

INTERNET SHOPPING AND ITS IMPACTS ON MOBILITY

J. Francke & J. Visser

KiM Netherlands Institute for Transport Policy Analysis

Ministry of Infrastructure and the Environment

P.O. Box 20901

2500 EX The Hague

The Netherlands

+31 704561915

Jan.Francke@minienm.nl

ABSTRACT

Internet shopping, is one of the trends that are having an impact on both passenger and freight traffic in urban areas. The market share of Internet shopping is growing at the expense of traditional shopping. Online shopping is closely connected with express home deliveries and therefore has an impact on urban freight transport: more traffic is flowing towards homes, less towards shops. Shopping trips are being substituted by home deliveries. If the Internet has an effect on people's time and financial budget, it will change people's behaviour directly or indirectly and internet shopping will affect the location of traditional retail facilities.

In this paper we discuss a number of facts concerning internet shopping (B2C) and its impacts on both passenger and freight transport, in relation to shopping behaviour and home deliveries. We describe how the logistics and the impacts on the demand for transport related to home deliveries are changing.

1. INTRODUCTION

The current trend for an increasing number of consumers to shop on the Internet has an impact on their travel behaviour, and also on the way their purchases are dispatched to their homes. Internet shopping mostly goes hand in hand with home delivery, thus it has an impact on freight and delivery traffic in cities. According to Giuliano [1] the increase in e-commerce requires new logistics arrangements in city centres, such as space for reception boxes, terminals that focus on providing logistics operations tailored to the needs of e-commerce, and new traffic arrangements and information services.

Correlations and trends are not yet very clear. Some time ago, the media in the Netherlands published the following warning [2]: cities would snarl up completely if the logistics of home deliveries did not improve. One of the issues is that home deliveries are less consolidated and thus less efficient than they could be, and therefore more expensive. Often the customer is not at home to take delivery of the parcel or is not satisfied with the ordered good and returns it. This leads to additional costs. It is also feared that web shops may displace physical shops, leading to the latter's disappearance and forcing customers to travel further away in order to visit a shop. Such news stories were grounds for the Netherlands Institute for Transport Policy Analysis (KiM) to look into the issue of Internet shopping.

1.1. Definitions

Internet shopping refers to the purchase of good or services by consumers on the Internet. The terms internet retailing [3] or E-commerce are also often used. E-commerce, however, covers any commercial transaction between organisations and people, including Business-to-Business (B2B) and Business-to-Government (B2G) [4].

The paper focuses on consumers, in particular on consumer buying physical goods (not services) on the Internet through online stores (Business-to-Consumer, or B2C). Insurances and travel tickets may also be bought on the Internet, but they are not related to the physical movement of a good. CDs and books are increasingly being replaced by digital alternatives and therefore are becoming services instead of goods. Also an increasing number of goods are bought digitally. Websites, such as eBay increase the trade of second-hand goods or homemade products between consumers (C2C) but this is not the focus of this paper.

1.2. Literature review

The KiM conducted a quick search of the available literature on the transport impacts of Internet shopping. A fair amount of research has already been carried out on Internet shopping itself, but much less on its consequences for transport, both for freight and passengers. Moreover, studies are often not very recent as Mokhtarian [5] shows in her literature review. Besides the literature research, the KiM consulted a number of experts. In the Netherlands, trends in Internet shopping and the home shopping market are monitored by Thuiswinkel.org and Blauw Research [6]. The European Commission maintains a Consumer Conditions Scoreboard, a monitoring tool that amongst other things observes the ordering of products by consumers from retailers outside their own countries. The Dutch spatial planning agency [7] carried out a detailed study on the development of Internet shopping and its consequences for transport, various aspects of this issue are described in the report. In 2009, Weltevreden and Rotem-Mindali [8] quantified the transport impacts. They looked into the extent to which home deliveries lead to more, or less, traffic compared with traditional shopping and deliveries to shops. Other studies have focused on home deliveries, for instance the traffic safety study of the SWOV [9], a study on logistical aspects [2] and the link with more sustainable distribution [10]. Park and Regan [11] focus on the issues of home delivery in the USA. Beside these sources, we have reviewed various online articles and the international literature.

1.3. Structure of the paper

First, we examine the rise of Internet shopping in Europe, Japan and the USA. Data from the EU, in particular the Netherlands and the UK, will illustrate our findings. We compare these figures with data from other countries, such as Japan and the USA. Then, we look at home deliveries, including associated problems for customers, suppliers and society. This is followed by an evaluation of the transport impacts on personal travel; on home deliveries and deliveries to shops. The final section looks at future trends concerning Internet shopping and home deliveries.

2. A FEW FACTS ON INTERNET SHOPPING

According to the European B2C E-commerce Report 2014 [12] global non-store internet retail sales, or internet shopping reached 1,552 billion euro in 2014, which accounts for about 4.2% of total global retail sales. The global online retail market showed a 14.8% average annual growth from 2007 to 2012, while total retail growth was just 0.9% over the same period [3].

In Europe almost one out of three consumers (32%) purchased goods and services over the Internet in 2013 [12]. This included goods (54%), but also services (46%), such as travel bookings, concert tickets and insurance policies. Since 2004 the proportion of Internet shoppers has risen in Europe by 23 percentage points from a base of 20% (EC, 2012). Consumers [13] are most likely to buy online in the UK (71%), Denmark (70%), the Netherlands (69%) and Luxembourg (65%). Online shopping is much less common in

most Eastern and Southern European countries. The lowest levels of online shopping are recorded in Romania (6%), Bulgaria (7%) and Italy (15%).

Online shopping in Europe remains largely domestic. Consumers are more likely to purchase online from national sellers/providers (39%) than from sellers located in other EU countries (10%) [13]. But this will probably change in the future.

In 1998 only 41 million euro was spent at internet shops in the Netherlands. In 2013, the Dutch home market for internet shopping was worth some 10.6 billion euro [14]. This is about 22% of total retail sales in the Netherlands [14]. Compared to 2.8% in 2005, internet shopping has gained a significant market share. These figures do not include goods that are bought over the Internet in other countries.

We also found some figures for other countries [12]. The e-commerce market in North America is dominated by the United States (US\$ 419 billion out of a total US\$ 452.4 billion in 2013) and with an estimated share of online goods standing at 7.5% of total goods retail. The size of e-commerce in the B2C market in the Asia-Pacific Area is US\$ 567,3 billion in 2013, of which US\$ 136,7 billion in Japan. China is the largest e-commerce market, namely 328.4 billion US\$ in 2013. This makes the Asia-Pacific region the largest and fastest (44.5% in 2013) growing e-commerce market. E-commerce has a share of 5.3% of total retail of goods in the Asia-Pacific area.

In Europe online shopping accounted for US\$ 482 billion and 5.7% of all retail spending in 2013. The UK is the largest e-commerce market, namely 107.2 billion euro in 2014. Survey work carried out in 2011 indicated that in the UK online spending as a percentage of total retail spending was higher than in all other European countries [15].

3. THE GROWING DEMAND FOR HOME DELIVERIES

Products purchased on the internet have to be delivered to the customer. Since most e-retailers do not run any physical shops (bricks-and-mortar), these products have to be delivered at home or to other appointed destinations. This may save a journey to the shop but causes delivery traffic in residential areas.

If the customer is not at home, the delivery man has to come several times. Sometimes the parcel cannot be delivered at all. This is not efficient for the delivery company and generates additional traffic. A failed home delivery is a source of annoyance both for the customer and the delivery company, which is why increasingly buyers are able to pick up their articles at pickup points (such as Kiala), a physical shop of the company itself (click&collect) or another parcel collection point (such as Bol.com-pickup points for the branches of supermarket chain Ahold in the Netherlands). Thus home delivery is not the only option.

An increasing number of pickup points are being introduced in several countries. Clearly this is a growing trend and, for certain products, could eventually replace home delivery. On the other hand home delivery is very convenient for customers and delivery issues can be solved thanks to ICT technology. In any case, pickup points could reduce the number of delivery vehicle-kilometres in urban areas.

Home delivery is not only a by-product of internet shopping. A long time ago many daily goods were delivered at home by retailers. Before the rise of the Internet, mail order companies delivered their wares at home and retailers delivered large goods, such as furniture and large electronic goods (e.g. televisions or dishwashers). Today mail order companies and traditional retail (bricks & clicks) are also part of the internet shopping community. Traditional retailers still deliver large goods at home but little information is available on these volumes.

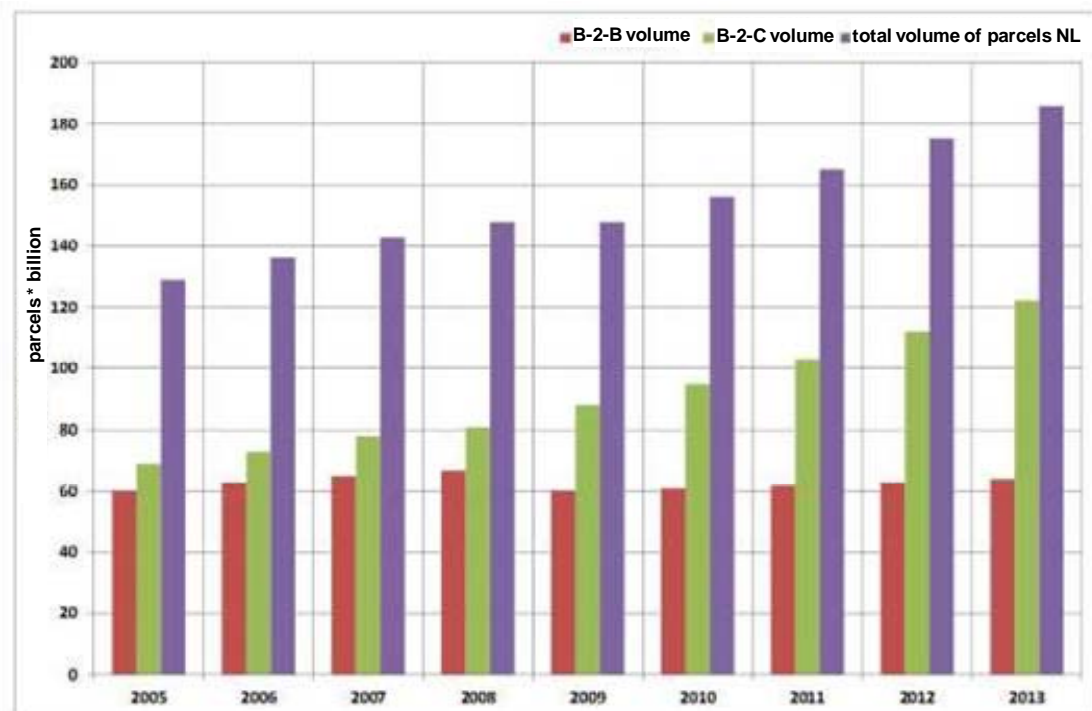


Figure 1 - Number of parcels, broken down into B2B and B2C in the Netherlands [16]

When we examine transport impacts in the next section, we will mainly deal with home deliveries. These are also tending to increase strongly, for example by an average 5% per year in the Netherlands – from 130 million parcels in 2005 to 190 million in 2013 [16]. In Europe more than 3.7 billion parcels are sent annually [17].

In 2006, almost 83% of all online purchases were delivered at home or at the workplace and 7% digitally. About 10% were collected by consumers themselves, either at a post office, a parcel collection point or a shop. Since 2006, the volume of goods received through self-collection has probably increased. We have unfortunately been unable to find any recent data. It is worth noting here that when consumers buy larger items, such as refrigerators and washing machines, the stores themselves deliver these products at home. But they have their own delivery channels (whether outsourced or not) and often do not make use of courier services. Such deliveries are therefore not part of the above-mentioned statistics.

3.1. Issues regarding home delivery

Although home delivery is highly appreciated by consumers, this service often raise some issues [11] for different actors, including customers, carriers and e-retailers. Consumers mention the following issues:

- not on time/not at home/ not delivered
- delivery charge too high/delivery time too long
- forced to stay at home: about 50% stays at home

Carriers complain about:

- additional costs for repeated delivery, indeed 12% of deliveries have to be brought a second time.
- non-deliverables: 2% of the goods cannot be delivered at all.

Most home delivery services only inform the customer on the date on which the goods are to be delivered and use a time frame of 9.00 until 17.00 or 19.00. For deliveries of parcels that fit inside a mailbox this is not a problem. For larger goods such a large time frame causes a 12% risk of delivery failure. A study in the UK reported that failed first-time home

deliveries accounted for approximately 12% of all first-time deliveries and that this figure was the same as in 2010. To put this figure in perspective, the study estimated that UK retailers generated around 740 million online orders in 2012 and that approximately one billion parcels and packets were dispatched in the UK. It was estimated that these failed deliveries cost companies and customers approximately £850 million in 2012. In addition it is estimated that consumers returned 22% of received orders in 2011 [18].

Larger web shops often offer more choice regarding time and date of delivery to make it easier for the customer and reduce the risk of failure. But it is only the carrier that can give more precise information on delivery time. With new ICT technology it is easier to give more accurate information on the time of delivery but carriers have hardly implemented such new technology. An alternative for home deliveries is the use of pickup points, which we now examine.

3.2. Pickup Points and click&collect

Consolidation makes transport more efficient. Possible options for greater consolidation are cooperation between shippers to consolidate deliveries, between receivers (shopkeepers) or cooperation between carriers at urban or national level (green city distribution in the Netherlands). In practice outsourcing to one provider is the most common way to consolidate and to generate efficiency gains. There are two interesting developments related to consolidation that we would like to discuss here, namely the increasing number of pickup points and the introduction of click&collect by traditional retailers. Giuliano et al [1] describe the development of pickup points in Europe.

Pickup points

Pickup points are locations where goods that have been ordered by mail or over the Internet can be collected. At least two different types of pickup points can be distinguished. The most common are parcel service points (PSP = staffed pickup point, found in supermarkets and stores). Pack stations are less common (these are unmanned pickup points using lockers). Unmanned pickup points can be found in Germany and France but they are not so common. In the Netherlands quite recently there have been some new initiatives for unmanned pickup points. The total number of pickup points has been increasing, from 900 in 2006 to about 4500 in 2013.

Pickup points provide an alternative to home delivery when it has failed or when goods need to be returned. Web shops promote the use of pickup points by charging no (or only a small) transport fee when people collect their goods at a pickup station instead of requesting a delivery at home. Deliveries of goods at pickup points are usually consolidated and therefore more cost-efficient. However, pickup points need a certain critical volume to become financially feasible. It is only thanks to the increase in Internet shopping that a denser network of pickup points has become possible.

In Japan consumers can designate convenience stores as their pickup points. Those who wish to use this service have to register as a member, and designate a branch office or an agency among a set of 24-hour convenience stores. When the ordered goods arrive at the pickup point, a notice of arrival is e-mailed to the consumer. They have to pick up the goods within three days of the date of arrival.

Click&collect by large retailers

A large number of traditional retailers also operate a web shop. This is called multi-channelling. Larger retailers combine ordering on the Internet with picking up goods at their stores (click&collect). In this way customers have a much wider choice of products to choose from and are certain that the products will be available when they pick them up. Thanks to multi-channelling and click&collect, traditional retailers are able to compete with

web shops. Particularly in the UK, traditional retailers such as TESCO are very successful on the web retail market. Click&collect also makes use of a consolidated delivery at the store and is therefore cost-efficient. However it still requires the customer to visit the shop.

4. TRANSPORT IMPACTS

In spite of the rapid growth in Internet shopping, transport impacts have remained limited until now – changes due to online retailing are still too small to be observed. Various studies have mapped transport impacts, either conceptually or through analysis (see Farag [19], Xinyu Cao [20] and Rotem-Mindali & Weltevreden [21]). The transport impacts of online shopping follow three different paths:

- a physical journey to a shop is called off or, quite on the contrary, a journey to a collection point or a shop elsewhere is made necessary (to collect the order or return a good), perhaps further away;
- Internet shopping may save time and thus enable another activity involving a journey or, quite on the contrary, it costs more time and leads to a reduction in activities and trips;
- logistics may be affected in as much as goods are no longer bundled in a freight vehicle and delivered to a shop, but are either delivered at home by courier service or sent to a parcel collection point;
- traditional retail will be affected by the increase in internet shopping as regards the number of shops or their location, and thus in turn will affect consumers' shopping behaviour.

4.1. Less shopping, but further away

If we look at personal travelling involved in shopping activities, both as regards essential and non-essential shopping in the Netherlands between 2003 and 2010, the number of trips, total distance and average distance linked to shopping all diminished continually, before stabilising. Since 2004, the duration of shopping trips has also decreased.

As a result of the above, the share of shopping in overall travel by the Dutch population has gone down (see Fig. 2). But the quick search conducted for this paper has not been able to detect an unequivocal link between the growth in Internet shopping and the decrease in shopping-related travel. A number of other factors are playing a role in this respect, for instance the economic crisis. The trends visible in the Netherlands can also be observed in the results of the National Travel Survey's in England [22] and Germany [23]. In 2013 the average person in England made 180 shopping trips, travelling on average 769 miles. These figures are 24% and 14% lower respectively, than the same figures for 1995/97. The decrease in shopping trips has been the largest overall contributor to the 16% fall in all trips in England recorded between 1995/97 and 2013. The National Household Travel Survey in the USA has not revealed these trends yet but the latest available results date back to 2009 [24].

By ordering online, buyers save themselves a trip to a store (by car or other means). Thus in theory an online purchase avoids a physical journey, but the reality is often somewhat different: for instance, an order may have to be collected in the store ('click&collect') or at a parcel collection point, or may have to be returned. From the point of view of passenger transport, self-collection is economical if the collection points are organised by neighbourhood or borough, or if collection can be combined with another trip; in this case, the collection point needs to be on the way, for instance at a public transport location or petrol station.

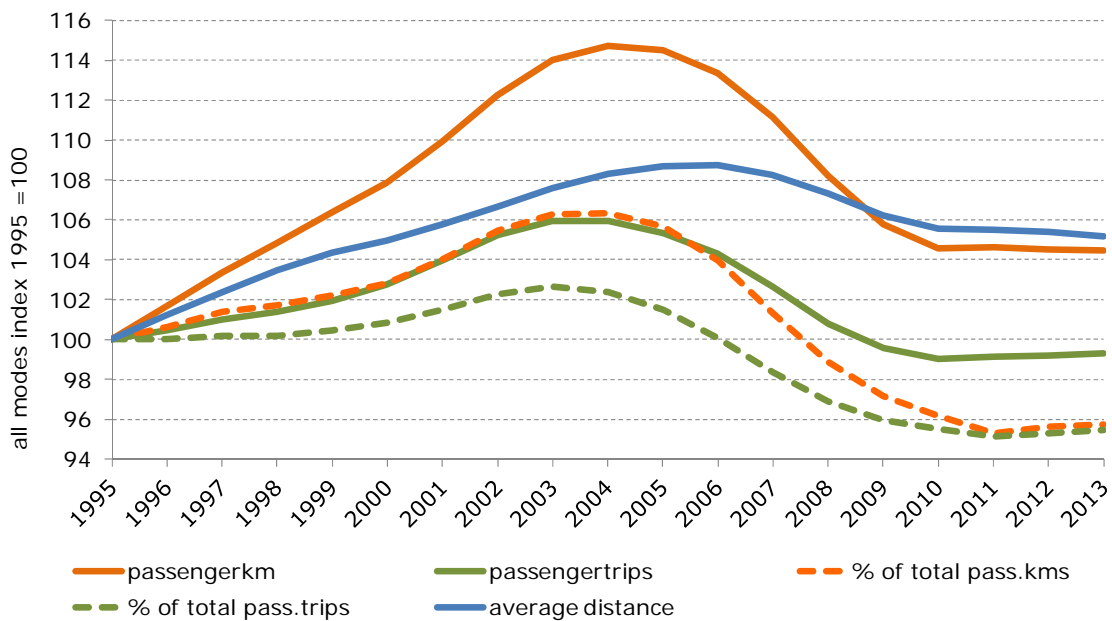


Figure 2 - Decline in the number of shopping trips and passenger-kilometres between 1995 and 2013 for the Netherlands (source: update Francke & Visser [25])

Another outcome may be that consumers, because they are looking on the Internet for products that are cheap or have a special feature, find these in another store. Without e-commerce, the purchase would not have taken place, or it would have been at a store nearby. It is precisely in such cases that Internet shopping generates more travel. It can also happen that consumers first look around in stores, for example for clothes, and then place an online order at a web shop. A variation is when consumers look around in showrooms or at displays, but order the product online on their smartphones. This type of shopping is often combined with another activity but does require an extra travel movement. Products that are bought thanks to the Internet, but without it would not be purchased, do not influence personal travel. Through substitution, Internet shopping is expected to lead to a slight drop in the number of passenger travel movements and the distances they cover. Weltevreden and Rotem-Mindali [8] have calculated that this would amount to 138.2 million passenger-kilometres by car in 2006 (0.4% of the total). The decrease in terms of percentage of personal travel, however, is smaller than the increase in terms of percentage in the number of online purchases; this is because consumers often combine shopping with other activities ('trip chaining'), compare products and prices in stores and on the Internet ('showrooming') and visit several stores ('multi-purpose shopping').

According to the literature surveyed, the growth in Internet shopping has divergent, often contradictory impacts on transport. This raises the question of whether, on balance, there are any visible impacts on the volume of personal travel. Time use surveys in the Netherlands have shown indeed that people spend just as much time travelling for shopping purposes as before, in spite of the strong growth in Internet shopping. In 2011, people even travelled longer for shopping purposes than in 2006. Most probably, this is because shopping is taking place more often or over greater distances – considering that the average travel speed and modal choice for shopping will not have fluctuated much during a limited time span. Dutch people are spending more time shopping (from an average 2.6 hours/week in 2006 to 3.1 hours/week in 2011) [26]. This increase affects both physical and web shopping, and concerns both people who shop online and those who do not. The increase in the time budget for Internet shopping in the Netherlands stems mostly from the fact that the number of online shoppers has grown, whilst the average time spent on web shopping per online shopper has remained the same. People

who shop online spend more time shopping than people who do not (3.7 against 3 hours). This could be due to the fact that the threshold for web shopping is lower, but it could also be that it mostly attracts people who enjoy shopping anyway.

The amount of time needed for shopping-related travel by the average online shopper in the Netherlands rose from 1.3 in 2006 to 1.8 hours per week in 2011, whereas those who did not engage in Internet shopping saw that amount decline (from 1.6 to 1.3 hours per week). It is worth noting here that online customers are 'active' shoppers who shop online a great deal and also physically spend much time on this activity. People who do not (yet) engage in Internet shopping have probably always spent less time on shopping anyway.

In 2013 the Netherlands Institute for Transport Policy Analysis started a new household mobility panel (MPN) survey to enable longitudinal research into changes in mobility and travel by following the same people – the panel – over a number of years. One of the focal points in the panel questionnaires for 2013 and 2015 is how mobility is influenced by the increased use of ICT for work, shopping and leisure. The first results on this subject coming from the MPN-panel survey of 2013 show that more than one third of all respondents indicate that Internet shopping in the past had not changed their physical shopping behaviour or their associated travel patterns. For the other two thirds of respondents there has been a change. Over 30% of the respondents stated that their shopping travel frequency had decreased due to increased Internet shopping. However, 11% stated the opposite effect an increased shopping travel frequency. Unfortunately, the net effect on passenger travel cannot be drawn yet on the basis of this first MPN-panel survey. A more empirical analysis of MPN-data on the relationship between shopping travel and changes in Internet shopping will be possible after several MPN-surveys. This will be possible from 2015. For a further analysis and description of the MPN and Internet shopping, see Hoogendoorn-Lanser et al. [27].

4.2. Less or more freight traffic?

Internet shopping also has an impact on goods transport. In the traditional distribution system, goods were bundled and shipped from the manufacturer or wholesaler to the retailer. This involved large volumes of bundles of goods transported in trucks that were, generally speaking, full on the outbound journey and somewhat empty on the way back, thus in principle as efficiently as possible. The last-mile transport was made up of consumers' passenger trips for shopping purposes – although there are emerging concerns that old people who are unable to drive cannot go shopping.

In the case of e-commerce, however, thick high-density freight transport is used in a limited way while fragmented direct delivery to consumers is dominant. Usually small-lot orders are consolidated by parcel delivery companies. The thick inter-city freight transport is de-consolidated at their terminals, and last-mile transport is conducted by small vans or trucks. Transport is carried in smaller volumes by light goods vans in multi-stop trips, whereby distances between stops can be fairly great, owing to a low stop density.

Small-lot delivery is often criticised for leading to an increase in traffic. But as the last-mile freight transport journey substitutes passenger shopping trips, it is likely that the total volume of freight and passenger traffic in terms of vehicle-km does not change that much.

The rise of Internet shopping has led to shifts in transport patterns but also to changes in logistics: namely the supply chain, stock management, design of distribution centres and the distribution structure as a whole [28]. Figure 3 illustrates the differences between a traditional distribution centre and an e-fulfilment centre for web shops.

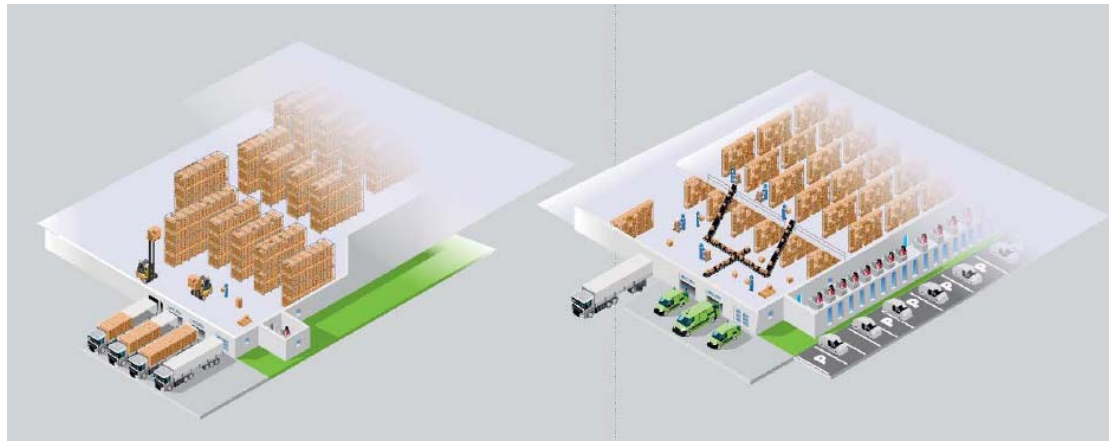


Figure 3 - A traditional distribution centre and an e-fulfilment centre [28]

Remarkably, peak times are distributed in a different way: whereas traditional deliveries to shops peaked on Fridays, home deliveries peak on Mondays [29]. We will not investigate this further in this paper. The worst bottleneck is the ‘last mile’: delivery at the consumer’s place [29]. The resulting picture is that the substitution of bundled deliveries to shops (by freight trucks) with home deliveries in smaller consignments (by delivery van) is generating traffic, namely more delivery van-kilometres.

ING [29] sketches the following picture: ‘We can make the rough estimate that 10% of freight movements in city centres are caused by deliveries to shops. This percentage is going to fall; on the contrary, goods deliveries to individuals in city centres are going to increase strongly. Light goods vehicles will replace large trucks, whereby the number of freight movements will increase within and near cities.’ According to Weltevreden and Rotem-Mindali [8], e-commerce will lead to a rise in the number of freight movements and in the length of distances travelled. In 2006, 35.1 million additional van-kilometres were recorded (0.2%). This did not include the fact that returning goods leads to yet more freight traffic, as is also the case with redelivering the same item at the same address several times (1.2 times on average).

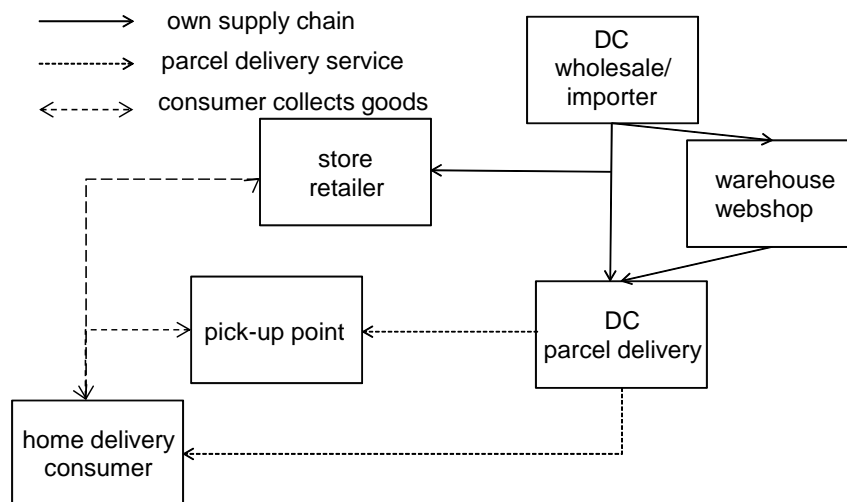


Figure 4 - Distribution through stores or web shops [25]

On the other hand, as the number of home deliveries increases, the delivery business will become more efficient. Boyer, Prud’Homme & Chung [30] have shown that as the address density grows, which will be the case as home deliveries increase, the number of kilometres travelled per address will fall. By making use of parcel collection points and dispatching bundled consignments to these points, courier services will economise on trips

to private homes. In this way, trips will be avoided, in as much as no home deliveries will have been attempted earlier.

4.3. On the streets

From a societal point of view, the impacts of increasing home deliveries on traffic is of interest. Several authors (Braimaister [9]; Weltevreden & Rotem-Mindali [8]; TNO [2]) expect that more home deliveries means more freight traffic but, on the other hand, less traffic related to shopping or, in other words, that Internet shopping will substitute a trip to a shop by a van delivery at home. In reality the situation is more complicated: people tend to combine different purchases in one shopping trip. So they may still go shopping but will buy less in shops. On the other hand parcel delivery services bundle different deliveries in one round trip. More deliveries per round trip means a more efficient delivery.

Thus in the Netherlands, the growth in home deliveries has not yet led to any significant changes in traffic or travel (see Box 1). Although some transport impacts can be detected, our estimates show that the increase in delivery van traffic does not really lead to more road congestion.

Quality of life impacts are therefore limited. The idea that neighbourhoods have become a Wild West of speeding delivery vans needs to be corrected. In the Netherlands, home deliveries of parcels are for the greater part in the hands of a few big players, such as PostNL (with a market share of 60%) and Selektvracht (DHL, with 20%). In principle, these can organise their logistical operations as efficiently as possible by bundling consignments and thus avoid needless kilometres. However we must consider the fact that this part of the transport business has been outsourced and that companies such as PostNL and Selektvracht are therefore not in charge of pre-trip planning.

Box 1: Home deliveries in the Netherlands

For the Netherlands we collected some information and made some assumptions concerning home deliveries in the year 2012. People in the Netherlands made approximately 3.7 billion travel movements to go shopping in 2012, 45% of which were made by car (as driver or as passenger). The total travel distance by car was 12.3 billion vehicle kilometres (2012), or 9% of total vehicle-kilometres in 2012 [31].

The share of delivery van traffic that can be associated with home deliveries is limited, according to the KiM – for instance in 2011, it concerned about 670 million vehicle-kilometres, out of a total of 17.4 billion vehicle-kilometres [32], or 3.8% of total light goods van use. The number of home deliveries is estimated to have concerned 100 million parcels in 2011 (based on OPTA [33]). In case these 100 million deliveries each substituted a trip to a shop, these 100 million (out of 3.4 billion movements) represented 3% (in vehicle-kilometres) of total movements for shopping purposes. Compared to the total traffic performance (170 billion vehicle movements), substitution with home deliveries does not have a significant impact on traffic. However more freight traffic in residential areas can be a traffic safety issue.

5. LOOKING AHEAD

Internet shopping can be expected to keep on growing. The following factors will contribute to this growing demand:

- increasing number of older people who use the Internet and discover how convenient it is to order online and get articles delivered at home;
- young people who are used to the Internet and smartphones, and also use the latter to order goods;
- traditional stores that close down as a result of the economic crisis combined with competition from e-commerce;
- some products still have a low online retail share (for instance supermarket articles) but will increasingly be ordered on the web;
- it is getting easier and simpler: smartphones can be used for web shopping as well.

Figure 5 shows the prospects for the United Kingdom in 2020 [34].

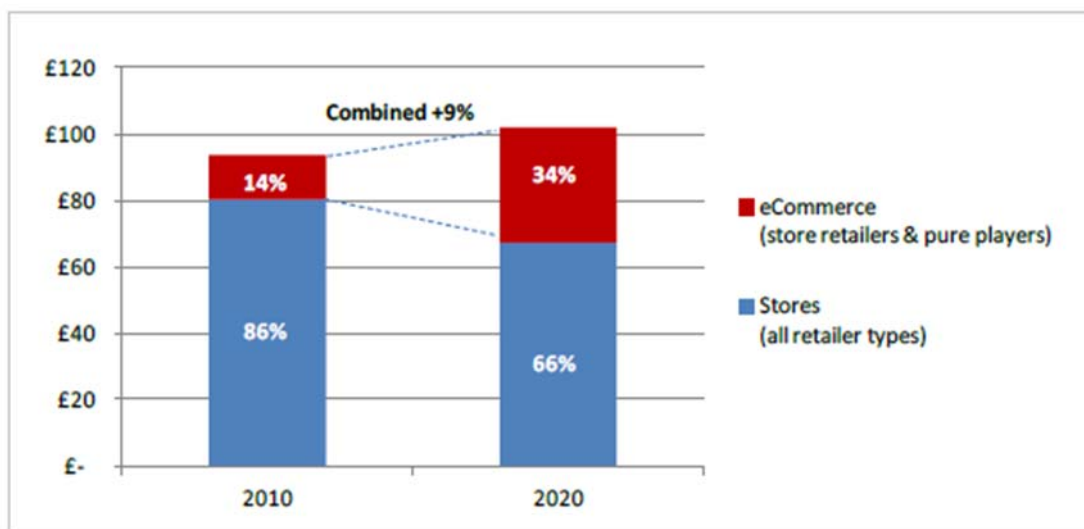


Figure 5 - Retail sales by stores and web shops in the UK in 2010 and 2020 in billions of British pounds [34]

As a result of the above the delivery of B2C parcels will continue to grow. The following projection for the Netherlands in the years 2014-2020 was made by E-sharp (see Figure 6). It shows that parcel deliveries will at least double in the next five years.

5.1. Industry is working on solutions

Meanwhile parcel delivery services have invested heavily in ICT technology, such as tracking & tracing, thanks to which customers have a better idea about the time at which their order will be delivered. Further improvements are possible here. Distribution structures have been modified, too, so that distribution speed can be increased, and to get closer to customers. Part of the solution lies in the development of alternative pickup points, of which there are more than 4300 in the Netherlands (estimate for 2013). This number is set to continue increasing in the coming years. The question is whether this constitutes a structural solution, or will better ICT products, after all, make it possible to improve home delivery operations?

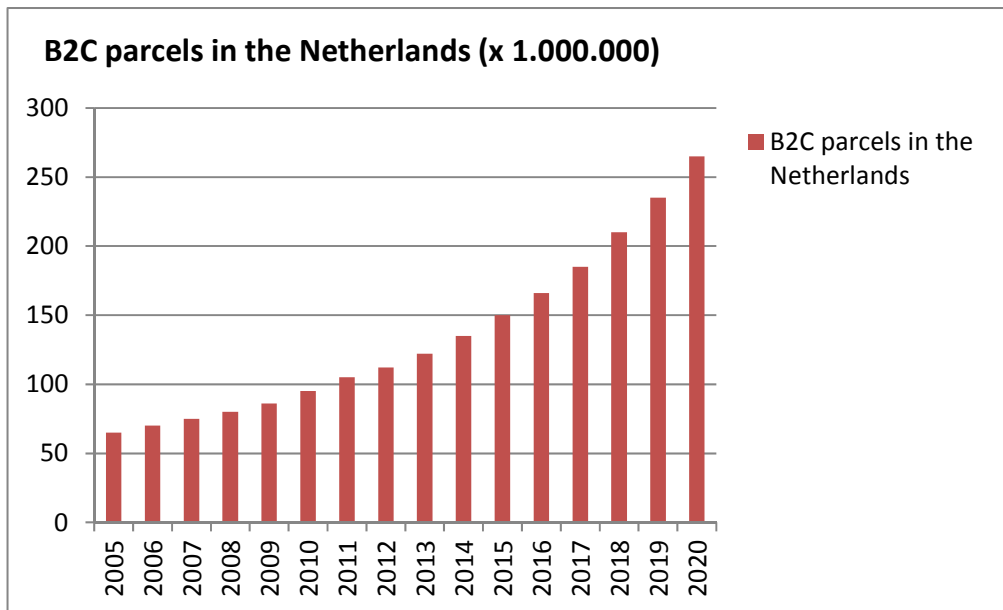


Figure 6 - Expected increase in B2C parcels in the Netherlands for the period 2014-2020 [35]

Home deliveries can become somewhat more efficient if courier service and customer can decide among themselves on a delivery time – for instance through a web application. Web shops offer an increasing number of delivery options: delivery at the home address, at an alternative address, at a web shop collection point, or at a national parcel collection point; choice of delivery day, or choice of delivery day + choice of time slot. Proposing several delivery options allows consumers to choose the method that suits them best.

On the other hand, the introduction of ‘fast shuttles’ – that can deliver an order within one and a half hour – is convenient for customers, but less so from a transport angle. These shuttles already exist in the UK but, as far as we know, not in the Netherlands as yet. Articles bought on the web shop Coolblue can even be delivered at home on the same day. Although deliveries in the evening help, for instance, to reduce road congestion, one should watch out that this type of service does not take off in such a way that eventually it leads to more vehicle-kilometres. Optimal pre-trip planning must remain the guiding principle. Here clearly lies a challenge for the transport businesses concerned. These are still reticent when it comes to this type of ICT service. One interviewed courier service was thinking about how they could inform their customers more precisely about delivery times, and about deliveries on appointment (whether against a fee or not).

Another solution would be to operate alternative modes of transport. For instance, in Brussels TNT Express delivers consignments with electric bikes, the ‘cyclocargos’, that are supplied by a mobile warehouse. This mobile warehouse is a trailer containing a small office, as well as a room for loading, unloading and sorting. It rides every day between the Brucargo airport and Brussels’ Jubelpark. The introduction of the cyclocargo and mobile warehouse are seemingly saving 900 delivery van-kilometres every week. More information on cycle logistics can be found on cyclelogistics.eu.

5.2. Impact on retail stock

Online retailing, for the time being, has mostly to do with non-essential shopping. The Internet share for products such as groceries, and DIY, sport and garden articles, is still small, but this is probably going to change. An ageing population, regional contraction and the shrinking retail stock will play a role in this. The number of empty shop premises has risen to an average 7.5% (1-1-2015) for the Netherlands as a whole [36]. This figure would

have been 8.3% if 13% of the empty shops had not found another use (for instance as living or office space). According to Molenaar [37] one in three shops will even disappear by 2020 (partly because of e-commerce). This may encourage consumers to buy more online, or to go shopping further away but less frequently.

The ING [29] argues that physical shops that do survive will be set up in such a way that they will assist web shops by allowing consumers to 'experience' their products. This means that in such retail spaces, consumers will be able to feel, smell, taste etc. It will be possible to place orders in such shops, but no longer to physically take products away – these will be delivered at home. In this way, shops will increasingly acquire the features of a showroom. It is unclear whether this will lead to more or, on the contrary, fewer vehicle-kilometres.

5.3. Sketching the future

If we look into the future, we can assume that Internet shopping will probably continue to rise. Courier services will optimise their networks of hubs and local warehouses in order to satisfy growing demand. Large web shops such as Amazon and Zalando will set up large distribution centres in Europe (to begin with, only in France and Germany). It is likely that these companies will use existing distribution channels, and that distribution channels will undergo fundamental changes. Unfortunately little information can be found on this topic. Recently, drones have been tested to deliver parcels. However, in some countries it is forbidden to fly an unmanned aircraft for business purposes. So it is unlikely that parcels will be delivered by drone in the near future. Other possible initiatives for the future include lock systems at homes or postal pipeline systems for parcel delivery.

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