

**Erasmus University Rotterdam**

Erasmus School of Economics

Bachelor Thesis Urban, Port and Transport Economics

**THE IMPACT OF  
E-COMMERCE ON THE  
SUPPLY CHAIN**

Name: Christian Poort

Student ID number: 360135

Supervisor: Guiliano Mingardo

Date final version: 16-07-2017

## **Preface**

The amount of freight traffic and trucks that can be seen on the roads nowadays and the traffic jams that are the result of this are problems I'm interested in. Also the rising knowledge of environmental issues caused by transport is interesting me problems. Especially, the way things are transported and the efficiency gains within supply chains where the reason to subscribe me for the minor and major of Urban, Port and Transport Economics and was also for me a conformation of the interest. The rising trend of E-commerce and speed of transport and delivery was decisive to me to research the subject about the effects of E-commerce on transport. This thesis is a final work of three years of the Bachelor Economics and Business Economics at the Erasmus University where I learned many things that are being used in this thesis. I would like to thank the company of Tuunte that cooperated with the interview and the discussion that I was able to have with them about this subject and the implications of my research. Also thanks to my supervisor G. Mingardo that helped me to define the research better and helped me to refine this thesis in total. I also want to thank my friends, girlfriend and family for supporting me and to discuss with them about the subject in order to define the structure of the thesis more clearly.

Christian Poort,

Rotterdam, 22 June 2017

## **Abstract**

This thesis is researching the impact of E-commerce on the supply chain of suppliers, mainly of companies that are distributing packages. The rising trend of E-commerce leads to a changing customer buying behaviour from physical stores to online stores and so creates more demand of the delivery of goods and packages delivered by distributing companies. The more service orientated way of buying and delivery is having its impact on transport but also on the design and impact of distribution centres. Distribution centres have to be located more efficient around the country, but also the role of the distribution centres is becoming more important because of the services that suppliers want to realize to their customers. The role of transporting companies is becoming more important within the supply chain of producing companies because of the growing size of the amount of deliveries due to E-commerce. Innovations are needed in order to handle the growing size of the delivery market and the negative externalities it produces. Most suppliers in the retail sector want to create a sustainable supply chain, the role of transport companies is becoming more important as ever due to the impact of E-commerce. The impact of E-commerce on the supply chain is significantly, not only for transport economics with their future ways of delivery and effects on transport. The design of the future cities and the localization of distribution centres are also having impact on urban economics.

## Table of contents

<b>Preface.....</b>	<b>2</b>
<b>Abstract.....</b>	<b>3</b>
<b>Table of contents.....</b>	<b>4</b>
<b>1. Introduction.....</b>	<b>5</b>
<b>2. Changing consumer behaviour due to e-commerce.....</b>	<b>10</b>
<b>3. The effects of e-commerce to distribution centres.....</b>	<b>17</b>
<b>4. Effects of rising distribution pressure to transportation.....</b>	<b>23</b>
<b>5. Innovations and trends in supply chain management.....</b>	<b>29</b>
<b>6. The changing role of transport companies within the supply chain.....</b>	<b>34</b>
<b>Conclusions and Discussion.....</b>	<b>38</b>
<b>Appendix: Case Study Interview.....</b>	<b>42</b>
<b>Reference List.....</b>	<b>47</b>

## 1. INTRODUCTION

### **Problem statement**

Distribution of goods, the logistic process and transportation of a product and the process of getting products from producer to the end consumer is a business where speed, money and time are important factors to maximize profits and customer satisfaction. In order to handle goods in a profitable and proper way, a supply chain needs to be created in which products are handled from the raw material to the final product. The way a supply chain is organised and used is called supply chain management. Earlier research defined multiple definitions of supply chain management but Martin Christopher, a well-known researcher in the field of supply chain management and logistics, defined supply chain management as: "The management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole"(M. Christopher, 2016). This definition is according to the literature the most appropriate one and so this one is used in this thesis to define the term supply chain management. The way the supply chain is designed is an interesting question and can be done by one company as a whole or it can be outsourced by all kind of logistic and transportation companies. Products can be transported to multiple different distribution centres or just to one large distribution centre but products can also be stored temporarily at certain storages and from there distributed as soon as possible to the final stage of the supply chain. All these factors and answers on these questions are having effect on the supply chain and the way a product is travelling from producer to the end consumer. There are a lot of ways a company can design its supply chain in the best order for the company to run their business and these designs have another effect to the end consumer.

The Internet is in the last decade an upcoming platform that is used by billions of people worldwide to interact and communicate with each other sociable as well as business like. Online shopping is seen as a way of shopping that is easy and clear for the customer to buy products in the most efficient way (Jiang, Yang, & Jun, 2013). When people shop online they obtain a lot of information very clear,

## The impact of E-commerce on the supply chain

they don't have issues like parking and they need less time for shopping activities. The minimisation of costs and effort is contributing to a better convenience to the customers and so increases customer value as a whole (Jiang et al., 2013). With the rising trend in the use of Internet there are also a lot of business created online (CBS, 2016). The amount of business taking place on the Internet is well noticeable and the web shops on the Internet are gradually overtaking the physical stores at the cities (Ploeg, 2015). If this online trend will continue and most products will be bought online this will have a major impact on the way goods are distributed and so it means that the supply chain needs to be organised in a different way.

The supply chain is slowly changing due to the changing buying behaviour of customers from physical shops to the online web shops (CBS, 2016). Online shopping is causing a shift in the way the supply chain is designed and the way in which products are being distributed. Due to online shopping is the diversity in the supply of goods much wider and the prices are becoming lower because of increased competition and low entry barriers. The end consumer has access to the widest range of products for the best price, but thanks to the rising competition of online stores there is much more than only price and quality on which can be competed. Online stores are also trying to maximize customer loyalty and customer satisfaction by the way the products are being delivered. Speed is an important aspect in the delivery of products shopped online and is also a way of producers to market their product. Transporting companies are usually nowadays already delivering the next day at your own place for free after a product is ordered. It is becoming the norm procedure for customers that shop online and it's also an important factor in the expectations of consumers and customer value. Online shopping ensures a fast delivery and this leads to a rising pressure on the management of the supply chain. Distribution centres of large companies are getting larger and centralized in the market because of increasing economies of scale and efficiency benefits (Daalhuisen, 2016). The logistic process will get more and more complex and supply chain management is getting a term that will become more and more important for companies due to the more service-orientated way of distribution of producers.

## The impact of E-commerce on the supply chain

In the future will supply chains be organised in different ways as the traditional ones we use nowadays where multiple brands have their own supply chain from the raw material to the manufactory than up to the distribution centres and finally end up at the retail shops. A lot of the process can be optimized when everything is shopped online and this can be accomplished by improved technology. First of all there will vanish a link in the old supply chain because the distribution centre will take over services of the retail shop due to the change in the shopping behaviour from the physical stores to the online stores. Distribution can be done more efficiently when products are shipped directly from the distribution centre to the end consumer and this could increase profits. The transportation of goods in multiple loads will increase drastically but will end up in a more efficient distribution of products. The distribution centres will probably handle less trucks and more small vehicles that will deliver to the consumers in the cities. The rising distribution could also have negative externalities because it will increase the amount of vehicles on the road and so also all other externalities that are linked to increased road usage will rise.

### **Aim and research question**

E-commerce changed the customer buying behaviour significantly in the last years due to the rising trend of the use of the Internet and the trend of aggressive marketing and online selling techniques. Producers are investing a lot in those new channels to sell their products to customers and market their products more by using the Internet and social media as ways to improve their sales. Most of the people in Europe have access to an internet connection and a big share of those people are also purchasing items online (CBS, 2016). In the last decade the amount of people that shop online is doubled and also the amount spent on products bought online is increased significantly. Nowadays there is the possibility to buy almost everything online due to the diversity and the amount of web shops that offer you everything you want for the right price delivered mostly the next day after you order a product for free of affordable prices. The question that arises is: *“what is the effect of the rising trend of E-commerce and fast delivery to the supply chain”* especially for the distribution of the products? This thesis will focus on Internet retailing and the consumers of goods from

## The impact of E-commerce on the supply chain

businesses to consumers (B2C) and not on services because they don't have a movement of physical goods that causes logistical problems.

The main question is answered by investigating multiple sub questions about the subject. First we need to know why E-commerce is a rising trend and what key elements are for people to shop online. Next is investigated what the effects of E-commerce are on the distribution process within the distribution centres and what is changing due to increasing sales and longer opening hours. Also the effect of transportation should be investigated because it plays a major role in the total effect that E-commerce has on the supply chain. Another question that arises is what the future innovations are within this subject to provide a solution to the negative effects of the risen transportation and distribution. At the end I will look to which link within the supply chain can be optimised within the process of delivery to obtain the best distribution of goods.

### **Methodology**

This thesis will research the main question by answering multiple sub questions about the main subject by reviewing existing literature. Every chapter in this thesis is based on a sub question and so all chapters are contributing to answer the main question. The literature is mostly found in scientific articles retrieved from magazines on the Internet about transport and supply chain management, accessed by the university library. The topic is widely discussed and so I will also use multiple newspapers and reports in order to stay updated and to review the latest trends and discussions about the subject. After discussing and reviewing the literature I discussed the main findings of the literature with a manager of a clothing company about the delivery. The interview is included in the appendix and was interesting because I was able to discuss about the future delivery possibilities of a change in the existing supply chain for the company.

### **Structure of the thesis**

The thesis started with the introduction and is followed by a chapter about the change in the customer behaviour and why e-commerce is a rising trend. The following chapter will describe the effects of e-commerce on the distribution



## The impact of E-commerce on the supply chain

centres within the supply chain. The next chapter will look to the effects on transportation because of the rising amount of deliveries of goods to the end consumer. The fifth chapter will look to future innovations and trends in the sector in order to discuss possible changes for the supply chain in order to become sustainable. The consecutive chapter will discuss the changing role of transport companies within the supply chain and investigates the effects of this to the distribution of products. Subsequently, this thesis will end with a conclusion of the main question that can be answered by the sub questions and a discussion will end in which shortcomings to this research are discussed. Furthermore, a discussion is presented in the appendix in which an interview is presented with a manager of a clothing company. The interview and discussion are added to obtain some practical information related to this subject.

## **2. CHANGING CONSUMER BUYING BEHAVIOUR DUE TO E-COMMERCE**

In this chapter is the changing effect of consumer buying behaviour due to E-commerce being discussed. The Internet caused a change in the market of retail as a whole extremely and has a large effect on the way people are buying their goods and the way that they are attracted to retail shops. Online shopping resulted in a lot of changes in buying and obtaining of goods by people and so the Internet had a large effect on the consumer buying behaviour. Customers are able to order their product from home and nowadays from everywhere because of the mobile Internet and this is causing a lot of simplicity for the consumers but problems for logistics services suppliers. Also the fast home delivery is an important driver in the buying behaviour of the online stores in comparison with the physical stores. The reason of the change in buying behaviour is important to investigate in order to see what factors are important for the change of supply chains.

### **Busy people**

People are busy nowadays and already have less time for all of their activities so they allocate less time for shopping and more to other things in their already decreased leisure time that's left (Golicic, Davis, McCarthy, & Mentzer, 2002). The online stores are using the importance of time in their advantage and created web sites where people are able to search for the goods they are searching for in less time as when they shop them at the physical stores. In real life customers have to search for their goods around a lot of different stores and within those stores at different paths and so the searching process is causing a lot of time that is wasted by the customers. Web shops are providing a shopping environment where customers can shop with limited time. The fact that leisure time is nowadays more important and consumers want to allocate their time more efficient than before results in more people that are searching for more efficient ways of shopping (Lancioni, Smith, & Oliva, 2000). The Internet convinces the people that allocate less time for shopping and so the shopping

behaviour is changing from the physical stores to the online web stores (Jiang et al., 2013). Most researchers at this topic are mentioning the factor time as an important variable in the changing buying behaviour of customers in to online shopping (Park & Kim, 2010). But the provision of information that customers are asking for in order to get the best buy and the best comparison between shops and items is also an important factor, just like the best information about the delivery (Lancioni et al., 2000). The online retailers are creating an interface on which consumers are able to compare and search for their items in the easiest and fastest way as possible and that results in time saving effort for the consumers.

The rising convenience is a factor that is very important in the reasoning of the shift of the consumer buying behaviour, but also the tendency of busier lives of people with less leisure time is playing a major role in the shift of the consumer buying behaviour (Jiang et al., 2013). The online stores are getting more attention because these shops are open 24 hours a day and 7 days a week and so customers aren't limited to certain kind of opening hours to shop their products. People nowadays are having busy lives with a lot of things they like to do and so they obtain more value to their leisure time as time for shopping (Kraaijeveld, 2015). Most people are also working during the opening hours of the physical stores or they have other obligations in these hours and so they are not able to physically go to the shops during the week. Online shopping is the solution to this problem because the shops are always open and it takes the people less time to obtain the goods they need or want (Close & Kukar-Kinney, 2010).

### **Consumer convenience and experience**

The big difference that always will stay between online web stores and physical stores is that the product cannot be touched, smelled or seen in reality at the online stores. Online stores are investing in the way they provide information to their consumers and when they do so it will contribute to the consumer convenience of the online stores (Jiang et al., 2013). Consumer experience is a factor on which online retailers cannot compete with the physical shops because of the atmosphere at the shop that also creates the consumer experience, at the moment this cannot be created better in online shops than in physical shops

## The impact of E-commerce on the supply chain

because of the limitations of the Internet right now. Consumer convenience is also an important factor to consumers and the online retailers are trying to convince people to buy products online by investing in better consumer convenience. Consumer convenience is affected by factors like price, information searching costs and the accessibility of the store (Jiang et al., 2013). Physical stores are having problems with consumer convenience factors like parking prices, the street image and other external factors like the diversity in shops on which they don't have any influence (Chiu, Wang, Fang, & Huang, 2014). Some of the convenience factors are difficult to change by a single shop at the city street and so that has to be managed by somebody in order to change the customer convenience as a whole for the shopping street. Innovations like searching machines and comparison sites on the Internet resulted in major improvements in the consumer convenience of the web stores (Chiu et al., 2014). Thanks to those sites it is made easier to shop online and to get easy access to all the information you need, also the fact that you don't have to park your car or have to travel to the store is contributing to the consumer convenience. The improved and fast delivery of the products that are being sold online is a major improvement for the consumer convenience and so this contributed in the change of buying behaviour from physical stores to online web sites (Overby & Lee, 2006).

### **IT innovations**

Innovations in technology are important factors in the changing customer buying behaviour. The introduction of the Internet was already an outstanding technology but innovations in IT can have impact on consumer convenience factors. Web shops are getting build in better ways and marketed in such a way that the customers are attracted to the web shops and to the products that are being sold on the web (Joong et al., 2008). Another technological improvement is made by the analytics of the web shops and the personal guidance on web shops on which the producer is getting to know the consumers buying behaviour of its clients (Joong et al., 2008)(Lancioni et al., 2000). Due to this innovation it is possible to see on which searching terms potential customers are searching for at the web, the producers are also able to see what kind of history customers

already have with online shopping behaviour. The data collected from a customer tells a lot about his buying behaviour and so this can be used to promote some products especially for this client. All kinds of marketing techniques can be used with all the information that is collected and they all are used to promote a certain kind of product at a certain kind of supplier in order to try to sell it to you. Suppliers of the online stores are able to see exactly in what kind of products you are interested and so those products will be advertised extra at the web sites you are visiting and so this marketing technique will subconsciously have an impact on you (Joong et al., 2008).

### **Loyalty programmes**

Other techniques like loyalty programmes are used to obtain and maintain the customers that are buying products online. Research showed that multiple factors are influencing the behaviour of online shoppers and their repeated buying behaviour but convenience factors that increase the utilitarian value are the most important ones in repeated buying behaviour (Chiu et al., 2014). The value is created for customers thanks to the high service levels and consumer convenience that customers obtain at the online stores. Better prices, more information and high service levels are resulting in customer loyalty and when all of those factors are given more value at the online shops as in the physical shops it leads to repeated loyalty purchases at the online stores. Online shops are having more utilitarian value in comparison with physical shops because of their high levels of customer convenience and this ensures a more loyal customer that is buying products more often online and is influencing the customer buying behaviour and results in more online purchases (Chiu et al., 2014).

### **Delivery**

Service and fast delivery are very important components for the consumer convenience of online shoppers and are the services that are asking a lot of change in the way products are getting distributed. Nowadays it is already possible and mostly normal to order something online and to get it delivered at your place already the next day or even the same day! The extremely fast delivery of products in online shopping led to a distribution network that has to

be efficient as well organised in order to obtain the fast delivery service and to obtain the extra consumer convenience. More online shopping will lead to more home deliveries and this will have a significant impact on the freight traffic and the road network (Weltevreden, 2008). The distribution by warehouses is changing a lot because of the shift of bulk quantities to the physical stores into a delivery system where all orders are packed and distributed piece by piece (Visser, Nemoto, & Browne, 2014). Delivery at home is a service that is highly appreciated by consumers but is leading to a lot of logistical problems because multiple parties are involved in this logistic process (Visser, Nemoto, & Browne, 2014). Customers are forced to stay at home and this costs them time and money but it also costs the transport companies money when customers aren't at home and the transport company has to come twice. Studies showed that the transport company has to return a second time in about 12% of the deliveries because there was nobody home the first time (IMRG, 2014). Solutions to this problem are delivery at pick up points where people can get their goods at any time they want. Also better information about the delivery could be given will help in order to decrease the number of trips.

### **Return of Goods**

Another important aspect in home delivery is the return of goods. Studies showed that the return service is a very important aspect for online shoppers and their convenience because they can order goods and are allowed to return them for free when the product isn't matching their expectations or when it is broken (IMRG, 2014). The service is great for the consumer convenience but it costs a lot of money for the producers and in about 50% of the deliveries the goods are send back to the producer, especially the large clothing companies like Zalando are having problems with this issue (Kamphuis, 2015). The high return rate is causing also a lot of logistical problems like a lot of packages that arrive back at the distribution centre and they all have to be handled separately to bring them back at their original location in the distribution centre. Returned goods also have to be handled by the administration in order to see if the returned good is actually damaged or if it still can be sold, also information to the customer and return of the money paid is an important issue.

All those steps are creating a lot of handling costs to the producers and results in a lot of money wasted and that's why the large especially clothing online retailers aren't making any profit (van Tellingén, Solarz, & Schaapman, 2016). The large online retailers aren't making the profits they should have to get with online retailing so they have to change their business plans because a lot of people are still buying their goods at the physical stores and returned goods can be thrown away (van Tellingén et al., 2016). Online retailers as Coolblue have already started some physical shops next to their online platform where they collect and sell their returned goods and also obtain market share because they aren't only seen online but also at the streets (PostNL, 2017). More people are believing in the strategy of physical shops next to the online web shops in order to obtain profits in the future design of the supply chain (van Tellingén et al., 2016).

### **From push to pull delivery strategy**

Online retailing is causing a shift in the way how products are being presented to the customers and so the online retailers are promoting their brands and products in a whole different manner as physical retailers (Close & Kukar-Kinney, 2010). Physical retailers are shops at the city streets where people are coming to in order to get the products they need or want and so physical retailers implement a push strategy. A push strategy is used because products are stored at the store and sold from there and in order to sell items the products are pushed from the manufactory to the customer within the supply chain (Chaffey, 2007). E-commerce is leading to another strategy namely the pull strategy where the producer is creating demand for its product and so customers are pulling the product through the supply chain from manufacturer to customer (Chaffey, 2007).

The changing environment for customers from offline to online shops is also changing the way customers are buying their goods and so increased the customer expectations about products and the services that are needed to provide customers with the products (Park & Kim, 2010). Web shops are attracting customers to their shops by the Internet where they can market their

## The impact of E-commerce on the supply chain

products and promote certain kind of products especially for one person. Online shops are also attracting people by their high convenience and services thanks to fast delivery standards and free return shipping of goods where the physical shops are attracting their customers by shopping experience rather than shopping convenience (Chiu et al., 2014). The products that are sold online have to be delivered to the customer his home or to a pick up point because online shops aren't build to have customers picking their item at the producers warehouse and so distribution can be optimised. E-commerce leads to more sales due to the service as the convenience that is provided by the online retailers. Risen delivery of packages leads to another strategy that has to be implemented within the supply chain of the delivery of goods. Attracting customers to web shops and convince them to buy online is playing a key role in the rise of E-commerce.

E-commerce is creating a lot of advantages to consumers. Due to the easy use, time saving effort and personalized marketing it makes E-commerce to the stadium where it is developed till now. Fast and free delivery with clear information is becoming standard and so this has to be implemented in the supply chain of online retailers.



### 3. THE EFFECTS OF E-COMMERCE TO DISTRIBUTION CENTRES

This thesis examines the effect of E-commerce on the supply chain, but in order to examine this first I need to examine the effect of E-commerce on distribution centres to see what the effects in the distribution network are. The conventionally and most globally way of planning a supply chain is that a manufactory is producing a final product with component products from different suppliers. From the manufactory the final goods are shipped to distribution centres and from there they are distributed in smaller quantities to the retailer by transporting companies, finally at the retail shops are products sold separately to the end consumer (Christopher, 2016). This simplified supply chain can be seen below and is a representation of the traditional supply chain. This simplified model of the supply chain is a good representation but in real life it is most likely that there are multiple concerned companies in the supply chain and so there are multiple steps within the chain. This added steps and companies are leading to a more complicated supply chain where the final product will become more expensive because of the handling costs of every company and so finally some companies won't even make profits within the supply chain.



Figure 1: Traditional Supply chain

The rising trend of online shopping leads to less physical stores (Nu.nl, 2014) (Ploeg, 2015) and so the supply chain is changing to a reduced and even more simple one where the final retailer is integrated at the distribution centre (Tseng, Yue, & Taylor, 2005). This results in one step less in the supply chain and it could be said that producers are able to make more profits because of this integration (Golicic et al., 2002). The physical retailer has to pay personnel, hire of the shop, the interior and equipment of the shop and so there are a lot of costs every physical retailer has to pay. When the retailer is online it doesn't have the costs a physical retailer has and so an integration of the supply chain would lead to less costs and expected to have also more profits (Chaffey, 2007).

## The impact of E-commerce on the supply chain



Figure 2: Integrated Supply Chain

Of course is the simplified model shown in figure 2 not a realistic view of the change in the supply chain otherwise every producer will change totally to E-commerce. The representation shows that the retailer and the distribution centre are integrated and this has major effects to the distribution centres of online retailers (Lancioni et al., 2000). The integration is leading to a whole different approach for the distribution centres and so distribution centres have to be organised way different as before (Joong et al., 2008). The physical retailers supply chain had a distribution centre simply said with just receiving goods from the manufacturer than store them and distribute them to the retailers and have a stock at the distribution centre as seen in figure 1. The integrated distribution centres distribute smaller quantities to end consumers and so they need to take over multiple facets of the retailer and this requires a restructuring of the distribution centre (Joong et al., 2008).

### Change in transport

The importance of the transport companies is also growing because of the integrated supply chain. More packages are being sent from the distribution centre directly to the end consumer and so this link in the supply chain is more important as ever before (Lancioni et al., 2000)(Christopher, 2016). Transport companies are profiting from the rising amount of packages that are being sent thanks to E-commerce and this results in more trips and deliveries and induces more profit for the transport companies (Gras, 2016). The transport companies

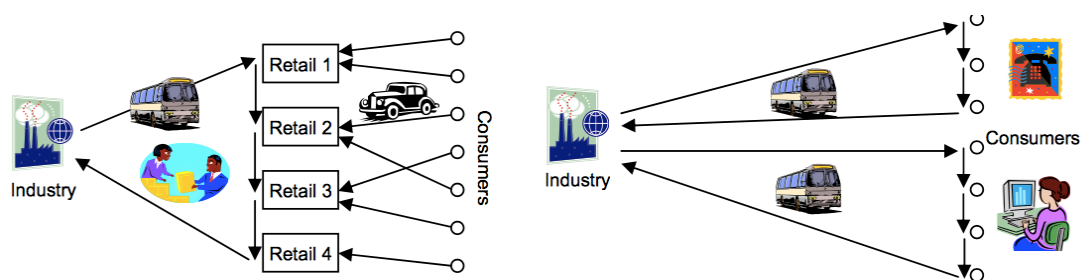


Figure 3: Change in transport (Tseng et al., 2005)

will act like mediators between consumers and industry and so the amount of trips especially by the consumers can decrease because there is no necessity any longer to visit the stores because everything can be ordered online, this can be seen in figure 3 (Tseng et al., 2005). City centres can be designed in whole other ways in the future where stores aren't needed any longer and the city centre could only be used for leisure activities like restaurants and other activities (Schäffeler & Wichser, 2003).

### **Bigger distribution centres**

There are nowadays more and bigger distribution centres than ever before and due to the trend of online retailing the distribution centres have to be located near the end consumer. The distribution centres need more working space in order to store and deliver all of its products because of the wide variety of products in the distribution centres due to E-commerce (Buck, 2015). The fast delivery can be accomplished by an improved network of distribution centres that are well organised throughout the country (Buck, 2015). The distribution centres were first less organised and decentralised located throughout the country. By the arrival of E-commerce and the effects of it this resulted in more centralised locations of distribution centres and so they are able to cover a bigger part of the end consumer market with less distribution centres (Chen & Notteboom, 2012). The relocation of the distribution centres leads to a wider market reach and so a decrease in the amount of distribution centres but result also in a rise in the space they require in order to compete with other producers to obtain maximum customer value in the services they offer (Chen & Notteboom, 2012). The great variety in products causes the distribution centres to get larger because of the diversity and amount of products that are stocked in smaller quantities as before (Joong et al., 2008). This great variety and low stock is causing a more Just-In-Time (JIT) delivery of the manufactory to the distribution centres and so has E-commerce also impact on the manufactory and transportation system in the total supply chain (Chaffey, 2007).

The JIT delivery system is implemented due to the smaller stock at the distribution centres but it is important that this stock can be complemented by the manufactory in a fast way and so the transport frequency between

## The impact of E-commerce on the supply chain

distribution centre and manufactory is increased (Schöder, Ding, & Kucht Campos, 2016). Large distribution centres are needed because of the great variety and the small quantities of products but also the amount of trucks that are being handled by the distribution centres is much higher then before and so the distribution centres are having more loading and unloading docks (Chaffey, 2007). More trucks are delivering final products every day due to the JIT delivery system of the producers and a lot of smaller trucks are leaving the distribution centre to distribute the packages in order to handle the fast delivery service the producer wants to offer.

### **Technology**

Innovations in ICT are not only having impact on the interface and the consumer buying behaviour of the web shops, but it also has a great impact on the distribution centre itself (Rotem-Mindali & Weltevreden, 2013). Online purchases are being processed in the system of the producer immediately and can be picked as fast as possible where it in the past took a while when all orders where collected and communicated between the retail store and distribution centre (Chen & Notteboom, 2012).

Also communication with the customer can be done much faster and easier and so both customer as producer are fully informed about the delivery status of the product and this information creates also extra customer value (Jiang et al., 2013). The stock quantity can also be measured easily by better communication and so the web store is always updated with the distribution centre inventory. Innovations in the manner products are being picked in the warehouse are changing thanks to innovations in machines and robots that are being used more often because of their efficiency and reduction in costs and this results in more autonomic and efficient distribution centres (Neng Chiu, 1995)(Chen & Notteboom, 2012).

### **Returned goods**

As mentioned previously, E-commerce leads to a lot of returned goods and this side effect of E-commerce has also great impact on the distribution centre (Kamphuis, 2015). Returned goods have to be collected and each returned good

has to be approved before it is sorted back into the warehouse. Every single unit also has to be corrected in the administration and this is causing a lot of work and time at the distribution centre. Returned goods that cannot be sold anymore because they are damaged are causing a lot of costs to the producer, which leads to less profits (Weltevreden, 2007). However, providing this service creates a lot of customer value (Chiu et al., 2014) and the fact that free return of goods is incorporated in the law (Rijksoverheid, 2017) is leading to a service for the producers that they just have to deal with in order to be legally active producers.

### **Opening hours**

Online retail shops are open 24 hours and 7 days a week and this accessibility results also in orders that have to be handled in the weekend and at nights for the distribution centres (Joong et al., 2008). The opening hours of online stores and the fast delivery service requires an order picking system that handles and collects orders in the warehouse quickly, this changes the working hours for the employees that collect the orders (Christopher & Towil, 2002). When products can be ordered before 22:00 and still be delivered at home the next day this implicates that order picking employees are needed also at night and so the opening hours of the online stores are also leading to longer operating opening hours of the distribution centres as well.

The order frequency is also changing because products can be ordered throughout the whole day and so the order frequency is unpredictable and leads to inefficiency with order picking (Chen & Notteboom, 2012). Transport companies are mostly not delivering in the weekends and so this distribution centres can be close as well in the weekends but this causes a congestion in the order picking on Mondays and so more people are needed on this day for example (Chen & Notteboom, 2012). Managing of the collection of orders is becoming more important in the distribution centre because of the frequency and amount of orders that have to be collected every day is raised and so is E-commerce leading to longer opening hours for the distribution centres.

### **Value added services**

The distribution centres are facilitating more activities because the retailer is disappearing in the supply chain and ensures that customers are getting their product in the right way. Because the distribution centre is in between the manufactory that delivers large quantities and the customer that only needs low quantities the distribution centre have to repack lots of their items and stock them (Joong et al., 2008). Other value added services like labelling and packaging the items are done by the distribution centre in order to gain more customer value and better delivery status of the final product (Chen & Notteboom, 2012). All of the extra handling and services are leading to a more efficient distribution centre but also a distribution centre where more specific work has to be done in order to deliver final products. The distribution centre is taking over the responsibilities and work of the physical retailers.

Distribution centres have to deal with the changing way of retailing and this leads to more distribution from en to the warehouse. Longer opening hours and provide of more services are effects of E-commerce on distribution centres. The result is that distribution centres are becoming bigger and better localized within the supply chain. Distribution centres of online retailers are playing a key role between supplier and customer.

#### **4. EFFECTS OF RISING DISTRIBUTION PRESSURE TO TRANSPORTATION**

The rising pressure on the distribution system of the supply chain due to the fast delivery service is leading to more than just another design of the distribution centre and the supply chain, it has also multiple effects on the way products are being transported. The effects on transport are important in the total impact that E-commerce has on the supply chain. The logistic process of the delivery of goods from factories to the end consumer is an important process in the entire supply chain and so transport companies are profiting of the fact that more packages are being sent these days due to the internet retailers (Gras, 2016). The rising amount of packages that are being sent has also consequences on the road and transport network worldwide and also on the design of the supply chains as mentioned earlier. It is investigated that there is a correlation between transport and e-commerce because of the fact that more packages are being sent from business to consumers like the internet retailers (B2C) and also from consumers to consumers (C2C) due to sites like marktplaats.nl (Weltevreden, 2007). The amount of transport to the physical stores decreases in the amount of total transport but the relationship between E-commerce and transport stays positive and so there is a positive effect to transport because of E-commerce (Tseng et al., 2005). The relationship is directly leading to more delivered packages, this increase in transportation is leading to more indirect effects to transport and those effects are very diverse. The infrastructure system is used more and the effects of this are having major impact on society nowadays. This chapter will mainly focus on distribution logistics by road and the effects of risen transport to the society as the supply chain with effects that can be as well negative as positive.

##### **Sustainability of the supply chain**

Suppliers try to implement a strategy that is resulting in the lowest cost strategy or obtaining the highest profit possible and so the supply chain needs to be designed in the best way possible and this is for every company different (Christopher, 2016). Suppliers need to invest in new designs of the supply chain

## The impact of E-commerce on the supply chain

and so they need to keep watching for new opportunities and strategies within their transport and delivery design as well. The fast delivery service is mostly outsourced by the large distribution and transportation companies and so these companies also has to innovate in new and more efficient ways of distribution and transportation of the goods in order to compete and design a sustainable supply chain (Schöder et al., 2016). The sustainability that is demanded by the retailers is resulting in more innovative ways of distribution and will so increase efficiency and lower the costs within the design of the supply chain (Visser et al., 2014). Innovations within the supply chain of transport and delivery will be discussed next chapter but is also mentioned now because of the importance of it within transportation and because innovation is needed in order to maintain a sustainable supply chain, especially for the delivery companies that are using the innovative equipment in order to deliver the packages.

### **Growing market transport companies**

Multiple studies showed that more packages are being send because of the rising use of E-commerce and that this results in more single trip deliveries of goods every day instead of bulk deliveries to the physical stores (Tseng et al., 2005)(Weltevreden, 2008)(Visser et al., 2014)(Gras, 2016). The changing transporting structure from a distribution supply chain nowadays to a more outsourced distribution by express delivery companies is causing a shift to delivery companies that are more specialised and that have economies of scale (Joong et al., 2008). The more specialised delivery companies arranging deliveries for multiple suppliers and are so in control of all packages that has to be send and so they are able to optimise the delivery system to all locations. The growing amount of packages that is transported every day is leading to a growing demand in the market for packages that have to be transported and so the delivery companies are also profiting from this rising business that can be seen in the increased profits of the big transportation companies (CBS, 2017). The packages that are being handled by delivery companies are resulting in more efficient trip planning and so in less average costs per package send due to economies of scale and efficient package handling of these companies (Mangiaracina, Marchet, Perotti, & Tumino, 2015). Side effects of this growing



amount of packages is that they all have to be delivered fast and because of the limited space per truck this leads in the short term to more trucks on the roads (Gras, 2016) what will result in some externalities discussed below.

### **Increasing road usage**

The rising amount and volume of the packages send and the limited space in the delivery trucks results in more delivery trucks on the roads that have to deliver the packages (Visser et al., 2014). The JIT delivery system of the transporting companies is calculated on trucks that pick up the packages at the suppliers and than redistribute all of the packages by small vans to all of their delivery points throughout the world. The rising amount of trucks and vans that is being used by the distribution companies can lead to multiple problems to the road network of the country.

First of all, a large part of the road network is already running on full capacity at rush hours these days and due to more vehicles on the road this could end up in a more than full capacity and will so lead to even more traffic jams as now already (Visser et al., 2014)(Hoogendoorn et al., 2016). According to studies at this subject there is concluded that on the long term people will use the car less for shopping activities because everything can be delivered at home and so all shopping trips of customers will end up in a delivery system were trucks are delivering the ordered products in an even more efficient way as when all consumers are going to drive to the physical stores (Visser & Lanzendorf, 2004)(Visser et al., 2014). This effect is also shown in figure 3 in chapter 2 where most transport is done by transporting companies and not by consumers and so results in less single trips and more organised delivery trips (Tseng et al., 2005). So according to this; the rise in E-commerce would result in less private car use in the long term and so less road use of private cars but more of delivery trucks but total road transport will decrease because of E-commerce (Rotem-Mindali & Weltevreden, 2013). This means that online retail will indirectly have an effect on the road usage and so the amount of congestion, this is all because of the more organised delivery design structure of the transporting companies.

E-commerce will also have indirect effect on the mobility choices of the people when it becomes easy to get your goods delivered at home the need of cars will

decrease and so public transport will become more attractable (Rotem-Mindali & Weltevreden, 2013). This could have major impact on the way cities will get designed in the future because of the lack of need of cars any longer. Unfortunately, nowadays is an increase in the amount of vehicles on the road still leading to more congestion (Lalkens, 2016) and so on the short term the effect of E-commerce on the road use and amount of congestion is only negative.

### **Pollution**

Another major negative externality nowadays thanks to the increased amount of deliveries, the increased road usage and the increased amount of vehicles is the extra amount of pollution it adds to the environment (Mangiaracina et al., 2015). The delivery trucks are nowadays still mostly driving on diesel and they are responsible for a major part of the exhaust gasses filled with carbon dioxide and other polluting gasses. The diesel trucks are contributing to the rising amount of pollution that is causing the negative externalities to the environment (Mangiaracina et al., 2015). Diesel trucks and vans are not only polluting more than average cars but they also consume more gasoline and so these cars are contributing more to the rising carbon dioxide emission what is held responsible for the climate change nowadays (Mangiaracina et al., 2015).

Pollution is becoming more important these days and sustainable supply chains are also looking for transportation options that are polluting less to the environment in order to stay and behave their sustainability. Governments are discussing also about this topic heavily nowadays and they are implementing policies in order to restrict the pollution especially within the city centres (Verbeek, 2017). Rotterdam has already introduced a environmental zone (Bogaard & Jansen, 2016) where old diesel cars, that pollute relatively a lot, aren't allowed to the city centre any more. Distribution companies have to cooperate with these policies in there own strategic policy in order to drive their businesses successfully. The increased distribution can contribute to more sustainable ways of transport within the supply chains of suppliers and so they can have a major impact on pollution in the future because the transport sector is responsible for a large amount of the pollution nowadays.

### **Location of distribution centres and city logistics**

Transportation is also effected by the way the distribution centres are designed and located within the distribution network. More and larger distribution centres are needed in order to handle all packages that have to be delivered and so the location of the distribution centres is an important factor within transport and delivery (Buck, 2015). The distribution centres have to be located near the consumers in order to provide the fast delivery service and to perform well within the distribution network and so has the location of the distribution centre within the supply chain effect on transportation as a whole (Tseng et al., 2005). The distances that have to be covered by the delivery trucks will decrease because of multiple distribution locations and this has also effect on the decreased delivery time to the consumer (Mangiaracina et al., 2015). Distribution centres should locate near the big cities in order to handle most of their orders but distribution within the city is asking for another delivery design as that of out of the city (Schäffeler & Wichser, 2003). Within the city are people living closer together and so less kilometres can be driven within the city but parking here is an issue and also emissions are extremely high when constantly driving small distances. Out of the city will the decrease in driving kilometres reduce pollution and road use as well and so do more distribution centres should optimize the transportation network of the delivery companies (Visser et al., 2014). More distribution centres will lead to another way of delivery but it should also have a positive effect on transport pollution and transport road usage.

### **Pick-up points**

Transport is not only done from the distribution centre to people's homes, also some special places are introduced where goods can be picked by customers so called pick-up points (Christopher, 2016). The implementation of these pick-up points is increasing the efficiency of the transport system within the supply chain even more because people can pick up their ordered items in their neighbourhood whenever they want and so they don't have to be at home at a certain time in order to get their product. Delivery companies can also use pick-up points when consumers aren't at home and so they don't have to come twice

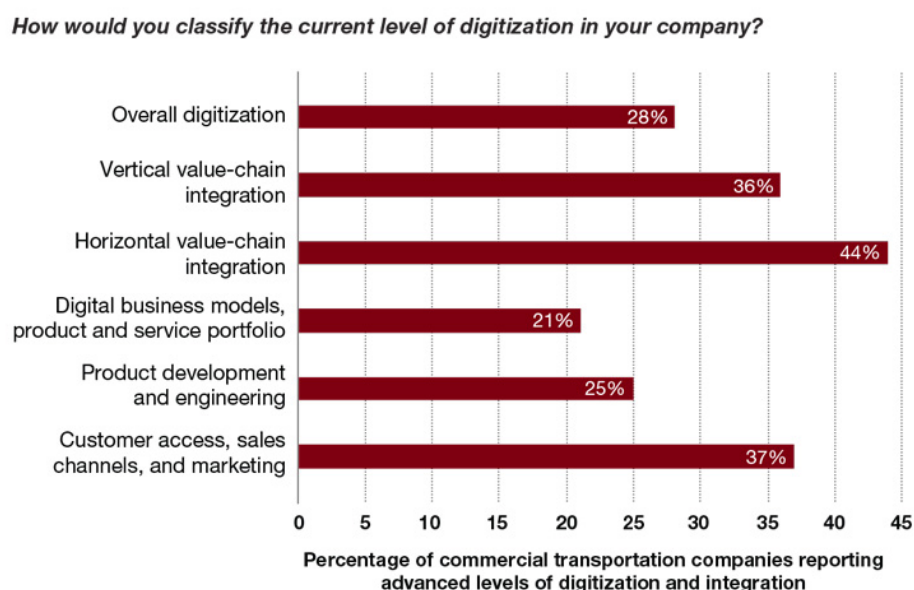
## The impact of E-commerce on the supply chain

to the same address but they can simple drop it at the pick-up point and this will increase transports efficiency and lower its negative externalities. The service is profitable for the delivery company that can bundle the deliveries to one point but the service is also contributing to the consumer convenience because of the wider time span the products can be picked up and the fact that consumers don't have to wait for their product but can pick it up whenever they want (Weltevreden, 2008). For transportation this means that is takes less addresses to deliver to and an even more efficient way of delivery and so has positive effects to transportation.

More transport is the result of more delivery due to E-commerce nowadays. The roads are running on full capacity and so traffic jams and more pollution are indirect results of risen E-commerce to the society. Better located distribution centres and an optimized delivery system could help the future problem of overfull road usage. Innovations in transport have to be made in order to lower pollution. The design of distribution centres and the road network have to be optimized in order to reach highest efficiency within distribution.

## 5. INNOVATIONS AND TRENDS WITHIN SUPPLY CHAIN MANAGEMENT AND TRANSPORT

The transport sector is developing and innovating in order to achieve a sustainable supply chain, but those developments are having major effects on transport as a whole. Distribution is already undergoing some important developments that are having their effect on transport that is already discussed in this thesis. The rising trend of E-commerce is responsible for the needed developments within the distribution sector of the supply chain. Innovations are playing a major role within transport and distribution and so the effects of these have effect on society, and that is why this subject is very important within the sustainability of the supply chains of suppliers. Research done by a consultancy firm showed the rising amount of digitization from a questionnaire, this is shown in chart 1 below (Elliott, Schmahl, & Tipping, 2017). The research also mentioned a higher level of integration within the companies due to digitization (Elliott et al., 2017). It is clear that transporting companies are developing and innovating in order to reach the sustainable supply chain and this can be done in several ways like integration of the value-chain, digitization and development in services (Elliott et al., 2017).



Source: PwC, "2016 Global Industry 4.0 Survey — Industry key findings"

Chart 1: Development in transporting companies, Source: (Elliott et al., 2017)

A very important factor within transport is the fact that fossil fuels are the main reason for pollution and global warming, but fossil fuels are also going to run at a certain point in time down to zero (Höök & Tang, 2013). Depletion of fossil fuels within a certain amount of time is also pushing the transport sector to innovate in their transport methods in order to switch over to means of transport where fossil fuels aren't needed any longer. Especially, the effects of depletion of fossil fuels and the effects of this on transport are being spoken in this chapter because of the importance of it in order to reach and maintain sustainable supply chains. The effects within distribution are leading to innovations of ways of transportation and those innovations are being discussed in this chapter.

### **Less pollution**

The transport sector is already dealing with higher prices of gasoline and this is also having effects on innovations within transport (Visser et al., 2014). Technology and innovations are needed within transport in order to reduce the costs and emissions that arise from the transport of distributing goods. One innovation that is already been introduced is the higher efficiency of the engines nowadays what is leading to less fuel consumption and so reduces the costs of transport and lowers the emissions automatically (Mangiaracina et al., 2015)(Verbeek, 2017). Also multiple environmental agreements are introduced in order to increase sustainability of a healthy environment and society and those are having their effect on innovations within transport. A very important event in this context is the Paris agreement of climate change in 2015 where the leaders of most countries of the United Nations signed an agreement in which they arrange a design in order to decrease the pollution of the world starting from 2020 (Farber & Peeters, 2016). This agreement has effect on the suppliers of vehicles and trucks because these products have to pollute less in order to contribute to the total decrease of pollution worldwide and so they are forced to innovate in technology in order to achieve the goal of decreasing pollution and global warming (Farber & Peeters, 2016). Cleaner diesel engines are already introduced just like several zones in inner cities where some cars are excluded because of their emission (Verbeek, 2017). All these contributions are leading to a healthier environment but have also their effects on transport and distribution.

Transporting companies have to invest in cleaner engines and newer cars in their fleet of trucks and so these companies are forced in new investments that could have effect on the profitability of these companies (Chaffey, 2007). Unfortunately, fossil fuels are depleting and so this innovation isn't a sustainable one, but for now it's helping to the high levels of pollution and fuel usage.

### **Electric driven trucks**

One opportunity for the transport sector is to invest in other sources of energy, one example for a sustainable source of energy is electric power that is produced by the power of wind or the sun and so can become a sustainable source of energy (Verbeek, 2017). Delivery trucks engines that are powered by electricity can be introduced into the supply chain of transporting companies and so make supply chains more sustainable as with diesel powered delivery trucks. Cars and trucks that will fully drive on electric power instead of fossil fuels will result in less pollution, but electric cars nowadays still got issues like a limited driving range and also not all electricity is produced by sustainable sources of energy but also with coal plants (Mangiaracina et al., 2015). Electric driven cars could be a solution for the environmental problem but still got its limitations. Also the road usage will still increase and will result in more traffic jams and so this will only be part of the solution in order to create sustainable supply chains. Other energy sources can be introduced in order to decrease pollution but these are all not effective to transport if nothing is done by the way transport is done and so the transport sector has not only to search for sustainable sources of energy but also other ways of transport that are being discussed in this chapter.

### **Delivery by bike**

Another possible sustainable way of transport is delivery by bike in the inner cities. This mode of transport isn't polluting to the environment and can be used always and so it is a sustainable mode of transport. Also with the innovation of e-bikes the delivery can be done easier and faster as with the electric cars and this type of transport is also contributing to the environment (Elliott et al., 2017). Just like the engines are bikes already used in transport and delivery, especially couriers of food and delivery of pizza for example is already done in this way but

also transporting companies like PostNL are experimenting with delivery of packages by bike (Middelweerd, 2017). The transport mode is fast and reliable in the inner city, bikes can park everywhere and are able to access all roads and are so able to deliver fast and reliable within a certain reach. The idea of distribution centres near the city and further distribution by bikes can be a solution for the cities and transporting companies (Schäffeler & Wichser, 2003). The delivery companies can be pushed in this direction by governments with the environmental rules of polluting within the city centres where polluting cars aren't allowed to drive in the centre (Verbeek, 2017). Delivery by bike creates also other benefits than only decreasing pollution but also that traffic jams can be bypassed and that delivery schedule can become more accurate as before.

### **Delivery by water or railway**

Transport by ship or train are possibilities that are less in the picture by the delivery companies but there could be some opportunities in transport by water or railway. These opportunities are unfortunately not that interesting for delivery companies at the moment because of the huge investments that are needed in ships or trains. Other negative aspect of these transporting ways is that waterways and rails are fixed infrastructure and so the flexibility that is needed within delivery cannot be obtained by these ways of transport nowadays. In the future there could be solutions by water or road for the delivery in the inner cities by water or large distances by rail but for now this is not an option that is interesting in obtaining sustainable supply chains for delivery.

### **Delivery by drone**

New technologies are important within transport and so is the introduction of the drone what is an unmanned mobile aircraft or helicopter that is able to fly without a physical pilot inside it (Hong, Kuby, & Murray, 2017). The technology could become an opportunity for the transport and delivery sector because drones are very flexible because of their use of the air and so they are able to access every location. Drones are also fast and do not occur traffic jams, they are unmanned so labour costs within delivery will decrease. Disadvantages of this mean of transport is that the investment for it are very high and the technology



isn't there where it should be nowadays in order to introduce it now. Also crashes and problems with the drone on its way are difficult to fix because no person is used any more at the delivery process and so also extra services cannot be given to customers like installation of a product. Drones will decrease pollution and road usage drastically and the technology can become a real innovation within delivery but it is only able to deliver small packages to the front door and isn't able to do anything more and that could become a problem. Limitations like limited flight range by batteries and limited amount of packages are problems that are affecting the introduction of drone delivery (Hong et al., 2017).

### **Self-driving cars**

So the technology of self-driving cars is one that is heavily undergoing tests nowadays and is maybe a solution that can be introduced for delivery of goods in the short term (Savelsbergh & Van Woensel, 2016). Self driving delivery vans will decrease the costs of labour drastically but just like the drones is this way of transport delivery one with limited capabilities because delivery without persons is only capable of delivery of small packages at the front door. Self-driving cars are innovate ways of transport but also this isn't one with a short-term perspective because of its limited capabilities.

So innovations within technology should be based on decreasing pollution of the means of transport and the accessibility to the final destinations. For only the small packages it is possible to introduce self-driving means of transport by self-driving trucks or drones but the majority of the deliveries still needs people that deliver the packages. To decrease the labour costs it is important that deliveries are planned more efficiently. Transport modes of smaller electrical vehicles and bicycles will decrease pollution and could distribute packages more efficiently and so it is important to focus on these innovations within transport and delivery.

## **6. THE CHANGING ROLE OF TRANSPORT COMPANIES WITHIN THE SUPPLY CHAIN**

Transporting companies are becoming more important for the delivery of goods to the end consumers because of their efficient ways of transport and their economies of scale. More suppliers are outsourcing their distributing activities to transporting companies because of their advantages, and its also more profitable and easier for the suppliers (Joong et al., 2008). In order to deliver the right service to the end consumer it is important that the delivery is done by the right persons and so people are playing an important role within delivery and the supply chain. More packages are being sent with transport companies and so these companies are playing an important role within the supply chain of suppliers (CBS, 2017).

### **Speed**

Transport companies are playing a key role for the time frame and speed of delivery to the end consumer. By the more integrated process of supply and delivery of packages by the large transporting companies it becomes possible to deliver faster and more efficient (Joong et al., 2008). The changing buying behaviour to a totally Internet ordering of packages will lead to an even faster network of distribution because of the link between suppliers and transport companies that can become more intensive by more visits a day by the transport company.

### **Communication**

The transporting companies are also becoming more responsible for the communication of the delivery to the customer as the communication to the supplier because of the service they are offering that is between these two parties. With the growing using public of the Internet, smartphones and other media it is possible to provide consumers with information about the delivery and nowadays people can even track where the truck is driving so you can be at home for a small time and than continue your day at work for example (Chiu et

al., 2014). This better communication is an important factor for online customers because of the consumer convenience it creates in the shopping process.

### **Green Logistics**

The transporting companies will also become responsible for the growing environmental issues caused by freight transport by road and so the innovation of transport modes to more sustainable ones will become even more important to the companies. The change in delivery transport modes is due to governmental restrictions and the demand to sustainable supply chains as discussed in chapter 4.

### **Decreased costs increased profits**

By economies of scale and more and more deliveries every day it becomes important that the delivery companies are going to work together and distribute even more efficient in order to decrease the costs of delivery (Schöder et al., 2016). By better planning, less costs of transport and better time schedules it becomes possible to reduce costs and increase profits as well as for the suppliers as for the transporting companies

### **Service**

The most important change in the role of the transporting companies is the value added services they offer (Chen & Notteboom, 2012). The already fast delivery service and the information and communication about deliveries are already services that are contributing to the consumer convenience but the next step in this process is to also deliver all kind of products. Some products are transported into boxes and opened by the customer and the product is ready to use like clothing, but also delivery of products that are demanding more work should be offered by transporting companies (Middelweerd, 2017). Coolblue is a leading company in the extra service it is delivering to consumers by also installing and take old appliances or furniture back (PostNL, 2017). PostNL and other companies are introducing this extra service also in order to create extra customer convenience and so attract suppliers to create partnerships that are going to offer this extra service to their customers (PostNL, 2017). Transporting

## The impact of E-commerce on the supply chain

companies are going to do more than only standard delivery of the product, but also the extra services like assembly or installation are becoming important within the supply chain and so the transporting companies are fulfilling a more diverse and integrated job within the supply chain of the retailers.

### Freight villages

In order to create efficient and time saving delivery to the consumers it is important that distribution centres of the transporting companies will locate near the cities or the big sales markets in order to deliver fast and efficient delivery. So called freight villages could probably be the result of innovations within the distribution sector where all warehouses and distribution centres are clustered together near their sales market (Schäffeler & Wichser, 2003). The design of a freight centre can also be seen in figure 4, suppliers are transporting their products in bulk to the distribution centres at the freight village by rail, sea or road. From the freight village are products send to the end consumers by small electrical delivery vans, bikes or other means of transport and so delivered in a sustainable and efficient way. The cluster of the freight village could also become responsible for more positive externalities like better design of the city centres, less pollution and road traffic in the city but also knowledge in this city can be exchanged between the companies within the freight village.

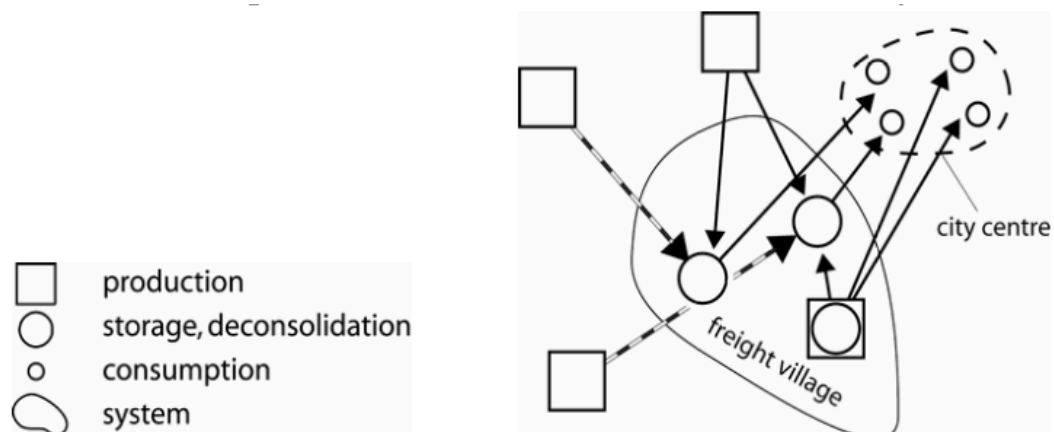


Figure 4: Freight village (Schäffeler & Wichser, 2003)

A freight village could have major effects on the design of the city centre, the efficiency of the supply chain and the delivery process itself. Together with more efficient and greener ways of transport this could become the new way of

## The impact of E-commerce on the supply chain

delivery by transporting companies that will result in less pollution and more profits. Transporting companies have to innovate in new ways of delivery and clustering in order to deliver the best service and gain the highest efficiency as well for society as for them selves.

## 7. CONCLUSIONS AND DISCUSSION

The goal of this thesis was to examine what the impact of E-commerce on the supply chain is and to give an answer on this research question. In order to investigate the impact of this the thesis is divided in multiple research chapters in order to give a total view about the subject.

First the changing customer behaviour is discussed in which can be concluded that online sales are rising rapidly because of the consumer convenience it creates by the delivery of services like fast delivery and return of goods. Also the fact that people are allocating less time for shopping results in online shopping that is a good alternative for this issue because the online shops are open 24/7 and are delivering the products fast in a small time frame. This results in more sales by the Internet and so more deliveries to more addresses. So sales by Internet are having their effect on the supply chain because it results in more deliveries other services and more sales.

Distribution is changing due to E-commerce and this is also where the impact of E-commerce is clearly visible within the transport sector. Supply chains are heavily changing due to E-commerce and so the role of transport companies is more important as ever. Distribution centres are getting bigger and more organised and are providing more services in order to create the best consumer convenience. Thanks to ICT it became possible to manage inventory better and also communication with consumers on the web sites is improved and is resulting in more clear information to the customers as well as for the suppliers. The effect to distribution centres is that they have become bigger because they are doing most of the work within the supply chain of the delivery. This also results in other ways of distributing the goods in a more efficient way.

Also the transport sector is undergoing some major differences because of E-commerce where more single packages are being sent instead of bulk freight to the physical shops. More small packed packages have to be delivered which results in more total volume that has to be delivered at more delivery locations by smaller trucks. The effects of this are that more vans enter the already busy

## The impact of E-commerce on the supply chain

roads what can lead to more congestion and pollution but this can also result in more innovation within the transport sector.

Innovations in order to reduce pollution and congestion can be done by the transport sector. Transporting companies are able to contribute a lot to society if they are able to innovate in more environmental friendly means of transport. Also relocation of distribution centres and the use of other transport modes can be used for delivery in order to create sustainable supply chains. Transporting companies always have to look in to the future in order to stay sustainable and to compete within the business of delivery. Innovations are needed to protect society for the negative effects of the effects of the risen distribution. More efficient and cleaner ways of transport seems to be the solution.

At last is the changing role of transport companies discussed. The rising amount of deliveries and the innovations within delivery have to be fulfilled by the transport companies and so they are playing a major role in the success of E-commerce. These companies are affecting the way delivery is done in the future and become part of the success of E-commerce and fast delivery. Service is priority for the online retailers and so offering more service to the consumers is the key role that has to be fulfilled by the transporting companies. Transporting companies should play a major role within the supply chain of suppliers and so have effect on society by innovations they will be able to obtain the best solution within transport with the highest efficiency for society as for themselves. Transporting companies could profit from the rising trend of E-commerce and should so anticipate on this trend.

The impact of E-commerce on the supply chain is bigger as we maybe think right now because of the side effects it creates. E-commerce leads to more deliveries of packages and so more delivery vans are used that are contributing to more congestion and pollution. Transport will innovate because of the negative effects and the corresponding implement environmental laws. New transport modes that are powered for example by electricity, are becoming more popular nowadays already, but also other means of transport can be introduced for example transport by air. The location of distribution centres will be designed in totally different ways and so transporting companies and cities are more

## The impact of E-commerce on the supply chain

connected with each other by for example the freight villages. Cities can be designed in new ways because there is no need for physical shops any longer and so the transport modes by the people can change drastically. The need for cars will decrease because of the changing design of the cities and so mobility choices will change to more public transport or other means of transport what all will lead to a better environment and more efficient distribution of goods.

E-commerce can lead to so many changes in the future as well within transport and the different mobility modes that can be used as within the design of the country and so the supply chain of transport companies is playing a major role in this change. What exactly will happen in the future cannot be seen right now but delivery of goods will have a great impact on the supply chain as society itself.

### **Discussion**

This thesis is examining the impact of E-commerce on the supply chain, but especially the impact it could have in the future. Predictions about this impact are done in most literature and the exact way the future will handle transport and delivery cannot be seen at the moment. The predictions that are given in this thesis are based on multiple researches and the practice also gives conformation of the literature because some pronounced changes in transport are already shown nowadays. The spoken impact and effects aren't that strange and mostly pretty consecutive with the strategies and supply chain nowadays. Maybe there are innovations in technology where nobody knows about now, but can be implemented in a few years and will lead to a whole other result as this thesis is given now, but none of that is really spoken about in literature. The case study gives only information about one company and so less reliable for the whole clothing industry delivery design but it gives a extra insight in the way of delivery now and what will happen probably on the short term. Delivery can be done in lots of markets and every industry will have different aspects for delivery.

Also the negative effects of E-commerce are not all discussed. When there are for example no shops in the city centre any more this could also lead to less attractive cities. The city is now a place where people come together and where



## The impact of E-commerce on the supply chain

facilities like restaurants are also within the city street. When all shops are gone the effect on transport and the supply chain could end up very different as we are thinking right now

The discussion with the company of Tuunte was very interesting in my research but didn't result in new conclusions about the subject. It was a nice meeting and the company was very interested in some ideas I came up with but unfortunately it isn't contributing a lot to this thesis and so it is only included in the appendix.

### **Limitations and further research**

This thesis was investigating the subject very globally and could be done more in detail in certain aspects of the subject and only focus more in detail on one effect of E-commerce. Also the thesis could be more focussed on the solutions to the problem within transport and investigate what really is the best solution to our transportation problem nowadays. Negative aspects of E-commerce could also be discussed in more depth and research at this topic could result in whole other conclusion. A limitation of this thesis is that not all information is provided, but that is needed in search for the best solution and so there cannot be done a good proposal to solve the problem.

## **APPENDIX: CASE STUDY**

In order to create more depth and practical relevant information in this thesis a case study is included in which I discussed the subjects and innovations within the transport and delivery sector with the logistical manager of the warehouse specialized in clothing. The company recently added an online web shop to the concept and so it is a case that is relevant as interesting to add to this research.

Tuunte is a clothing company with 46 physical shops at the moment and an own distribution centre and headquarter located in Winterswijk in the Netherlands. The company designs its own brands and clothes from here and let them get manufactured in countries as China, Taiwan or Bangladesh. From the manufactories the clothes are shipped in containers to the distribution centre in Winterswijk and from there is the supply chain totally controlled by the company. The clothes are unboxed and structured at the warehouse and labelled with codes, prices and other information needed in the stores. From the distribution centre the items are packed into crates on wheels and then are distributed to the shops through out the Netherlands in a circular model where the truck passes multiple shops to unload the goods. This supply chain isn't that interesting to me because it isn't a whole lot different as I expected, but what interests me more is the introduction of the web shop, not that long ago, and the consequences this has on the existing supply chain.

In an interview I tried to find out what the effects of the web shop were to the supply chain and also if the manager can become interested in the innovations that I've found in my research. The total interview can be seen in the appendix where also the answers to the questions are included, the total discussion was built around those questions and was for both parties very interesting. The interview was in some views a little bit unexpectedly but most of the questions were pretty normal to my expectations. The manager found the discussion about new ways of transport and delivery very interesting but for the moment these changes are not made within the company because of the lack of finance and the great impact it could have on the running business. For the long term my

results are taken into account for the changing decision of the design of the warehouse and also the way they like to transport. The effect of the web shop becomes bigger and so distribution also. Tuunte likes to incorporate fast delivery but this need some changes within their distribution centre. These changes are discussed and led to interesting ideas like some shops on important locations where clothes only can be seen and where the rest of the clothes can be ordered online. This example is like the case of Coolblue that has some physical locations as an online web shop. This discussion has created some ideas for the manager and is so contributing in the future.

### **Interview Tuunte**

1) Wat is uw functie en werkzaamheden met betrekking tot de distributie van de goederen?

*Ik ben huidig directeur van Tuunte holding en verantwoordelijk voor alle strategische beslissingen als het coördineren van de huidige werkzaamheden. Ik ben betrokken bij de inkoop van de goederen en heb dus te maken met de leveranciers van de kleding. Wat betreft de distributie heb ik voornamelijk invloed op strategische beslissingen in de toekomst maar niet op de huidige gang van werking binnen het magazijn.*

2) Hoe komt de kleding bij jullie distributie centrum binnen?

*De kleding komt het distributie centrum binnen door middel van containers vanuit landen als China en Bangladesh. Hier wordt de kleding geproduceerd en vervolgens ingeladen waarna het per schip via Rotterdam naar Nederland gaat en per vrachtwagen bij ons wordt afgeleverd. Ook hebben wij lokale leveranciers, deze transporten gaan ook via vrachtwagens.*

3) Wat wordt er in jullie magazijn/distributiecentrum aan handelingen verricht met betrekking tot de producten?

*In het magazijn worden de goederen ontvangen in dozen apart per artikel en per maat of op maat gesorteerd. De goederen worden uitgepakt en beoordeeld op kwaliteit voordat deze in ons magazijn worden gesorteerd. Ook worden sommige artikelen opgehangen en geprijsd indien dit nog niet gedaan is in de fabriek.*

## The impact of E-commerce on the supply chain

*Vervolgens worden producten per winkel gesorteerd in bakken om klaar te worden gezet voor transport naar de winkels.*

4) Hoe is de distributie van de kleding geregeld? Veel kleine transporten of wordt er gewacht op een hoeveelheid die rendabel is om te gaan rijden?

*Wij rijden met eigen vrachtwagens vaste routes op vaste dagen langs de winkels. Op sommige dagen moeten spullen voor een bepaalde winkel worden klaargezet en op andere dagen weer van een ander filiaal. Het ligt er net aan op welke dag deze voor transport staat om ook gepakt te worden in het magazijn.*

5) Wat zijn de kosten van de distributie van jullie distributiecentrum naar de winkels en eindconsumenten?

*Deze heb ik niet precies bij de hand, er zijn kosten aan verbonden om 2 vrachtwagens te laten rijden langs de winkels en ook het klaarzetten van de goederen per winkel kost tijd en geld. Toch proberen we op tijd te besparen door alles op verrolbare bakken of rekken te transporteren zodat de goederen gemakkelijk en snel kunnen worden uitgeladen. Ook zijn de routes redelijk optimaal en gaat de vrachtwagen nooit leeg weg.*

6) Hoe gaat de verwerking van internet orders met betrekking tot de distributie hiervan?

*Bestellingen komen binnen via de webshop en vervolgens gepakt uit het magazijn, maar wanneer deze niet meer aanwezig zijn in het magazijn worden deze vanuit een winkel opgehaald tijdens de route van de vrachtwagen en meegenomen naar het centrale magazijn. Met ons order beheer systeem kunnen wij ook precies zien of de goederen nog op voorraad zijn of dat deze juist in een winkel liggen of al zijn uitverkocht en hierdoor hebben we ook geen grote voorraad nodig. Vanaf hier worden goederen ingepakt in een klein doosje of pvc-envelop. Vervolgens worden goederen verstuurd naar winkels met onze eigen vrachtwagens om zo afgehaald te kunnen worden in de winkel (en ook gepast kunnen worden) of verzonden via PostNL direct naar de klant.*

7) Zijn jullie voornemens om meerdere distributiecentra te starten of elders te gaan vestigen met 1 distributiecentrum?

## The impact of E-commerce on the supply chain

*Nee, wij hebben nog geen concrete plannen maar er zijn wel ideeën om centraler in Nederland te vestigen met ons distributiecentrum en/of de distributie uit te besteden.*

8) Zijn er veel retourzendingen? En wat wordt er met geretourneerde artikelen gedaan?

*Ongeveer 35% van onze artikelen besteld via de webshop gaat retour. Deze artikelen worden of terug gebracht naar onze winkels of na kwaliteitscontrole vanuit het magazijn over de winkels verdeeld.*

9) Hebben jullie meer ruimte nodig in het distributiecentrum door internetverkoop en door de bijkomende retour zendingen?

*Nee voorlopig niet, we hebben genoeg ruimte en door lage voorraad is er ruimte over.*

10) Zijn er nog eventuele diensten die jullie zouden willen toevoegen aan bestelde artikelen op internet?

*Nee, geen overwegingen.*

11) Zouden jullie willen werken aan een nog snellere levering van online bestelde goederen?

*We zouden graag naar de formules willen waar tot 22:00 kan worden besteld en de volgende dag thuis kan worden geleverd. Praktisch is dit nog niet uitvoerbaar maar hier zijn we wel mee bezig.*

12) Zouden volgens jullie fysieke winkels langer open moet zijn of betere diensten aanbieden aan klanten om te concurreren met de internetverkoop?

*Nee, de fysieke winkels gaan op de lange termijn een andere functie vervullen en daarom geloof ik niet dat er concurrentie is met de internet verkoop doordat dit verkoop via een heel ander kanaal is. Er zullen altijd mensen naar winkels blijven gaan maar de manier waarop die winkels zijn ingericht zal wel veranderen.*

## The impact of E-commerce on the supply chain

13) Zien jullie de fysieke winkels op de lange termijn als belangrijke verkooppunten of zou dit kunnen veranderen door het internet naar alleen enkele showroom winkels waar kleding gepast kan worden en vervolgens online besteld en thuis bezorgd wordt?

*Ja, dit zou bijvoorbeeld zo'n andere inrichting zijn. Vestiging van fysieke winkels zal uitsluitend op merkversterkende locaties plaatsvinden of locaties waar veel mensen bij elkaar komen. Het concept om mensen de mogelijkheid te geven om te passen en vervolgens het artikel thuis gestuurd te krijgen zou een optie kunnen zijn.*

14) Zouden jullie de volledige distributie van jullie goederen willen uitbesteden aan een transportbedrijf?

*Ja dit is te overwegen zoals al eerder gezegd.*

15) Zijn jullie voornemens om schonere manieren van transport te gebruiken als dit bijdraagt aan een duurzaam bedrijf ook al zal dit een duurdere optie zijn dan op dit moment?

*Ja dit willen wij zeker.*

## REFERENCE LIST

### Literature references

- Bogaard, J. Van Den, & Jansen, H. (2016). Gezondheidswinst met lokale ambities en informatie op maat. *Tijdschrift Voor Gezondheidswetenschappen* 94, (8), 288–290.
- Buck, R. (2015). How changing supply chains impacts location choices. *Corporate Real Estate Journal*, 4(3), 223–229.
- CBS. (2017). *Kwartaalmonitor Transport en logistiek*. Den Haag.
- Chaffey, D. (2007). *E-business and E-commerce Management: Strategy, Implementation and Practice*. Pearson Education.
- Chen, L., & Notteboom, T. (2012). Determinants For Assigning Value-added Logistics Services To Logistics Centers Within A Supply. *Journal of International Logistics and Trade*, 10(1)(3), 3–41.
- Chiu, C. M., Wang, E. T. G., Fang, Y. H., & Huang, H. Y. (2014). Understanding customers' repeat purchase intentions in B2C e-commerce: The roles of utilitarian value, hedonic value and perceived risk. *Information Systems Journal*, 24(1), 85–114. <https://doi.org/10.1111/j.1365-2575.2012.00407.x>
- Christopher, M. (2016). *Logistics & supply chain management*. Pearson UK.
- Christopher, M., & Towil, D. R. (2002). Developing Market Specific Supply Chain Strategies. *The International Journal of Logistics Management*, 3(1), 1–14. <https://doi.org/10.1108/IJBM-07-2013-0069>
- Close, A. G., & Kukar-Kinney, M. (2010). Beyond buying: Motivations behind consumers' online shopping cart use. *Journal of Business Research*, 63(9–10), 986–992. <https://doi.org/10.1016/j.jbusres.2009.01.022>
- Farber, D. A., & Peeters, M. (2016). *Climate Change Law*. Edward Elgar Publishing.
- Golicic, S. L., Davis, D. F., McCarthy, T. M., & Mentzer, J. T. (2002). The impact of e-commerce on supply chain relationships. *International Journal of Physical Distribution & Logistics Management*, 32(10), 851–871. <https://doi.org/10.1108/09600030210455447>
- Gras, P. (2016). Online shoppen zorgt voor explosieve groei pakketvervoer. *Autoriteit Consument & Markt*. Retrieved from <https://www.acm.nl/nl/publicaties/publicatie/15814/Online-shoppen->

- zorgt-voor-explosieve-groei-pakketvervoer/  
Hong, I., Kuby, M., & Murray, A. (2017). A deviation flow refueling location model for continuous space: A commercial drone delivery system for Urban Areas. *Advances in Geographic Information Science*, 125–132.  
[https://doi.org/10.1007/978-3-319-22786-3\\_12](https://doi.org/10.1007/978-3-319-22786-3_12)
- Hoogendoorn, S. P., Immers, L. H., Schuurman, H., Taale, H., van Katwijk, R., Wilmink, I. R., & Yuan, Y. (2016). Verkeer in Nederland.
- Höök, M., & Tang, X. (2013). Depletion of fossil fuels and anthropogenic climate change-A review. *Energy Policy*, 52, 797–809.  
<https://doi.org/10.1016/j.enpol.2012.10.046>
- IMRG. (2014). IMRG UK Consumer Home Delivery Review 2014. *Imrg*, 1–72.
- Jiang, L., Yang, Z., & Jun, M. (2013). Measuring consumer perceptions of online shopping convenience. *Journal of Service Management*, 24(2), 191–214.  
<https://doi.org/10.1108/09564231311323962>
- Joong, J., Cho, K., Ozment, J., Sink, H., Cho, J. J., & Ozment, J. (2008). Logistics capability , logistics outsourcing and firm performance in an e-commerce market. *International Journal of Physical Distribution & Logistics Management*, 38(5), 336–359.  
<https://doi.org/10.1108/09600030810882825>
- Lancioni, R. A., Smith, M. F., & Oliva, T. A. (2000). The Role of the Internet in Supply Chain Management. *Industrial Marketing Management* 29, 45–56.
- Mangiaracina, R., Marchet, G., Perotti, S., & Tumino, A. (2015). A review of the environmental implications of B2C e-commerce: a logistics perspective. *International Journal of Physical Distribution & Logistics Management*, 45(6), 565–591. <https://doi.org/10.1108/IJPDLM-06-2014-0133>
- Neng Chiu, H. (1995). The integrated logistics management system: a framework and case study. *International Journal of Physical Distribution & Logistics Management*, 25(6), 4–22. <https://doi.org/10.1108/09600039510093249>
- Overby, J. W., & Lee, E. J. (2006). The effects of utilitarian and hedonic online shopping value on consumer preference and intentions. *Journal of Business Research*, 59(10–11), 1160–1166.  
<https://doi.org/10.1016/j.jbusres.2006.03.008>
- Park, C.-H., & Kim, Y.-G. (2010). Identifying key factors affecting consumer



- purchase behavior in an online shopping context. *International Journal of Retail & Distribution Management* *Iss International Journal of Retail & Distribution Management*, 3112(6), 16–29.  
<https://doi.org/10.1108/09590550310457818>
- Rotem-Mindali, O., & Weltevreden, J. W. J. (2013). Transport effects of e-commerce: What can be learned after years of research? *Transportation*, 40(5), 867–885. <https://doi.org/10.1007/s11116-013-9457-6>
- Savelsbergh, M., & Van Woensel, T. (2016). 50th Anniversary Invited Article—City Logistics: Challenges and Opportunities. *Transportation Science*, 50(2), 579–590. <https://doi.org/10.1287/trsc.2016.0675>
- Schäffeler, U., & Wichser, J. (2003). *Inner Urban Freight Transport and city logistics*. Retrieved from [www.eu-portal.net](http://www.eu-portal.net)
- Schöder, D., Ding, F., & Kucht Campos, J. (2016). The Impact of E-Commerce Development on Urban Logistics Sustainability. *Open Journal of Social Sciences*, 4(March), 1–6. <https://doi.org/10.4236/jss.2016.43001>
- Tseng, Y., Yue, W. L., & Taylor, M. A. P. (2005). The role of transportation in logistics chain. *Eastern Asia Society for Transportation Studies*, 5, 1657–1672. <https://doi.org/10.1017/CB09781107415324.004>
- Verbeek, T. (2017). *Living Cities : Reconnecting Environmental Health and Urban Planning*. Ghent University.
- Visser, E.-J., & Lanzendorf, M. (2004). Mobility and Accessibility Effects of B2C E-Commerce: a Literature Review. *Tijdschrift Voor Economische En Sociale Geografie*, 95(2), 189–205. <https://doi.org/10.1111/j.0040-747X.2004.00300.x>
- Visser, J., Nemoto, T., & Browne, M. (2014). Home Delivery and the Impacts on Urban Freight Transport: A Review. *Procedia - Social and Behavioral Sciences*, 125, 15–27. <https://doi.org/10.1016/j.sbspro.2014.01.1452>
- Weltevreden, J. (2007). *Winkelen in het Internettijdperk Inhoud*. Den Haag.
- Weltevreden, J. W. J. (2008). B2c e-commerce logistics : the rise of collection-and-delivery points in The Netherlands. *International Journal of Retail & Distribution Management*, 36(8), 638–660.  
<https://doi.org/10.1108/09590550810883487>

**Web references**

- CBS. (2016). Meer Nederlanders shoppen online. Retrieved April 27, 2017, from <https://www.cbs.nl/nl-nl/nieuws/2016/24/meer-nederlanders-shoppen-online>
- Daalhuisen, G. (2016). Warehousing in 2020: trends in de sector. Retrieved April 30, 2017, from <http://www.logistiek.nl/warehousing/blog/2013/6/warehousing-in-2020-trends-in-de-sector-101129463>
- Elliott, J., Schmahl, A., & Tipping, A. (2017). 2017 Commercial Transportation Trends. Retrieved June 4, 2017, from <https://www.strategyand.pwc.com/trend/2017-commercial-transport-trends>
- Gras, P. (2016). Online shoppen zorgt voor explosieve groei pakketvervoer. *Autoriteit Consument & Markt*. Retrieved May 30, 2017, from <https://www.acm.nl/nl/publicaties/publicatie/15814/Online-shoppen-zorgt-voor-explosieve-groei-pakketvervoer/>
- Kamphuis, B. (2015). Online aankoop gaat steeds vaker retour. Retrieved May 19, 2017, from <http://nos.nl/artikel/2024926-online-aankoop-gaat-steeds-vaker-retour.html>
- Kraaijeveld, K. (2015). Waarom steeds meer mensen “druk druk druk” zijn. Retrieved May 19, 2017, from <https://www.vn.nl/waarom-steeds-meer-mensen-druk-druk-druk-zijn/>
- Lalkens, P. (2016, December 23). Aantal files zal in de komende jaren blijven stijgen. *Financieel Dagblad*. Amsterdam. Retrieved June 6, from <https://fd.nl/economie-politiek/1180711/aantal-files-zal-in-komende-jaren-blijven-stijgen>
- Middelweerd, H. (2017). PostNL: “Verduurzaming van logistiek is geen revolutie, maar een evolutie.” Retrieved June 6, 2017, from <http://www.duurzaambedrijfsleven.nl/future-cities/23191/postnl-verduurzaming-van-logistiek-is-geen-revolutie-maar-een-evolutie>
- Nu.nl. (2014). Opnieuw meer winkelpanden leeg. Retrieved May 19, 2017, from <http://www.nu.nl/ondernemen/3673224/opnieuw-meer-winkelpanden-leeg.html>

- Ploeg, J. van der. (2015). Webshops overstijgen dit jaar fysieke winkels. *De Volkskrant*. Retrieved May 5, 2017, from <http://www.volkskrant.nl/economie/webshops-overstijgen-dit-jaar-fysieke-winkels~a4126952/>
- PostNL. (2017). 5 belangrijke e-commercetrends. Retrieved June 7, 2017, from <https://www.postnl.nl/zakelijke-oplossingen/logistieke-oplossingen/extra-at-home/>
- Rijksoverheid. (2017). Consument en recht. Retrieved May 19, 2017, from <https://www.rijksoverheid.nl/onderwerpen/bescherming-van-consumenten/inhoud/consument-en-recht>
- van Tellingen, H., Solarz, T., & Schaapman, E. (2016). Over het einde van (pure) webshops en het piramidespel van Zalando. *Retailwatching*. Retrieved 19 May, 2017, from [http://www.retailwatching.nl/etail/artikel/Xo1j690YRXWq2rIjK\\_KQnQ-0/over-het-einde-van-pure-webshops-en-het-piramidespel-van-zalando.html](http://www.retailwatching.nl/etail/artikel/Xo1j690YRXWq2rIjK_KQnQ-0/over-het-einde-van-pure-webshops-en-het-piramidespel-van-zalando.html)