

12. Home Shopping

12.1 Introduction

Home shopping, where customers have goods delivered to them, is a growing phenomenon. The nature of home shopping is discussed further in the next sections. However, one key characteristic is that it has clearly, so far, been a private sector initiative with relatively little public sector involvement.

In this chapter, we initially examine the available evidence about

- The nature of home shopping
- The current and future scale of home shopping
- The different characteristics of what people buy, and
- The transport impacts of the different sectors

However, we were primarily concerned to examine the way in which the public sector can condition the way in which the services develop, and the transport impacts which will result.

Many of the issues for optimising home delivery operations overlap with issues for optimising freight travel in general, and include, for example:

- grants to encourage investment in IT for efficient scheduling
 - vehicle maintenance and driving training schemes to help companies to minimise fuel use
 - national policies on fuel and travel pricing
 - regulations on vehicle use within cities
 - transshipment schemes
 - dedicated freight vehicle lanes
 - encouragement of cycling and walking couriers
 - schemes to promote vehicles with more efficient engines, and that run on alternative fuels or hybrid power systems
 - policies on times for permitted deliveries in residential areas
 - schemes to promote local sourcing of goods
- etc..

These issues have been explored in various contexts, including ECMT 1997, FTA 1997, DETR 1999, the UK TransportEnergy Best Practice¹ programme, and the EU SURFF² and JUPITER (1 & 2)³ projects.

There is also a growing body of research and commentary about the overall transport and environmental impacts of home deliveries (including Handy & Yantis 1997, Romm et al 1999, Transport en Logistiek 2000, Dodgson et al 1997 and 2000, Browne *et al* 2001, Retail Logistics Task Force (2001), Hopkinson & James 2001, Kärnä 2001, OECD/ECMT 2001, Mokhtarian & Salomon 2002, Mokhtarian 2004 and

¹ www.transportenergy.org.uk/bestpractice/index.cfm

² www.euroweb.net/surff

³ europa.eu.int/comm/energy/en/thermie/jupiter2.htm

European projects ROSETTA⁴, STELLA⁵ and Digital Europe⁶), together with studies relating specific sectors, as reported later in this chapter.

For this project, we were particularly keen to find evidence about local authority involvement in schemes which have focused on home shopping. Although we did not undertake a case study interview, we were able to draw on a detailed report about a pilot project taking place between the Royal Mail and Nottingham City Council. This has involved the development of a number of different delivery locations that people can have shopping delivered to, and has been written up as a case study for the Department for Transport's Transport Energy Best Practice programme, (TransportEnergy BestPractice 2004).

From the analysis work, a number of indications also emerge about other ways in which both central and local government might wish to get involved in home shopping, and the policy implications are summarised in section 12.12.

It should be noted that we were largely unable to gain any information about the public sector costs of different forms of involvement in home shopping, although some tentative statements are made in section 12.11.

12.2 The nature of home shopping

Home shopping is often taken to be synonymous with electronic commerce, or Internet shopping. In reality there are a number of different ways in which people can purchase goods from home, most of which are forecast to increase in the future. This is important since the social profile of those who use different channels is different, and therefore concentrating on Internet options alone results in a distorted picture of the potential impact of home shopping in the future. In particular, these options are:

- catalogue shopping, where the growth area is seen as specialist catalogues aiming at more upmarket clientele (compared to the traditional market which was 'middle-aged housewives' and those in need of cheap credit).
- direct retailing such as Tupperware or Avon, media advertisement with phone ordering and specialist subscription services such as book clubs.
- Internet shopping (where the main advantages are seen as being the opportunities to buy goods internationally, to get cheaper products, to readily find products requiring complex searches and to obtain new types of services and products).
- TV shopping (which has the advantage of operating on the basis of familiar technology, being watched in a comfortable environment conducive to browsing and providing a more regulated environment than the Internet).
- 'intelligent' household items such as dustbins and refrigerators (For example, Electrolux have developed a product called Screenfridge, which can be used to automatically reorder items as they run out).

In short, there are a whole range of ways that customers can and will be able to order products for delivery. It is also widely expected that technologies will increasingly merge in the future. For example, interactive TV, smart mobile phones and even

⁴ www.trg.soton.ac.uk/rosetta

⁵ www.stellaproject.org

⁶ www.digital-eu.org

games consoles from Sega, Sony and Nintendo are starting to provide access to e-mail and the Internet. According to a Reuters Business Briefing quoted by Morris (2000):

“The likely truth is that the future is going to be dominated by neither Internet shopping nor a borne-again resurgence of high streets and shopping malls. It will, rather, be a sensible, genuinely progressive amalgam of on-line and high street businesses - what’s already being called clicks and mortar”.

There is also increasing interest in the delivery of shopping to locations other than the home. This is discussed further in section 12.7.3.

12.3 The current and future scale of home shopping

12.3.1 Estimates of all forms of home shopping

Data collected by the Office for National Statistics (2003) suggests that home shopping sales (defined as ‘mail order’ and ‘other non store retail’) have constituted about 4% of total retail sales for the last 10 years, and are only just starting to become more significant. There have been some concerns about how accurately the ONS data reflect reality, particularly the newer forms of retailing such as Internet and TV shopping. Given that most home shopping is still dominated by catalogue sales, these figures provide some indication of current trends. Specifically, for example, Mintel (2003) estimates that mail order still constitutes 70% of home shopping sales, direct selling makes up 10%, whilst e-commerce (including Internet and TV sales) and other forms of home shopping make up the remaining 20%. However, there has been very rapid growth in Internet and TV retailing, compared to other home shopping sectors. For example, Mintel (2003) also quote data from a nationally representative sample of 1476 adults aged 15+, where the proportion claiming to have bought goods from the Internet has increased from less than 10% in 2000 to about 25% in 2003.

More specific estimates of the home shopping market have recently been commissioned from the Department for Transport, to evaluate the current and future scale of home shopping.

The work was conducted by Foley et al (2003b). It involved interviews with 24 key professionals and policy makers, and in-depth analysis of 5 reports from three expert organisations, namely Key Note, Retail Intelligence and Verdict. Final results from the work represent an ‘average’ of the results given in the reports, adjusted to take account of expert opinion. These findings are given in table 12.1

These data suggest that the scale of the home shopping market may perhaps be double that shown by ONS statistics, with rapid growth expected, particularly for Internet shopping and grocery home shopping.

Table 12.1 Estimates of the size of the home shopping market

	2000	2005	2010
Size of home shopping market	£16.3 billion	£30.5 billion*	£57.0 billion*
% of all retail sales	8%	13.8%	n/a
On line sales	£4.9 billion	£11 billion	£22.5 billion
On line sales as % of all retail sales	n/a	4.3%	7.7%
Grocery home shopping market	£530million	£4.25 billion	£13 billion
% total food retail sales	0.6%	4.0%	11%

* Inferred from predicted rates of growth between 2000 and 2005, and 2005 and 2010.

Foley et al (2003) also reviewed statistics about the prevalence of home shopping. Their review quoted studies suggesting that 52% of consumers have received at least one home delivery in the last 12 months. It argued that women were much higher users of home shopping than men, and that home shopping was most common in the middle of the socio-demographic scale (with the highest level of home shopping occurring in social group C2).

However, these results probably reflect the current dominance of mail order selling in the home shopping market at present. If the greatest growth occurs in Internet and TV retailing, the profile may change, to reflect the distribution of technology.

Access to new technology is increasing fast. According to the ONS (2004), between 1998/99 and 2002/03, the proportion of households with a home computer increased from 33% to 55%, and the proportion with Internet access rose from 10% to 45%. At the same time, 94% had a telephone and 98% had a television. Analysis of the Expenditure and Food survey (ONS, annual) suggests that income is the biggest determinant of access to all types of technology. In terms of household types, it is notable that retired households are far less likely to own the newer types of technology. The presence of children in the household increases the numbers that own a home computer, or have access to the Internet or satellite TV. This effect is more marked for two person households (probably because they have more disposable income). (Notably, this reverses the effect observed for general retailing, where the presence of children in the household means that the household behaves more like a 'poorer' household, making fewer discretionary purchases than might be expected. This implies that new technologies are not viewed as luxury goods but more as educational tools).

Take-up of new technologies is expected to continue, partly because a growth in technical literacy will probably mean that more people are able to use the new options available, and partly because the new technologies are becoming a cheaper and more ubiquitous part of everyday life. However, there are concerns that certain sectors of the population (in particular, the elderly and the poor) may remain relatively disconnected from the new technologies, with implications for social inclusion, as discussed briefly in section 12.9 and 12.12.

12.3.2 Estimates of internet shopping

As well as general estimates of the home shopping market, a comprehensive review of internet shopping was conducted by Cairns et al in 2000, including assessment of surveys from Lex Transfleet, Ernst & Young, Which?, Continental Research, Fletcher Research (later Forrester Research), National Opinion Polls, Verdict, The Henley Centre, Bossard Consulting Group, and others. The findings are summarised below.

In general, a number of key characteristics seemed to be emerging, both about Internet users, and Internet shoppers, (who do not necessarily have the same profiles). Profiles may be expected to change, as use of the Internet progresses, and in terms of the product bought. For example, anecdotal evidence about grocery retailing suggests that 'time pressed families' from poorer households may constitute a significant segment of the home shopping market for groceries. Moreover, all surveys suggested that initial bias in Internet profiles is diminishing over time as it becomes a more 'everyday' technology - for example, the gender balance is becoming more representative of the general population. However, currently, major characteristics of Internet users and shoppers are as follows:

- More men than women use the Internet
- Internet users have a higher level of education, come from richer households and higher social classes
- Internet users are younger than average
- Internet users are more likely to live in larger cities, and particularly London.
- Internet shoppers are more likely to be experienced Internet users, and more technologically aware generally.
- Time spent on the Internet use largely replaces time spent using other communications and entertainment technologies, although people mention a wide range of activities that they substitute.
- Many people access the Internet from work, so that home penetration of computers and Internet access is not the limiting factor on the number of people who may e-shop.

In terms of numerical estimates, Cairns et al (2000) highlighted that in 1999, estimates of annual Internet sales were £0.6-3 billion (0.25-1% of total sales). Future predictions were that, by about 2005, Internet sales would account for £7-20 billion (3-7% of total sales); and by about 2010, could account for £40-113 billion (12-25% of total sales⁷). However, the reliability of future estimates was considered dubious, given the amount of variability both in current estimates, and between future estimates. Particularly dramatic increases in internet sales were tending to occur at Christmas.

In general, the findings reported by Cairns et al are in line with the recent estimates by Foley et al, except for the predictions for internet sales in 2010. Here, the figures from Foley et al are considerably more conservative, presumably reflecting the fact that experts are now more cautious given longer term experience of Internet shopping.

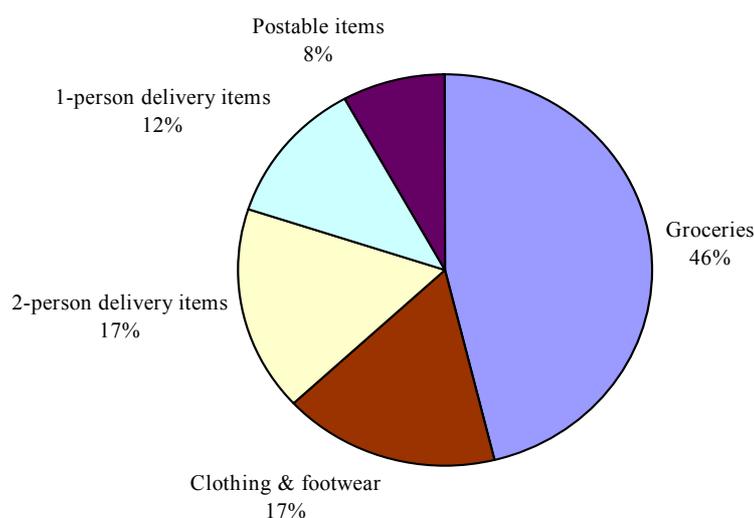
⁷ £40 billion is considerably less than 12.5% of total sales, but the data source gave no estimate of what percentage of sales it did imply.

12.4 The different characteristics of what people buy

In the work by Cairns et al (2000) five main sectors of goods were defined, according to their logistical requirement. The study excluded sales of 'special' types of products (like houses, cars, public transport tickets, theatre tickets and holidays), and services (including banking, insurance and other personal financial transactions etc).

Data from the Family Expenditure Survey was classified to provide some insights into the size of each sector. The results are given in Figure 12.1

Figure 12.1: Proportion of household spending on different sectors



To create these sectors, data were added together as follows:

Groceries = Food, non-alcoholic drink, detergents and other cleaning materials, toilet paper, pets and pet food, toiletries, soap, cosmetics and hair products.

Clothing & footwear = Clothing and footwear

2-man delivery items = Furniture, floor covering, gas and electrical appliances, kitchen/garden equipment, household hardware and sports/camping equipment

1-man delivery items = Soft furnishings and bedding, kitchen and electrical consumables, TVs, videos, computers, audio equipment, toys, hobbies, horticultural goods, plants and flowers,

Postable items = jewellery, watches, books, maps, diaries, newspapers, magazines, photos and CDs.

It is notable that groceries account for nearly half of this expenditure. Clothing and footwear, and two-person delivery items (mainly household goods) are the second two biggest sectors, in terms of spending.

The sectors are relevant, because they have different logistical requirements, and will have different transport impacts. These issues are considered in more detail in the following subsections.

12.4.1 Groceries

This category includes sales of food and other household items. Home shopping offerings for groceries have to deal with several distinctive features - the goods have to be delivered at three temperature regimes (frozen, chilled and ambient), and

customers expect very short lead times. Purchasing is likely to occur regularly, allowing retailers to build up a relationship with their customers.

Home shopping options for groceries have been available in the UK for over 20 years, as reviewed by Cairns 1996. However, the last few years has seen a major expansion in offerings, as most of the mainstream retailers have started to offer services via the web. Most are using a logistics model whereby internet grocery orders are picked, packed and delivered using conventional stores (or facilities immediately adjacent to stores). This is the model used by Tesco, which is seen as the market leader for grocery home shopping, and now offers home delivery from stores to 95% of the UK (Tesco 2002). The only mainstream retailer using a different model is Ocado, an independent venture which delivers Waitrose goods. Although there has been the development of some independent ventures, these remain a small part of the market, and many were relatively short-lived, either closing down or being absorbed by the multiples.

Demand for the home shopping options seems to be variable. A recent Government survey of the major grocery retailers reports the following:

“General consensus exists among the grocery retailers that e-commerce will not exceed 10% of total UK grocery sales value by 2005, or 15% by 2010, with many of those interviewed thinking that these are very optimistic predictions. In the opinion of the retailers interviewed, a realistic estimate of the e-commerce share of the UK grocery market in 2005 appears to lie between 2.5 and 10%.” (Retail Logistics Task Force, 2000)

These figures are in line with the more specific estimates (4% by 2005 and 11% by 2010) produced by Foley et al (2003).

In terms of the transport impacts, although the total proportion of groceries which are purchased by home delivery is still very small, this sector has generated some of the greatest academic interest because of the absolute volumes involved and the regular nature of the delivery.

12.4.2 Clothing and footwear

This category is fairly clearly defined, and differs from the others in that it tends to have significantly higher return rates (typically up to 30-40%). Catalogue shopping is dominant for clothing and footwear, although the nature of the catalogue market is changing. Traditionally, the catalogue market was dominated by the 'big-book' catalogues, that were partly so attractive because they offered a source of cheap credit. However, in 1987 Next launched a more specialist home shopping catalogue, attempting to develop a more up-market image for catalogue shopping, and a number of other high street stores have followed suit. There has also been some growth in internet offerings, including sites developed by the main retailers.

As home shopping for clothing and footwear is evolving, companies are starting to offer shorter lead times, and returns policies which are more conducive to 'buying before trying'. Already, items purchased online from major clothing retailers often arrive with a pre-paid return label, and, in some cases, it is possible to take items back

to a high street store, regardless of the purchasing method. Access to out of stock items and a wider range of sizes are seen as key benefits, compared with conventional shopping services.

In terms of the transport impacts, given that much of the home shopping market for clothing and footwear is catalogue sales which has already existed for some time, the growth of new delivery movements is less. It is also notable that this sector is proving to be the least successful on the Internet. However, the high return rates of this sector generate concerns about delivery movements.

12.4.3 Two-person delivery items

This category includes products such as large items of furniture (eg. sofas, wardrobes) and other large household items (eg. electrical items like washing machines, cookers and fridges; and some DIY products). The sector is distinctive in that the ordering of items, and later delivery, is already a major feature. Customers have been conditioned into waiting for goods, with deliveries sometimes taking a month or more (since many items are made to order).

However, there is evidence that customers are increasingly demanding shorter lead times, and are only really prepared to wait when they are purchasing high quality individual items. Because these types of large items are bought infrequently, the sector also relies more on advertising than on building long-term relationships with customers, and on providing high quality services and advice at the time of purchase. In general, most of the major players have developed their own websites (for example, www.comet.co.uk, www.mfi.co.uk), which offer the opportunity to purchase products. A number of dedicated e-retailers have also set up, such as www.furniture123.co.uk and www.pineonline.co.uk.

In terms of the transport impacts, the nature of these items means that home delivery has always been a major feature. Any increase in deliveries by stores is likely to represent efficiency savings, since one vehicle delivering several items is almost always likely to be more efficient than customers using their own private vehicle transporting only one item at a time.

12.4.4 One-person delivery items

This category includes many hi-tech objects like computers, stereos and TVs, together with other household/leisure items (eg. smaller electrical items like irons and some sports equipment).

Of items in this sector, computers are particularly dominant in terms of home shopping sales, and initially at least, they accounted for the highest sales value of all items sold over the Internet. A significant proportion of all computers are sold over the internet, and a high proportion of transactions are conducted directly with the manufacturers. For example, Dell only sell via the internet.

Most of the major high street players (including Dixons, Currys and Comet) have their own websites, and there are also a number of specialist e-retailers such as Dabs.com. There has also been the set up of a number of auction sites, such as e-Bay,

where customers can specify how much they wish to pay for a product; and sites encouraging consumers to club together to negotiate prices, such as LetsBuyIt.com⁸.

In terms of the transport impacts, this is the sector where there appears to be the biggest growth in deliveries direct from the manufacturer to the customer which is leading to the development of entirely new supply chains.

12.4.5 Postable items

This category includes all items small enough to travel via conventional postal services, like books, CDs and other leisure/gift items. This seems to be the only category containing products that could 'dematerialise' into electronic forms. It also seems to largely consist of luxury items, which are discretionary purchases, such that the increased range of options offered by home shopping is more likely to stimulate demand in this sector than in others. Third, by definition of the sector, this group of products is the easiest to transport. Hence, it is perhaps not surprising that this sector contains the some of the most popular products to buy via non-store options, and where there is most likely to be increasing international trading.

Amazon.com was one of the first Internet companies to set up, and has become synonymous with the dot.com revolution, with its sales of books, and subsequently, sales of other leisure products like CDs and videos. Meanwhile, jewellery is reported to be one of the largest selling items on TV channels such as QVC.

In terms of transport impacts, postable items, that can travel through conventional postal services are likely to have relatively little impact aside from leading to an expansion of the conventional postal market. Concerns in this sector are related to the growth of international purchasing, and aggressive just-in-time market fulfilment strategies, one example being the notorious tale of the fleet of airplanes chartered by Amazon.com to deliver the fourth Harry Potter book.

12.4.6 Overview and policy implications of sector characteristics

Different sectors generate different requirements. For groceries, temperature regimes, storage options and short delivery times are paramount. For clothing, good returns policies are vital, whilst for two-person delivery items, reliable delivery arrangements and good after-sales service are more important. Postable items are more likely to be sold internationally, and price and novelty value will be key determinants of success. Computers seem to be the only item where a considerable amount of sales are increasingly being conducted directly between the customer and the manufacturer.

Each of the different sectors generates different transport requirements. As highlighted above, postable items are largely travelling via conventional postal services, two-person items have always required delivery and home sales of clothing and footwear are dominated by the catalogue distribution networks, which have been in place for some time. Consequently, the newest and fastest growing national home delivery sectors are home shopping sales of groceries and 'one person delivery items'. The next sections look at some evidence in relation to the transport impacts of these

⁸ These sites sell other products too, but are particularly important for one-person delivery items.

sectors. In particular, section 12.6 examines local authority involvement in a trial scheme which aimed to reduce the transport impacts of 'one person delivery items', clothing and footwear and some postable item deliveries.

12.5 Transport impacts of grocery home shopping

A review carried out by Cairns (2004) has examined the currently available evidence about the transport impacts of grocery home shopping. This material is summarised in the following sections.

12.5.1 Modelling assessments of the transport impacts of grocery home shopping

There has been modelling work about home shopping by number of commentators. The key results from these studies are shown in the following table:

Table 12.2 Traffic impacts of grocery home shopping services

	<i>Impact on traffic generated by those undertaking home shopping</i>	<i>Total impact on grocery shopping traffic, depending on the proportion of the population taking up home shopping.</i>
Cairns 1997	-70-80%	1% take-up: -0.8% 15% take up: -13.1%
Palmer 2001	Deliveries from existing stores: -75% to -91% Deliveries from mix of stores and fulfillment centres: -69% to -78%	0.5% take-up (2001): -3.7% 2% take-up (2003): -8.2 or -8.6% 5% take-up (2005): -12.6% or -11.5% 10% take-up (2010): -22.7% or -20.7% depending on fulfillment model
Punakivi et al 2001-03	-53.7% to -92.8% depending on the time restraints placed on delivery options	
Farahmand & Young 1998	-87%	
Persson & Bratt 2001		10% take-up: +0.5%* to -8.5% 25% take-up: -14% to -24% 50% take-up: -40% to -49% depending on fulfillment model, delivery destination and time restraints
Murto 1996		1 trip per week replaced: - 2% decline in total traffic (i.e. not just grocery traffic)

* It should be noted that this result is not considered to be credible given the associated descriptions in the paper.

There were additional studies by Karna (2001), Orremo et al (1999), Nockold (2001) and Freire (1999), which provide further insights, but did not produce numeric estimates of the kind that could be readily incorporated into the table. It was notable that although the various research projects were based on different software, worked at different scales, and used different assumptions, they produced some broadly

similar results about the traffic impacts of grocery home delivery services. These were:

- If delivery vehicles directly substitute for car trips, the kilometres saved per shopping load are likely to be substantial – **with reductions in the order of 70% or more**. Even with very stringent operating constraints or very low levels of customer demand, reductions of 50% or more are predicted.
- The degree of savings broadly depends on the extent to which customer orders can be consolidated. Deliveries from local stores (as opposed to dedicated fulfilment centres) appear more efficient, (as shopping remains consolidated in larger vehicles for longer, only being subdivided into smaller vehicles for local delivery closer to customer homes). Delivery operations with fewer time constraints are also more efficient. There are then a number of related factors that will have an impact (including delivery vehicle capacity, the location and density of customer demand, the location of the store or fulfilment centre, etc.).
- The effect on overall travel for food shopping will largely be determined by the level of take-up of home shopping.

These conclusions are made in the context that food shopping accounts for only a small *proportion* of total motorised travel, although it generates a significant amount of travel in absolute terms. These assessments provide a starting point for considering the traffic impacts of home deliveries.

12.5.2 Behavioural responses not included in modelling assessments

In reality, changes in customer behaviour are likely to be more complex than the models assume. There are three changes in customer behaviour which are commonly discussed in relation to calculations about traffic impacts, as discussed below:

- **Car-drivers may change the frequency of their shopping**

There is concern that people may order some goods, such as dry, 'standard' products, but still make a car journey to buy other items, like fresh produce. This would mean that delivery traffic would add to existing car traffic, rather than replacing it. However, whether this happens partly depends on home delivery cost structures. Where there is a delivery charge to pay, it seems unlikely that many people will place small orders. The evidence is that, on average, the opposite effect is more dominant – with home shoppers tending to buy more and shop less often (presumably to get the most from their delivery charge). For example, Brunn-Jensen (1999) reports that, on average, Tesco home shoppers buy 120% more than store customers (an average basket size being £91 compared with £41.30 for in-store customers), whilst Iceland home delivery customers buy 500% more (the average basket size being £45, compared to the average in-store shop of £7.60). The impact of less frequent shopping should be further travel reductions⁹.

⁹ This might not apply if home shopping services are stimulating additional purchases. So far, commentators like Verdict Research (2000) have reported that this phenomenon is relatively limited (less than 10% of Internet sales) and that such 'new' purchases are largely concentrated in the 'postable' items sector, including products such as books and CDs which are typically more

- **Non-car drivers start to use services**

If people who currently do not use a car for home shopping start receiving home deliveries, then there is no decline in car travel to compensate for the growth in delivery traffic. One counterargument is that the availability of home delivery services could, in some cases, 'tip the balance' in longer term decisions about car purchase. Moreover, the proportion of households who do not use a car for major food shopping is relatively small, with some research commissioned by Sainsburys suggesting that even 30% of non-car-owning households get a lift or take a taxi (Telephone Surveys 1994).

- **Cars 'released' from grocery shopping may be used more for other things**

There is concern that if a car is not used for the journey to the supermarket, it may be used more for other things, either because the shopper gains time, or because other members of the household will use it. Some argue that the 'time-poor households' likely to be using services will probably have 'suppressed trips' that they will want to make instead. Others suggest that such households will spend any 'time gains' by lengthening existing activities, or on in-home relaxation, (which is likely to be one of their most 'time-squeezed' activities), and that they are likely to be richer households where adults who want a car have one already. (The validity of this argument would diminish if Internet shopping becomes increasingly widespread). If it is the case that cars 'released' from shopping are used for more travel elsewhere, it is still unclear whether such additional travel should be counted in any home shopping 'traffic impact assessment'. Travel for food shopping is considered to be one of the most car-dependent trip purposes, because of the transport of bulky goods. Hence, reducing car travel for that journey purpose can still be considered a success in policy terms. Meanwhile, the 'responsibility' for reducing car-use for other trip purposes presumably depends on initiatives specific to those types of trip. Partly, the last argument simply highlights the need for an integrated transport policy. Given that people will always want to undertake some travel, the challenge is to ensure that people are provided with a more attractive alternative than the car for all journey purposes.

More generally, the scale of the behaviours described in the second two bullets are critical to their importance on overall traffic impacts¹⁰. Most of the models were showing reductions in travel per shopping load in excess of 70%. Crudely, this implies that even if 7 out of 10 home shoppers were not previously driving, or continue to drive for other purposes, there is unlikely to be a net increase in traffic from new services.

discretionary, luxury purchases. 'New sales' are not currently considered to be a significant phenomenon for grocery shopping.

¹⁰ In one study of tele-workers (Gould and Golob, 1997), it was shown that, on days when people worked from home, on average, they spent about an hour less on work and associated travel, whilst spending 46 minutes on out-of-home discretionary activities (including travel for those activities). In contrast, those working away from home spent about an hour more on work and associated travel, and 37 minutes on out-of-home discretionary activities (including travel). This implies that when working from home, only about 15% of 'saved time' was converted into out-of-home activities. This highlights that people who gain time will not automatically wish to convert all of it into extra out-of-home activity. However, the particular focus of their study makes it difficult to draw more specific conclusions about the overall traffic impacts of home shopping.

12.5.3 Studies of the traffic impacts of grocery home shopping

To understand the complexity of behavioural responses to home shopping, studies of actual changes in customer travel behaviour are required. Although the author is aware of numerous undergraduate and MSc projects which have attempted to survey home shoppers, there has been little mainstream research or literature on the topic, partly due to the problems of accessing home shoppers for research. A few small studies are reported below, together with related surveys of relevance to the issue.

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• **Customers of the Food Ferry¹¹ (Millar 1998)**

'The Food Ferry' is an independent grocery delivery company operating in London. In 1998, in a survey of 160 customers, 61% of respondents reported that they owned at least one car, with 74% of these reporting that they were using their car less because of shopping with the Food Ferry. This implies that 45% of all respondents were reporting reduced car-use as a result of using the service. In addition, Millar reported that "two or three customers indicated they have got rid of their vehicle altogether because of the Food Ferry".

• **Customers of James Telesuper (Tacken 1990)**

'James Telesuper' is a grocery home shopping service in the Netherlands, where, at the time of Tacken's work, customers could order goods by phone or computer. Tacken surveyed 146 customers from Amstelveen, (a town with a large central shopping area and a small shopping centre in each residential district). Survey results showed that over 50% of tele-shopping customers were still buying fresh goods from a store, but were less likely to use supermarkets, and more likely to use local shops. They were also making less trips. In general, tele-shopping customers were shopping less often than average, with 49% ordering once a month or less. Of those still visiting shops, when asked how their means of travel for shopping had changed, 28% said that they travelled less by car, 23% that they walked more often, and 14% that they travelled more by bike. 70% believed that the service was saving them time, with the average quoted saving in the order of 0.5 - 2 hours. Most did not say how the time gain was being spent, but Tacken comments: "the extra time may not have been devoted to new activities, but to more time for existing activities, including sleeping in... Most people did not mention any new activity that required travel".

• **Members of Imperial College who use e-commerce (Snead 2001)**

Snead (2001) undertook an email survey of 95 staff and students from Imperial College, London, of whom 12 undertook home shopping for groceries. On average, the grocery home shoppers reported that using the service has resulted in a reduction of 4 trips per month. Snead comments: "Although this is not a large sample, the fact that the figure for groceries was twice as high as for any other type of shopping is worthy of note. The reason for this is probably that grocery shopping is normally the primary purpose of the shopping trip". 85% of respondents also reported that they would have travelled by car to purchase groceries, had they not shopped from home – implying that there was an average saving of 3.4 car trips per month.

¹¹ www.foodferry.co.uk

- **Customers of Schnucks Express Connection (Morganosky & Cude, 2000)**

Morganosky & Cude (2000) carried out a survey of 243 customers of Schnucks Express Connection, the internet grocery shopping service offered by a St-Louis-based store chain to parts of mid-west USA. The research did not provide any direct information about travel impacts, although it did ask about some relevant aspects of behaviour change. About 53% of people shopping from home felt that it saved them time, although 47% did not. Many (81%) reported that they were still using stores to buy food, although there was no clarification as whether these were the same stores as previously, and it is also notable that a high proportion (51%) had only started using the internet to buy groceries in the preceding month. Perhaps the most interesting finding was that many of the users identified convenience factors as reasons for using the service (including a considerable number of mothers with young children and people with physical problems lifting and carrying groceries), rather than a desire to achieve time savings in order to undertake other activities.

- **Expert views about home shopping**

In their review of research evidence and expert opinion, Foley et al (2003a) concluded that, typically, on-line grocery buyers make 3.5 fewer shopping trips per month, compared to non-buyers of online groceries. The only dissenting expert felt that the effect on travel was a slightly smaller reduction of 2 trips per month. In addition, one grocery expert stated that on-line customers typically order groceries relatively infrequently – every 15 days on average.

- **Motorists support for home shopping (Lex Transfleet 2000)**

Lex Transfleet carry out an annual survey of motorists, designed to be representative of UK motorists in general. In 2000¹², they asked 1563 motorists whether they would support home shopping if it led to a rise in the number of vans/trucks delivering goods. 22% said they would still support services, whilst 38% would be opposed. Notably, the question formulation did not include potential traffic reductions from reduced car usage – suggesting that the researchers did not consider it important in people's evaluations. To some extent, this assumption is justified by other qualitative evidence, which suggests that people are likely to perceive delivery vehicles in residential areas as noisy, dirty, and a safety risk to vulnerable road users (regardless of their actual operational characteristics), and that they are more likely to notice delivery vehicles *per se*, because, compared with cars, they are bigger, and a less common feature of the local environment.

In summary then, these surveys suggest that, whilst home shopping for groceries may generate some offsetting travel for other purposes, in general, it is likely to reduce personal car-use, with motivations for using home shopping grocery services often being about reducing hassle and having more time for existing activities. The survey of James Telesuper further clarifies that, whilst some trips may still be made to stores, the number is likely to reduce, and trips are more likely to be to local shops, by more sustainable modes. Meanwhile, the survey by Lex Transfleet highlights that perceptions of traffic impacts are likely to be skewed by concerns about delivery vehicle growth, regardless of any offsetting reductions in private car traffic. Such

¹² In the Lex Transfleet 2001 report, the same question was asked – but only to home shopping motorists (a total of 317 people). Opposition was significantly lower (at 24%), whilst support was higher (37%). However, given who was asked, the answers are less representative of general public opinion.

perceptual issues strengthen the business case for ensuring that home delivery services for groceries operate at maximum efficiency, using attractive, well-driven, environmentally-friendly vehicles, since this could affect whether people choose to use services, and which services they choose to use. Meanwhile, the need for research about actual traffic impacts is reinforced, since it is important that policy decisions are informed by facts about transport and environmental impacts, not simply public perceptions.

12.6 Trial scheme to minimise the transport impacts of some non-food deliveries

As discussed more generally in section 12.7.4, there is considerable interest in the use of drop boxes to increase the efficiency of delivery operations. TransportEnergy BestPractice (2004) reports on a trial scheme in Nottingham which has been effective in reducing the amount of travel generated by (supposedly) postable items, which won't go through the letterbox or need a signature, together with some deliveries of clothing and footwear and 'one-person delivery items'. The trial is of particular interest given that it is an example of public sector involvement in the home shopping sector.

12.6.1 Nature of the trial

In 2002-3, the Royal Mail undertook the trial in two postcode areas of Nottingham, in collaboration with Nottingham City Council. The trial aimed to address the problem of failed deliveries, which occur when no one is at home to receive items that either require a signature (such as time guaranteed services) or are too big to be posted through the letterbox. It included items from catalogue and Internet retailers, where such retailers were registered with Royal Mail's Local Collect service¹³.

In the trial, customers were allowed to choose where items would be delivered to, both initially and following failed deliveries. The options included their own address, a neighbours address, an automated local bank (which were situated in various locations around the city), their local Post Office branch and/or Royal Mail delivery office. For some options, customers could request to be notified of the delivery by text or e-mail. The trial required the Royal Mail to ensure that the delivery facilities were in place, and to develop a database of customer preferences. An extensive marketing campaign was implemented to encourage customers to register their preferences. Initially, all unregistered customers were assigned their own address as the preferred delivery address and the nearest Post Office branch as their preferred redelivery address.

Nottingham City Council helped to facilitate the scheme as follows:

- The council helped the project concept to be swiftly introduced a wide range of prospective partners, including hospitals, universities, shopping centre management and railway station management. (This was important when identifying locker bank locations).

¹³ This is a nationwide service, where customers ordering from registered catalogue or Internet retailers can ask to have their goods delivered directly to one of almost 15,500 participating Post Office branches.

- Locating locker banks in public places required planning permission, and a city council representative facilitated the necessary pre application discussions between Royal Mail and Development Control. This meant that any issues could be addressed as early as possible.
- The city council provided local census information and access to city and regional partnerships including a community committee.
- The city council helped to publicise the scheme locally

12.6.2 Scale of the scheme

The trial took place in postcodes NG5 and NG9 in Nottingham. These are both mixed suburban areas, with a combined total of 68,000 residential addresses. There were 33 relevant Post Office branches located within the areas, and one Royal Mail delivery office with customer pickup facility in each. In addition, 11 locker banks were introduced into the area. In total each week 1,001,000 items are delivered into the areas of which 36,000 are packets/parcels or require a signature. This implies that there are potentially 28 relevant deliveries per household per year, which could be affected because they are not delivered successfully the first time, or because the customer would choose for them to be delivered elsewhere.

During the trial, around 2000 customers registered a delivery or redelivery preference. Some 50,000 more used the service without registering, when their undelivered items were redelivered to Post Office branches. The total number of deliveries in the scheme, either to the local Post Office branch, locker bank or neighbour, has increased over time. In February 2003, it was 6000 per month, whilst by October 2003, it was 12,000 per month and the trend was still one of upward growth. This implies growth from one item per household per year to 2 items per household per year. The majority have been redeliveries to the local Post Office branches.

A wide range of products and goods were delivered during the trial. These included books, DVDs, CDs, computer hardware and software, fishing tackle, live plants, holiday tickets, DIY kit, clothing and curtains.

12.6.3 Impacts of the scheme

With funding from the Department for Transport, 200 individuals from the trial areas were surveyed by telephone in February 2003, including half who had registered to have the local Post Office branch as their preferred redelivery option and half who had been allocated this option by default. Results from this survey were as follows:

- 25% of customers reported that they had increased the frequency of home shopping as a result of the service. A further 41% thought that they would shop from home more in the future due to the availability of the service.
- About half of the respondents stated that they used a different mode of transport to get to the local Post Office branch compared to how they would normally travelled to the Royal Mail delivery office. Over 30% of all respondents said they had changed from using a car or motorcycle.
- 71% of those using the service found that collecting items from their local Post Office branch (rather than the Royal Mail delivery office) reduced the length of

their journey, by an average of 14 minutes. Collecting items from the Post Office branch increased the journey length of only 8% of customers.

- A third of customers combined their last trip to the Post Office branch to collect their item with the trip to another location. Over 50 % of these combined their trip to the Post Office branch with a trip to the supermarket, and 19% combined their trip with a trip to work.
- On average, a customer in the trial area would have been travelling about a mile less to collect an item from their local Post Office branch, compared to the Royal Mail delivery office

The reduction in distance travelled to each local Post Office compared with travelling to the Royal Mail delivery offices, is reported to correspond to a saving in car miles of between 50,000-100,000 miles per annum, 5000 to 10,000 kilograms of carbon and equivalent savings of other polluting emissions within the trial area. Scaling up the trial to the whole of the UK is estimated to equate to an annual saving of between 30 and 60 million miles per annum (and between three and six million kilograms of carbon). Combining trips to collect goods with another journey and/or making the journey without using a car will have resulted in an even greater reduction in the number of private vehicle miles, (TransportEnergy BestPractice 2004).

An alternative calculation (not given in the case study write-up) would be as follows. Given that 96% of people live within one mile of a Post Office branch, and that the average customer would have been travelling a mile less to reach the Post Office, compared with the Royal Mail delivery office, it seems fair to assume that average journey distance has at least halved for collecting redeliveries. 30% of these journeys are no longer made by car, and some would have been made anyway. Given that 30% of journeys to the local Post Office branch were combined with another trip purpose, a mid range estimate would be that 15% of all journeys would have been made anyway. Combining the assumptions that 15% of journeys would have been made anyway, 30% are no longer made by car, and the remaining 55% are half the distance, implies that the total effect of the trial may have been to reduce customer mileage to collect unsuccessfully delivered packages by 72%.

Other impacts reported from the scheme were:

- All 33 Post Office branches in the trial saw an increase in business as a result of the trial operations.
- No new mileage was introduced into the Royal Mail operation, and significant capacity was available to absorb increased home shopping within existing services.
- Royal Mail did not reduce their operational mileage since their vehicles were driven around the trial area to maintain regular services, and these movements were independent of any home shopping deliveries or redeliveries included in the load.

Royal Mail is now conducting similar trials in different geographic and demographic areas, including rural, city centre and small town locations.

12.7 Other evidence about the traffic impacts of home shopping

As highlighted in the introduction, there have been a number of overview studies of the general transport impacts of home shopping. Opinions vary. For example, Mokhtarian (2004) argues that “there may be negative impacts due to increased travel, even if those impacts are likely to be localized and/or small in magnitude for the most part”. In contrast, Romm et al (1999) comment that “we suspect the Internet economy will be no worse than neutral in the transportation sector, but could well have a large positive impact”. However, the amount of empirical research or numerical estimation reported in these studies is small, with assertions often based on theory, and the majority of commentators highlight the difficulties of drawing firm conclusions given the current volatility and complexity of home shopping. The following sections report on the most relevant available empirical evidence.

12.7.1 Handy and Yantis (1997)

Handy and Yantis (1997) report on a survey of 470 people conducted in 1995, drawn from the three US cities of San Jose (California), Oklahoma City (Oklahoma) and Austen (Texas). They specifically report that their sample was not representative of the cities’ populations, but argue that it does provide some insights into home shopping

Of the sample, 65% reported making a purchase from a catalogue in the preceding 12 months, with clothing, books and gifts being the main items purchased. These people were asked to think of their last purchase, and consider what they would have done if it had not been in the catalogue. 32% said they would not have bought it. 40% said they would have looked for it on their next trip to the store whilst less than 20% said that they would have made a special trip to a store. In addition, 56% of respondents said that, at some time, they have made a trip to a store because of something they saw in a catalogue (although the authors report that respondents may have interpreted ‘catalogue’ as ‘advertisement’, and there is no information about the frequency with which this has occurred).

9% reported purchasing from a home shopping channel (approx.42 people). Of these, 65% indicated that they would not have brought the item, and less than 2% indicated that they would have made a special trip.

Given the problems of survey representativeness (and the small size of some of the subcategories), it is hard to draw firm conclusions from this research. However it clearly indicates that, in some circumstances, and for some products, home shopping may stimulate extra purchases, and, even where the purchase would still have been made, it does not always replace a trip to a store. In terms of traffic impacts, the significance of this finding will partly depend on the nature of products – for example, as highlighted in section 12.4.5, increased sales of books may have little impact on overall transport where they travel by conventional postal services.

12.7.2 NOP surveys

In June 2003, British Telecom commissioned an NOP telephone poll of 538 internet shoppers, as reported by Fogarty 2003. Results were as follows:

- 78% said that Internet shopping had saved them making at least one journey by car. Of all respondents, 23% said that it had saved a journey of less than five miles; 22% said that it had saved a journey of 5-10 miles; 10% said that it had saved a journey of 11-20 miles and 23% said that it had saved a journey of over 20 miles.
- Of the 427 internet shoppers who said that they had saved a car journey, 82% said that they had not made a new replacement car journey. Of the remainder, 7% said that they had made a new journey of under five miles, 6% said that they had made a new journey of 5-10 miles, 2% said that they had made a new journey of 10 to 20 miles and 3% said that they had made a new journey of over 20 miles.

Taking these results together implies that, for those who said that Internet shopping had saved them a car journey, allowing for increased travel by some (and assuming, conservatively, that the average length of a journey over 20 miles is 25 miles) still works out as an average reduction of 8.9 miles of personal travel.

NOP subsequently conducted a more substantial poll in December 2003, as reported by Geraghty 2004. It involved interviews with 1,600 Internet users. The sample was weighted to match Financial Research Survey¹⁴ generated profiles of Internet users, and selected from 17,931 GB adults (who were screened for Internet usage in the previous 12 months using the FRS and NOP's two Omnibus Vehicles). Of the sample, 45% reported that they had shopped on-line in the last 4 weeks, and 42% reported that they made a personal purchase.

As in the previous survey, 78% reported that Internet shopping had saved them making at least one journey by car. The distribution of trips lengths saved was also relatively similar – 26% said <5 miles; 19% said 5-10 miles; 13% said 11-15%; 5% said 16-20 miles and 15% said over 21 miles.

Geraghty (2004) reports that the average number of miles saved was 9.1. 18% of those saving a trip reported that they had used the saved time to make another journey, of an average length of 2 miles. This implies that, for those making additional trips, the average mileage saved was 7.1, and for all those who saved a trip, the average mileage saved was 8.7 miles.

12.7.3 Motors and Modems study

Dodgson et al (1997) report on a telephone survey of 303 respondents, conducted by Critical Research Ltd. This was commissioned for the RAC Motors and Modems study. They report the findings as follows:

- about 60% of people can be expected to become home shoppers to some degree over the next 20 years, whereas 40% appear to express a fundamental lack of interest in home shopping. (This conclusion was based on the premise that some

¹⁴ This is one of the most respected surveys of consumer behaviour in relation to the personal financial services sector, designed to give a representative picture of the UK.

of the reasons that people gave for not using TV or Internet shopping should be overcome, such as concerns about security of credit card details, lack of information, unavailable technology and an inability to see products).

- Somewhere between 6% and 19% of regular shopping trips could be replaced by a home shopping purchase (based on the fact that 6% of respondents said that they were already purchasing food by home shopping, and 19% said they were already purchasing clothes in that way).

Dodgson et al therefore concluded that home shopping could replace 1-3% of all shopping trips after five years, 2-6% of shopping trips after 10 years, and 4-11% of shopping trips after 20 years.

In 2000, these estimates were reassessed as part of a general updating of the study. In this report, the researchers revised their estimates upwards on the basis of the rapid growth in Internet shopping. Their 2000 estimates were that tele-shopping will reduce car shopping travel by 5% by 2005 and by 10% by 2010. They comment: "We have allowed for some increase in delivery trips, primarily by light vans, but we would expect some of the delivery to be by mail, which would not necessarily increase traffic levels."

12.7.4 Information about drop boxes

Section 12.6 described a particular trial to try and increase the efficiency of delivering to customer homes, by providing customers with a set of delivery options (including locker banks and local Post Office branches). There have been a number of other experiments (as reported, for example, by Dodson 2001 and Frost 2002), and numerous commentators have highlighted generally that providing delivery to a storage unit, where the customer does not have to personally receive the goods, would allow those delivering home shopping to use wider time windows and run more efficient delivery operations. It could also enable operators to schedule more deliveries at off-peak times, helping to reduce peak-period congestion. An overview of options, and the associated security issues, is given in McKinnon and Tallam (2002).

Various products have been developed for receiving unattended deliveries at individual homes. However, a number of the private companies that have tried to provide reception boxes for customers have experienced problems with financial viability, (MacLeod 2002). Some commentators argue that the priority is to incorporate such units when new housing is built, since the marginal costs of adding such features will be less. There has also been considerable interest in delivering to intermediate points, including where people work, local shops, garages, community centres, railway stations, Park & Ride sites, etc. (as explored in detail by DTZ Research, 2000). Such intermediate points should also reduce the transport impacts of home deliveries, if they do not reinforce the need to drive for another trip purpose.

The general efficiency savings from being able to make unattended deliveries have been examined by Nockold 2001, and Punakivi et al (2001-02).

Nockold (2001) compared the effects of offering all customers a 3-hour time slot, with assuming that varying proportions of customers would accept delivery at any

time during the day. In all scenarios, he argued that a reduction in delivery time constraints would result in transport cost reductions¹⁵. One specific result was that replacing all 3 hour time slots with delivery at any time during the day would reduce total transport costs by 27-36%

Modelling work on the issue has also been undertaken by a team in Finland, including papers by Punakivi & Saranen 2001, Punakivi, Yrjölä & Holmstrom 2001 and Punakivi & Tanskaren 2002. Their research showed that, in terms of total transport costs, compared to offering same day delivery in three 2-hour time slots:

- next day delivery, in nine 1-hour time slots would generate transport costs that were 53% more.
- next day delivery, in one 10-hour time slot (equivalent to the situation where the company delivers to a reception box) would be 27% cheaper.
- next day delivery, in one 10-hour time slot, where customers are told which day deliveries can take place (and deliveries are sorted on the basis of postcodes and divided evenly between delivery days, to present the most efficient situation from the e-grocer's viewpoint.) would be 43% cheaper.
- shared reception boxes (where deliveries for a number of customers can be made to one, unattended location) would be 55-66% cheaper.

It should be noted that their calculations of costs appear to be related (but not necessarily directly correlated) with vehicle delivery mileage, and relate only to the costs of providing the delivery, not the reception box. The work has also examined the various payback periods for the e-grocer, if they choose to invest in individual delivery boxes or shared reception boxes. It shows that, in some circumstances, the payback periods may be relatively long, which may bias a private company against investment

In brief, then, these studies suggest that encouraging greater use of drop boxes or shared reception facilities could reduce the amount of home shopping delivery travel quite substantially, compared to asking customers to opt for delivery to their home during a specific time window, with transport cost savings ranging from about a third to over 50%. However, the costs of providing such facilities may be quite substantial and it is unclear whether the private sector is likely to invest in them without public sector intervention.

These results complement the findings of the Royal Mail trial. In the Royal Mail trial, operator travel remained largely unchanged (since Royal Mail deliveries are mostly 'postable items' and so visits to individual homes are made anyway). However, there was a major impact on customer travel to retrieve unsuccessfully delivered goods. The simulations described above highlight that, for operators who are largely delivering non-postable items (of the size that could fit into some kind of locker or reception box), the main impact would be a reduction in operator travel, since they could operate considerably more efficiently. The public policy implication is that investment in facilities where goods can be retrieved by customers could help to reduce traffic by both customers and operators, depending on the situation.

¹⁵ It should be noted that it is unclear how 'total transport cost' relates to vehicle mileage, and the relationship may be indirect.

12.8 Summary of information about the effects of home shopping on car use

The traffic impacts of grocery home shopping services have been examined. These could be particularly important as a considerable proportion of conventional food shopping is done by car. The results are given in Table 12.3. In summary, a number of modelling exercises and other surveys suggest that the substitution of private cars by delivery vehicles could reduce traffic by 70% or more. The (small) base of empirical evidence suggests that concerns about offsetting behaviour changes (such as increased frequency of shopping or more car use for other purposes) are unfounded - i.e. the scale of these behaviours will not be sufficient to outweigh the main impact, and there may well be reinforcing changes in the opposite direction.

Table 12.3 Evidence about the traffic impacts of grocery home shopping

Study	Finding
Modelling simulations by Cairns 1997, Palner 2001, Punakivi et al 2001-023, Farahmand & Young 1998, Persson & Bratt 2001, Murto 1996, Karna 2001, Orremo et al 1999, Nockold 2001 and Freire (1999)	<ul style="list-style-type: none"> • Where delivery vehicles directly substitute for car trips, the kilometres travelled per shopping load are likely to reduce by 70% or more • The effect on overall travel for food shopping will depend on the level of take up
Millar 1998	45% of Food Ferry customers are using their cars less as a result of the service, and some have given up a car
Tacken 1990	Customers of James Telesuper were less likely to go to food stores, less likely to go food shopping by car and more likely to visit local shops
Snead 2001	On average, grocery home shoppers report an average reduction of 3.4 car trips per month
Morgansky & Cude 2000	Home shoppers are mainly using services for convenience, rather than to generate time for other activities
Foley et al 2003	Experts believe on-line shoppers make 3.5 fewer shopping trips per month, and order shopping only once a fortnight
Lex Transfleet 2000	Public perceptions of the traffic impacts of home shopping are only likely to focus on the growth in delivery vehicles.

For non food shopping, there is relatively little research about traffic impacts. The information we were able to uncover is given in Table 12.4. There are a couple of studies (in particular, the NOP polls reported by Fogarty 2003 and Geraghty 2004) suggesting that home shopping may generally be reducing car use, although considerably more evidence is needed to be conclusive, and the work by Handy and Yantis highlights the importance of 'new purchasing' in some home shopping sectors. Meanwhile, it is clear that local authorities and other agencies have the opportunity to shape the impacts of home shopping by the form of support services offered. The trial undertaken between Nottingham City Council and the Royal Mail, where customers

were offered a range of (re)delivery options for goods, suggested that there have been substantial reductions in customer travel as a result. Meanwhile, modelling work by several commentators suggests that public investment in facilities that enable retailers to deliver goods to dedicated facilities, rather than having to make a specific arrangement with a customer, could result in significant reductions in the amount of delivery traffic (with efficiency gains, and the opportunity to undertake more delivery trips at off-peak times).

Table 12.4 Evidence about the traffic impacts of all types of home shopping

Study	Finding
TransportEnergy BestPractice 2004	In a Royal Mail trial, offering customers alternative delivery options resulted in reductions in customer mileage to collect unsuccessfully delivered goods. Estimates suggest reductions were in the order of: <ul style="list-style-type: none"> • at least 50-100,000 miles p.a. for 68,000 households, or • up to 72% of car mileage for this type of journey (with current effects on 2 trips per household per year, up to a maximum of 28 trips per household per year, and a typical affected trip length of 2 miles or less)
Handy and Yantis 1995	In some circumstances, and for some products, home shopping stimulates extra purchases, and, even where the purchase would still have been made, home delivery does not always replace a trip to a store.
Fogarty 2003 and Geraghy 2004	78% of Internet shoppers say that an Internet purchase has saved them a car journey. About a fifth of these people say that they have used the saved time to make another car journey. Taking account of this 'rebound' effect, for those saving a car journey, the average reduction in personal travel is in the order of 8-9 miles.
Dodgson 2000	Tele-shopping could reduce car shopping travel by 5% by 2005 and 10% by 2010
Nockold 2001, and Punakivi et al 2001-02	Compared to offering customers daily delivery in three 2-hour time slots, delivering to a secure box at the customers house, or a local lockerbank could reduce the delivery costs for operators by between a third to a half.

12.9 Other effects from home shopping

The literature contains many hypotheses about the 'potential' effects from home shopping, but there is relatively little evidence about observed benefits. Therefore, only a few key reported impacts from home shopping are quoted here. These are:

- **Increased viability of local shops**

The Dutch experience reported by Tacken (1990) suggests that delivery of bulk food shopping can help to increase the vitality and viability of local grocers, bakers, butchers and other small shops. The Royal Mail initiative in Nottingham generated a new function for post offices, helping to increase their viability.

- **Reduced viability for conventional high street shopping**

Initially, the growth of internet shopping was hailed as 'doom' for the high street. As highlighted earlier, this does not seem to have occurred, although there have undoubtedly been impacts on sales volume in particular sectors – notably books, music and electrical items. For example, this may have been a factor in Dixons recent decision to close down 106 smaller stores (Dixons Group plc, 2004). For books and music, there is some evidence that the internet is generating additional demand, such that it is unclear how far it has led to problems for high street chains.

- **Improved options for customers**

For all types of customers, home shopping options potentially enable the purchase of a wider range of goods and services, including, in some cases, access to more appropriate products (e.g. clothes in unusual sizes; food for unusual dietary requirements; specialist equipment for unusual sports and other hobbies etc.). In some sectors, such as electronic goods, there is also some evidence that the advent of Internet shopping has led to significant price deflation, and that customers have benefitted from the opportunities to compare prices and to browse for product information.

- **Impacts on social exclusion**

Home shopping potentially increases the access of those in geographically remote areas to products and services. In practice, many companies offering home shopping have started by offering their services in compact urban areas – since the costs of delivering to a relatively densely clustered customer base are less. However, as offerings have expanded, more and more are offering services to the majority of the UK.

In addition, there may be benefits for those 'trapped' in the home by the lack of a car and/or responsibilities such as childcare and/or physical disabilities that make shopping difficult. For example, anecdotal evidence about grocery retailing suggests that 'time pressed families' from poorer households may constitute a significant segment of the home shopping market for groceries. Tesco has been offering a form of social service home shopping service for elderly people in Gateshead since 1980 – and Gateshead Council feel that, for one particular subset of their social service clientele, it has been more cost effective and appropriate than some of the more traditional ways of helping such people through social services.

However, these benefits are only maximised if everyone has access to the new forms of home shopping. Currently, there are some concerns that those getting 'left behind' on the internet revolution (such as the elderly) may actually experience a reduction in shopping options where there are impacts on high street stores.

Further impacts from home shopping relate to synergies with other transport policies as discussed in the next section.

12.10 Synergies between home shopping and other policies and issues

It seems likely that there would be a strong synergy effect between different types of home delivery, in that people who become more accustomed to using it for some of their shopping would become more likely to extend this to other shopping.

So far, to our knowledge, there has been no public promotion of home delivery services for food shopping. However, this could clearly form one element of wider initiatives aiming to address traffic at busy locations such as access junctions for supermarkets.

For all types of home shopping, there is clear potential synergy with freight quality partnerships and other initiatives aimed at addressing delivery traffic, which should take account of home shopping issues.

In general, levels of home shopping may increase as a result of traffic restraint policies, which increase the costs of driving to, and/or parking at, shops, or of owning and using a car more generally. In these circumstances, the cost of delivery charges is likely to be seen as more favourable than it is at present.

Home shopping clearly dovetails with other soft factors, namely tele-work and tele-conferencing, which have the potential to encourage more localised patterns of living. It could also facilitate a shift from personal car ownership to greater use of alternative modes and/or membership of a car club, since it offers the potential to reduce the need to transport bulky goods which people may see as an important reason for having their own vehicle. The need to transport food shopping as a feature of car dependence was discussed in Goodwin et al (1995).

12.11 Future impact of home shopping

For food shopping, there is a broad consensus that by 2005 perhaps 2.5 to 10% of groceries might be purchased from home, increasing to a maximum of 15% by 2010. According to analysis of 1998-2000 National Travel Survey data by Cairns 2004, shopping for groceries accounts for 40% of all car/van driver kilometres travelled per person per year for shopping. Modelling assessments suggest that, amongst those utilising home delivery services, vehicle mileage saved per shopping load is of the order of 70% or more. Assuming therefore, that perhaps 5-15% of all groceries sales swap to the internet in ten years time, this suggests grocery home shopping could reduce vehicle mileage for all shopping by about 1 – 4% over that period.

For non-food shopping, Foley et al's estimates suggest that perhaps 14% of all retail sales will be home shopping by 2005, including 4% by Internet, and that sales value might approximately double by 2010 (implying that 28% of all sales may be by home shopping, including 8% by the Internet).

Currently, there are few estimates of the overall impacts of home shopping. However it is clear, as shown by the Royal Mail trial, that the impacts from such growth will depend on the way that home shopping services develop, and the extent to which the

public sector intervenes to shape their nature. The Royal Mail estimate that their trial could be scaled up nationally to almost 17,000 collection points, and that this would result in a saving of at least 30 and 60 million miles a year. Other estimates relating to the efficiency savings for operators from investment in drop boxes at individual homes or communal reception points suggest that delivery transport costs could reduce by 30-50%. Unfortunately, there is little data to suggest how much traffic this could affect. Foley et al (2003b) emphasize the lack of such data, although they highlight one estimate suggesting that that 60% of packages carried by parcel carriers are for individual homes. Further ways in which the public sector could affect the traffic impacts of home shopping are given in the next section.

We have largely been unable to obtain any information about the costs of public sector involvement in home shopping, partly because such involvement has been limited. In the Nottingham trial, the local authority primarily acted as a facilitation agent (presumably incurring minimal costs). However, it is possible that local authorities could dedicate significantly more resources to this area, by giving greater attention to instituting access regulations, offering grants for more efficient operations, paying for installation of locker banks or drop boxes etc..

Given our lack of financial information, it has been impossible to undertake cost-impact assessments to evaluate the importance of investing in such initiatives. However, it is possible to carry out a 'reverse' calculation. According to Cairns 2004, the average car/van driver travel generated per person per year for food shopping is 290 kilometres, and the reduction in travel, from undertaking home shopping, is likely to be in the order of 70% (implying 203 kilometres of car/van travel would be saved). Therefore, to reduce traffic at a cost of a 1.5 pence per kilometre, it would be appropriate to spend £3 for every new grocery home shopper. Given a city of 200,000 people where promotion work and/or the provision of better drop-off facilities might change the take-up of grocery home shopping from being 10% of the population to 15% of the population by 2010, this implies that the local authority could afford to spend £30,000 per year, or £300,000 over 10 years.

The overall traffic impacts of other types of home shopping are far less clear. However, the available evidence does suggest that investment in better drop off facilities should reduce travel for customers in some circumstances (where their alternative is travelling to a more remote collection point such as the Royal Mail delivery office), and should also improve the efficiency of freight transport (where the freight vehicles are primarily travelling to deliver home shopping, as opposed to circulating on a 'fixed round' anyway). Consequently, this strengthens the case for public sector investment and promotion of such facilities, and potentially justifies higher spending levels than those given in the preceding paragraph.

12.12 Policy implications relating to home shopping

- Consideration of home shopping could be included in freight quality partnership discussions.
- National programmes to encourage greater use of alternative fuels (for example the Powershift programme) could consider extending their remit to include grants and other promotion measures to encourage walking and cycling couriers.

- Local authorities could be encouraged to give greater consideration to the types of delivery vehicles that they allow into different types of areas - for example, allowing greater access for energy-efficient or 'clean fuel' vehicles in residential areas, or giving them greater parking rights – for example, the right to park in controlled parking zones.
- National government could consider convening discussions with the major supermarkets about the future of grocery home shopping, and the best ways to operate the delivery part of the schemes efficiently.
- Local authorities could consider tailoring some forms of home shopping services, such as grocery services, to be part of the range of options that they can offer to social service clients with problems accessing shops.
- Both national government and local authorities could be encouraged to consider funding and otherwise facilitating the introduction of local drop-off facilities for shopping. Measures could include extension of the Royal Mail trial undertaken in Nottingham; introducing lockerbanks, drop boxes at individual homes and/or requiring new housing developments to include facilities where shopping can be delivered; and, also, encouraging local shops and services to operate in conjunction with home shopping services as a way of increasing their viability. Further consideration of the most appropriate way of introducing such facilities, and possibly a range of pilot experiments, could be valuable.
- Ensuring that the whole population has access to the goods and services emerging from the internet revolution could be an important part of ensuring future social inclusion.
- Greater empirical research about the behaviour of home shoppers, and how home shopping impacts on their car travel, could be helpful.

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