper US study 2015, stated in Ipc.be (2017), e-shoppers have an increasing interest in having more alternative collection locations with longer accessibility. The survey result reveals that e-shoppers' preferences in having alternative delivery locations have increased by 9% and reached to 35% since the last two years.

It is debated by Joerss, Neuhaus and Shröder (2016) that the future's last mile deliveries are likely to change due to customer demand and the larger volumes that will be transported. Taking the future into consideration, the respondents have answered which different delivery methods for last mile delivery they believe will be used. The respondents believe that it is pretty likely or very likely that they will have their parcels delivered by the following delivery methods in five years: 57% electronic digital locker, 56% locker system found at the place of residence, 24% unattended home delivery where the parcel are delivered to the front door/door step, 17% to the trunk of the car by access code that is valid for one occasion and 16% with a drone (PostNord et al., 2017).

2.3.2 Locker manufacturers

ByBox is a UK company that has the biggest digital locker (called Smart boxes) coverage in the UK and delivers more than 20 million items each year by using Smart boxes. They offer a night delivery of items to over 22,000 Smart boxes (Bybox.com, 2017a). Their delivery network covers more than 1,200 locations across UK, Ireland and Benelux. The delivery activities proceed before 8am and night delivery will be conducted before traffic occurs, by doing so they reach 99% delivery consistency. All the delivery operations are tracked through their software platform at all times with full visibility (Bybox.com, 2017a). Bybox brings out

their Click and Collect solutions by offering universities, logistics companies and retailers their ByBox locker technology and licensing their software to their customers as a smart delivery method. Until now they have customers like Rutgers University, DSV. Their locker software was used in Europe, Asia, Africa and the Americas. Their service scope includes helping customers find manufactures in building regional lockers, assisting customers with locker software by presenting locker dashboard (Bybox.com, 2017b).

In 2009, they expanded their locker business to B2C section by launching MyByBox. They supply lockers and offer full range of management services to support locker installation. ByBox has also been integrated clean energies like solar panelled roofs and other energy efficient functions to their electronic delivery lockers (International Post Corporation, 2010). LogiBag, which is a part of ByBox group, has placed more than 54,000 secure electronic lockers in 22 countries, mainly to industry related to airlines.

KEBA is another package logistic solutions company with a main market in Austria. KEBA is one of the world leading company in digital click and collect solutions. It was founded in 1968 and has its base in Linz, Austria. They are very competitive in selling electronic secure lockers and are the largest supplier to the postal industry, like Austria Post, Deutsche Post DHL (International Post Corporation, 2010). It is also the largest supplier of digital locker to postal companies. Since 2001, Deutsche Post DHL has installed around 3000 digital lockers they purchased from KEBA. They have sold their digital lockers to Lithuania, Luxembourg, Germany, UAE, Russia, Denmark, Austria and Turkey (ipc.be, 2017).

2.3.3 Digital lockers in Sweden

In Sweden there are not many digital lockers installed. Even though digital lockers were pilot tested, no parcel stations have been permanently settled (Forslund et al., 2016). The knowledge regarding how to utilize digital lockers is very limited. Thereby a project with a close collaboration between Lund University, Skåne, Helsingborg and the representatives from different business branches was initiated. Under the project period, five to eight parcel stations are supposed to be installed in Helsingborg and the surrounded areas (Vinnova.se, 2017). The aim of the project is to test the digital lockers and evaluate their usage of how to integrate digital lockers in cities and society in regards to accessibility and establishing knowledge of customer effects and the effects of increased demand of home delivery (Relog.lth.se, 2016).

PostNord is the leading logistics company in the Nordic countries (Postnord.com, 2014). They started to pilot the digital locker solution in Norway, Finland and Sweden in 2014. In Stockholm, four parcel stations were installed at Kista Galleria, Liljeholmstorget Galleria, Hemköp Östermalmstorg and Coop Forum Bromma (Ehandel.se, 2014). Zalando, a big e-commerce company with big product categories mainly in clothing and fashion, is the first e-commerce company in the pilot initiated by PostNord to provide digital lockers to their customers. The digital lockers were installed at shopping centres and locations closely the public transport focal points. Every parcel station has the capacity of 40 packages. To pick up the parcels, customers need to have two pin-codes that they receive through message notifications (Postnord.com, 2014). Customers do not need to show their ID to pick up the parcels from the digital lockers, instead they use the pin-codes they have received. The digital locker is also barcode reader to make returns easy to operate (Ehandel.se, 2014).

However, according to Ehandel.se (2017), the digital lockers were closed down and the pilot result was evaluated in November 2015. Stated in Ehandel.se (2017), PostNord mention that

location is a crucial factor to drive the volume and there are technical problems relate to the digital lockers that need to be solved. Deep interviews were conducted with 60 people who used the digital lockers and 93% of the interviewees stated that they had no knowledge about digital locker before they tried it. Sweden is in its starting stage when it comes to digital lockers, therefore educating customers is very important. Even though the understanding of how the digital locker functions is very rare, customers' feedbacks were quite good after they use digital lockers. The positive feedback was mostly related to the fast speed, while the reason why people do not choose to use the lockers is mainly due to the safety concern and the lack of personal service. The biggest threat that was found, based on the feedback from customers, is that the Swedish customers are pretty satisfied with the delivery methods that are provided in Sweden at the moment. Therefore there is not enough demand for digital lockers (Ehandel.se, 2017).

Bring is also offering a digital locker solution. Since 2015, Bring has placed 11 parcel stations in Stockholm area and the result turned to be favourable. The digital lockers were mostly placed at grocery stores. From June 2016, Bring planned to install parcel stations at subway stations across Stockholm. A pilot test was made in different areas in Stockholm, more specifically Gullmarsplan, Technical high school (KTH) and the commuter train station at Spånga (Via.tt.se, 2016). According to SVT news in April 2017, the 15 biggest cities in Sweden plan to build more apartments and office buildings close to rail tracks. More than 45,000 new homes will be built and many offices and stores will be set up. Over 63,000 people are expected to work in areas close to the rail track in the future (svt.se, 2017). For this reason, railway stations could potentially become a hot spot to install digital lockers in the future.

According to an investigation, Bring digital lockers could drive the customers to buy more. The result shows that almost 50% of the customers that come to collect their parcels from the digital lockers purchase something from the stores close by (Via.tt.se, 2016). According to Bring, digital lockers are easy to use for the customers, who choose where they would like to receive their parcels meaning at which parcel station. A message with a code will be sent to the customers in order to open the digital locker. The parcels could be stored in the locker for 14 days and the reminder message will be sent if the parcels are not collected (Bring.se, 2015). Digital lockers are scalable, meaning more digital lockers could be added based on the number of lockers needed and requirements on the locker sizes (Via.tt.se, 2016).

DHL is collaborating the Danish digital locker suppliers SwipBox to enlarge their digital locker network (Transportochlogistik.se, 2017). Willys has also signed contract with SwipBox in 2015. Thereby customers could access the digital lockers at around 40 Willys stores initially. More digital lockers could be installed within Axfood group after the initial phase. Before the contract was signed, digital lockers were tested at around ten Willys stores and the feedback was good from both the customers and the personal working at the stores (Axfood.se, 2015). In the end of 2016, to further enhance their network and make their position in delivery services to private persons stronger in Sweden, DHL Express started to collaborate with Instabox, the Swedish start-up company focusing on digital locker solutions (Transportnet, 2016). The number of deliveries to DHL's digital lockers under Christmas period increased by 35% in 2016 comparing with 2015. At the moment approximately 130 DHL Express digital lockers could be found around Sweden, located at strategic places like grocery stores, shopping centres, small convenient stores, bus and subway stations. DHL started to place digital lockers in Sweden from December 2014 and started in Stockholm since

2016. The aim is to install at least 200 parcel stations around Sweden (Transportochlogistik.se, 2017; Mynewsdesk.se, 2017).

In 2015, Instabox also started to collaborate with the convenient store chains Pressbyrån and 7-eleven in Stockholm to try out the digital locker solution (Mynewsdesk.se, 2015). After the pilot, result showed to be positive, Instabox had gotten many partners that want to collaborate with them, like Netlens.se and the online pharmacy Apotea.se (Ehandel.se, 2016). Instabox is now collaborating with several selected online stores and provide their customers same day delivery digital lockers. For example, customers who purchase products from apotea.se before 13:00 could retrieve their parcels at 17:00 the same day. Customers could also track their parcels through Instabox's website and their app. They will receive a message with code when their parcels have been placed at the selected locker locations. If the e-shoppers are not able to collect the parcels from the lockers themselves, they could type in others' phone number so that they can get the code and collect the parcels for them (Instabox.se, 2017).

2.3.4 Digital lockers outside Sweden

Parcel station with lockers has been increasing steadily since lockers were introduced in Germany in 2001/2002 and reached 2,500 in 2013 (Morganti et al., 2014). In 2017, the number of digital lockers installed in Germany has reached over 3000 (Transportochlogistik.se, 2017). People in Germany could reach a parcel station within 10 minutes across the country (DHL 2009, cited in Morganti et al., 2014). In average, each parcel station has 76 lockers, but this number could vary depending on where the lockers are situated, most of the digital lockers are situated within cities. In contrast to Germany, locker coverage in France is very low. This may be due to security regulations in France that not allowing people to leave unattended parcels in lockers. These regulations were revised around 2014 (Morganti et al., 2014).

Digital lockers have been rising across Europe. The operators of the parcel station can be National Post Operators (NPO), their competitors or e-retailers. In some countries like Germany, NPO are the first to initiate digital lockers, while in other countries like Poland and Ireland, the competitor companies are the ones who are first to the market (Forslund et al., 2016). In table 4, countries with digital lockers have been stated together with the operator and the name of different parcel stations. As it can be seen in this table, different names are used in different countries to describe digital lockers stations. Mentioned, earlier parcel station is employed to keep consistency in this thesis.

Table 4: Digital lockers outside Sweden.

Country	Operator Type	Operator	Name
DE	NPO	Deutsche Post	Packstation
NO	NPO	Norway Post	MyQuickBox
AT	NPO	Austrian Post	Post.24
BE	NPO	Bpost	Digital lockers
FI	NPO	Itella	Smartpost
DK	NPO	Post Danmark	Døgnpost
Multiple	Competitor	Inpost	Inpost
FR	NPO	La Poste	Pick-up station
NL	NPO/Competitor	PostNL	Inpost
IR	Competitor	Nightline	Parcel motels
Multiple	E-retailer	Amazon	Amazonlocker
DE	Competitors	GLS, DPDgroup, Hermes, UPS	ParcelLocker
LUX	NPO	Post Luxembourg	PackUp
CH	NPO	Swiss Post	My Post 24
CZ	NPO	Ceska Posta	Digital locker
HK	NPO	HongKong Post	Parcel locker
AU	NPO	Australia Post	Parcel locker
US	Competitor	UPS FedEx	Smart locker
UK	Competitor	InPost Amazon	Parcel locker Amazon locker

Source: Forslund et al., 2016; Ipc.be, 2017; International Post Corporation, 2010; Fedex.com, 2017

Deutsche Post DHL

Deutsche Post DHL parcel station was initiated in 2002 as a substitute for conventional home delivery and reached 90% population coverage in Germany by 2010. Since 2009, parcel stations were installed extensively by large companies to make their employees easily access their ordered parcels. To take advantage of the parcel station, customers must pre-register and become a member in a loyalty program. Customers can type in parcel station's address as delivery address. After the parcels delivered, customers get an email or message notification. To open the locker, customers need to use their smart card that they get by doing registration, as well as a pin code they get from the notification (International Post Corporation, 2010).

Besides receiving parcels, customers could also use station to post parcels and the postal fee is €1.50 less compared to ordinary postal services. There are facilities at the parcel station that could be used to create and print bar-coded labels. There is also a possibility to pay at the parcel station. After scanning/swiping the barcode with a sensor, the parcel is placed into an empty locker. The consignor is then given a receipt as a confirmation of the consignment (International Post Corporation, 2010).

Until 2016, DHL has installed 2,750 digital lockers. Stated by ipc.be (2017), 90% of the German population could reach parcel station within 10 minutes. The lockers are installed in areas where many people pass by, while also at large companies so that the employees could easily access to their online orders. Such companies are for example Zalando and T-Mobile. In April 2015, DHL started to incorporate with Germany's housing company, Deutsche Annington, to place lockers in the building areas. The lockers are free and the residents can approach them through an RFID chip or hand scanner (ipc.be, 2017).

Post Denmark

Post Denmark offered electronic locker services in Copenhagen in 2008 and by the end of 2009 they had managed to install 102 facilities across all big cities in Denmark. Additional to nominal parcel collection, customers could also send parcels under 10 kg by using the lockers. The prices are lower for sending and receiving parcels from parcel stations compared to traditional postal services (International Post Corporation, 2010).

Le Group La Poste

Since 2014, parcel stations started to be installed in France. By the end of 2015, 200 parcel stations had been installed in the five biggest cities among the dense areas in France. The digital parcel terminals are provided by the Australian company KEBA and each terminal could manage to have 40-100 parcels each day. In 2016, the parcel stations were expected to increase to around 1,000 locations in France and around 6,500 e-retailers provide customers delivery services to parcel stations (ipc.be, 2017).

Correos

Correos started to install parcel stations 'CityPaq' since late 2014. By the middle of 2016, 55 parcel stations are completed. A pilot project incorporating with the rail operator Renfe in Spain was initiated. Citypad was installed at nine train stations in Barcelona and Madrid. The parcel stations have the same accessibility time as the train station (ipc.be, 2017).

2.3.5 Lockers owned by e-retailers

Amazon is an e-retailer that put customer satisfaction to the most important position in their business. With customers' requirements of same day delivery, the challenges put on last mile delivery operations is extreme (Morganti et al., 2014). Until 2016, there has been over 600 Amazon lockers installed across the UK. The parcel stations placed at shopping centres, convenience shops, business parks, petrol stations, hubs with many transport connections, headquarters, and academics institutions like universities (ipc.be, 2017).

In UK, customers could select Amazon locker as pick-up locations and choose either one day delivery or standard delivery (Amazon.co.uk, 2017a). One day delivery indicates that customers' orders will be intended to deliver one day after dispatched. Different carriers are employed to process the delivery, thereby delivery time frames could differ, but all the parcels will be delivered by 9PM with intention (Amazon.co.uk, 2017b). After customers select Amazon locker as pick-up location, a code, together with address and opening time for selected locker location will be sent by email. All the information are also accessible through customers' Amazon accounts. When customers arrive at Amazon locker location, they just need to follow the instructions on the screen. Customers have maximum three business days to pick up parcels from lockers, otherwise the parcels will be returned to Amazon and customers will be refunded.

2.3.6 Locker location

It is stated in Iwan, Kijewska and Lemke (2015) that the e-shoppers' willingness of choosing lockers as the delivery location is also decisive for the success of locker implementation. From customers' point of view, the most important barrier for them not selecting lockers is that they need to cover the last mile delivery themselves from the parcel stations to their homes. Authorities are also key actors to cooperate with. At local level, it is important that authorities initiate strategies and policies that support the installation of digital lockers together with other important associations and representatives. Moreover local authorities should also rent public spaces where parcel station can be installed. Digital lockers' implementation should also be supported by transport planning and fleet monitoring system. At a national level, national authorities should promote different delivery system alternatives that have less effect on environment. National authorities should also support local authorities' initiatives in implementation of parcel stations (Iwan, Kijewska and Lemke, 2015).

For this reason customers could retrieve their ordered parcels at a time that is convenient for them. They often collect their parcels while they do other things, like shopping or refuelling the car. Locker solution could then reduce the pollution caused by urban freight transport both through delivery companies consolidating the flows and also through the reduction of urban car transportation (Iwan, Kijewska and Lemke, 2015).

The efficiency of the digital locker system depends to a big extent on the suitable location in the city area. Based on the data from InPost Company in Poland, the best locations for installing digital lockers concerns the availability of hot spots with a high density of population within suburbs, pedestrian areas with large amount of passengers in city centres, shopping centres, parking lots in supermarket, bus or subway stations next to local commuting hubs, petrol station forecourts, service stations and business centres (Iwan, Kijewska and Lemke, 2015). An experiment was done in Szczecin, a city in the north of Poland, from January 2012 to April 2013 to estimate digital locker locations' impact on the number of

parcel deliveries. First of all the most and least used parcel stations were identified according to the monthly delivered parcels to specific lockers. Then five least popular parcel stations were relocated to more suitable locations and one new parcel station was installed. After the modification, the average number of parcels delivered through lockers were increased by 32% in total. Four of the relocated parcel stations increased in deliveries while one has decreased deliveries. In this experiment, the most important factor in choosing new locations was the proximity of gas stations, university and shopping centres. The result shows that the parcel stations that are put close to shopping centres have the highest growth in the number of deliveries (InPost 2015 cited in Iwan, Kijewska and Lemke, 2015).

It is stated in Iwan, Kijewska and Lemke (2015), that a survey with 83 respondents was done in Poland in 2015 about customers' expectations on digital lockers locations. The result indicates that 33% of the respondents prefer to have parcel stations close to their home, 21% of them wish to have parcel stations on their way home, 19% of them like to have parcel stations in parking lots and 11% of them wish to have lockers at safe locations. In addition to this, 10% of the respondents prefer to have parcel stations close to shopping centres while 5% of them value parcel stations that close to public transport stops (Iwan, Kijewska and Lemke, 2015).

2.3.7 Benefits and limitations of the locker solution

According to figure 3, locker solution is the only unattended delivery method among click and collect solutions. For customers, unattended delivery is less costly compared to home delivery since the delivery operator could arrange delivery in a more flexible and efficient way. Moreover, unattended delivery could reduce customers' waiting time for delivery so that customers do not need to be constrained by the delivery window (Xu, Ferrand and Roberts, 2008). Customers could become less dependent on services provided from the manned collecting points (Iwan, Kijewska and Lemke, 2015). According to Bybox.com (2017b), 90% of the people who purchase online prefer to collect packages from lockers compared to manned collection points.

For the e-retailers, the locker solution could improve customer satisfaction since the customers could go to the parcel station and collect the parcels when it suit them. The e-retailers could also save money by eliminating or reducing the number of home deliveries, thereby reduce the related costs for vans and personnel etc. There are also indications that customers make more purchases due to convenience of collecting parcels from lockers (Bybox.com, 2017b)

Delivery solutions that could shorten the delivery time or increase the number of deliveries per hour are both good for the environment and beneficial for e-retailers. This is related to the concept of Delivery Value Density (DVD), which is calculated by dividing average total dollar volume of the shipment by the average travel distance each delivery journey. From business point of view, for e-retailers, it is hard to find out a delivery solution that could both save money and satisfy customers. Generally the cost saving proposed by e-commerce companies are eaten up by high delivery costs. Therefore good delivery options with high DVD are beneficial. The merit of delivering to the collection points is that it could increase the number of parcels delivered and reduce delivery time, thereby the DVD could be increased by using the collection point solution. Moreover the waiting time could also be saved by using the collection point solutions (Xu, Ferrand and Roberts, 2008). With a wider delivery window, the delivery cost is reduced since the delivery company could plan the trip better and coordinate the delivery (Cullinane, 2009).

According to a survey done in 2006 in Cologne, a city with population of around one million and 29 stations, parcel stations with lockers could save 35,000 trip-km annually. The reason for that is the reduction of private car driving distance due to parcel collection because lockers were well integrated in customers' daily routine (Forkert and Eichhorn, 2007 cited in Morganti et al., 2014). Another research study was carried out Poland in October 2013 to compare traditional delivery system by couriers and delivery to InPost digital locker regarding different environmental criteria. The results are shown in table 5. The unattended delivery method using delivery or boxes has been deemed to be a good solution (Xu, Ferrand and Roberts, 2008).

Table 5: Comparison of digital lockers and traditional courier deliveries.

	Courier	InPost digital lockers
Number of km during a day	150	70
No of parcels delivered during a day	60	600
CO2 emission; tons per annum	32 500	1516
Annual fuel consumption in litters	22 500 000	105 000
Results	100%	<5%

Source: Iwan, Kijewska and Lemke 2015.

For the logistics companies, they could utilize their capacity to the best condition by making unattended delivery (Fernie and Sparks, 2014). They could make the delivery that suits their time and capacity (Iwan, Kijewska and Lemke, 2015).

For local authority, by using the parcel station as last mile delivery solution, traffic incurred by e-commerce could be reduced; therefore it is beneficial for the city environment. The cargo compartment could be better used through consolidating the parcels. Van usages, congestions in the cities and environment pollution incurred by delivering the parcels could be reduced (Fernie and Sparks, 2014; Iwan, Kijewska and Lemke, 2015).

There are mainly three limitations for locker solution. First of all the investment cost is high, together with high management, locker maintenance, repair and running costs like electricity. Moreover, it is often hard to get reasonable locations to install the lockers and much efforts needs to put into negotiating with public authorities, pondering upon legal issues and systematizing leasing works. Another big issue with lockers is the limitation of sharing the use of lockers because postal and logistics companies invest in lockers that only themselves and their customers can get access to (International Post Corporation, 2010). Even though the lockers are shared with different companies, it is still problematic to ensure the access and safety of the devices, as well as fairly share the costs among the companies (Xu, Ferrand and Roberts, 2008).

From customers' point of view, the concerns around using lockers as delivery options are general the congestion around the parcel stations, the parking problem, the safety problem and also the cost of using this scheme (McLeod, Cherrett and Song, 2006). To offset the costs incurred from the lockers, customers in UK are charged with an extra fee for using unattended delivery services. This could also be a hinder for spread locker solutions to a large extent (Xu, Ferrand and Roberts, 2008).

Comparing lockers with other click and collect options, it has disadvantage on several factors. First the manned collection points provide normally more payment options than the lockers.

Second, the lockers may be hard to use for the group of people who are not used to using digital machines, like old people. The lockers could thereby perceived to be inconvenient to use for old people. Moreover, even though the parcel stations install lockers with different sizes, there are still size and weight restrictions on the parcels (Ding, 2014). For example in UK, the Amazon lockers have dimension restriction up to 42cm x 35cm x 32cm and a weight limitation of 4.5kg. Combined items exceed either the dimension or weight restriction need to be removed and delivered to elsewhere (Amazon.co.uk, 2017a). The restrictions on parcel size and weight are not as strict as the digital lockers if the parcels are stored at warehouses at collection points (Ding, 2014).

To summarise and compare digital lockers with other last mile delivery alternatives based on their potential benefits and problems for customers, e-retailers, logistics companies and city authorities table 6 is created by the authors of this research.

Table 6: Summary of pros and cons of each delivery methods.

Delivery Options Information	Attended home delivery	Reception boxes/Delivery boxes	Locker	Pick-up at collection points	Pick-up at physical stores
Possible problems for customers	<ol style="list-style-type: none"> 1. High failed deliveries 2. Constraint at home during delivery window 3. High delivery cost 	<ol style="list-style-type: none"> 1. Comparably low delivery cost 	<ol style="list-style-type: none"> 1. Customers have to collect 2. Low delivery cost 	<ol style="list-style-type: none"> 1. Customers have to travel to collect. 2. Possibly long queuing time 3. Low delivery cost 	<ol style="list-style-type: none"> 1. Customers have to travel to collect. 2. Possibly long queuing time 3. Low delivery cost
Benefits for customers	Do not need to pick up parcels self	<ol style="list-style-type: none"> 1. No need to wait at home during delivery window 2. Accessibility 24/7 3. Very short retrieval time 	<ol style="list-style-type: none"> 1. No need to wait at home during delivery window 2. Accessibility 24/7 for some digital lockers depending on where they are installed 3. Very short retrieval time and no need to show ID 	No need to wait at home during delivery window	No need to wait at home during delivery window

Possible problems for e-retailers	1. High delivery cost 2. Customer satisfaction (when first time delivery fail)	No	1. Customer satisfaction (no detail instruction provided)	No	No
Benefits for e-retailers	Customer satisfaction	Customer satisfaction	Customer satisfaction	Customer satisfaction	Customer satisfaction
Possible problems for logistics companies	1. Poor use of vehicle capacity 2. Fixed delivery window 3. Long drip-off time	1. High/Medium initial investment 2. Poor use of vehicle capacity 3. High/Medium initial investment	1. Medium initial investment 2. Medium initial investment	No	No
Benefits for logistics companies	No	1. Comparably short drop-off time	1. Good vehicle utilization 2. Very short drop-off time	1. Good vehicle utilization 2. Very short drop-off time 3. Low/Medium initial investment	1. Good vehicle utilization 2. Very short drop-off time 3. Low/Medium initial investment
Possible problems for city authorities	Congestion More vehicle More pollution	Congestion More vehicle More pollution	Possibly congestion around parcel station	No	No
Benefits for city authorities	No	No	Less congestion Less vehicle Less pollution	Less congestion Less vehicle Less pollution	Less congestion Less vehicle Less pollution
Potential reduction in goods vehicle activity compared to attended delivery	-	Some reduction	Large reduction	Large reduction	Large reduction

Source: Own.

2.4 E-commerce's impact on customer travel behaviour

Customer travel behaviour is closely connected to the specific last mile delivery method e-shoppers select to collect their parcels. Under this section e-commerce and customer travel behaviour are stated together with trip chaining theory, a theory explaining how customers travel.

2.4.1 E-commerce and customer travel behaviour

Customer travel and shopping behaviours differ largely land by land. In the USA, 93% of the people make shopping by taking cars, while in Netherlands, 48% of the shopping trips is made by car and 48% by non-motorized modes (Rotem-Mindali and Weltevreden, 2013). In Great Britain, people that are older than 16 make in average 219 shopping trips each year, which accounts for 21% of all the trips a person travel each year. Of these 219 shopping trips, 42% are made by car drivers, 21% are generated by the car passengers. Regarding mileage, people with an age of 16 and older, in average travel 926 miles every year for shopping and 82% of the mileage is made by car (Cullinane, 2009). In Sweden, the shopping trips generate around one fifth of the overall passenger trips, which is equals to one tenth of the passenger kilometres. The number is almost the same as it is in the rest of Europe. Most of the trips are generated by cars (Hiselius, Rosqvist and Adell, 2015).

Customers' travel behaviour change along with the changes in customers' shopping behaviour. From 1996 to 2006, instead of visiting frequently to local shops, people make more trips to shopping centres at the edge of the town or to the shopping areas outside of the town area. For this reason, people in average make 13% less trips each year, however the average length of the trip has increased by 10% (Cullinane, 2009).

E-commerce is believed to have the potential to reduce customers' shopping trips by cars, more precisely number of shopping trips per person and the distance travelled per person. One of the arguments behind this is that customers could make shopping at home without going out. Another argument is that online shopping could reduce the number of fruitless travel, meaning the reduction of trips on searching for out-of-stock products at physical stores (Rotem-Mindali and Weltevreden, 2013). However, many scholars argue that the shift to online shopping may not reduce the travel trips by car.

It is revealed that people that make frequent online shopping travel to physical stores as many times as the ones who do not purchase frequently online. The time frequent online shoppers save though online shopping is spent on additional trips (Spijkerman, 2015). Some found out that internet shopping generates even more general trips and also shopping trips. Online shopping has not replaced physical store shopping, but rather is used as a supplementary shopping method. People shopping online do not substitute the trips to the physical stores, rather is used as a method to expand their active space, meaning people could use internet as a media to discover the stores they have never been to, thus the shopping trips could be increased (Frag, Dijst and Lanzendorf, 2003).

Moreover, shopping at physical stores sometimes are related to social activities, therefore the shopping experience could not be substituted by online shopping. Online shopping could to some extent increase freight transport distance, because customers may find out retailers that

they did aware of before and travel to the stores to check on their products (Rotem-Mindali and Weltevreden, 2013).

Based on the above discussion, it is obvious that it is very hard to judge whether online shopping is beneficial for environment or not, because many trips may be made not based on a single purpose, meaning some activities could be chained with other activities. Therefore it is difficult to measure the environmental effects of e-commerce. Nevertheless, the shift from customers shopping trips by cars to parcel delivery services (PDSs) induced by online shopping is trendy. Even though the increased home delivery and parcel delivery services do not have clear effects on the environment, Spijkerman (2015) highlights that well-managed parcel delivery services (PDSs) with reduced delivery time and less fuel consumption could be beneficial for city environment and make PDSs more efficient.

2.4.2 Trip chaining

Customers' travel behaviour is complicated because activities could be chained together to become a trip chain (Primerano, et al., 2007). Trip chaining indicates a combined trip where the customers undertake more than one activity during one trip. This behaviour is common among consumers and is contrary to only visit one store per trip (Edwards, McKinnon and Cullinane, 2010). For example, people may go to physical store shopping on their way back home after work. The shopping mall may be located in the middle of the trip. Avoiding visiting the shopping mall could only reduce an engine start but have little or no effect on travel distance by car (Rotem-Mindali and Weltevreden, 2013). The activities people undertake generate trips; these trips could be grouped into three categories according to Stopher et al. (1996 cited in Primerano, et al., 2007):

- Mandatory activities normally indicate the trip people take daily from home to work or to school. The location and timing are all the same (Primerano, et al., 2007).
- Flexible activities are the activities that people perform regularly like buying groceries. For this group of activities, location and timing can be different for different trips (Stopher et al. 1996 cited in Primerano, et al., 2007).
- Optional activities are activities that are irregular, meaning these activities could be executed frequently during a short period of time. It could also be the case that no such activities take place or being planned during a period. Moreover the location and timing vary to a large extent. The example of optional activities could be social activities (Stopher et al. 1996 cited in Primerano, et al., 2007).

There are many definitions of trip chain, yet there is not a single definition that is generally agreed upon. A trip chain could comprise one activity or several activities that are linked together. All the trips are based on home no matter how many locations have been reached during the trip. Home is thereby the only anchor since all activities have their start and end at home (Stopher et al. 1996 cited in Primerano, et al., 2007).

Some propose that the mandatory activities have very strong impact on the number of flexible and optional activities that could potentially take place. The anchor points are as previously mentioned home, but also school or work. The trip chain is then defined as the trip segments

that practiced between the anchor points. A trip segment is the part of the trip between a specific pair of activities (McGuckin and Murakami 1995 cited in Primerano, et al., 2007).

Since each trip could contain many activities and have multiple purposes, online shopping could in some cases have very limited impact on physical shopping trips. In Sweden pick-up at collection points are the most frequent used method to collect customers' online ordered parcels and most of the collection points are situated at the same place as the grocery stores. In this case online shopping could influence customers' travel behaviour and provoke customers to pick up parcels from these locations (Hiselius, Rosqvist and Adell, 2015).

3. Method and methodology

In this chapter, the research paradigm of this research is described. Moreover, it is also explained how the researchers carried out their research, meaning the process and the chosen method to collect data are stated. The chapter ends with reflections in regards to reliability, validity and generalization.

3.1 Research paradigm

Research paradigm is according to Collis and Hussey (2014) the framework guiding the researchers in how to conduct the research. The paradigm is based upon assumptions and philosophies of how to view the world and to interpret knowledge. This research is mainly within the interpretivist paradigm for several reasons, but as told by Collis and Hussey (2014) there is usually a continuum of paradigms and it is very seldom a research is purely within the positivist paradigm or in the interpretivist paradigm. In addition to this, there are also many different views and interpretations of what the different paradigms exactly mean. However, with the purpose and research questions as the backbone of the research, this research is found more within the interpretivist paradigm, even if it is not completely interpretative.

Compared to a positivist study, the interpretative is usually more subjective oriented, meaning that there are multiple realities and the truth is often socially constructive and subjective. Findings from interpretivist studies are often more qualitative, but biased and based on values from the respondents. Often the aim in interpretivist studies is to develop an understanding, therefore the researchers can use smaller samples when investigating the chosen phenomenon or phenomena. Patterns and understanding is the key in interpretivist studies, going back to the research questions it becomes clear that this is the aim of this research.

The process is often inductive, meaning theories are developed from observations of the empirical truth and reality. Inductive process is according to Collis and Hussey (2014) moving from the specific to general, which means taking the findings from individual observations and making them into general patterns.

This research is both explorative and analytical at the same time. Hence, the first research question is exploratory and investigates the potential of digital lockers as a delivery method for e-commerce of clothes. The second research question is more analytical and tries to see the relation between the customers' travel behaviour and different collection methods. To answer the two research questions both qualitative and quantitative data need to be collected.

3.2 Research process

From the beginning, the idea was to collect data by surveys in form of questionnaires with persons having experience of purchasing clothes online and doing observations of the different delivery methods used when purchasing clothes online in Sweden. However, the survey was intended as the main method to collect the data needed for this research, while the observations was seen as a complement to give the researchers deeper knowledge and understanding of different last mile delivery options. More specifically, the researchers were interested in how digital lockers were used by the customers and how the customers experienced their retrieval from digital lockers compared to other delivery methods.

3.2.1 Observations

In order to evaluate the potential for digital lockers to be used as a delivery method when purchasing clothes online, the researchers wanted to observe different delivery methods for online shopping in Sweden. Based on the previous literature, the researchers decided that the delivery methods like pick-up at collection point, pick-up at retailer's physical store and digital lockers should be observed.

To observe pick-up at collection point the researchers contacted a convenience store where parcels are being retrieved by the e-shoppers. However, due to integrity concerns the convenience store said no and did not want to participate in the observation. For the delivery method 'pick-up at retailer's physical store, a clothing retailer chain who offers both clothes online and in physical stores was contacted, for the sake of being observed. The researchers were welcome to contact the local stores in Gothenburg, but the headquarter could not promise that any observations could take place.

To observe digital lockers, the researchers went to a grocery store where a digital locker can be found, to investigate during what time during the day it would be most interesting to observe it. However, while the researchers were there to investigate nothing happened. At two other occasions the researchers themselves retrieved parcels from two digital lockers. One was located in a convenience store in central Gothenburg and the other within a shopping mall, also in central Gothenburg. Both lockers were from the same delivery company. While collecting the parcels, the researches could not see any other customers collecting any parcels. The researchers therefore tried to locate other delivery companies offering digital lockers in Gothenburg. When no other companies was found, the researchers decided that no attempts of further observations should take place.

Summarising this section, the researchers decided after the attempts to make observations and being neglected permission to make further observations, that no observations should be carried out for the purpose of this research. Instead the focus was put on the survey from which the collection of primary data was retrieved. The survey is discussed in the following section in this chapter. Furthermore, in the last section of this thesis, *5.2 Concluding remarks and future research*, the authors have made some comments in regards to why they believe that the observations of the digital lockers could not take place. In regards to observations of other delivery methods for last mile delivery of e-commerce, no further comments will be stated by the authors of this thesis.

3.2.2 Survey

Surveys could be used both in positivist studies and interpretivist studies. However, they are usually more frequent in positivist studies compared to interpretive studies. Surveys could be either descriptive or analytical, in this research it is both (Collis and Hussey, 2014). Therefore, the survey results could be used to answer both research questions.

Regarding the survey, the aim was to get a random sample of respondents in the survey, to be able to generalize the results needed for the people living in Sweden. The researchers had seen other surveys being conducted on trains with the passengers and it seemed like the response rate was quite high since the respondents had time to answer the questions. Therefore, the researchers contacted a few train companies in Sweden to get permission to do surveys with the passenger on the trains. However, the researchers did not get any permission

from the train companies. Instead the researchers thought of doing surveys with random persons found at stores and shopping malls around Gothenburg to get a random selection of participants and thus respondents. In order to get a high response rate the researchers thought of limiting the number of questions in the questionnaire by using two different questionnaires; one for respondents who had experience from purchasing clothes online and one for respondents who had no previous experience. The idea was also to see if there was any difference between consumer of online clothes and respondents who had not bought clothes online, especially on the question whether the non e-shoppers not doing online shopping is due to the issues with delivery methods. The researches would start by asking the respondents if they had bought clothes online within the 12 last months or not. The respondents would get one of the two questionnaires depending on their answer. Eventually, the researchers thought this might be too complex and there was a chance of a low response rate when asking random persons around Gothenburg.

Based on the above stated reasons, instead of having all the people as the population of this research, the researchers decided to limit the population of this research to students found at universities in Sweden. There were several reasons for choosing students as the population. First of all surveys usually require access to many participants who are willing to respond and have time to do so. Since the researchers of this study were students themselves it was relatively easy to find other students willing to participate in the survey. Another reason for choosing students was that most of the students are young and are likely to be the e-shoppers and consumers of clothes in the future. Furthermore, the researchers believed that most students at least have tried to purchase clothes online. In addition to this, students usually have less money to spend compared to people with full time jobs. Since e-commerce sometimes is a bit cheaper compared to buying the same products in a physical shop, it could be the case that e-commerce of clothes is common among students. According to (PostNord et al., 2017) e-commerce is sometimes chosen among the customers due to the possibility of getting a lower price through discounts and price comparison sites. The last reason for choosing students was that attitudes towards car-ownership and getting driver's licence have changed over the last decades among young people. According to Trafikverket.se (2014) there is a trend among young people postponing to get a driver's licence or restrain from getting it all. Only 60% of young people (18-24 years old) have a driver's licence in 2011, compared to 75% in 1980. The car ownership has also declined among young people and the attitude towards car ownership has changed even though there are large regional differences. Therefore, there is a chance that the travel behaviour will change in the future, which made the students and their behaviour interesting to study. Due to the above mentioned reasons, students were deemed as a suitable population for this research.

The researchers realized that it is good to collect random sample among all students in Sweden to be able to generalize the results of the survey to the whole population of this research, meaning all the students attending universities in Sweden. However, in order to have a random sample, the researchers needed to have accessibility to all the university students' contact information, which was not possible to achieve during the time period of this research. Therefore a convenient sample, also called natural sampling was employed. This means that the researchers used students who were accessible at the time of the survey. This also indicates that the researchers had small possibility to affect the sample. According to Collis and Hussey (2014) samples in interpretivist studies do not have to be random, meaning non-random and biased samples could be used when collecting data in interpretivist studies.

For this reason, the researchers decided to use only students found at the different universities in Gothenburg. The students used in the sample are attending the University of Gothenburg and Chalmers, Gothenburg. For economic reasons, contact information to all the students were not possible to retrieve, instead the contact information, meaning email addresses were acquired either through Gothenburg University or through personal contacts of the researchers. However, for the researchers to be able to draw conclusions from the surveys, the sample needed to be large enough to get at least 200 responses. The researchers therefore decided that the sample should include at least 2000 students, meaning at least 2000 surveys should be distributed to students.

3.3 Data collection

Under this section, the processes of how the primary data and secondary data were collected are explained in detail, so that the readers can understand the primary and secondary data collection process better.

3.3.1 Primary data

The primary data was collected by an online survey. At first the researchers wanted to distribute the questionnaires manually, but later on decided to distribute them through a web based program called Survey Monkey. In Survey Monkey it was possible to arrange the questions with a logic, meaning the questions could be adapted to whether the respondents had bought clothes online within the 12 last months or not. Thereby the number of questions each respondent had to answer could be decreased. To distribute the questionnaires, Survey Monkey could basically be used either by putting a link to the survey online where the students could choose to participate or by sending the link in an email. The researchers chose the second option and accessed 2342 email addresses to students attending Chalmers, University of Gothenburg, mainly the School of Business, Economic and Law.

The questionnaire was constructed by creating questions linked to e-commerce of clothes and the different delivery methods with a specific focus on the potential of digital lockers, based upon the previous literature the researchers found. Inspiration of how to form the questions was also found in industry reports like E-barometern Q3 by PostNord et al. (2016) and E-barometern Årsrapport 2016 by PostNord et al. (2017) etc.

The questionnaire contained in total 42 questions, of which all questions except one were closed questions. Several of the questions were multiple choice questions. For some multiple choice questions, the respondents were allowed to choose more than one alternative. The researchers have to a large extent tried to avoid ranking and rating questions, since according to Collis and Hussey (2014) it is difficult for the respondent to rank or rate alternatives. For this reason the researchers chose to only include one rating question.

The questions were divided into different categories, meaning there were different groups of questions. One group was focusing on e-commerce of clothes, one was regarding e-commerce in general, one specified on purchasing of clothes in physical store. But there were also one for delivery methods, one for travel behaviour, one regarding returns and one specifying on digital lockers. In the end a group of questions regarding the background of the respondents were found. All the question in the questionnaire is found in Appendix A.

The questions were also arranged in the way so it become possible to ask follow-up questions to get in-depth understanding of customer behaviour. An example of this would be: “Which of the following methods would you like to use to receive your parcel if you were free to choose?” And the follow-up question was: “Why would you like to receive your parcel with this method?”. The questions were arranged for the reason that the researchers wanted to create a logic in the questionnaire, meaning that if for example a respondent answered “No” to the question “Have you returned any clothes bought online within the 12 last months?”, no further question regarding how the return was carried out etc. would be asked. Instead this respondents would skip this group of questions and continue at next question category. By using the logic the researchers could make sure that only questions that was relevant to the respondents were asked. Thereby the number of questions each respondent had to answer became limited and the number of respondents answering each question varies. As stated before, some of the questions were multiple choice questions where the respondents were allowed to choose more than one alternative, this means that for some questions the number of responses is higher than the number of respondents.

All questions and related options were considered several times and piloted with a small group of people before the survey started. When constructing questionnaires, it is according to Collis and Hussey (2014) important to carefully structure the questions and pilot them before doing the data collection. Since both Swedish and international students were found in the sample, the questions and options were written both in English and Swedish to assure that the respondents would not have any problem in understanding, but also to increase the possible response rate.

The survey was sent out by links in emails to the respondents from 6th of April 2017 until the 19th of April 2017, depending on when the researchers accessed the email addresses. Reminders were sent out to the email addresses automatically if the students in the sample did not answer on the survey. Finally the survey was closed down at 21st of April 2017. By then, in total 2342 students had received a link to the survey. The total number of respondents reached 353, out of these 281 were complete. The response rate of the survey was thus 15% and the rate of completed surveys was approximately 12%. However, as mentioned earlier, due to the logic and the possibility for the respondents to automatically allowing the respondents to skip questions, the number of respondents answering each question varied. When analysing the questions, the analysis was based upon how many respondents the specific question had, meaning that for some questions the response rate is a bit lower because of the logic.

3.3.2 Secondary data

Secondary data is used mainly in the introduction and theoretical framework section. Previous literatures like academic articles and industry reports have been collected mainly through search engines, like Google Scholar and data bases found at the University of Gothenburg’s library, like SuperSearch and Scopus. Several industrial reports describing how e-commerce in Europe, the Nordics and in Sweden is developing have been used to identify trends and the current situation together with challenges the industry is facing. Some of these were sent to the researchers by email after having subscribing for them. Articles regarding e-commerce, e-commerce of clothes, travel behaviour were also found. Key words used to find articles were e.g. e-commerce, e-commerce of clothes, delivery methods for e-commerce, travel behaviour, customer travel behaviour, e-commerce and impact on travel behaviour etc. While searching articles, both English and Swedish have been used, especially when finding the industry reports and when describing the current e-commerce situation in Sweden.

Several web pages, like newspapers, company websites, has been used to find how the current situation in Sweden and implementation of digital lockers is in Sweden at the moment. Most of these web pages and newspaper articles was found from Swedish sources. Also web pages from companies involved with e-commerce and digital lockers have been used for the purpose of finding information of how the digital lockers work, how they can be used by the customers etc.

3.4 Data analysis

The data collected from the survey is mostly nominal and these data are summarised in the form of frequency in table or figure form. Ordinal data are gathered only for the rating question in the survey. Therefore, in the analysis, the survey results are shown in terms of frequency and compared to the literature review and the similar numbers found by other researchers and in industry reports.

Descriptive analysis was employed because the data can be presented with graphical forms, such as tables, figures, graphs (Collis and Hussey, 2014), which makes it clear to find out which alternatives that were most frequent and thereby could facilitate the analysis. Most of the survey results are displayed in the form of tables or graphs with only one variable, yet a few cross-tabulations are made in order to see the connections between different variables, meaning the questions. The cross-tabulations found in the analysis are table 15, table 19, table 20 and table 25.

3.5 Validity, reliability and generalizability

The result of the survey has a low validity since convenient sample is employed instead of random sample when doing the survey due to time constraint and lack of resources. Also for this reason, the result get in this research can not be generalized to the population, which in this case is all the university students in Sweden. On the other hand, as mentioned before, it would maybe possible to generalize the results and apply the results on other product categories that have the same characteristics as clothes, like books, beauty products and for some cases medicines and electronic products, for this sample of students. For sure, the results could be generalized for other fashion products like shoes, bags and other fashion items, all depending on the size of the parcels and the digital lockers.

However the result is still interesting to investigate and the reliability of this research is quite high. It is likely that the same or very similar results would be gotten if the same questions were asked to the same respondents in this survey.

4. Analysis

In this chapter the data collected from the survey is described and explained according to the literature review. In the first section e-commerce of clothes is analysed, in the second section the problems related to last mile delivery is further explained and analysed. The third section is specified in delivery methods and the related preferences of the respondents and the fourth is specified in the digital lockers. Lastly, in the last section the customer travel behaviour is analysed.

4.1 E-commerce of clothes

Found from the survey, 264 (75%) of the total 353 respondents purchased clothes online during the last 12 months. Out of those, 94 respondents (37%) buy clothes every 6th months, compared to 34% who purchase clothes online every third month. Only 3% of the respondents are frequent online buyers of clothes and purchase clothes online two times or more every month. There are in total 89 respondents who did not purchase clothes online during the last 12 months. Of these respondents 37% purchase clothes every third month in a physical shop, 25% purchase clothes every 6th month and only one respondent (1%) chose the option for purchasing clothes 2 times every month or more. Based on this results the researchers can see that most of the respondents, whether they purchase their clothes online or in physical shop choose to buy clothes either every third month or 6th month. For both respondent groups the lowest percentage is found in the option “2 times every month or more”.

When the respondents were asked why they choose to purchase clothes, the online shoppers replied the following, seen in table 7. Out of the 249 respondents, 155 (62%) chose it to save time (Time saving), 153 (61%) because of the larger product range compared to physical stores, 109 (44%) for the reason that it is cheaper compared to physical stores and 48 (19%) for the reason that they believe that it is easy to find suitable clothes. Please notice that the respondents were allowed to choose more than one alternative for this question.

Table 7: Reasons for purchasing clothes online.

Why do you purchase clothes online?		
Answer Options	Response Count	Response Percent
Cheaper compared to physical stores	109	44%
Larger product range compared to physical stores	153	61%
Easy to find suitable clothes	48	19%
Time saving	155	62%
Other	20	8%
	<i>Answered Question</i>	249
	<i>Skipped Question</i>	104

Source: own.

When the results are compared to the answers for respondents who do not choose to shop clothes online, these respondents answered according to table 8. It is clear that the two most common reasons for customers to buy clothes in physical stores is because they want to see and feel the clothes and also they want to try the clothes on before buying. When the same respondents were asked if they bought other items except for clothes online, 72% said ‘yes’, while the remaining respondents (28%) answered ‘no’. This could indicate that the items they buy online are of such nature that the buyer does not have to evaluate the quality or it might not be possible, like cinema tickets, e-books, medicines etc.

Table 8: Reasons for purchasing clothes in a physical store.

Why do you purchase clothes in a physical store?		
Answer Options	Response Count	Response Percent
Easy to find suitable clothes	44	51%
Time saving	4	5%
I like to have the clothes I buy directly	15	17%
I like to see and feel the clothes before I buy them	64	74%
I want to try the clothes on before I buy them	69	80%
I do not like to purchase on internet	7	8%
I do not like to wait for the delivery	6	7%
I prefer to have personal service	11	13%
Other	9	11%
	<i>Answered Question</i>	86
	<i>Skipped Question</i>	267

Source: own.

The non online-shoppers of clothes were also asked what could make them do online shopping of clothes instead of buying in physical stores. This result shown in table 9 indicates that fast delivery is not an important motivator for them to purchase clothes online, rather lower price, larger product range and low delivery fee were selected as the three most important reasons that could possibly trigger them to buy clothes online. Therefore it is important for the e-retailers to provide a big range of product and offer cheap delivery and products to attract customers.

Table 9: Aspects that could make the respondents do online shopping of clothes instead of buying them in a physical store.

What could make you do online shopping of clothes instead of buying them in a physical store?		
Answer Options	Response Count	Response Percent
Fast delivery	12	15%
Various delivery options	11	14%
Low delivery fee	32	41%
Time saving	17	22%
No need for visiting physical shops	14	18%
Lower price of the clothes	54	68%
Larger product range	32	41%
Other	14	18%
	<i>Answered Question</i>	79
	<i>Skipped Question</i>	274

Source: own.

According to JDA Software Nordic AB and Centiro (2016) about 56% of the respondents in a survey revealed that they came across some problems when ordering something online within the last year. Going back to the respondents who bought clothes online within the 12 last months, as seen in table 10 the most common problem the respondents came across was that the clothes did not fit (67%). Nearly as frequent was the fact that the clothes did not fulfil the respondents’ expectations (59%). Only a fifth of the respondents (20%) had not experienced any problem, while 16% revealed that they had problem in regards to the delivery.

Table 10: Problems experienced when purchasing clothes online during the 12 last months.

Have you experienced any of the following problems when purchasing clothes online during the 12 last months?		
Answer Options	Response Count	Response Percent
The clothes did not fit	152	67%
The clothes did not fulfil the expectations I had	141	59%
There were issues with the delivery	39	16%
There were issues in regards to the payment	7	3%
I have not experienced any problem related to purchasing clothes online	48	20%
Other	5	2%
	<i>Answered Question</i>	239
	<i>Skipped Question</i>	114

Source: own.

4.2 Problems with last mile delivery

When specifically looking at problems with last mile delivery, it was found from the survey that approximately 80% of the respondents had not confronted any delivery problems when buying clothes online, while 20% said that they had encountered some delivery problems during the last twelve months. The problems that the respondents had experienced are seen in

table 11. The most common problem is that the parcel was delivered too late (60%), 22% answered that they had to wait around for the delivery or that their parcel did not arrive at all. Out of the respondents, 20% do not like that they could not track their parcel and nearly 18% complained that they had to queue to collect their parcel. This result corresponds with Eurobarometer (2013 cited in Morganti et al., 2014) that claim that the problems customers complain about delayed deliveries and that e-shoppers complain about their ordered goods being delivered unattended. Furthermore, it is also shown that the respondents would like to be able to track their parcels while being delivered. Tracking parcels is important according to Iwan, Kijewska and Lemke (2015), who did a survey asking for e-shoppers motivation to use digital lockers. In that survey, 7% of the respondents believed that parcel tracking was important. According to Bybox.com (2017c) and Instabox.se (2017) their technique allows the e-shoppers to track their parcels through their software platform when using their digital lockers.

Table 11: Delivery problems encountered in the last 12 months.

Which are the delivery problems you have encountered in the last 12 months?		
Answer Options	Response Count	Response Count
The parcel got delivered too late	27	60%
The parcel did not get delivered at all	10	22%
I had to queue to collect the parcel	8	18%
I had to wait around for the delivery	10	22%
It was not possible to track the parcel	9	20%
Other	5	11%
	<i>Answered Question</i>	45
	<i>Skipped Question</i>	308

Source: own.

Looking at the non e-shopper of clothes in the survey, 9 (11%) out of 81 respondents said that the current delivery method is a barrier for them to do e-shopping of clothes seen in table 12. Of the 11% of respondents who believe that current delivery method is a barrier, 56% of them stated that they do not want to go to pick up the parcels themselves; 33% of them stated that they do not want to queue to collect the parcels. The least important reason is that they worry that they might miss the delivery when the parcels are delivered to their home. This result indicates that delivery options with good locations, short queuing time and longer retrieving window provided to the customers could potentially reduce the barrier for non e-shopper of clothes to try to buy clothes online.

Table 12: Whether the current delivery methods is a barrier for buying clothes online.

Are the current delivery methods a barrier for you to buy clothes online?		
Answer Options	Response Count	Response Percent
Yes	9	11%
No	72	89%
	<i>Answered Question</i>	81
	<i>Skipped Question</i>	272

Source: own.

In regards to at which time during the day the respondents normally pick up their parcels or have the parcels delivered to their home the answers can be seen in table 13. It is clear that more than half (57%) of the respondents either pick up their parcels or get them delivered in the afternoon, between 16:00-18:59. The second most common time to collect parcels or get them delivered to home is between 19:00-22:00. This is in line with the survey done by DTI (2001 cited in Xu, Ferrand and Roberts, 2008), which states that most of the respondents in a survey done in 2001 preferred to get their parcels delivered especially between 18:00 and 20:00. This could be a problem for the logistics companies because they can not fully utilize their capacity because of the uneven expected time slots (Xu, Ferrand and Roberts, 2008). Therefore the reason why most e-shoppers prefer to have their parcels delivered between 6pm and 8pm can be explained by the space-time theory that is mentioned by (Thill and Thomas 1987; Kondo and Kitamura 1987; Nishii et al. 1988 cited in Primerano, Taylor, Pitaksringkarn and Tisato, 2007). Based on Goulias and Kitamura (1989 cited in Primerano, et al., 2007), travelling from work to home is a mandatory activity and could generate flexible and optional activities. Examples could be flexible activities such as buying groceries and picking up their parcels at collection points, as well as optional activities such as having dinner with friends could be generated.

Table 13: Normal pick-up time/delivery time of the parcels.

At which time during the day do you normally pick up your parcels yourself or have the parcels delivered to your home/get your parcels delivered?		
Answer Options	Response Count	Response Percent
07:00-09:59	4	2%
10.00-12:59	12	5%
13:00-15:59	24	10%
16:00-18:59	133	57%
19:00-22:00	50	22%
Other	10	4%
	<i>Answered Question</i>	233
	<i>Skipped Question</i>	120

Source: own.

4.3 Delivery methods

This section analyse the delivery methods that the respondents in the survey had used at their last online purchase of clothes and the delivery methods they prefer to use in the future. A

cross-tabulation is made to compare their last online purchase and the delivery method they would like to use for their future purchase of clothes online. In the end of this section, respondents' preferences are also analysed.

4.3.1 Delivery methods used at last occasion

The respondents who bought clothes online within the last 12 months were also asked to answer which type of delivery they used at the last occasion they bought clothes online. The results can be seen in table 14. In total 241 respondents answered, 14% selected home delivery as delivery method. Table 15 reveal that home delivery was chosen for the reason that it is convenient from locational aspects by 19 respondents, but some respondents, 14 of them found it cheap to use. Besides that, only 6 respondents found it fast to choose home delivery.

Table 14: Delivery method used at the occasion the respondent bought clothes online.

At the last occasion you bought clothes online, how did you receive your parcel?		
Answer Options	Response Count	Response Percent
Home delivery	34	14%
Pick-up at the retailers physical stores	15	6%
Pick-up at collection point (e.g. ICA, or other convenience store)	188	78%
Digital lockers	1	0.4%
Other	3	1%
	<i>Answered Question</i>	241
	<i>Skipped Question</i>	112

Source: own.

Table 15: Reasons for choosing the specific delivery method at the last occasion.

At the last occasion you bought clothes online, how did you receive your parcel?					
Why did you choose this alternative as a delivery method?					
Answer Options	Cheap delivery	Convenient location	Fast delivery	Response Count	Response Percent
Home delivery	14	19	6	29	14%
Pick-up at the retailers physical store	12	9	3	14	7%
Pick-up at collection point	127	85	44	164	79%
Digital lockers	1	0	0	1	1%
				<i>Answered Question</i>	208
				<i>Skipped Question</i>	1

Source: own.

Coming back to figure 2, click and collect options include pick-up at collection points, pick-up at physical stores and digital lockers. Based on table 14, 6% of the respondents used pick-up at the retailer’s physical stores, 78% pick-up at collection points and 0.4% digital lockers. From the literature and several industrial reports it is clear that click and collect is growing fast (PostNord et al., 2017). From the survey results, in total 204 respondents (85%) of the respondents chose a click and collect alternative when ordering clothes the last time. This result is higher compared to PostNord et al. (2017), who found out that every sixth respondent in their survey used click and collect when shopping online. It is also clear from the survey that picking up at collection point is the mostly used collecting method.

When the respondents were asked why they chose this delivery method, they answered according to table 16. Out of the respondents, 65% chose it because the method they selected was cheap, 48% chose it because of convenient location and 23% because it was fast. Furthermore 15% of the respondents chose to answer “Other”, several of the specified answers are related to the fact that the retailer did not offer any options for the respondents to choose from, which is interesting since PostNord et al. (2017) stress upon the importance of giving the e-shoppers many different delivery options and methods to choose from. According to a survey done by Kantar Sifo webpanel that is written in PostNord et al. (2017), 78% of the respondents stated that they would like to choose among different delivery methods and 18% of the customers that were unable to choose delivery alternative shifted to another e-retailer. It is thereby important to offer the customers different delivery alternatives, based on what PostNord et al. (2017) found from their survey and the survey result from this thesis.

Table 16: Reason for choosing the delivery method.

Why did you the specific alternative as a delivery method when you bought clothes online at last occasion?		
Answer Options	Response Count	Response Percent
Cheap delivery	155	65%
Convenient location	113	48%
Fast delivery	54	23%
Other	36	15%
	<i>Answered Question</i>	238
	<i>Skipped Question</i>	115

Source: own.

When combining the questions regarding which delivery method the respondents used and why they used it, the result can be seen in table 15. It is clear that most respondents chose pick-up at collection points, and they chose it for the reason that it is cheap (127 respondents). Other reasons for choosing collection points are that the location is convenient (85 respondents) and fast delivery (44 respondents). The results are in accordance with IMRG (2016a); JDA Software Nordic AB and Centiro (2016) and PostNord et al. (2017) which mentioned that click and collect alternatives are beneficial because it offers both choice and convenience to the e-shoppers. The other click and collect methods like pick-up at the retailers’ physical stores is popular mostly because it is cheap, seen from the survey results of this thesis.

Only one respondent had used digital lockers as a delivery method the last time and it was chosen for the reason that it was cheap as well. The fact that only one respondent used a digital locker at the last occasion he or she bought clothes online shows another picture than

what Morganti et al. (2014) stated, meaning that digital lockers are growing. The survey indicates that very few, meaning 1 out of 241 respondents, used it as a delivery method the last time they ordered clothes online, in regards to e-commerce of clothes in Sweden. However, it could be the case that it is more frequently used in countries other than Sweden. Based on Forslund et al. (2016) and Ehandel.se (2017), the digital locker is a newly employed solution in Sweden and Swedish e-shoppers have lack of knowledge in how to use the digital lockers. Even though there are pilot tests going on and some have been tried out, there are no permanently settled digital lockers in Sweden at the moment. However, this situation may change along with the collaboration between different actors, such as the collaboration among DHL and SwipBox (Transportochlogistik.se, 2017), SwipBox and Willys (Axfood.se, 2015), DHL and Instabox (Transportnet, 2016), Instabox with 7-Eleven and Pressbyrån (Mynewsdesk.se, 2015).

4.3.2 Preferred delivery methods for next purchase

The respondents who purchased clothes online within the 12 last months were asked how they wanted their clothes bought online to be delivered, the results are shown in table 17. Most of the respondents (70%) would like the clothes to be delivered to their home (home delivery) which is not a method of click and collect, while 47% would like to collect the parcels at a collection point. Besides this, 16% of the respondents would like to use digital lockers and nearly as many respondents and 14% would like to collect from the retailers' physical store. When the respondents are asked why they would like to use the methods they have chosen, they answer according to table 18. Most of the respondents (85%) would chose it due to the convenient location. The second most frequent reason to choose the chosen delivery method would be because of the delivery speed (fast delivery) with 26% of the respondents. The reason that the type of delivery would be more reliable in time of delivery compared to other delivery methods was chosen by 21% of the respondents.

Table 17: Methods the respondents would prefer to use.

Which of the following methods would you like to use to receive your parcel if you were free to choose?		
Answer Options	Response Count	Response Percent
Home delivery	164	70%
Pick-up at the retailers physical store	32	14%
Pick-up at collection point	110	47%
Digital lockers	37	16%
Other	6	3%
	<i>Answered Question</i>	235
	<i>Skipped Question</i>	118

Source: own.

Table 18: Reasons for choosing the specific delivery method if it was optional.

Why would you like to receive your parcel with this method when you were free to choose?		
Answer Options	Response Count	Response Percent
Convenient location	198	85%
Fast delivery	61	26%
Safer compared to other delivery methods	26	11%
More reliable in time of delivery compared to other delivery methods	49	21%
Other	18	8%
	<i>Answered Question</i>	234
	<i>Skipped Question</i>	119

Source: own.

Seen in table 19 there is a comparison between which type of delivery the respondents would like to use and why. Home delivery is by far chosen for the reason of convenient location, also collection points are chosen for this reason. Meanwhile, collection points are chosen for the reason that it is considered safer and more reliable in time of delivery, compared to other types of delivery. Digital lockers is chosen for the reason that the location would be convenient, but as stated before, only 16% would like to use this method.

Table 19: Reasons for choosing a specific delivery method in the future.

Which of the following methods would you like to use to receive your parcel if you were free to choose?

Why would you like to receive your parcel with this method?						
Answer Options	Convenient location	Fast delivery	Safer compared to other delivery methods	More reliable in time of delivery compared to other delivery methods	Response Count	Response Percent
Home delivery	156	45	15	22	162	73%
Pick-up at the retailers physical store	30	14	6	10	32	14%
Pick-up at collection point	82	39	18	37	100	45%
Digital lockers	31	20	4	14	35	16%
Other	2	1	0	2	3	1%
					<i>Answered Question</i>	223
					<i>Skipped Question</i>	0

Source: own.

4.3.3 Comparison of delivery methods used at last occasion and preferred delivery methods for next purchase

Comparing the delivery methods the respondents used at the last occasion they purchased clothes online table 14 with the delivery method they would choose if they could, seen in table 17, it becomes clear that home delivery is the method that the majority of the respondents would like to choose (70%). However, only 14% of the respondents selected home delivery at the last occasion. Most of the respondents (78%) used a collection point at the last occasion, but the number of respondents who would like to use it if they were free to choose is smaller (47%). About 6% of the respondents used pick up at retailers' physical store and nearly 14% would like to use it for the next time. In regards to digital lockers, only 0.4% used at the last occasion, while 16% would chose it if they could, which indicates that there is a good potential for digital locker to develop in the future.

A cross-tab, seen in table 20, is made according to what the respondents would like to use in the future based upon what they used the last time they bought clothes online. Please notice that the respondents were allowed to choose more than one option for how they wanted to receive or collect their parcels if they were free to choose.

Table 20: Preference of delivery method in the future, based on which delivery method used at the last occasion.

Which of the following methods would you like to use to receive your parcel if you were free to choose?						
At the last occasion you bought clothes online, how did you receive your parcel?						
Answer Options	Home delivery	Pick-up at the retailers physical store	Pick-up at collection point	Digital lockers	Response Count	Response Percent
Home delivery	27	9	126	0	162	70%
Pick-up at the retailers physical store	4	8	20	0	32	14%
Pick-up at collection point	11	9	87	0	107	46%
Digital lockers	3	3	31	0	37	16%
Other	0	1	4	1	6	3%
					<i>Answered Question</i>	231
					<i>Skipped Question</i>	7

Source: own.

Seen in table 20 is the cross-tabulation, which the following bullet points summarise. The calculations of the willingness to use digital lockers are based on what the respondents used at the last occasion they bought clothes online and which delivery methods they would like to use, meaning adding the responses from the points above and dividing it with the number of respondents who would like to use digital locker.

- The respondents who did home delivery the last time would like their parcels in the following way if they were to decide: 27 would still like home delivery, 4 prefer pick-up at retailers' physical store, 11 would like to collect their parcel at collection points and 3 would choose a digital locker. In total 45 respondents chose any of the options, out of those 3 chose digital lockers, meaning approximately 7% of the respondents who used home delivery would like to use digital lockers.
- The respondents who did pick-up at the retailer's physical store the last time would like their parcels in the following way if they were to decide: 9 would prefer home delivery, 8 would still like to pick up at the retailer's physical store, 9 would like to collect their parcel at collection points and 3 would choose a digital locker. In total 29 respondents chose any of the options, out of those 3 chose digital lockers, meaning approximately 10% of the respondents who used home delivery would like to use digital lockers.
- The respondents who did pick-up at collection point the last time would like their parcels in the following way if they were to decide: 126 would prefer home delivery, 20 prefer pick-up at retailers' physical store, 87 would still like to collect their parcel at collection points and 31 would like to use digital lockers. In total 264 respondents chose any of the options, out of those 31 chose digital lockers, meaning 12% of the respondents who used home delivery would like to use digital lockers.
- The respondent who used a digital locker the last time specified that he or she did not know which delivery method to use if he or she were free to choose.

Summarising the points above, it becomes clear that home delivery is still the most popular alternative for the respondents who used home delivery and pick-up at collection points the last time they bought clothes online. The respondents who used pick-up at the retailer's physical store were equally interested in using either home delivery or pick-up at collection points in the future. By choosing home delivery the respondents will avoid going somewhere, meaning the location is likely to be convenient for them. Instead, by using a collection point, the time-constraints could for some instance be avoided. Besides that, there is a potential to benefit from the convenient location of the collection point at which the pick-up takes place. Especially if the collection point is located nearby the customer's home, close to the workplace/school or some other place the customer usually go, like a grocery store.

The likelihood of choosing pick-up at the retailers' physical stores or digital lockers in the future is smaller compared to the other delivery methods. Reason for not choosing pick-up at the retailer's physical stores to the same extent as home delivery and pick-up at collection points could be because the customers, and thus the respondents need to travel to the stores anyhow, in order to collect the parcels. However, this option could in some cases be free of charge, which could be a motivation for the customers to go there and collect their clothes (lindex.se, 2017; ginatricot.com, 2017; åhlens.se, 2017).

The motivation for using a digital locker could to some extent be the location, meaning it could be convenient, based on where the digital lockers are located. Also time constraints

could in some cases be avoided, depending on the location of the digital lockers, for example if the digital lockers are located inside a convenience store the customers might have to adapt to the opening hours of the store to collect their parcels. On the other hand, if the digital lockers are installed outside, the customers may have the possibility to access them any time during the day or night. Depending on the knowledge and preference of the customers, they might find it better to use a digital locker to avoid queuing to collect their parcels, which could also be a motivation for choosing digital lockers.

Based on the calculations of how many percentages that would like to use lockers when purchasing clothes on the internet, the largest group is found within the respondents who used collection point at the last occasion. A reason for this could be that some digital lockers are located inside convenience stores and grocery stores, where the respondents are used to collect their parcels. Therefore the researchers believe that some of the respondents from this group, might have come across a digital locker while collecting their parcels. These people may have the curiosity to try the digital lockers in the future. Another reason could be that the same respondents find it more convenient to use a digital locker since the chance of having to queue decreases with this method.

4.3.4 Customers' preference on delivery methods

In terms of the e-shoppers' preferences, it is clear that people in different countries expect different things from e-commerce. This is stated by Morganti et al. (2014) who claims that German e-shoppers stress more upon delayed deliveries and damaged goods. Based on a survey, only 4% of the German respondents want to have their parcels delivered to parcel station, even if Germany has a very good coverage of pick-up locations for parcel stations. About 90% of the respondents still wanted their parcel to be delivered to their homes, while 3% want parcels delivered to their place of work and 3% to collection points. Also PostNord (2016) claim that there are differences in delivery expectations when looking at the Nordic countries. Danes are the ones who prefer home deliveries the most and Swedes and Norwegians are more used to pick up parcels at collection points or at their mailbox. In this research, the survey regarding customers' perceptions and expectations of e-commerce and delivery alternatives are based on their experience in Sweden, independent of the country they originally come from. Based on the survey result the researchers of this thesis get, seen in table 17, it is clear that most of the respondents would prefer home delivery. This result is contradictory to what is mentioned in PostNord (2016).

Home delivery is still the most frequent answer of how the respondents would like their future clothes to be delivered (70%). However, according to table 20, 37 respondents (16%) respondents are willing to use a digital locker, which is higher compared to retailers' physical stores (14%). As stated before, click and collect is a popular alternative when purchasing physical items online. In total 176 respondents have chosen one of the alternatives included in the definition of click and collect compared to 162 respondents who chose home delivery.

Seen in table 18, the most specific reason for choosing one or several of the delivery methods was convenient location. The locational aspect of home delivery could therefore have an impact of what the respondents want, this is confirmed in table 19 which combines delivery method the respondents would like to use and why. Home delivery and convenient location were chosen by most of the respondents.

However, if the non e-shopper respondents actually bought clothes online, they would like their parcels being delivered in the following way, seen in table 21. The results revealed that 39 respondents (48%) would prefer home delivery and 31 (38%) respondents would like to collect their parcels at a collection point. Only 4 respondents (5%) respondents would like to use a digital locker as the delivery method and even less respondents, 3 of them (4%) would like to collect the parcel at the retailer’s physical store. This would be in line with what was found from the respondents who had bought clothes online, meaning the e-shoppers. Most of those respondents preferred home delivery as well and the second most frequent option was pick-up at collection points. Using digital lockers was the third option when comparing the frequency and collect from the retailer’s physical store was the least popular option.

Table 21: Preferred delivery method for clothes bought online.

If you bought clothes online, how would you like them to be delivered?		
Answer Options	Response Count	Response Percent
Home delivery	39	48%
Pick-up at the retailer's physical store	3	4%
Pick-up at collection point	31	38%
Digital lockers	4	5%
Other	4	5%
	<i>Answered Question</i>	81
	<i>Skipped Question</i>	272

Source: own.

4.4 Returns

PostNord et al. (2017) reported that returns and how the return flow of e-commerce is handled is of great importance to the customers. BHV (2013 cited in Morganti et al., 2014) found from a survey made by UPS that more than half of the respondents had a bad experience from doing a return and 77% of the respondents had returned something bought online at least once. When the respondents in the survey of this thesis were asked questions regarding returns, half of all respondent (50%) had returned clothes they bought online within the last 12 months. The most common reason for returning the clothes were that they did not fit in size (87%) and the fact that the clothes did not fulfil the respondent’s expectations (64%). According to BHV (2013 cited in Morganti et al., 2014) the return rate for fashion products is around 40% in Germany in 2013. Therefore, the return rate is much lower in Sweden than in Germany, based on the result the researchers of this research get. A reason for this might be that German e-shoppers usually buy clothes in different sizes and colours to compare (Kolbrück and Werner 2013 cited in Morganti et al., 2014), while the survey results from this thesis show that only 13% of the respondents bought clothes and intended to send it back, when asking customers with Swedish experience.

The return methods e-shoppers of clothes chose the last time are shown in table 22. Most of the respondents returned at a collection point (88%), while one of the respondents used a digital locker to make their return. Comparing the return methods they used last time and the return methods they want to use in the future, nearly half of the respondents (49%) would like to return their parcels at a collection point, while 26% like a delivery company to collect the

parcel at their home. Out of the respondents, 16% think it would be better to return their clothes at the retailer’s physical store and 8% would like to use a digital locker. This result indicates a large difference between which return methods the respondents used at the last time they returned and which method they would like to use. The respondents who used collection point to make their return would like having their parcels collected from their home, meaning make returns in the method that are mostly convenient based on location. According to Stopher et al. (1996 cited in Primerano, et al., 2007), home is a very important anchor point based on customer travel behaviour analysis.

Table 22: How the last return was carried out.

How did you make the return the last time you made a return?		
Answer Options	Response Count	Response Percent
At the collection point	96	88%
Delivery company picked the parcel from my home	2	2%
Via mailbox	6	6%
Retailer’s physical store	4	4%
Digital locker	0	0%
Other	1	1%
	<i>Answered Question</i>	109
	<i>Skipped Question</i>	244

Source: own.

When the respondents were asked specifically about returning their parcels with digital lockers, 77% of the respondents would prefer this method instead of going to collection points or physical stores. In regards to this, e-handel.se (2014) mention that the parcel machines and digital lockers have bar code readers, which enable the e-shoppers to make their returns through a digital locker if they wish to do so.

Going back to Morganti et al. (2014), many of the e-shoppers experience some kind of problem when doing returns. In the survey done for the purpose of this research, only 7% of the respondents had experienced some problems when returning clothes bought online. Of these respondents, the most common problems found while returning were that the return was costly (75%), it is hard with refunding (50%), and information regarding returns is missing or too complicated (37%). According to PostNord et al. (2017), 83% of the respondents believed that free returns are important to motivate them to buy products from the e-retailers. It is also of great importance that the e-shoppers have easy access to relevant information to make the return process easier.

4.5 Digital lockers

According to the result of the survey, 11% of the respondents reported that that they had used a digital locker as a delivery method at least once when purchasing something online. Moreover, 36% answered that they would be willing to try a digital locker if such were available. Seen in table 23 the motivation for using digital lockers is the possibility to collect the parcels whenever (31%), meaning more flexible collection in regards of time restrictions.

Looking at table 1, customers have the possibility to access digital lockers 24 hours every day, depending on where the digital lockers are located. Other motivations for using digital lockers, seen in table 23, are that it is easy to operate (20%), no need for queuing (17%) and time saving (16%). Furthermore, only 11% would choose it due to convenient locations.

Table 23: Reason for using digital lockers.

If you are willing to try to use digital lockers to collect parcels, please specify why.		
Answer Options	Response Count	Response Percent
No need for queuing to collect the parcel	31	17%
Easy to operate	38	20%
Convenient location	22	12%
Time saving	30	16%
Possibility to collect parcels whenever	59	31%
Other	8	4%
	<i>Answered Question</i>	188
	<i>Skipped Question</i>	165

Source: own.

The respondents who did not like to use digital lockers reported the reasons for this to be: no convenient location (21%), concerns of security and safety (18%), hard or difficult to operate (13%), the price might get higher or increase (8%), congestion around the parcel stations (3%) or problem with parking (2%). However, 36% of the respondents said something else as the reasons for not wanting to use digital lockers as a delivery method. Out of these, the most common answers were: they liked the current delivery methods and could not see why they would need another one, they were afraid that they would not have time to collect their parcels before they got sent back to the retailers or that they had too little knowledge of digital lockers and how they worked. From the above mentioned results, it is clear that convenient location is the major hinder for customers to use digital lockers. Coming back to the result the researchers of this thesis get in table 20, the most important reason why people select one specific delivery method is due to its convenient location. Therefore the location is of important for digital lockers to become more frequently used.

The respondents were asked to rate a few alternatives of what they believed would be motivation for using digital lockers as a delivery method. Please notice that the respondents were asked to rate each alternative from 1-7, 1 being very unimportant and 7 is very important. Seen in figure 4, all the alternatives have a pretty high rate, meaning the respondents believe that all the alternatives are of importance. It could also be identified that there is no big difference between the alternatives. However, the alternative “Convenient location” has a slightly higher average rate compared with the other alternatives. The other two alternatives “Lower price for delivery” and “Fast delivery” have also slightly high rates compared to the other alternatives. This result again corresponds with the result from table 20 that location is the most important factor to motivate customers to select a specific method.

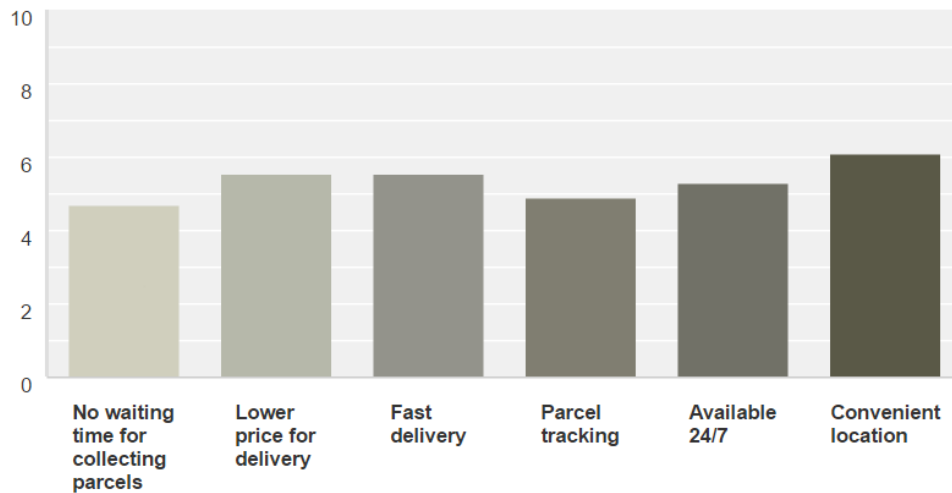


Figure 5: Ratings for motivation to use digital lockers. Source: own.

According to Ehandel.se (2017), PostNord also stated that location is a crucial factor to drive the volume after their pilot test on digital lockers was failed and the digital lockers were closed down. In table 24 the respondents specifies where they believe that the digital lockers should be located, 74% believe that the digital lockers should be located in the residential areas, meaning close to people's homes, while 51% believe it would be convenient to place them on the way to workplace or school. According to Iwan, Kijewska and Lemke (2015), the best locations for installing digital lockers are places with high density of population, pedestrian areas or city centres. But it could also be shopping centres, parking areas at supermarkets, bus or subway stations or petrol station forecourts. Most of the pilots and trials in Sweden have been carried out in areas or locations where many people pass by or where people work or study, like Technical high school (KTH) or commuter train station in Spånga (Via.tt.se, 2016). The reason why the digital lockers could potentially be installed at these locations could have something to do with customer travel behaviour and trip chaining. Like it is stated in Iwan, Kijewska and Lemke (2015) customers normally go and collect their parcels while they are doing something else, like shopping. Therefore it is very important to analyse customers travel behaviour in order to find out the best suitable location to install the digital lockers.

Table 24: Location of digital lockers.

Where would you prefer the digital lockers to be located?		
Answer Options	Response Count	Response Percent
Shopping centre	68	24%
Parking lot in supermarket	68	24%
Bus stations and tram stations	69	25%
Petrol station forecourts	16	6%
Close to home, in the local residential area	207	74%
On the way to or from work and school	142	51%
Other	6	2%
	<i>Answered Question</i>	279
	<i>Skipped Question</i>	74

Source: own.

According to Vinnova.se (2017) knowledge of how to use digital lockers in Sweden is still very limited. Ehandel.se (2017) also stated that the results from their deep interviews with customers who tried digital lockers indicated that 93% of the interviewees had no knowledge of digital lockers before they tried them the first time. When the pilot made by PostNord were evaluated the positive feedback was mainly regarding speed, while the negative feedback were mostly concerning and the absence of personal service. A threat towards the implementation and development of digital lockers is the fact that Swedish e-shoppers seem pretty satisfied with the current delivery methods. Based on Bring.se (2015), lockers are easy for the e-shopper to use and that the parcels could be collected within 14 days after the delivery. However, according to the results from the survey in this research, some of the respondents who answered “Other” for why they did not like to use digital lockers, specified the limited time frame to pick up their parcels as a reason.

4.6 Customer travel behaviour

Customer travel behaviour is rather complicated and complex to investigate and analyse, which might be the reason that many of the scholars and the previous literature contradicts each other at several aspects. For this reason and to make it understandable, the authors of this thesis have kept the arguments from the previous literature in order to explain the results from the survey.

According to Rotem-Mindali and Weltevreden (2013) the customer travel behaviour and shopping patterns are different from country to country. Shopping in US is made by car to 93%, while only 48% of the shopping trips are made by car in the Netherlands. In Great Britain, 42% of the shopping trips are made by car drivers, while 21% are generated by car passengers (Cullinane, 2009). In Sweden shopping trips are equal to one fifth of all passenger trips of which are generated by cars (Hiselius, Rosqvist and Adell, 2015).

From the survey, 86% of the respondents answered that they normally use public transportation, while 51% usually are walking, 23% use bike and 14% usually take the car when going somewhere. When the respondents were asked how they travel in order to get to collection points when such are used, the percentage of each transport mode used differs. Most of the respondents (80%) are walking to the collection points, 28% usually take public transport, 19% use a car and 16% use their bikes when going to collection points. In regards to car-usage, 67% of the respondents normally do not have access to a car, while the rest of the respondents (33%) have access to a car.

To find out the connection between the mode of transport e-shoppers normally use to collect their parcels and the delivery methods they selected, a cross-tabulation shown as table 25 is made. Most of the respondents used pick-up at collection point, out of these the majority walked to the collection point, except for that public transport is commonly used among the respondents. Walking was also the most common option for pick-up at the retailers’ physical stores. As described earlier, only one respondent had used digital locker as a delivery method at the last occasion clothes were bought online, and this respondent answered “Other” for transport mode usually used for going to collection points. Car was used most frequently for respondents who had chosen pick-up at collection points, which was also the most frequent answer for respondents who usually take their bike.

Table 25: Mode of transport based on delivery method at last occasion.

Which mode of transport do you normally use to get to the collecting points?					
At the last occasion you bought clothes online, how did you receive your parcel?					
Answer Options	Pick-up at the retailers physical store	Pick-up at collection point	Digital lockers	Response Count	Response Percent
Walking	13	144	0	157	81%
Biking	2	31	0	33	17%
Public transport	7	46	0	53	28%
Car	3	30	0	33	17%
Other	0	0	1	1	1%
				<i>Answered Question</i>	193
				<i>Skipped Question</i>	11

Source: own.

The respondents were asked if they, the last time they collected a parcel, went somewhere else or undertook another activity. Out of the respondents, 62% said they did also performed more activities than only collecting the parcel, while 38% said that the collecting of the parcels was the only activity during that trip. According to Edwards, McKinnon and Cullinane (2010) it is common that customers undertake more than one activity during a trip. Iwan, Kijewska and Lemke (2015) also mentioned that customers normally go and collect their parcels while doing something else e.g. shopping. Stated by Hiselius, Rosqvist and Adell (2015), pick-up at collection points are the most frequent used method to collect customers' parcels bought online in Sweden. Most collection points are situated near by or at the same place as grocery stores. This means that online shopping has potential to influence customers' travel behaviour to make the customers pick up parcels from these locations.

The respondents also answered a question regarding if they believed that they had decreased the number of times or occasions going to a physical store, for the reason that they can shop clothes online. Out of the respondents, 68% believed that they had reduced the number of physical visits, while 32% believed that they had not. Related to this e-commerce is sometimes believed to have potential to reduce shopping trips by made by car. Rotem-Mindali and Weltevreden (2013) argue this, since customers could make shopping at home without leaving their homes. Yet, another argument is that online shopping could reduce the number of travels that do not result in any purchase. However, Spijkerman (2015) argues that e-shoppers travel to physical stores as many times as the ones who do not purchase frequently online, since the time they save from online shopping is used to perform more trips. Contradictory, Farag, Dijst and Lanzendorf (2003) claim that online shopping generates even more trips, since it only supplement some of the shopping trips and online shoppers expand their active space by e-shopping by using internet to discover the stores they were unaware of before. Cullinane (2009) argues that the travel behaviour of the customers has changed, nowadays the customers tend to visit shopping centres located more far away instead of visiting their local shops. Thereby the average length of the trips increase while the number of trips decrease. Rotem-Mindali and Weltevreden (2013) also states that shopping trips are closely related to social activities and therefore trips can not be fully substituted by online shopping.

5. Conclusion

The final chapter starts by answering the two research questions. In the second section, the authors of this thesis also discuss their findings from their experience of collecting parcels from digital lockers in Gothenburg and further discuss the digital locker situation in Sweden with their own impression. Finally, the researchers discuss their contribution together with suggestions for future research.

5.1 Results of the research questions

The first research question is: *What is the potential of digital lockers as a last mile delivery solution and a reverse logistics solution for e-commerce of clothes?*

First of all, starting with the results from the survey and the current context in Sweden in regards to the usage of digital lockers, it is still very limited compared to other countries in Europe, like Denmark or Germany where it seem like digital lockers have become quite popular.

However, the researcher believe that there is potential for digital lockers to be used in Sweden as well, mostly for the reason that digital lockers have some advantages compared with other delivery methods. One of the main advantages would be the flexibility the customers could benefit from. By choosing digital lockers as delivery method, customers could retrieve parcels any time during the day or night, depending on where the digital lockers are located. Another benefit of digital lockers is that there is no need for queuing. By using digital lockers inside convenience stores or grocery stores, queuing for collecting parcels could to some extent be avoided since digital lockers are automatic and the customers do not have to wait to be served by the staff. Furthermore, if e-commerce keeps increasing, using digital lockers might be more convenient to deal with the increasing parcel volume, for both the personnel working at collection points as well as for the consumers collecting parcels. Digital lockers is also a solution that could solve the shortage of delivery capacity for online shopping especially during the peak periods like Christmas. Another advantage the customers get from using digital lockers is being able to track and trace the parcels, which seemed important to the respondents. According to the digital lockers' situation in Sweden, most of the companies, either logistic companies or the digital locker providers offer parcel tracking services for the e-shoppers, which might be a trigger according to the survey results. Besides this, it was found from Amazon.co.uk (2017c) that for the customers, it is also cheap and fast to use digital lockers, therefore customers who want to have a cheap and comparably fast delivery will likely select digital lockers to have their parcels delivered.

Moreover, the location of where to install digital lockers is of great importance to drive the volume. It was indicated throughout the research that location and locational aspects are very important to the customers and e-shoppers. Locations like shopping centres, parking lots in supermarket, bus or tram stations, residential areas, on the way to or from work and school are the hot spots. In addition to this, locations close to home and locations on the way to or from work and school were selected by most of the respondents in the survey. Therefore, it can be concluded that locations that are close to home or on the way to or from school or work, are the best locations to install digital lockers. The authors of this thesis believe that placing lockers close to where people live, like in the residential area, would increase the willingness

of using digital lockers among the customers and that it would increase the potential of the digital lockers.

However, there are some threats towards the digital lockers. The first drawback the authors have found is the problem of the knowledge and awareness of digital lockers might still be a bit limited in Sweden. This might depend on the companies owning the digital lockers and the way they are doing their marketing. At least the authors themselves have not noticed any marketing campaigns or similar attempts from either digital lockers providers or their collaboration partners. Therefore informing e-shoppers about digital lockers and making them aware of the delivery option should be the first step for logistic companies and e-retailers in order for digital lockers to become more frequently used.

Another threat towards the usage of digital lockers is the fact that pick-up at collection points is a commonly used delivery and return method for e-shoppers who purchase clothes online. Inhabitants in Sweden or e-shoppers in Sweden have gotten used to collect and return their parcels this way. It could be the case that the customers are aware of the digital lockers, but do not see the need for them since they are used to collect the parcels at similar settings as in which most of the digital lockers could be found at this point in time. With this the authors mean convenience stores or grocery chains which usually offer some kind of collection point service for the purpose of delivering parcels to their customers. Yet, another delivery method that might create a problem for digital lockers is home delivery. Based on most of the respondents from the survey stated that they would like to use home delivery instead if they are able to choose among all the delivery and return methods. This is basically because they think it is better due to the convenient location of home. This result could also indicate that it would be preferable to place digital lockers in residential areas, by doing so digital lockers could possibly become competitive with home delivery. The last threat the authors have identified is problems with finding an agreement among different actors involved. Such problems could potentially influence the location and issues in regards to who should be responsible for maintenance of the digital lockers.

The second research question is: *What impact will e-commerce of clothes and different delivery methods have on how customers travel, meaning their travel behaviour?*

According to the literature review and previous research, it is clear that e-commerce of clothes has a strong impact on customers' travel behaviour. The customers' travel behaviour changes along with their shopping behaviours and the possibility of buying clothes online shapes customers' shopping behaviour. However, scholars have different views on how e-commerce changes the way customers travel. Some authors like Rotem-Mindali and Weltevreden, (2013) believe that e-commerce could potentially change the pattern and thus make the customers travel less since they can purchase from home without going out to physical stores. They suggest that fruitless shopping trips could be reduced by shopping online. However, other authors like Spijkerman (2015) believe that e-shopping will not change the number of trips customers make to physical stores even though for the frequent e-shoppers. The time e-shoppers save by doing online shopping is used to do more shopping trips. People could expand their active space because they can search on the internet and discover stores that they are interested in.

It is however hard to specify how much impact e-commerce of clothes has on how customers' travel and to which degree it influences customers' travel behaviour, because of the complex nature of customer travel behaviour. Based on the trip chaining theory explained

in Primerano, et al. (2007), activities could be chained together to form a trip chain. The activities customers take can be divided into three categories, which are mandatory activities, flexible activities and optional activities. Thereby a trip chain could contain several trip segments and activities from different activity categories. Based on the survey result, 62% of the respondents stated that they also performed other activities besides collecting parcels, meaning their activities of collecting parcels are integrated in a trip chain with other activities and with other purposes. For example, the activity of collecting a parcel at either collection point or digital locker close to the residential area, workplace or school could potentially be integrated into the mandatory trip, in this case the trip from home to workplace or school, or the other way around. In this way customer travel behaviour changes due to the activity of collecting parcel, however the distance customer travelled may not change so much since the pick-up location are close to home, work or school.

There is also an impact of delivery methods on customer travel behaviour. The pick-up locations shape customers' travel routes and the transport modes customers use to collect their parcels. Based on the survey result, most of the respondents (86%) used public transport to collect their parcels, while 23% of them use bike and 14% take cars. The reason why they select specific delivery methods may derive from the considerations of both time and locations. Based on the space-time theory that is stated in (Thill and Thomas 1987; Kondo and Kitamura 1987; Nishii et al. 1988 cited in Primerano, Taylor, Pitaksringkarn and Tisato, 2007), people are constrained by both space and time. Due to the reason that the anchor points meaning home, work and school under most circumstances are fixed in location and time, other activities need to adjust to the location and time to home, workplace and school and revolve around them.

Combining the space-time theory with the trip chaining theory, the most suitable locations to have collection points or digital lockers are the locations that are situated on the way between home and work or school where customers pass by. Due to the fact that many other activities, flexible activities and optional activities, could be integrated with mandatory activities, it is good to install collection points and digital lockers somewhere flexible activities and optional activities might take place. The flexible activities that normally take place on the way between work, school and home could be grocery shopping. This could be the reason why most of the collection points and digital lockers are installed at supermarkets or convenience stores. Besides that, optional activities could also be generated, for example customers could shopping with friends besides doing groceries before going home, therefore some digital lockers are installed at shopping centres.

To sum it up, both e-commerce of clothes and different delivery methods have impact on how customers travel. The travel behaviour also has impact on which last mile delivery method the customers choose, meaning delivery methods and customer travel behaviour influence each other in both directions. The delivery methods customers choose could formulate how their parcels are collected and thus how the customer travel. It is also obvious that both e-retailers and logistics companies are interested in customer travel patterns in order to provide the most convenient service possible for e-shoppers. For this reason, customer travel behaviour is influencing the delivery methods the e-retailers and logistics companies provide to make the customers satisfied.

5.2 Concluding remarks and future research

Under this section, further discussion about digital lockers in Sweden are stated according to the authors' own experience. Besides this, some thoughts related to future research are stated in the end of this section.

The researchers that the phenomenon of digital lockers is quite new in Sweden since Sweden, compared to other countries has been slow to adopt digital lockers. The researchers also get the impression that it will take some time for the Swedish customers to adjust and adopt this new delivery method. Perhaps for this reason there was not much activity at the location where the digital lockers were placed, which was discovered at the attempts of making observations and when the researchers used digital lockers themselves. Even though the researchers visited a grocery shop in the centre of Gothenburg in the afternoon when people usually do grocery shopping and at the same time collect parcels, there was no one collecting it from the digital lockers. At two other occasions, the researchers collected parcels from digital lockers themselves, also in central Gothenburg during peak hour for collecting parcels. At both occasions there were no other customers seen nearby the digital lockers attempting to retrieve their parcels.

The researchers came to two conclusions why this could be the case. First of all, it could be the case that someone actually just had collected their parcel or were about to, but since the collection itself takes very little time, the researcher might just did not see them. Comparing the time it takes to collect a parcel from a digital locker is very quick compared to collect it from a manned service point where there usually are many people waiting and thus creating a queue. Secondly, all of the digital lockers were not easy to see, meaning it was unlikely that a person coming to the store for another purpose than collecting the parcel would notice them. In fact, one of the digital lockers was located upstairs of a convenience store, making it impossible to notice. Again, the authors of this thesis believe that more marketing would be preferable and that it would be beneficial to locate the digital lockers at spots where they are visible to other customers visiting the shops, shopping malls, commuting stations for other purposes than collecting parcels.

In this thesis, the authors have summarised digital lockers' implementation situations of many countries from different parts of the world, especially digital lockers in Sweden which have not been put together before this research. This could potentially facilitate future research regarding digital lockers in Sweden. A suggestion for future research would be to more closely investigate why Sweden, compared to other European countries has been slow to adopt to this delivery method. By finding the reasons, the researchers believe that important factors and barriers could be found, which could be used to further develop and implement digital lockers in Sweden, both for clothes and other products that have the similar characteristics bought online.

Moreover the researchers select university students in Sweden as the population for the survey. It could be interesting to investigate other groups of people as well, like young working class, older people or middle aged people. Furthermore, in regards of travel behaviour, observations could be done in future to achieve deeper knowledge of the way customers travel.

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Appendix A

Questionnaire

E-commerce of clothes

Question 1: Have you bought clothes online during the 12 last months?

Alternatives: Yes/No

Logic: If the respondents answered “Yes” they continue until Question 14, if the respondents answer “No” they skip Question 2-Question 14 and start on Question 15.

Question 2: How often do you purchase clothes online?

Alternatives: Once every 12 months / Once every 6 months / Once every 3 months / Once a month / 2 times every month or more / Other

Logic: Only for e-shoppers.

Question 3: Why do you purchase clothes online?

Alternatives: Cheaper compared to physical stores / Larger product range compared to physical stores / Easy to find suitable clothes / Time saving / Other

Logic: Only for e-shoppers.

Question 4: Have you experienced any of the following problems when purchasing clothes online during the 12 last months?

Alternatives: The clothes did not fit / The clothes did not fulfil the expectations I had / There were issues with the delivery / There were issues in regards to the payment / I have not experienced any problem related to purchasing clothes online / Other

Logic: Only for e-shoppers.

Delivery methods

Question 5: At the last occasion you bought clothes online, how did you receive your parcel?

Alternatives: Home delivery / Pick-up at the retailers physical store / Pick-up at collection point / Digital lockers / Other

Logic: Only for e-shoppers.

Question 6: Why did you choose this alternative as a delivery method?

Alternatives: Cheap delivery / Convenient location / Fast delivery / Other

Logic: Only for e-shoppers.

Question 7: Which of the following methods would you like to use to receive your parcel if you were free to choose?

Alternatives: Home delivery / Pick-up at the retailers physical store / Pick-up at collection point / Digital lockers / Other

Logic: Only for e-shoppers.

Question 8: Why would you like to receive your parcel with this method?

Alternatives: Convenient location / Fast delivery / Safer compared to other delivery methods / More reliable in time of delivery compared to other delivery methods / Other

Logic: Only for e-shoppers.

Question 9: At which time during the day do you normally pick up your parcels yourself or have the parcels delivered to your home/get your parcels delivered?

Alternatives: 07:00-09:59 / 10.00-12:59 / 13:00-15:59 / 16:00-18:59 / 19:00-22:00 / Other

Logic: Only for e-shoppers.

Question 10: Have you experienced any delivery problem when doing online shopping of clothes in the last 12 months?

Alternatives: Yes / No

Logic: Only for e-shoppers. If the respondents answer “No”, they skip Question 11 and continue on Question 12.

Question 11: Which are the delivery problems you have encountered in the last 12 months?

Alternatives: The parcel got delivered too late / The parcel did not get delivered at all / I had to queue to collect the parcel / I had to wait around for the delivery / It was not possible to track the parcel / Other

Logic: Only for e-shoppers.

Travel behaviour

Question 12: Which mode of transport do you normally use to get to the collecting points if such is used (e.g. ICA, petrol station, other convenience stores)?

Alternatives: Walking / Biking / Public transport / Car / Other

Logic: Only for e-shoppers.

Question 13: The last time you collected a parcel, did you go somewhere else or doing some other activity at the same time?

Alternatives: Yes / No

Logic: Only for e-shoppers.

Question 14: Do you think you have reduced the times you visit physical stores when you purchase clothes online?

Alternatives: Yes / No

Logic: Only for e-shoppers.

Purchase in a physical store

Question 15: How often do you purchase clothes?

Alternatives: Once every 12 months / Once every 6 months / Once every 3 months / Once a month / 2 times every month or more / Other

Logic: Only for non e-shoppers.

Question 16: Why do you purchase clothes in a physical store?

Alternatives: Easy to find suitable clothes / Time saving / I like to have the clothes I buy directly / I like to see and feel the clothes before I buy them / I want to try the clothes on before I buy them / I do not like to purchase on internet / I do not like to wait for the delivery / I prefer to have personal service / Other

Logic: Only for non e-shoppers.

Question 17: What could make you do online shopping of clothes instead of buying them in a physical store?

Alternatives: Fast delivery / Various delivery options / Low delivery fee / Time saving / No need for visiting physical shops / Lower price of the clothes / Larger product range / Other

Logic: Only for non e-shoppers.

Delivery methods

Question 18: If you bought clothes online, how would you like them to be delivered?

Alternatives: Home delivery / Pick-up at the retailers physical store / Pick-up at collection point / Digital lockers / Other

Logic: Only for non e-shoppers.

Question 19: Are the current delivery methods a barrier for you to buy clothes online?

Alternatives: Yes / No

Logic: Only for non e-shoppers. If the respondents answer “No”, they skip Question 20 and start on Question 21.

Question 20: If you answered yes, please specify why

Alternatives: The parcels may not be delivered on time / The parcels may not be delivered at all / I do not want to go anywhere to pick up the parcels / I do not want to queue to collect the parcels / I do not want to wait at home for the delivery / I might miss the delivery when they delivery to my home / I do not want to pay for the delivery / Other

Logic: Only for non e-shoppers.

E-commerce

Question 21: Do you purchase other products online, not including clothes? (e.g. medicines, cosmetics)

Alternatives: Yes / No

Logic: Only for non e-shoppers. After answering this question the non e-shoppers skip Question 22-Question 29 and start on Question 30.

Returns

Question 22: When you order clothes online, do you usually order more than one of the same item to compare e.g. size and colours?

Alternatives: Yes / No

Logic: Only for e-shoppers.

Question 23: Have you returned any clothes bought online within the 12 last months?

Alternatives: Yes / No

Logic: Only for e-shoppers. If the respondents answers “No”, they will skip Question 24-Question-28 and continue on Question 29.

Question 24: Why did you return the clothes?

Alternatives: The clothes did not fit in size / The clothes did not fulfil the expectations I had / I found a better offer somewhere else / Other

Logic: Only for e-shoppers.

Question 25: How often do you make returns, meaning approximately what percentage of the clothes you buy online do you return?

Alternatives: 10% / 20% / 30% / 40% / 50% / 60% / 70% / 80% / 90% / 100%

Logic: Only for e-shoppers.

Question 26: How did you make the return the last time you made a return?

Alternatives: At the collection point (e.g. ICA, Pressbyrån or other convenience store) / Delivery company picked the parcel from my home / Via mailbox / Retailer’s physical store (e.g. Zara, Lindex) / Digital locker / Other

Logic: Only for e-shoppers.

Question 27: Have you experienced any problem when doing returns of clothes bought online?

Logic: Only for e-shoppers. If the respondents answer “No”, they will skip Question 28 and continue on Question 29.

Alternatives: Yes / No

Question 28: If you answered yes, what are the return problems you have encountered?

Alternatives: It was costly / It was hard to know how to make the return because of lack of information or complicated process / Difficulties with refunding / Other

Logic: Only for e-shoppers.

Question 29: If you were returning clothes you bought online, how would you like to make the return?

Alternatives: Delivery company pick it up from my home / Return the parcel at the retailer's physical store / Return the parcel at a collection point (e.g. ICA, Pressbyrån or other convenience store) / Return by a digital locker / Other

Logic: Only for e-shoppers.

Digital lockers

Question 30: Have you ever used digital lockers as a delivery method?

Alternatives: Yes / No

Logic: For both e-shoppers and non e-shoppers.

Question 31: If there were digital lockers as a delivery method, would like you use it?

Alternatives: Yes / No

Logic: For both e-shoppers and non e-shoppers. If the respondents answer "Yes", they will do Question 32 and then continue on Question 34, if the respondents answer "No" they will do Question 34 and continue on Question 34.

Question 32: If you answered yes, please specify why

Alternatives: No need for queuing to collect the parcel / Easy to operate / Convenient location / Time saving / Possibility to collect parcels whenever / Other

Logic: For both e-shoppers and non e-shoppers.

Question 33: If you answered no, please specify why

Alternatives: No convenient location / Congestion around the digital lockers / Parking problems / The price for the delivery might be higher / Hard to operate / Unsafe / Other

Logic: For both e-shoppers and non e-shoppers.

Question 34: If digital lockers were available, what would be the motivation for you to choose this as a delivery alternative? Please rate each alternative from 1-7, 1 being very unimportant and 7 is very important

Alternatives: No waiting time for collecting parcels / Lower price for delivery / Fast delivery / Parcel tracking / Availability 24/7 / Convenient location

Logic: For both e-shoppers and non e-shoppers.

Question 35: According to you, where would you prefer the digital lockers to be located?

Alternatives: Shopping centre / Parking lot in supermarket / Bus stations and tram stations / Petrol station forecourts / Close to home, in the local residential area / On the way to or from work and school / Other

Logic: For both e-shoppers and non e-shoppers.

Question 36: If you could make returns by digital lockers, will you use it instead of going to stores (e.g. ICA, Pressbyrån)?

Alternatives: Yes / No

Logic: For both e-shoppers and non e-shoppers.

Background questions

Question 37: Gender

Alternatives: Woman / Man

Logic: For both e-shoppers and non e-shoppers.

Question 38: Age

Alternatives: Under 20 / 20-25 / 26-30 / Over 31

Logic: For both e-shoppers and non e-shoppers.

Question 39: Nationality

Alternatives: -

Logic: For both e-shoppers and non e-shoppers.

Question 40: Net income (kr) per month

Alternatives: 0-4999 kr / 5000-9999 kr / 10.000-14.999 kr / 15.000-19.999 kr / Over 20.000 kr/

Logic: For both e-shoppers and non e-shoppers.

Question 41: Which of the following modes of transport do you normally use?

Alternatives: Car / Public transportation / Bike / Walking / Other

Logic: For both e-shoppers and non e-shoppers.

Question 42: Do you normally have access to a car?

Alternatives: Yes / No

Logic: For both e-shoppers and non e-shoppers.

