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Smart online grocery delivery and peri-urban consumers' attitudes

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Abstract

Purpose: To explore consumers' attitudes towards e-commerce, in particular online grocery shopping, and its delivery in non-dense areas for the purpose of designing smart last-mile solutions.

Approach: The state-of-the-art of smart e-commerce delivery in dense areas was identified by a review of the literature. It was expected that this knowledge could be transferred to non-dense areas. This prediction was examined and explored further by making use of four focus groups recruited in a Swedish mid-sized town.

Findings: Respondents were generally positive towards e-commerce, although mixed attitudes were found with regard to online grocery shopping. Further, the willingness to pay for flexible, smart and sustainable delivery was low, with a notable exception for local produce.

Originality: The knowledge acquired and solution developed in dense areas is not readily transferred to non-dense areas. There is scope for developing new Business Models for the supply chain of local produce. For the prototype testing and roll-out of smart e-commerce delivery platforms, the online local produce market is recommended.

Key words: Consumer' attitudes, Local produce, Online shopping, Parcel handover, Route optimization, Willingness-to-pay

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1. Background

The virtue of traditional brick-and-mortar retailing is that the vendor, the consumer and the goods match in time and space for the handover of the parcel of goods. And each agent manages his own arrival at and return from the locus. Flexibility in the match is provided by the vendor's opening hours and shelf storage and the consumer's willingness to travel. E-tailing loses some of the strict restriction imposed by the matching. At a trivial cost, 24/7 opening hours can be offered. Goods can be kept at easily accessible, large and inexpensive warehouses simplifying the stocking challenge. And to the extent the consumer is willing to accept a digital representation of the goods, no travelling is required. Unsurprisingly, with the emergence of inexpensive internet-based ordering systems, consumers have rapidly shifted towards e-tailing, and the vendors have followed suit.

To appreciate the shift towards e-tailing it is useful to be aware of some statistical facts. The total number of Internet users in 2017 exceeds 3.88 billion people worldwide which constitute more than the half of the world population (Internet World Stat, 2017). Online shopping is growing with accelerating pace with retail e-commerce sales estimated to reach 2.290 billion U.S. dollars worldwide in 2017 which implies 23,2% rise since 2016 and constituting 10,1% of total retail sales (Statista, 2017). The European market follows the global tendency and is predicted to grow by 14% reaching 602 billion euros in the end of 2017 (Ecommerce Europe, 2017). More and more consumers choose to buy goods online: 87% of UK consumers and 67% of Swedish consumers order goods online (Ecommerce Europe, 2017; Postnord, 2017). Technological development, digitalization and fast pace of life has made it possible to purchase online both durable and nondurable goods including grocery. Grocery online is predicted to grow up to 150 billion U.S. dollars worldwide constituting 9% of market share by 2025 (Kantar Worldpanel, 2016). In Sweden grocery e-commerce grew with 30% in 2016 and is continuing to grow (Svensk Digital Handel, 2017). The growth in Internet usage for the purpose of e-shopping unsurprisingly caused the growth of parcel delivery numbers. Only in UK more than one billion deliveries were generated by e-shopping in 2013 and this number is expected to grow by 2018 generating 1.35 billion deliveries (Barclays, 2014).

E-tailing has not erased the need of a matching up with the consumer in time and space, but changed it. It requires the distribution, typically by a third party (hereafter referred to as PDC, parcel delivery company), of the parcel to a place and at a time where the parcel can be handed over to the consumer. Moreover, e-tailing has led to consumers making more returns as a consequence of not having had the opportunity to physically evaluate the goods prior to purchases. In fact, it has been reported that up to 50 % of some categories of online purchased goods are subject to return, thereby increasing the need of matches. The frequent occurrence of unsuccessful matches between the consumers and the PDC:s and parcel handovers and the need for managing returns has prompted a recent research interest on consumers' attitudes towards delivery of online purchased goods: including the question of how to adequately incorporate the delivery into the e-tailer's Business Model. Further, there is an interest in developing smart, in particular, last-mile delivery solutions.

This paper came about as an intermediate step in the development of a smart solution named SAILOR (www.transport-era.net/results/sustainable/urban-last/). The precise design of the system needed to adapt to consumers' attitudes towards delivery. Further, SAILOR was intended to be deployed also in non-dense areas of which the literature provided little guidance with regard to consumers' preferences. The aim of this work is, thus, to explore consumers', outside the urban core, attitudes towards delivery of online purchased goods. The frequency in grocery shopping and the growth in the online ditto prompted us to pay specific focus on online grocery shopping and the related challenge in the distribution of the groceries.

This paper is organized as follows. In section two we outline the theory of predicted behaviour, technology acceptance model and the concept of the SAILOR solution. In section 3 we summarize the empirical knowledge about consumers' attitudes towards e-commerce, parcel handover, and present the theoretical framework for this study. Section 4 gives the methodology and describes the data collection procedure. Section 5 presents the findings and the section 6 provides a concluding discussion.

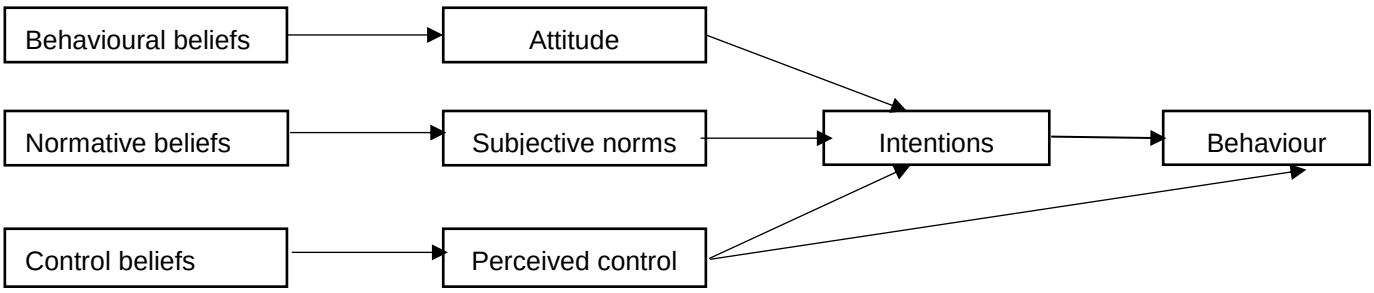
2. Theoretical background and supply chain solutions

In this section we provide a theoretical framework for consumers' attitudes towards e-commerce

and the parcel delivery by making use of the theory of predicted behaviour (TPB). TPB was proved to be relevant in studying consumers' attitudes in general and in online grocery shopping settings in particular being the best fit to the data and explaining consumers' buying intentions (Hansen et. al., 2004). As the SAILOR solution contains an element of technology, it is to expect that the consumers' attitudes may also depend on their proneness to adopt new technology. For this reason, we complement the TPB with a theory about technology acceptance. Finally, the SAILOR solution is outlined and related to the theory.

Figure 1 is an illustration of TPB and it can be explained as follows. According to TPB (Ajzen, 1985, 1991) which is often applied in consumer behavioural research, human attitudes towards some action is one of the three constructs which cause the intention to conduct this action. Attitudes are determined by behavioural beliefs which constitute a person's expectations regarding the outcomes of the action and if these outcomes are favourable or unfavourable. Another two constructs are subjective norms and perceived control. Subjective norms are influenced by normative beliefs or, with other words, what the person believes about the reaction of the relevant "others" to the performed action. Perceived control is influenced by control beliefs which have to do with the person's perception about her ability to carry out the action. Perceived control not only influences behavioural intentions but is directly linked to the behaviour in question.

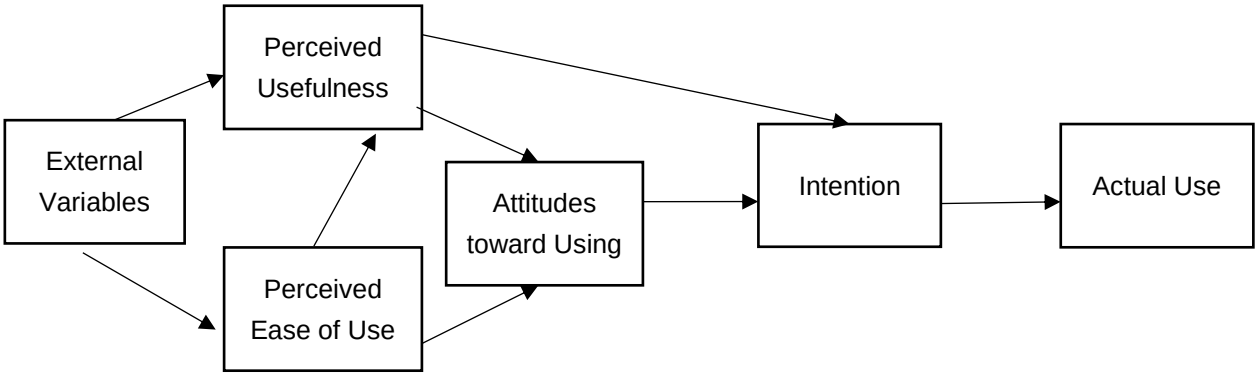
Figure 1: An illustration of the Theory of Predicted Behaviour (TPB)



Of course, the concept of attitudes needs to be clarified in our context. The consumer will have attitudes towards several components of the goods and its delivery. From the literature reviewed by Huseynov & Yildirim (2016) it is clear that most focus has been on the attributes of the goods and the shopper's interface in online shopping. The detailed understanding of the consumers' attitudes towards mode of delivery is much less examined. However, smart and efficient delivery will be hard

to come by without exploiting IT-solutions that engage the consumer. It is therefore to reckon with the consumers' attitudes towards technology. Technology Acceptance Model (TAM) is illustrated in Figure 2.

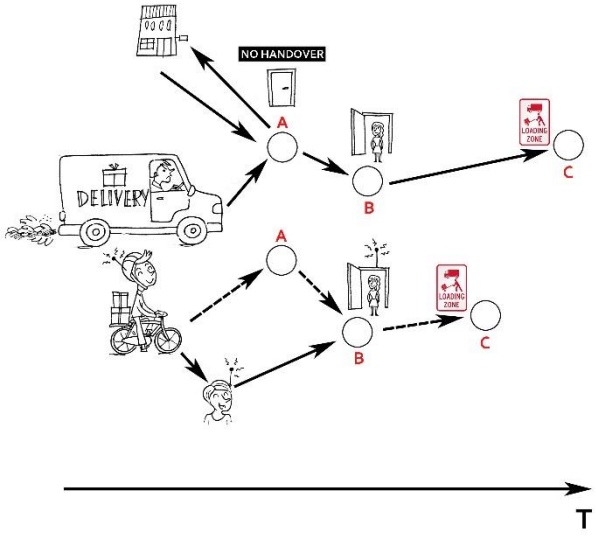
Figure 2: An illustration of Technology Acceptance Model (TAM)



According to Technology Acceptance Model (Davis, Bagozzi & Warshaw, 1989), attitudes towards using a technology is a direct determinant of a person's *intention* which, in turn, predicts *actual use* of the technology. *Attitudes* are caused by two particular beliefs: *perceived usefulness* and *perceived ease of use* of the technology in question. *Perceived usefulness* can be explained by the extent to which a person believes that the technology is useful to her and will help to perform an action in a better way, more efficiently or effectively. *Perceived usefulness* together with *Attitudes* towards using technology directly influences *Intention* to use the technology. *Perceived ease* of use means to what extent a person believes that the benefits of using the technology will be greater than the effort exerted in order to use it. Even when a person realises the usefulness of the technology she can at the same time perceive it to be difficult to use. Both beliefs, *perceived usefulness* and *ease of use*, are influenced by external variables. Moreover, *perceived usefulness* is also determined by *perceived ease of use*, which means that the easier a person believes the technology use is the more useful she perceives it.

This study is aimed at exploring consumers' attitudes for the purpose of designing smart last-mile solutions in the frame of the SAILOR project. Figure 3 provides a conceptual representation of the technical part of the SAILOR solution to the last-mile delivery of parcels. It gives a representation of today's situation and the strived for situation up on a successful implementation of SAILOR.

Figure 3: The SAILOR concept of last mile delivery



Presently, and in contrast to urban Europe, delivery of parcels for consumers in Sweden typically ends at a pick-up point making the consumer managing the last mile transport herself. To the extent a parcel delivery company makes a direct handover, it usually works as a static routing of the vehicle stipulating a time window for deliverance and a place (the residential address). This is illustrated in the picture of a truck travelling the route passing points A-C finding no one at the place in point A and being delayed at C because of a waiting time for unloading. The illustration concerns deliveries, but the same structure applies for returns. The SAILOR system is expected to remedy these matching problems. Upon coordination, delivery to customer A is re-routed to the place where the receiver happens to be and the unloading at C is swifter because of slot availability information. The solid arrows illustrate the actual trip while the dashed the statically planned one, and their length illustrate the trip time along the route. Delivery by bike also appears in the picture as this mode of delivery is made use of in some of the demonstrations cities in Europe where the SAILOR prototype is being verified.

With a theoretical framework for the consumers' attitudes towards e-commerce and, in particular, the parcel delivery we turn in the next section to the question of what knowledge is provided by the existing literature.

3. Current knowledge of consumers attitudes to e-commerce and its delivery

For successful implementation of solutions for parcel delivery it is of crucial importance to understand the consumers' perspective in regards to e-commerce and its delivery. The majority of studies deal with issues of consumers' attitudes, intentions and behavior in connection with e-commerce in general. Previous research reveals that consumers' attitudes towards e-commerce are positively related with consumers' intention and actual behavior (Ha & Stoel, 2009; Ingham et. al., 2015). Many studies focusing on the consumers' behavioral issues attempt to reveal different factors which influence consumers' attitudes towards e-commerce. Huseynov & Yildirim (2016) reviewed 208 articles related to B2C e-commerce, 107 of which are dealing with online consumer behavioral issues. Consumers' attitudes towards e-commerce are often associated with such factors as trust (Al-Debei et. al., 2014; Becerra & Korgaonkar, 2011; McCole et. al., 2010), perceived benefits, perceived usefulness and perceived ease of use of e-commerce (Al-Debei et. al., 2014; Chen & Teng, 2013; Lin, 2008). For example, time and effort savings, price attractiveness and perceived enjoyment were found influential for consumers' intention towards using e-commerce (Broekhuizen & Huizingh, 2009).

The body of research regarding e-grocery is much more narrow. Some studies assess differences between traditional offline and online grocery shoppers (Andrews & Currim, 2004; Chu et.al., 2010; Degeratu et.al., 2000). These studies confirm that online grocery shoppers prefer products in larger sizes, have higher brand loyalty and are less price sensitive. Anesbury et.al. (2016) studied the process of grocery shopping online and compared it with the traditional grocery shopping in store. They didn't reveal any significant difference in regards time spent and effort expended, concluding that consumers engaged in online grocery shopping value time efficiency when purchasing grocery. Hansen (2008) empirically prove that consumers' attitudes toward online grocery shopping is the most important predictor of online grocery buying intention. Attitude towards online grocery shopping is effected by personal values such as self-enhancement which is about doing things effectively. Moreover the consumers' perceived ease – difficulty of carrying out a purchase of grocery online and the previous experience were found to effect attitude and willingness to engage in

online grocery shopping. One of the earliest and most heavily cited studies within online grocery settings suggests that the primary reasons for consumers to buy grocery online are convenience and time saving (Morganosky & Cude, 2000). Hand et.al. (2009) also highlighted the importance of situational factors as the reasons for consumers' engagement in shopping grocery online, such as having children or being sick. These situational factors might be classified under convenience or saving time. Raijas (2002) confirms the importance of convenience, ease and speed of the task as being central for consumers when they choose to buy grocery online. His study identifies four key factors for engaging in online grocery shopping instead of traditional grocery shopping: avoidance of product picking and delivery, time saving, easiness to order groceries and the desire to try something new. Wilson-Jeanselme & Reynolds (2006) analyse consumers' preferences concluding that ordering time, quality and delivery time being the most important factors for online grocery shopping consumers. One more study explores customers' beliefs about internet grocery shopping using TPB (Ramus & Nielsen, 2005). Its results suggest that consumers' attitude towards online grocery shopping is caused by outcome beliefs which include seven groups: convenience of shopping; range of available products and information about the products; enjoyment and fun of shopping; social aspects of shopping; personal service; price, bargains and costs; and technical systems and home page.

Regarding the previous research on the delivery of online purchased goods the following results can be summarized here. Delivery prices were found to be an influential factor on consumers' behavior within online shopping settings and effect the order frequency and number of returns (Lantz & Hjort, 2013; Petersen & Kumar, 2010; Lewis, 2006). For example, lenient or free delivery and return policies generate increased number of orders and returns. Huang & Oppewal (2006) have found that the price for home delivery of online purchased grocery and the travel time to a physical store both have impact on consumers' choice between the online and the traditional channel for grocery shopping. However, it was empirically proved that the price for home delivery is not the most important factor affecting consumers' choice. Traveling time to the traditional grocery store has greater impact on the consumer choice than the price for home delivery, suggesting that consumers are willing to pay for the convenience of home delivery. Further, home delivery was found to be the most preferable way in case of grocery shopping due to the fact that consumers can save time and energy by avoiding driving to the store and transport heavy bags (Ramus & Nielsen, 2005). Some disadvantages of home delivery were

however also reported by the study. Firstly, the need to arrange suitable time and place for home delivery was found to be inconvenient. Secondly, the possibility to directly complain or return the purchased goods is limited in case of unattended home delivery. Unattended home delivery was not found being a preferable mode of package delivery in general e-commerce settings with consumers rather preferring to pick up parcels from service points (Xu et al., 2008). Delivery price was also found to be important in connection with home delivery explaining that high price make small orders being perceived as expensive (Ramus & Nielsen, 2005).

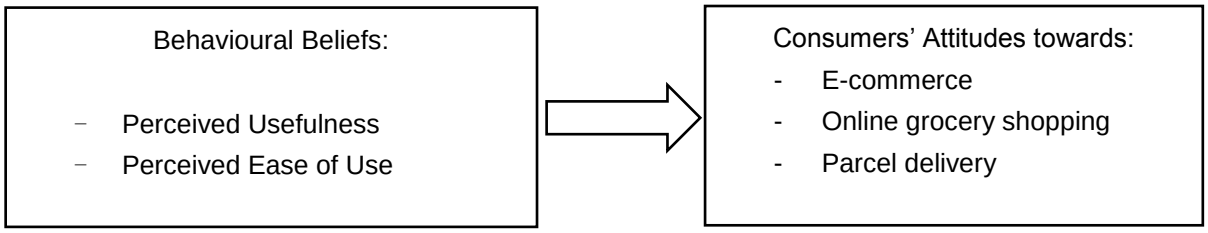
Moreover, the results of a large consumer survey reveal that problems related to parcel delivery are one of the key preventers of buying online. Consumers often abandon already completed online purchase when they face high delivery price or long delivery time. It has also been found that convenient and flexible delivery and return options effect consumers' decisions regarding repeated purchases (Copenhagen Economics, 2013).

Indeed, the delivery of online purchased goods to consumers, which constitute the so called last mile delivery, is the most expensive, least efficient and most problematic part of the overall delivery process. The relative importance of the last mile in the total logistical cost can go up to 50% (Vanelslander, Deketele & Van Hove, 2013). Although there are home delivery solutions, they are undeveloped (for instance real time delivery is seldom offered) and consumers often prefer to get to a service point to collect their parcel. A first major cost driver in the literature is a failed or unsuccessful handover in home delivery. This is a missed delivery that happens when the receiver is not home to take delivery of the goods or to provide the parcel for return (Amico & Hadjidimitriou, 2012). Authors who discuss the use of delivery time windows in home delivery almost always make the reasonable assumption the consumers will be home during the delivery (Guiffrida and Nagi, 2006; Boyer et al, 2009; Narny and Barnes, 2000; Wang and Regan, 2002). The assumption could be sensible if the consumers themselves choose the time window at their convenience. However, research has been done to establish unsuccessful delivery rates with varying results depending on the company and their "no-one-home" policy (Edwards et al., 2010, van Duin 2015).

Taking into account the knowledge provided by the existing literature and combining TPB and TAM we suggest a model to be used in this study in order to explore consumers' attitudes towards

e-commerce, in particular online grocery shopping, and its delivery in non-dense areas for the purpose of designing smart last-mile solutions. This model is illustrated in Figure 4. Consumers' attitudes are believed to be shaped by consumers' behavioural beliefs about online grocery shopping, and its delivery. Consumers' behavioural beliefs are divided into consumers' perceived usefulness of online grocery shopping and its delivery and perceived ease of use of the latter. Perceived usefulness is about benefits consumers believe can be derived from online grocery shopping and its delivery. Perceived ease of use means the extent to which consumers believe it is easy/difficult to carry out online grocery shopping and its delivery.

Figure 4: An illustration of attitude determinants



4. Methodology

The theoretical framework coupled with the (empirical) knowledge in the previous section enables us to make some basic assumptions for one of the settings where a SAILOR prototype was to be tested. These assumptions are to be examined empirically in our setting. It was decided to collect data on consumers by the means of Focus Groups. The rationale for this method and the description of the data collection procedure is provided in this section.

Based on the previous research the following assumptions are explored in more depth in the settings of this study:

1. Consumers (favourable and unfavourable) attitudes towards e-commerce in general and online grocery shopping in particular including its delivery including:

- perceived usefulness in terms of benefits such as convenience, time and efforts savings and
- perceived ease of use in terms that it is easy to order goods including grocery online which also

allows to avoid trips to traditional stores.

2. Based on the available range of delivery modes, to explore the consumers' attitudes towards home delivery of online purchased grocery in particular and their willingness to pay for such convenience in terms to save time and effort.

The aim of this study is to explore consumers' attitudes towards e-commerce, in particular online grocery shopping, and its delivery in non-dense areas for the purpose of designing smart last-mile solutions. Exploring attitudes includes such contents as perceptions, opinions, emotions, feelings, beliefs and ideas people express in connection to some issue. For this purpose using focus groups is considered as a relevant and appropriate method (Krueger & Casey, 2015). Additionally focus groups are helpful on the initial stages for getting information to be further applied in larger quantitative studies. The results of this study are to be used in designing and testing a last-mile solution in one of the four settings within SAILOR being the mid-sized town of Borlänge in Sweden. Moreover focus groups showed to be an effective method to explore consumer attitudes in different related areas: food information (Nocella et.al., 2014), road pricing (Pronello & Rappazzo, 2014), product packaging (Hollywood et.al., 2013; Olsmats et al, 2015), service quality (Crowley & Gilreath, 2002) and online retailing (Ramus & Nielsen, 2005).

To collect data for this study four focus groups were conducted with totally 30 participants, 17 men and 13 women. All participants are residents in Borlänge with experience in online shopping. The participants volunteered to participate in the study and were included in the focus groups using snowball sampling (Denscombe, 2014). The groups were formed based on the participants' age to capture potential differences in attitudes. The following groups were formed:

Group 1: average age of 58 years

Group 2: average age of 51 years

Group 3: average age of 35 years

Group 4: average age of 24 years

All focus groups interviews were conducted in Borlänge in the period of April – May, 2017. Each

focus group session lasted one and a half hour and each group had from 5 to 11 participants. Participants in all groups were discussing the same predefined set of questions. The questions were formulated in a way to reflect the theoretical framework of the study and get information regarding participants' beliefs and perceptions about usefulness and ease of use of e-commerce, in particular online grocery shopping and its delivery. The questions were open-ended and allowed for free discussion on the stated topics. The moderators presented the aim of the research study and shortly explained the background, thereafter discussions of focus questions followed. The topics were perceived as interesting, the discussion flew freely and the moderators did not need to force participants into discussion. The moderators ensured that the discussion didn't significantly deviate from the subject and that everybody had opportunity to express their views. All focus groups discussions were audio recorded and notes were taken by the moderators. The notes were later read and the audio records were listened to. The participants' comments were first divided into similar categories, the categories were labelled and their occurrences were checked across all focus groups. Later the behavioural beliefs were identified and the data were coded according to the perceived usefulness and perceived ease of use of online shopping in general, online grocery shopping in particular and its delivery.

5. Findings

The findings are divided into two groups: consumers' general attitudes towards e-commerce, in particularly grocery e-shopping followed by attitudes towards its delivery. The results for each group are presented under two categories of identified beliefs: perceived usefulness and perceived ease of use. Participants' beliefs are listed in the order based on the mixture of following factors: *frequency* or how many times they were mentioned by participants in all focus groups; *extensiveness* or how many participants mentioned the concept; and *participants' perception of importance* or if participants mentioned the concept as important for the discussion.

Attitudes towards e-commerce, in particularly grocery e-shopping

Participants in all focus groups have shown positive attitudes towards e-commerce in general. All of them are regular e-commerce users. The range of products purchased online varies from consumer

electronics to clothes and food. Participants explained their favourable attitudes with factors such as lower prices, wider choice of products and convenience of e-commerce in general. In regards to grocery e-shopping the following beliefs of participants were identified.

The perceived usefulness of grocery e-shopping:

Range of products

The analyses of focus groups sessions allow us to distinguish between two types of beliefs regarding the range of grocery products available online. First, favourable beliefs regarding dry food and alcohol which participants either consider buying online or do already engage in such buying behaviour. This is how one participant expressed it[1]:

- *I order wine and beer online. It is very convenient and you can find online something they don't have in a normal alcohol store.*

Second, generally unfavourable beliefs regarding fresh foodstuff like meat, milk products and vegetables.

- *I can consider buying some grocery online such as alcohol or protein powder but fresh food such as milk I will always buy in a store.*

The range of these products is also believed to be wider in traditional grocery stores than online. One interesting thing which was noticed is that participants in Group 1 almost unanimously expressed negative beliefs towards e-grocery in both categories. Some participants in Group 2 were positively referring to dry food and alcohol online. In group 3 all participants had positive beliefs about dry food and alcohol online and negative beliefs about fresh food online. Finally, participants of Group 4 generally expressed positive beliefs on all categories of grocery online.

One more interesting fact which was revealed during the focus group sessions was dinner solutions (recipes with food ingredients for self-cooking). Dinner solutions were believed to be a valuable

[1] Participants' expressions are based on audio records of focus groups and the translation from Swedish to English is done by the authors.

option but only by participants who had experienced this type of grocery shopping. Participants without such experience were indifferent to the service.

Quality of products

Many discussions in all focus groups were dedicated to the question of product quality, especially fresh food, fruit and vegetables. The majority of participants believe that the quality of the fresh food purchased online is not as good as the food one chooses oneself on the store shelf of a brick-and-mortar grocery store. The quality can be affected by negligence of the picking personnel or damages during the packing or/and transportation. Some of the beliefs expressed by the participants are cited below:

- *The picker won't care if the bananas he puts in the bag are ripe enough or of right colour or not rotten on one side. And even if he is diligent enough he doesn't know what level of ripening I prefer.*
- *You can get a milk pack which expires tomorrow, because they pick it from the first row, it's ok, you can use the milk and everything, but yourself you would choose a milk which is fresher, you know, those which always stand behind.*
- *They are not careful when they pack the bags: they can put soft fragile things in the bottom and heavy things on the top and when you get your bag some food is already damaged.*
- *You never know how the bags are transported. Some packages inside the bags can be broken and you will have sugar or flour on all your grocery.*

One interesting result was discovered in all focus groups. Participants expressed the opposite view in regards to local produce. Locally produced food is believed to have better quality than the food available in grocery stores. This belief is very strong and all participants agreed that fresh goods, ecologically produced by the local farmers and hunters, especially meat, fish, fruit, vegetables and egg has prima quality. In this case it doesn't matter that the food is picked up, packed and delivered by someone else because it is still perceived to be better than what you get from the bigger grocery store. Moreover, it is not possible to choose these goods yourself because local farmers usually do not have shops or even if they have shops they can be remotely situated and not easily reachable. This is how one participant expressed himself:

- *It's totally different with the locally produced food, you can't even compare the quality… You can't find it in a regular store, let's say a hunter who has an elk, or a local farmer who has few cows….*

Joyfulness of grocery shopping

The majority of the participants believe that it is fun to do grocery shopping in brick-and-mortar stores. They see it as a kind of adventure and excitement of everyday life. Some of them also perceive the traditional shopping as an opportunity to socialise, meet people and spend time with the family doing an activity together. So, traditional grocery shopping is an appreciated activity. This is how some participants talked about it:

- *It's nice to go shopping, if you have luck you can even meet some friends or neighbours and talk to them.*
- *I like to go shopping with my wife, we always discuss food and what we will have for dinner.*
- *I highly appreciate going to Ica (local supermarket), sometimes it's the most exciting thing of the day.*

An interesting fact that these beliefs were expressed by participants from all age categories across all focus groups.

Desire to touch

Desire to touch is closer connected to the joyfulness of grocery shopping and was said to be a very important part of it. Many participants express the desire to use their feelings when they buy grocery. They want to see, smell and touch the products, especially fresh food such as fruit and vegetables. Two participants expressed it in this way:

- *I want to pick up one apple from the heap, have a closer look, smell it, put it back, take it again… change my mind, pick another one*.
- *I like going to the fresh food department and smell meat and fish, look how different pieces look like, choose the one I like most.*

Again, the same as in the situation with the quality of products, the participants in all focus groups

unanimously expressed an opposing view in regards to the local produce. The participants trust the local producers more than the big grocery chains. The belief, that the local produce is always ecological and of prima quality, eliminates the need and the desire to sense the product. This is how it was put by one participant:

I am very interested in buying meat from a local farmer or hunter……. I don't need to see it before I buy because these guys can be trusted and it's a good thing to support them, especially when I know that this cow or a pig was alive yesterday and lived next to me and is not coming from Brazil where I am not sure what they eat and how they were treated.

Price of products

Price in regards to e-commerce in general was named as the most important factor. E-commerce is believed to be attractive mostly because of the lower price of goods. In contrast, price for grocery is not believed to be lower online than in brick-and-mortar stores. The majority of the participants believe that grocery prices are the same regardless of the channel. Some of the participants even expressed the belief that grocery prices are slightly higher online, especially in case of omni-channel retailers and dinner solutions. Omni-channel retailers are believed to have higher prices on their web pages than in traditional stores. Moreover, it's not always the same special offers with lower prices which can be found in traditional stores are also available online.

The perceived ease of use of grocery e-shopping:

Range of vendors

Almost all the participants agreed that online shopping in general offers wider possibilities in terms of large number of available vendors online which makes online shopping easy. It's usually easy to find a product online and even compare different terms at different vendors. While the range of vendors for e-commerce in general is perceived as large, the situation with grocery online shopping is different. The participants discussed that the range of vendors offering grocery online is limited. Some of the participants were aware that grocery online can be purchased either as a ready dinner solution with recipes and food ingredients or as a free choice of grocery items. The number of

vendors though is believed to be limited to one or two players on the market. Some of the participants only mentioned Linas Matkasse[2] and ICA[3] as the possible choice of vendors offering grocery online in Borlänge. Moreover, some of the participant were totally unaware of the possibility to buy grocery online.

I've got a leaflet from ICA with some discounts on the food bought via Internet. Does anybody else sell grocery via Internet?

Convenience

The question about convenience was also perceived differently for e-shopping in general and grocery e-shopping in particular. Generally e-shopping is believed to be very convenient because of the wider range of products available online, and it is also often perceived as less expensive than in the traditional brick-and-mortar stores. Regarding the grocery e-shopping the above factors are perceived differently which makes it less convenient in the participants beliefs. The range of products is perceived to be the same or sometimes even less than in traditional grocery stores, and the prices are believed to be at least the same or even higher, especially in the case of dinner solutions. Moreover, all the participants in all focus groups agreed about easy accessibility of the traditional grocery stores. Many of the participants claimed to have several traditional grocery stores in the proximity. The time saving aspect of grocery e-shopping was only mentioned to be hypothetically convenient for those consumers who live at a long distance from traditional grocery stores. Almost all the participants in all focus groups do not believe that they save time buying groceries online.

It will probably take more time for me to open the webpage and try to find necessary items than to go to ICA on my way home from work.

One more issue linked to the convenience of e-shopping was discussed in some focus groups, namely, payment issues. Some of the participants, especially in the Group 1, expressed distrust to the payment methods of e-commerce. They were unwilling to often give away the details of their

[2] A Swedish online vendor offering ready dinner solutions
[3] A Swedish grocery chain

payment cards in fear these to be used in an illegal way leading to negative consequences.

One belief which was uncovered in the focus groups' discussions of e-grocery shopping convenience concerns impulse shopping. Some participants believed that this way of purchasing grocery can potentially eliminate impulse buying. This is perceived to be positive and possible due to the shopping lists. When buying online one is usually believed to follow a certain list of necessary items, either a one-time list or a weekly list of repetitive shopping items which are bought every time without updating, such as milk, bread etc. The fact that a customer does not need to physically be in the store reduces sudden desire and chances to buy unplanned goods. This is how one participant expressed it:

When you are walking in the store or waiting at the cashier you just grab a chocolate bar or chewing gum which you actually don't even plan to buy. Buying things online is more systematic and planned.

Attitudes towards delivery

The results show that focus groups' participants experienced different types of parcel delivery. Among participants' discussions two types of delivery can be distinguished: self-pick up and home delivery. Here we present participants responses analysed based on the perceived usefulness and ease of use of both types of parcel delivery.

The perceived usefulness of delivery

Type of delivery

Participants expressed different types of beliefs regarding parcel delivery. Many participants, especially in the Group 1 prefer self-pick up option over home delivery. They explained this preference by convenience and accessibility of the service places for self-pick up of goods ordered online. Moreover, delivery to the service places, which are usually grocery stores, is seen as a traditional practice and a habit for getting online purchased goods delivered. When buying online participants expected that they would get their orders delivered to the closest service place which is

usually in a walking distance from their home.

Another group of participants clearly regard home delivery as a preferable type of parcel delivery. They perceive home delivery as the most useful way to get goods delivered because of enhanced convenience of this option in comparison with self-pick up. The interesting observation is that this option was preferred if all other conditions, especially delivery price was the same. Another interesting observation was that participants who preferred home delivery over self-pick up typically resided a longer distance from central town and were employed working away from home day time, meaning that they were not home to receive parcels during day time.

One more interesting fact about parcel delivery is that all participants strongly link the type of delivery to the type of parcel or goods that are to be delivered. Namely, small packages are almost always preferred to be delivered into the mail box by unattended home delivery. Big parcels, such as home electronics are logically being expected to be delivered home by attended home delivery. All other parcels which are too big for mail box and can be picked up in a service place are typically preferred to be collected at a service point. One exception was noticed to be made for grocery. In case of buying grocery online home delivery was the most useful way to get it delivered due to the perishability of the goods and urgency to get them. This belief was expressed in many cases hypothetically as almost none of the participants were engaged in grocery online shopping at the moment when the focus group interviews were conducted.

Price

Price was one of the most discussed issues about parcel delivery. Generally, all participants expressed high price sensitivity. In all focus groups the majority would choose the cheapest alternative for delivery when buying online, which is often delivery to a service place for self-pick up. A free delivery option was much appreciated and often expected especially in the situation when many e-commerce actors offer such delivery. This is how one participant expressed it:

The best delivery for me is home, quick and free of charge.

Interesting to notice that price in many cases is perceived as determinant factor when choosing

between different modes of delivery. Some participants claimed that they would choose home delivery more often if the price is the same as for pick-up option.

Regarding online grocery shopping many participants believe that the price for home delivery is too high and does not justify the convenience of buying grocery online. The price for grocery home delivery of 129 SEK (about 13 Euro) was discussed in the focus groups based on the price offered by ICA, the main grocery omni-channel actor on Borlänge market. Many participants expressed preferences to either buy grocery in a traditional way transporting it to home by themselves or to buy online with self-pick up option in the grocery store which is free of charge. The same preferences were exhibited concerning the dinner solutions grocery bags offered by the same actor. The participants would rather pick up the bags in the physical store and transport them home than to pay for home delivery.

One very interesting observation is that in case of ecological local produce such as locally produced meat and vegetables the majority of the participants in all focus groups expressed totally opposed beliefs. Almost all of them are willing to pay extra for delivery of such products. This is explained by the fact that the local produce is not available in traditional grocery stores. The smaller local producers, farmers and hunters usually have it difficult to deal with grocery chains but are believed to offer products of superior quality: fresh, ecological and in relatively limited quantities. All participants regardless of age showed almost unanimous interest in such products. Linked with the inaccessibility of local produce in the traditional stores the participants are willing to order it online and have it delivered home. The participants also expressed willingness to pay for such delivery. This willingness was not only explained by the fact that home delivery was the only way to get such goods but also by the willingness to support the local producers, farmers and hunters.

The participants were also asked to discuss the value of flexibility of parcel delivery and the willingness to pay for such services. Questions like delivery to the different places such as work, sport club or school where people usually spend much time were discussed. The participants' responses diverged into two groups. One group of the participants generally perceived the service attractive and were interested to have an extra possibility for the parcel delivery. The willingness to pay for such service is however low. The participants are not ready to pay extra for such

value-added delivery option. Another group of participants did not find this service attractive regardless of the price. They showed, even if it does not cost more than the traditional delivery, no interest to have their parcels delivered to places other than home or service place for self-pick up. Especially for grocery delivery other places than home or a pick-up station in a grocery store were not perceived as appropriate again because of perishability of the goods. Here it is the expression of one participant:

If I order grocery such as milk and meat I would really like to get them direct home to be able to put them in the fridge. It is no idea to deliver them to my work where I don't have such possibility.

Time saving

Interestingly, many participants didn't discuss time saving of home delivery as a useful option. Picking up parcels is not generally perceived as time consuming activity due to the fact that service places for most participants are situated in walking distance and are the places which participants visit almost every day for other reasons, such as grocery shopping or petrol refilling.

Some participants mentioned though that getting parcels delivered to them, for example home or at work could potentially save their time. But two reasons were mentioned which can potentially reduce the usefulness of such delivery, higher price and necessity to negotiate the conditions for such delivery.

Flexibility

Flexibility was discussed as a factor which is perceived important for parcel delivery. Flexibility was generally understood as a possibility to choose between different types of delivery, the more options available to choose between, the more positive participants perceive the delivery. Between different options the participants discussed self-pick up, home delivery and delivery to different places. Technological innovations, such as using mobile phones and possibility to track the parcel were also discussed as useful. The matter of price was an issue raised in these discussions also. Though the participants appreciate the choice of different types of delivery many were mostly inclined to choose the cheapest one. Those who are willing to pay more discussed that the price

difference should not varied much between the cheapest options and the alternatives, showing high price sensitivity in connection to delivery options.

Flexibility was also discussed as a possibility to choose the most convenient place for self-pick up of the parcel. The participants appreciated to have a choice of places where the parcel is delivered. Sometimes, it is more useful to pick up the parcel at a place in walk distance from home and sometimes at a place closer to the work or somewhere else.

The perceived ease of use of delivery:

Time windows

When discussing different types of parcel delivery many participants named inconvenient time windows for home delivery as a disadvantage. The participants would like to choose between different options for home delivery themselves and not be assigned a particular time by the delivery company. This is how one participant put it:

I bought tyres online and the only time they could deliver them was on Wednesday between 10 and 16. I stayed at home and the tyres arrived in the evening. Couldn't they tell me from the beginning, or at least have shorter time window, so I didn't need to take the whole day off from work?!

No one at home

Some participants mentioned "no one at home" situation when delivery arrives to the resident address finding nobody at home to receive the parcel. This situation is perceived as a disadvantage for home delivery and one more argument for the self-pick up option.

I don't need to sit and wait at home for the delivery when I can decide myself when it suits me better to pick up the parcel. Sometimes I'm not even at home to get the delivery.

Some participants didn't though perceive this situation as problematic in case the delivery company can notify about the delivery time in advance.

If I have a call from the courier to say 20 - 30 minutes before the delivery I can just take my bike and go home from the work to get the parcel.

Another disadvantage of "no one home" was discussed in connection to the delivery company policies in such situation, namely if the parcel is left at the door/stairs, at a service point for later self-pick up or will be again delivered to the residential address later. Different opinions were expressed regarding this point. Some participants would like the parcel to be left in the post box which is not always possible with the lager parcels and the type of post boxes people have. The majority of the participants do not want parcels to be left at the door unguarded due to the potential risk of theft.

Returns

Discussions about returns revealed the following three results. Firstly, some participants avoid returns when buying online due to the inconveniences related to the price for return, filling in return papers and transporting the return parcels to the post service point.

I never returned anything I bought online. Even if it's something wrong with the goods I feel it's too complicated to return it back.

Secondly, returns are often perceived to be free of charge for the customers and should be paid by the seller.

When I buy online I always check the return policy. It should be free of charge.

Thirdly, the process of returning of online bought goods is perceived almost the same as delivery process. The majority of participants prefer going to the service point to return the goods. They see some advantages though if the parcel could be returned directly to the courier coming to the residential address but are not ready to pay extra for such service.

6. Concluding discussion

The focus groups were recruited in Borlänge being the Swedish demonstration site for SAILOR. The choice of Borlänge drew on several earlier studies that have exploited that Borlänge (and the region Dalarna where Borlänge is centrally situated) mimics the Swedish e-commerce market overall (see e.g. Carling et al (2012; 2013a; 2013b; 2015; 2017) and Zhao et al (2017)). However, before discussing the findings of this study it is useful to recognize the setting for e-commerce in Borlänge (and Sweden) as it differs substantially from the European urban situation. In the focus sessions the discussion evolved around the current situation with e-tailed goods being delivered foremost to pick-up points for the consumer's own transport of the last-mile. The discussion concerned the alternative of delivery to home or another location of the consumer's choice. Consider the Netherlands as a contrasting e-commerce market where Weltevreden and Rotem-Mindali (2009) report that Dutch consumers receive 1-2 percent of the parcels to a pick-up point instead almost all parcels are delivered to their homes. One important cost driver for last mile is the delivery density as discussed by Somers (2014). The population density of the Netherlands compared with Dalarna is about 50 times higher which explains a greater occurrence of direct parcel handover to consumers in the Netherlands. Moreover and specific to the grocery market, there are five major food store chains present in Borlänge of which a few offers e-commerce of food stuff and home delivery at a high price (about 12 Euros), where the price is high due to poor economy of scale. Hence, the discussion here concerns consumers in low-density peri-urban and rural settings.

The respondents had a general, favourable attitude to e-commerce, while the attitude towards e-shopping of grocery varied by the age of the respondents with a more positive attitude of the younger respondents. The younger respondents were also more positive towards flexible, smart and sustainable delivery although the willingness-to-pay was modest. However, the respondents were broadly positive to e-shopping and flexible delivery of local produce that was perceived to be inaccessible in existing grocery stores.

Hence, there seems to be an opportunity to make use of the consumers' desire for local produce and integrate it with the supply chain of either the parcel delivery companies, the actors on the local

produce market or the existing grocery chains. The latter could for instance explore the idea of including local produce in their e-grocery offer and thereby exploit a higher willingness-to-pay for last-mile delivery which would lead to a better economy-of-scale in regards to both order-picking and a higher delivery density.

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References

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In Kuhl & Beckman (Eds.). *Action-control: from cognition to behavior* (pp.11-39). Heidelberg: Springer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211.

Al-Debei, M. M., Akroush, M. N., & Ashouri, M. I. (2015). Consumer attitudes towards online shopping. *Internet Research*, *25*(5), 707-733.

Amico, M., Hadjidimitriou, S. (2012). Innovative logistics model and containers solution for efficient last mile delivery. Procedia-Social and Behavioral Sciences, vol. 48, 2012, pp. 1505-1514.

Andrews, R. L., & Currim, I. S. (2004). Behavioural differences between consumers attracted to shopping online versus traditional supermarkets: implications for enterprise design and marketing strategy. *International Journal of Internet Marketing and Advertising*, *1*(1), 38-61.

Anesbury, Z., Nenycz-Thiel, M., Dawes, J., & Kennedy, R. (2016). How do shoppers behave online? An observational study of online grocery shopping. *Journal of Consumer Behaviour*, *15*(3), 261-270.

Barclays (2014). *The last mile*. Retrieved from https://www.home.barclays/content/dam/barclayspublic/docs/BarclaysNews/2014/September/the-last-mile-report.pdf

Becerra, E. P., & Korgaonkar, P. K. (2011). Effects of trust beliefs on consumers' online intentions. *European Journal of Marketing*, *45*(6), 936-962.

Broekhuizen, T., & Huizingh, E. K. (2009). Online purchase determinants: Is their effect moderated

by direct experience?. *Management Research News*, *32*(5), 440-457.

Boyer, K. K., Prud'homme, A. M. and Chung, W. (2009). The Last Mile Challenge: Evaluating the effects of Customer Density and DeliveryWindow Patterns. Journal of Business Logistics, 30(1), 185–199.

Carling, K, Mengjie, H, & J, Håkansson, (2012). Does Euclidean distance work well when the p-median model is applied in rural areas? *Annals of Operations Research*, 201, 83-97.

Carling, K, Håkansson, J, & Jia, T, (2013a). Out-of-town shopping and its induced CO2-emissions. *Journal of Retailing and Consumer Services*, 20(4), 382-388.

Carling, K, Håkansson, J, & Rudholm, N, (2013b). Optimal retail location and CO2 emissions. *Applied Economics letters*, 20(14), 1357-1361.

Carling, K, Han, M, Håkansson, J, Meng, X, & Rudholm, N, (2015). CO2-emissions induced by online and brick-and-mortar retailing. *Transportation Research D*, 40, 28-42.

Carling, K, Meng, X, Håkansson, J & Rudholm, N, (2017). The effect on CO2 emissions of taxing truck distance in retail transports. *Transportation Research Part A*, 97, 47-54.

Chen, M. Y., & Teng, C. I. (2013). A comprehensive model of the effects of online store image on purchase intention in an e-commerce environment. *Electronic Commerce Research*, *13*(1), 1-23.

Chu, J., Arce-Urriza, M., Cebollada-Calvo, J. J., & Chintagunta, P. K. (2010). An empirical analysis of shopping behavior across online and offline channels for grocery products: the moderating effects of household and product characteristics. *Journal of Interactive Marketing*, *24*(4), 251-268.

Copenhagen economics (2013). E-commerce and delivery. Retrieved from https://www.copenhageneconomics.com/dyn/resources/Publication/publicationPDF/8/238/0/E-commerce-and-delivery.pdf

Crowley, G. H., & Gilreath, C. L. (2002). Probing user perceptions of service quality: using focus groups to enhance quantitative surveys. *Performance Measurement and Metrics*, *3*(2), 78-84.

Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35, 982–1003.

Degeratu, A. M., Rangaswamy, A., & Wu, J. (2000). Consumer choice behavior in online and traditional supermarkets: The effects of brand name, price, and other search attributes. *International Journal of research in Marketing*, *17*(1), 55-78.

Denscombe, M. (2014). *The good research guide: for small-scale social research projects*.

McGraw-Hill Education (UK).

van Duin, J.H.R., de Goffau, W., Wiegmans, B., & Tavasszy, L.A. (2015), Improving home delivery efficiency by using principles of address intelligence for b2c deliveries, Proceedings International Conference on City Logistics 2015.

Ecommerce Europe (2017, December 06). European Ecommerce Report 2017. Retrieved from https://www.ecommerce-europe.eu/press-item/european-ecommerce-report-2017-released-ecommerce-continues-prosper-europe-markets-grow-different-speeds/

Edwards, J. B., McKinnon, A. C., and Cullinane, S. L. (2010). Comparative analysis of the carbon footprints of conventional and online retailing: A "last mile" perspective. International Journal of Physical Distribution and Logistics Management, 40(1/2), 103-123.

Guiffrida, A. L., and Nagi, R. (2006). Cost characterizations of supply chain delivery performance. International Journal of Production Economics, 102(1), 22-36.

Ha, S., & Stoel, L. (2009). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of Business Research*, *62*(5), 565-571.

Hand, C., Dall'Olmo Riley, F., Harris, P., Singh, J., & Rettie, R. (2009). Online grocery shopping: The influence of situational factors. *European Journal of Marketing*, *43*(9/10), 1205-1219.

Hansen, T. (2008). Consumer values, the theory of planned behaviour and online grocery shopping. *International Journal of Consumer Studies*, *32*(2), 128-137.

Hansen, T., Jensen, J. M., & Solgaard, H. S. (2004). Predicting online grocery buying intention: a comparison of the theory of reasoned action and the theory of planned behavior. *International Journal of Information Management*, *24*(6), 539-550.

Hollywood, L., Wells, L., Armstrong, G., & Farley, H. (2013). Thinking outside the carton: attitudes towards milk packaging. *British Food Journal*, *115*(6), 899-912.

Huang, Y., & Oppewal, H. (2006). Why consumers hesitate to shop online: An experimental choice analysis of grocery shopping and the role of delivery fees. *International Journal of Retail & Distribution Management*, *34*(4/5), 334-353.

Huseynov, F., & Yıldırım, S. Ö. (2016). Behavioral issues in B2C E-commerce: The-state-of-the-art. *Information Development*, *32*(5).

Ingham, J., Cadieux, J., & Berrada, A. M. (2015). e-Shopping acceptance: A qualitative and meta-analytic review. *Information & Management*, *52*(1), 44-60.

Internet World Stats (2017, November 25). Internet usage statistics. Retrieved from http://www.internetworldstats.com/stats.htm

Kantar Worlpanel (2016). *Global e-commerce grocery market has grown*. Retrieved from

https://www.kantarworldpanel.com/global/News/Global-e-commerce-grocery-market-has-grown-15-to-48bn

Krueger, R. A., & Casey, M. A. (2015). *Focus groups: A practical guide for applied research* (5. [updat] ed.). Thousand Oaks, Calif: Sage Publications.

Lantz, B., & Hjort, K. (2013). Real e-customer behavioural responses to free delivery and free returns. *Electronic Commerce Research*, *13*(2), 183-198.

Lewis, M. (2006). The effect of shipping fees on customer acquisition, customer retention, and purchase quantities. *Journal of Retailing*, *82*(1), 13-23.

Lin, H. F. (2008). Predicting consumer intentions to shop online: An empirical test of competing theories. *Electronic Commerce Research and Applications*, *6*(4), 433-442.

McCole, P., Ramsey, E., & Williams, J. (2010). Trust considerations on attitudes towards online purchasing: The moderating effect of privacy and security concerns. *Journal of Business Research*, *63*(9), 1018-1024.

McLeod, F. and Cherrett, T.J. (2006), Optimising vehicles undertaking waste collection,Final report for the Department for Transport, London, unpublished, September.

Morganosky, M. A., & Cude, B. J. (2000). Consumer response to online grocery shopping. *International Journal of Retail & Distribution Management*, *28*(1), 17-26.

Nanry, W. P., and Wesley Barnes, J. (2000). Solving the pickup and delivery problem with time windows using reactive tabu search. *Transportation Research Part B: Methodological*, 34(2), 107-121.

Nocella, G., Romano, D., & Stefani, G. (2014). Consumers' attitudes, trust and willingness to pay for food information. *International journal of consumer studies*, *38*(2), 153-165.

Olsmats, C., Nilsson, B. & Pousette, S. (2015). Perceptions of Sustainability and Functional Aspects on Liquid Carton Board Packaging Materials versus Competing Materials for Juice Applications in Sweden. *Beverages* 1(3), 194-203

Petersen, J. A., & Kumar, V. (2010). Can product returns make you money?. *MIT Sloan Management Review*, *51*(3), 84-89.

Postnord (2017). *E-handeln I Norden 2017*. Stockholm

Pronello, C., & Rappazzo, V. (2014). Road pricing: How people perceive a hypothetical introduction. The case of Lyon. *Transport Policy, 36*, 192-205.

Raijas, A. (2002). The consumer benefits and problems in the electronic grocery store. *Journal of Retailing and Consumer Services, 9*(2), 107-113.

Ramus, K., & Asger Nielsen, N. (2005). Online grocery retailing: What do consumers think? *Internet Research, 15*(3), 335-352.

Somers, A (2014). Effects of e-commerce on the value chain: conquering the last mile. KU Leuven.

Statista (2017, November 25). Retail e-commerce sales worldwide from 2014 to 2021. Retrieved from https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/

Svensk Digital Handel (2017). *Livsmedelshandeln på nätet väntas växa med rekordstarka 1,7 miljarder kronor under 2017*. Retrieved from https://dhandel.se/wp-content/uploads/2017/09/dgital-mathandel-prognos-2017.pdf

Vanelslander, T., Deketele, L., and Van Hove, D. (2013). Commonly used e-commerce supply chains for fast moving consumer goods: comparison and suggestions for improvement. International Journal of Logistics Research and Applications, 16(3), 243-256.

Wang, X., and Regan, A. C. (2002). Local truckload pickup and delivery with hard time window constraints. Transportation Research Part B: Methodological, 36(2), 97-112.

Weltevreden, J W J and Rotem-Mindali, O, (2009). Mobility effects of b2c and c2c e-commerce in the Netherlands: a quantitative assessment. *Journal of Transport Geography*, 17, 83-92.

Wilson-Jeanselme, M., & Reynolds, J. (2006). Understanding shoppers' expectations of online grocery retailing. *International Journal of Retail & Distribution Management, 34*(7), 529-540.

Xu, M., Ferrand, B., & Roberts, M. (2008). The last mile of e-commerce–unattended delivery from the consumers and eTailers' perspectives. *International Journal of Electronic Marketing and Retailing, 2*(1), 20-38.

Zhao, X., Carling, K, & Håkansson, J, (2017). Residential planning, driver mobility and CO2 emission: A microscopic look at Borlänge in Sweden. *European Planning Studies*, 25(9), 1597-1614.