



**UNIVERSITY OF
WESTMINSTER**

An analysis of online shopping and home delivery in the UK

by

Julian Allen, Maja Piecyk and Marzena Piotrowska

University of Westminster

**Carried out as part of the Freight Traffic Control
(FTC) 2050 project**

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allenj@westminster.ac.uk; m.piecyk@westminster.ac.uk; m.piotrowska@westminster.ac.uk

ABOUT THE FREIGHT TRAFFIC CONTROL 2050 (FTC2050) PROJECT

This report has been produced as part of a research project entitled “Freight Traffic Control 2050 (FTC2050): Transforming the energy demands of last-mile urban freight through collaborative logistics”. It is an EPSRC-funded project that began in April 2016 and will run for 36 months.

Freight transport currently makes up around 16% of all road vehicle activity in our cities and by 2030, the EU would like to see largely CO₂-free logistics systems operating in our urban centres. With van traffic predicted to increase by 20% in London by 2030, and the uptake of alternatively fuelled and electric goods vehicles slow, more radical strategies are needed to reduce the numbers and impacts of freight vehicles in our cities.

Working with parcel carriers in London, this project will examine the potential for closer operational collaboration between carriers to reduce urban traffic and energy demand whilst maintaining customer service levels, and evaluate to what extent such relationships can develop naturally within a commercial setting or whether a 3rd party ‘Freight Traffic Controller’ (FTC) would be necessary to ensure equitable distribution of demand across a city. The key research objectives are to:

1. Investigate the collective transport and energy impacts of current parcel carrier activities in urban areas;
2. Create a database to gather and interrogate collection and delivery schedules supplied by different carriers;
3. Use the data with a series of optimisation algorithms to investigate the potential transport and energy benefits if carriers were to share deliveries and collections more equitably between them and develop tools to help visualise those benefits;
4. Evaluate what business models would be needed to enable carriers to collaborate in this way;
5. Investigate the role a 3rd party 'Freight Traffic Controller' could play in stimulating collaboration between carriers to reduce energy demand and vehicle impacts across a city;
6. Identify the key legal and privacy issues associated with the receipt, processing and visualisation of such collaborative schedules;
7. Consider the wider application of this approach to other sectors of the urban freight transport market.

The project is a multidisciplinary collaboration, led by the University of Southampton’s Faculty of Engineering and the Environment (CEE), and involving the Southampton Business School (SBS), Lancaster University’s School of Computing and Communications and Data Science Institute (LU), the University of Westminster’s Faculty of Architecture and the Built Environment (UoW) and University College London’s Bartlett Centre for Advanced Spatial Analysis (CASA). Two major carriers (TNT and Gnewt Cargo, (the latter operating for DX and Hermes)) have agreed to participate in the research along with Transport for London (TfL).

For further information about the FTC2050 project please visit the project website at:

<http://www.ftc2050.com/>

The Principal Investigator of the project is Professor Tom Cherrett
(T.J.Cherrett@soton.ac.uk Tel: + 44(0)23 80594657)

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1. INTRODUCTION

This report contains a review and analysis of online retail shopping and home delivery operations in the UK. It has been carried out as part of the EPSRC-funded Freight Traffic Control (FTC) 2050 project, which is investigating the scope for collaboration in order to facilitate greater efficiency in urban freight transport and logistics activities, and thereby reducing the cost of these operations to companies (resulting in greater profitability) while at the same time improving the sustainability of these operations in terms of road traffic levels, traffic casualties, CO₂ and air pollution emissions. See the website for further details of the project: <http://www.ftc2050.com/>

Section 2 presents information and data about the online shopping market in the UK, comprising the non-food, grocery, and takeaway food and home delivered meals sectors in the UK. It presents the sales revenue and growth rate of the online shopping market as a whole, as well as in these three sectors, together with insight into leading retailers and forecasts of growth. Consumers' views and concerns about online shopping are also discussed. It also addresses the issue of profitability for retailers and logistics carriers in the various online shopping sectors, and considers how profitability can potentially be enhanced.

Section 3 considers the home delivery requirements and operations that support the online shopping market in the UK, comprising the non-food, grocery, and takeaway food and home delivered meals sectors in the UK. Insight is provided into differences and similarities in logistics and home delivery operations in these three sectors. General developments in logistics and delivery operations that support online shopping are presented, together with detailed insight into innovation and challenges in each of the three sectors.

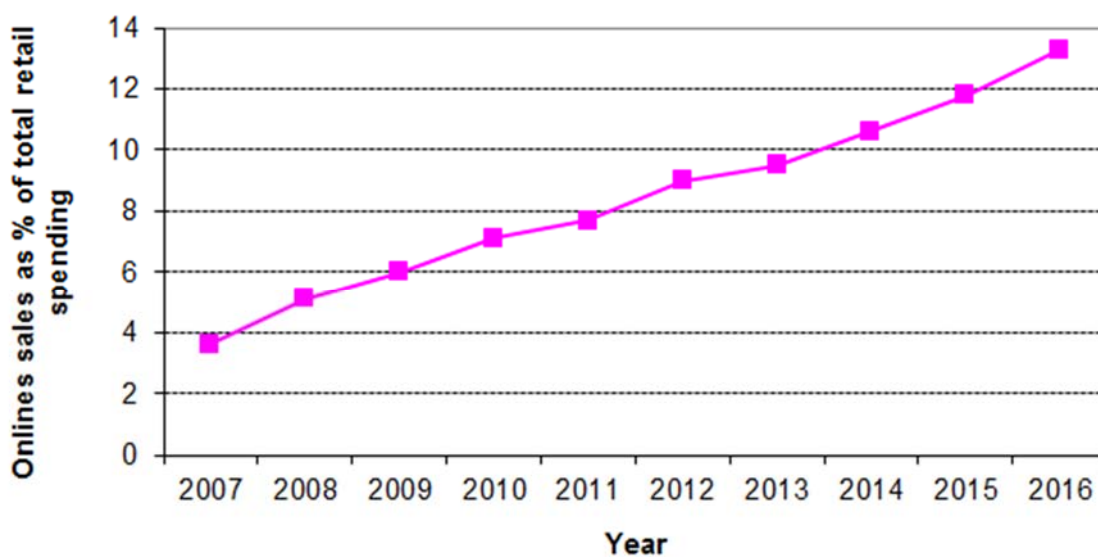
Section 4 analyses the current traffic and environmental impacts of home delivery activities in the UK, and together with possible future developments in online shopping and home delivery operations and their likely traffic and environmental impacts.

2. THE ONLINE SHOPPING MARKET IN THE UK

2.1 Size and importance of the online shopping market

Survey work by the Office for National Statistics (ONS) shows that online shopping accounted for 14.2 per cent of all retail spending in the UK in July 2016. This is equivalent to approximately £50 billion per year (ONS, 2016). The growth in the proportion of total retail sales accounted for by online shopping has been rapid in recent years (see **Figure 2.1**). Substantial growth in online retail spending is continuing with an increase of 17.3 per cent in the average weekly spend between July 2015 and July 2016 (ONS, 2016). This ONS survey work involves among 5,000 retailers including all large retailers and a panel of smaller retailers and covers all sectors of the retail industry. ONS estimates that the survey respondents cover approximately 90% of all known UK retail turnover.

Figure 2.1: Online sales as a percentage of total retail spending in the UK, 2007-2016



Note: data is for end of July in each year.
Source: produced from data provided in ONS (2016)

Another survey of online shopping in the UK by the Interactive Retail Media Group (IMRG) and Capgemini provides a significantly greater total market size estimate than the ONS survey work (approximately twice as large). This IMRG and Capgemini survey work showed that £104 billion was spent online in the UK in 2014 (which is more than double the amount spent in 2009). This accounted for 24% of the total retail market (compared to 13% in the ONS survey). There was a 14% growth in the UK online retail market between 2013 and 2014 (IMRG and Capgemini, 2015). However, this IMRG and Capgemini market estimate includes non-physical retail sales which are not included in the ONS survey (such as travel and hotel sales, the sales of electronic games and music).

The IMRG and Capgemini survey also showed that online sales via smartphones and tablet devices accounted for 37% of online sales in the UK in 2014 and represented a 55% growth compared with the previous year (IMRG and Capgemini, 2015).

2.2 Online shopping market by sector

Most important in terms of online retail spending in the UK is the non-store retailing sector, with online spending accounting for 78 per cent of total spending in this sector in July 2016. In the food sector 4.7 per cent of total spending was online in July 2016, and was 10.6 per cent in non-food store sector – see **Table 2.2** which shows the importance of online shopping in various retail outlets in the UK in July 2016. (ONS, 2016).

Table 2.2: Online retail sales in the UK by sector in 2015 (seasonally adjusted)

Type of retailing	Type of non-food store	Annual sales in 2015*	Proportion of all UK online sales
Predominantly food stores		£6.4 billion	14.4%
Predominantly non-food stores	<i>Non-specialised stores</i>	<i>£3.6 billion</i>	<i>8.9%</i>
	<i>Textile, clothing and footwear stores</i>	<i>£5.9 billion</i>	<i>12.0%</i>
	<i>Household goods stores</i>	<i>£2.3 billion</i>	<i>6.1%</i>
	<i>Other stores</i>	<i>£3.5 billion</i>	<i>8.1%</i>
	SUB-TOTAL	£15.3 billion	35.1%
Non-store retailing		£20.8 billion	50.4%
TOTAL***		£42.5 billion	100.0%

Notes:

* - grossed up from seasonally-adjusted weekly sales (thereby removing calendar and seasonal effects).

** - Data is based on July 2016 and is seasonally-adjusted.

*** - Total is for all retailing excluding automotive fuel.

Source: calculated from data in ONS, 2016.

Table 2.3 shows the importance of online sales in the various retail outlets as a proportion of total retail spending in each outlet type in the UK.

Table 2.3: Online retail sales as a proportion of total retail sales in each type of retail outlet in the UK in 2016

Type of retailing	Type of non-food store	Proportion of all UK retail sales in this sector
Predominantly food stores		4.7%
Predominantly non-food stores	<i>Non-specialised stores</i>	12.6%
	<i>Textile, clothing and footwear stores</i>	12.7%
	<i>Household goods stores</i>	9.3%
	<i>Other stores</i>	8.0%
	SUB-TOTAL	10.6%
Non-store retailing		78.9%
TOTAL **		14.2%

Notes:

* - grossed up from seasonally-adjusted weekly sales.

** - Total is for all retailing excluding automotive fuel.

Data is for end of July 2016.

Source: calculated from data in ONS, 2016.

The ONS data presented in **Tables 2.2 and 2.3** do not provide a breakdown of non-food online sales into items of differing sizes, nor does it provide sales of takeaways and other home-delivered meals. In addition, the food stores in **Tables 2.2 and 2.3** do not include sales by online-only retailers. **Table 2.4** provides an estimate of total online shopping sales in the UK in 2015 by product type (and size in the case of non-food items), which includes the sales of groceries, non-food small items, non-food large items (which are defined as items that require a two-person crew to deliver them), and home-delivered and takeaway meals sector (which is not included in ONS online shopping sales data). This provides an estimate of total annual online retail sales in these product categories of £51.4 billion in 2015/6.

Table 2.4: Estimated online retail sales in the UK in 2015/6 by sector and product type

Type of online retailing sector/product	Annual sales (£)	Annual sales (%)
Grocery *	£8.6 billion	17%
Non-food small items**	£31.8 billion	62%
Non-food large items***	£4.3 billion	8%
Takeaway and other home-delivered meals****	£6.7 billion	13%
TOTAL	£51.4 billion	100%

Notes:

* - see section 2.8 for further details of this estimate (Source: Mintel, 2016c)).

** - see section 2.7 for further details of this estimate (Calculated from ONS, 2016 & Verdict, 2016a).

*** - see section 2.7 for further details of these estimates (Source: Verdict, 2016a).

**** - see section 2.9 (Source: Fedor, 2016 from Euromonitor).

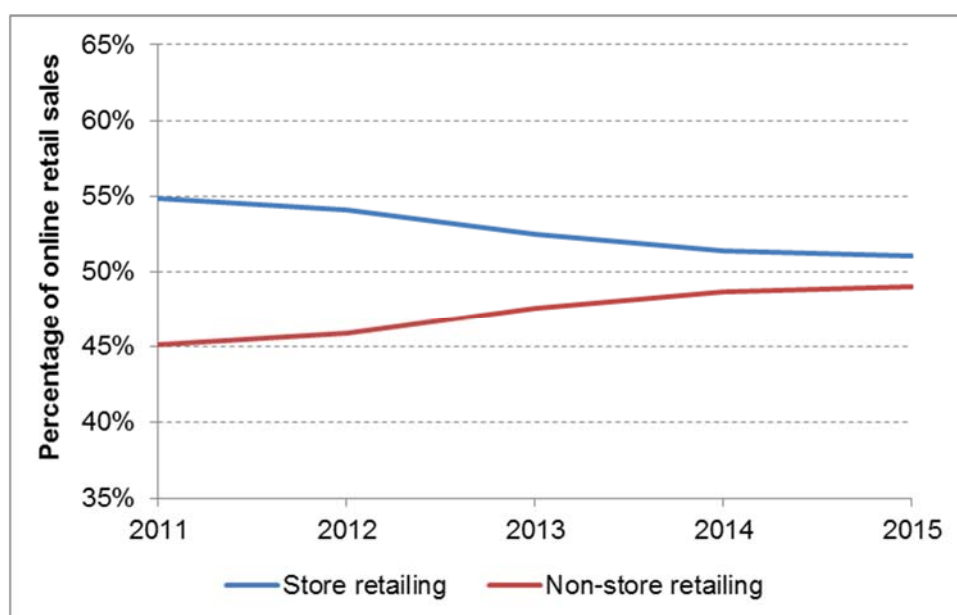
Source: calculated from data in ONS, 2016; Fedor, 2016; Verdict, 2016a.

Table 2.4 covers the main sectors of online shopping that involves physical goods being delivered to consumers' homes. In addition, many non-physical goods are ordered online that do not require delivery such as insurance, holidays, passenger travel and electronic book and music downloads. There are also additional services that are delivered to consumers' homes such as ordering chefs who cook in your home for you (provided by companies including MyChef, La Belle Assiseste, CooksatHome, and Home-Cooking), events planners that will organise events for any occasion for you at your home, and companies that can make arrangements to pick- up and deliver whatever you need at home (from meals at any restaurant, to goods from any shop, to keys you left in a friend's home, to gifts you need purchased, to medicines from a chemist, to dry cleaning you need collecting - companies providing such services include such as Henschman and Quiqup). As part of its vision, Quiqup aims to encourage the use of independent local retailers and businesses (similar to Postmates in America), and also makes home deliveries on behalf of some restaurants listed on online meal platform provider Hungry House (Highfield, 2016; Kamsyn, 2016; O'Hear, 2017).

Year on year growth in online food retailing to July 2016 was estimated to be 13.4 per cent, non-food online retailing to be 18.4 per cent, and non-store online retailing to be 17.7 per cent (ONS, 2016).

In terms of total online sales, non-store retailing is getting close to equalling store retailing in the UK. In 2011 non-store retailers (also referred to as 'pure players') accounted for 45% of total online retail sales in the UK. By 2015 this had risen to 49% of total online retail sales. See **Figure 2.2**.

Figure 2.2: Online sales in the UK: Store retailers versus non-store retailers



Source: Calculated from data in ONS, 2016.

2.3 Online shopping market by product category

At the onset of online shopping in the UK in the 1990s, clothing and footwear was the most important category in terms of total sales. However, over the intervening two decades, the picture has changed, and electrical goods now represent the largest category in terms of retail

sales. These two product categories together with groceries accounted for approximately 75% of total online retail sales in the UK in 2015 (see **Table 2.5**).

Table 2.5: Online retail sales by product category in the UK in 2015

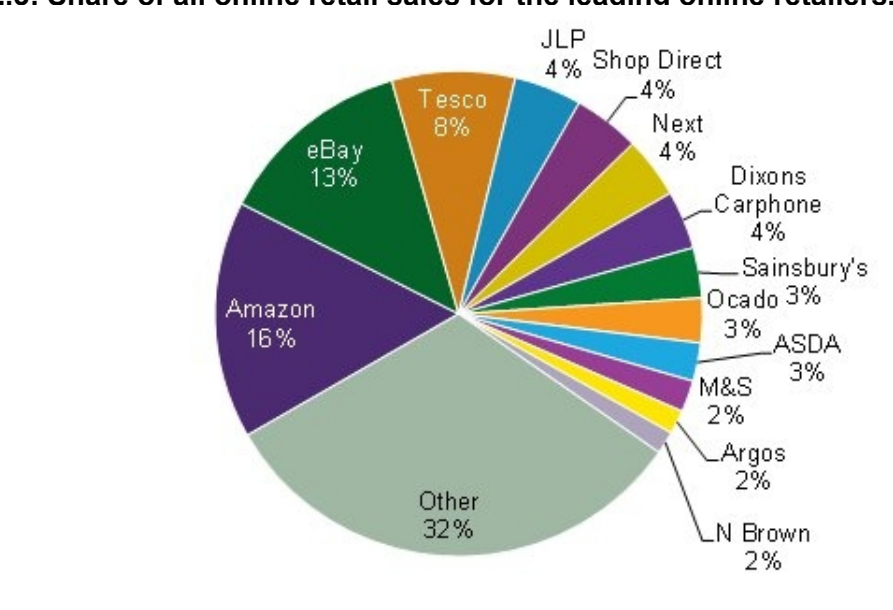
Product category	Total annual sales (£ million)	Proportion of online retail sales (%)
Electrical/electronic goods	12,390	29.1%
Clothing and footwear	10,647	25.0%
Grocery*	8,620	20.3%
Furniture	1,185	2.8%
Cosmetics and toiletries	967	2.3%
Hard-copy books	633	1.5%
Hard-copy music and video	545	1.3%
All other categories	7,564	17.8%
Total of above	42,550	100%

Source: Mintel, 2016a.

2.4 Leading retailers in the online shopping market

Within the online retailing market there are approximately a dozen major retailers (with market shares of 2 per cent or greater), together with hundreds of medium-sized retailers and thousands of small ones. eBay (which accounted for 13% of online retail sales in the UK in 2015) is itself made up of thousands of small retailers together with many more private individuals (so comprising both business-to-consumers (B2C) and consumer-to-consumer (C2C) sellers). The same is true of the largest online retailer in 2015, Amazon, which both sells direct to consumers (B2C) but also offers its Amazon marketplace as a selling platform for thousands of small businesses and private individuals (B2C and C2C). **Figure 2.3** shows the breakdown of market share in online retailing in the UK.

Figure 2.3: Share of all online retail sales for the leading online retailers. 2015



Source: Mintel, 2016a.

2.5 Forecasts of the online shopping market

It is likely that the absolute and relative importance of online sales will continue to increase in future, albeit at a slower rate than in the last decade. The following factors are likely to play an important role in the future growth of online shopping (European Commission, 2012):

- New demand: ageing of the population
 - Older people discover the convenience of internet ordering
 - Young people used to internet and remote ordering by the internet
- Traditional shopping (bricks and mortar) is hit by the economic crisis and the competition of online shopping: number of shops reduce
- Certain goods, such as groceries which only have a small relative online presence, will increase, considering the above mentioned factors
- The use of smart phones to purchase goods online will continue to grow making shopping at home and on the move more convenient and easier

Forecasts suggest that growth in online shopping sales will remain strong in the UK between 2016 and 2021, averaging between 10-12% sales growth per annum. Online shopping's share of all retail goods sales has grown by about 1 percent per annum in recent years in the UK. The relative importance of online shopping is likely to continue to increase over the next five years but the rate of change of this relative importance is likely to slow rather than accelerate (Mintel, 2016a). This will result in a growing volume of home delivery activity, but not all online sales growth will necessarily result in greater home delivery activity, as some items will be fulfilled electronically (such as book and music downloads), or through store-based 'Click & Collect' and other collection services.

It is estimated that there were 36.4 million online shoppers in the UK in 2014, with the number forecast to increase to 41.1 million by 2019 (Verdict, 2014). A recent UK survey showed that when asked about their main reasons for shopping online, 95 per cent of respondents mentioned convenience and flexibility, 92 per cent mentioned the range of products available, 82 per cent mentioned price, 43 per cent mentioned speed, and 41 per cent mentioned online reviews (Royal Mail, 2014). A major deterrent to those not using online shopping services is a concern about fraud and the security of online card payments. A European survey in eight countries of why people did not shop online showed that the most common deterrent was that people liked to browse the goods in store. However the second greatest deterrent was these security concerns, with between 30 per cent of respondents (in the Netherlands) and 59 per cent of respondents (in France) citing them (Verdict, 2011).

Online shopping currently remains largely domestic. Consumers are more likely to purchase online from national sellers/providers (39 per cent) than from sellers located in other EU countries (10 per cent) (European Commission, 2012). But this will probably change in the future.

2.6 Consumer use of online shopping services

Online shopping has become widely used by UK consumers. Recent research indicated that 95% of all UK consumers have made use of online shopping in the previous 12 months (Mintel, 2016a). Key reasons for the growth on online shopping in the UK include the product range available, the prices offered by retailers and the convenience of the ordering and delivery services, which save time and the need to physically shop. The availability and uptake of required technologies (including computers, tablets and mobile phones) has facilitated this growth in online shopping in the UK. Research suggests that computers are the most common technology used by consumers to place online orders, followed by smartphones and tablets.

The vast majority on online orders are placed by consumers while at home. However, in the case of online orders placed by smartphone, approximately one third of consumers have used these to place orders while away from their home – most of these consumers placing orders while away from home are aged below 35 years (Mintel, 2016a).

In the case of takeaway and other home-delivered meal services, unlike other types of online shopping, consumers still more commonly use the telephone to place their orders for takeaway/home delivered meals rather than ordering on computers, based on the perceived ease/convenience of this method. However, online ordering has been increasing, and is expected to continue to do so (Mintel, 2016b).

In terms of online grocery shopping, people aged under 35 are far more likely to be ordering food in this way than older people, and are also likely to place more frequent such orders (Mintel, 2016c). In addition, parents with dependent children are more likely to use online grocery shopping compared with adults without dependent children (Mintel, 2016c). This is presumably a reflection of the availability of time available for shopping among these different groups of consumers.

As discussed in **section 2.3** the three most important physical product categories in terms of online shopping are: i) electrical/electronic goods; ii) clothing and footwear, and iii) grocery. These three product categories were responsible for approximately three-quarters of total UK online spending on physical products in 2015 (Mintel, 2016a). Research indicates that approximately three-quarters of consumers using online shopping are using it to purchase a specific product, while two-thirds browse between retailers while shopping online (Mintel, 2016a).

2.7 Online non-food shopping market

Data indicates that 58% of the total sales of non-food online shopping in the UK in 2015 was spent with non-store (i.e. online-only, pure-play) retailers, while 42% billion was spent with store-based online retailers (ONS, 2016).

Non-food large items include furniture, white goods (fridges, freezers, washing machines, dishwashers etc.), other large electrical goods, carpets and garden furniture and equipment. For the purposes of this report, large products are defined as those that require delivery to consumers in large goods vehicles using two-person crews. Meanwhile small items, in the context of this report, are defined as all other non-food products, which are typically transported as parcels and small packages. These small items are typically delivered to consumers in vans (and sometimes in cars and on motorbikes) by a single person.

Estimates of the size of the online shopping market in the UK in 2016 for large items is shown in **Table 2.6**. This indicates that total online sales of large, non-food items were £4.3 billion in the UK in 2016.

Table 2.6: Online sales of large items delivered by two-person delivery crews in the UK in 2016

Type of large item	Online sales in 2016 (£ million)	Proportion (%)
DIY & gardening	274	6%
Electricals	2,420	57%
Furniture & floorcoverings	1,472	34%
Homewares	116	3%
TOTAL	4,282	100%

Source: calculated from data provided in Verdict, 2016a.

ONS has estimated that annual online sales of non-food products (from both online-only and store-based retailers) were £36.1 billion in 2015 (ONS, 2016). This includes both large and small non-food items. By subtracting the above estimate of large non-food online sales from this it is possible to derive an estimate for total online sales of small non-food items in the UK in 2015/6 – which is £31.8 billion.

Table 2.7 provides an estimate of the size of the online shopping market for small items in the UK in 2016 sub-divided into those that are letterbox-sized, those of shoe-box size and those that are larger parcels and packages (but which still only require a delivery by a single person).

Table 2.7: Online sales of small items delivered in the UK in 2016

Product	Online sales (£ million)				Proportion of total online sales (%)
	Letterbox	Shoobox	Larger	TOTAL	
Books	42%	33%	25%	1,152	3.1%
Clothing & footwear	6%	34%	60%	12,899	34.9%
DIY & gardening	5%	41%	54%	844	2.3%
Electricals	2%	33%	66%	7,580	20.5%
Furniture & floorcoverings	0%	0%	100%	552	1.5%
Health & beauty	18%	51%	31%	1,386	3.7%
Homewares	2%	32%	66%	1,656	4.5%
Music & film	70%	19%	11%	511	1.4%
Proportion of total	8%	34%	59%	100%	100.0%

Source: calculated from data provided in Verdict, 2016a.

2.8 Online grocery shopping market

Store-based food and drink shopping in the UK is a major retail sector. In 2015 it was estimated to have generated £150 billion of sales. It comprises three key sub-sectors: (i) non-specialised food stores (i.e. grocery supermarkets, high street food stores, and convenience food stores), (ii) specialist food stores, and (iii) alcoholic drinks, other beverages and tobacco stores. The importance of these three types of stores sellers in terms of annual sales are shown in **Table 2.8**.

Table 2.8: Importance of types of stores in total store-based food and drink sales in the UK, 2015

Food store type	Annual sales (£ million)	Proportion of total store-based sales
Non-specialised food stores	139.1	92.7%
Specialist food stores	8.1	5.4%
Alcoholic drinks, other beverages and tobacco stores	2.8	1.9%
TOTAL	150.0	100%

Source: ONS, 2016.

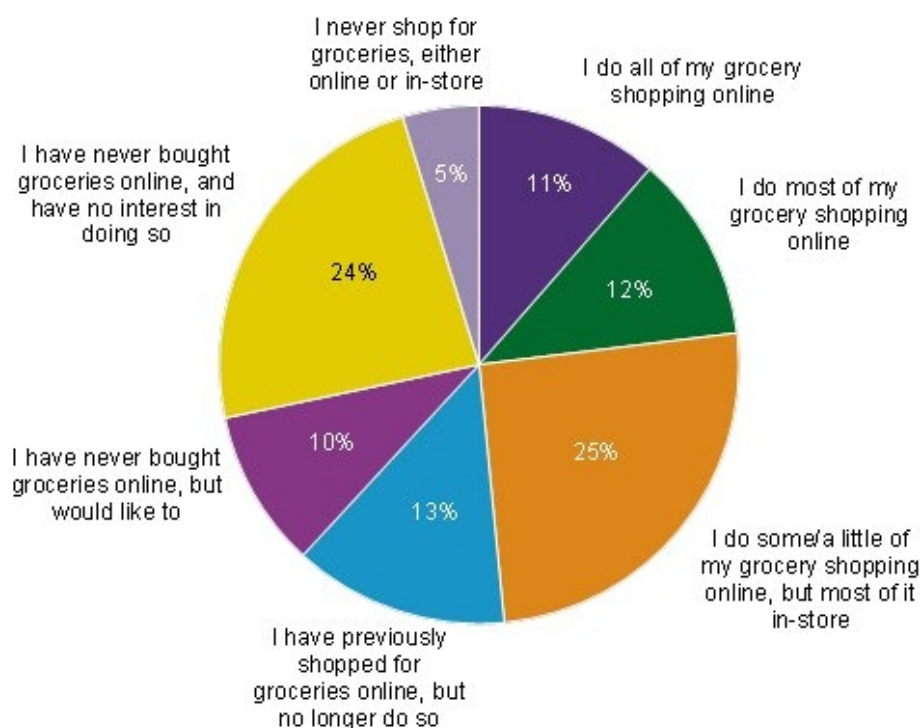
The online grocery and food shopping market in the UK has become a small but established part of total food sales over recent years. It was estimated to have generated total annual online sales from store-based retailers of approximately £6.4 billion in 2015, which was estimated to account for 4.3% of total food sales in the UK in 2015 (calculated from data in ONS, 2016). It is growing quite quickly, with an estimated 13% year-on-year increase in total sales in July 2016 (ONS, 2016). By comparison, another estimate of online grocery sales in the UK, which included sales by online-only (i.e. pure-play) as well as store-based retailers indicated total sales of £8.6 billion in 2015 (Mintel, 2016c).

It has been estimated that online grocery sales could continue to gain market share over the next few years, with one forecast suggesting that these sales will account for 9.1% of total grocery sales in the UK by 2020 (Mintel, 2016c). However, there are a range of growing and future pressures that are likely to face online grocery retailers in the UK that are likely to result in a downward pressure on their individual market shares. These include: (i) the growing importance of the restaurant and takeaway food delivery sector and its major players including Just Eat, UberEATS, Amazon Restaurants and Deliveroo; (ii) growing food product lines and competitive pricing from store-based discount retailers; (iii) efforts by food manufacturers with branded products, such as Unilever and Reckitt Benckiser, Unilever and Diageo to sell online directly to consumers (Fung Global Retail & Technology, 2016).

The online grocery and food shopping market in the UK constitutes a far greater proportion of total food sales than in other Western economies. Estimates on online fast-moving consumer goods (FCMG) sales as a proportion of total national FMCG sales in the UK in June 2016 were 6.9%, compared with only 0.4% in Italy, 1.2% in Germany, 1.4% in the USA, 1.7% in Spain and the Netherlands and 5.3% in France (Kantar Worldpanel quoted in Fung Global Retail & Technology, 2016).

Market research has shown that almost half (48%) of shoppers in the UK use grocery online shopping to a greater or lesser degree (see **Figure 2.4** - Mintel, 2016c). It is estimated that 11% of UK consumers do their grocery shopping exclusively online (Mintel, 2016c).

Figure 2.4: Current usage of online grocery shopping in the UK, December 2015



Notes:

Question asked: "Thinking about grocery shopping, which one of the following best describes your use of online shopping?"

Sample size: 2,000 internet users aged 16+

Source: Lightspeed GMI/Mintel in Mintel, 2016c.

2.8.1 Store-based and online-only grocery retailers

The online grocery market can be subdivided into two types of retailer; those that are store-based and those that are not. The former includes the major grocery retailers such as Tesco, Sainsbury and Asda. The main player in the online-only sector is Ocado. Other suppliers in this sector include fresh food box suppliers, and the new entrant Amazon. **Table 2.9** shows the importance of these two sub-sectors and the players within them.

Table 2.9: The importance of store-based and online-only grocery retailers in the UK in 2015

Type of grocery retailer	Share of UK online grocery market (%)	Specific retailers	Share of UK online grocery market (%)
Store-based	74%	Tesco, Sainsbury, Asda	48%
		Other	26%
Online-only	26%	Ocado	14%
		Food box suppliers (inc. Abel & Cole, Graze, Fresh) and others	12%
TOTAL	100%		100%

Source: Calculated from data in Mintel, 2016c.

Table 2.10 shows the online sales and online market shares of the leading online grocery retailers in the UK in 2015. This indicates the predominance of Tesco, followed by Sainsburys, Ocado and Asda.

Table 2.10: UK grocery retailers' estimated net online sales and market shares in 2015

	Net sales (£ million)	Online market share (%)
Tesco	3,051	38.2
Sainsbury's	1,232	15.4
Ocado	1,108	13.9
Asda	951	11.9
Waitrose	329	4.1
Morrisons	145	1.8
All others		14.7

Source: Mintel, 2016c (from companies' reports and accounts and Office of National Statistics)

In terms of store-based grocery retailers, Tesco's online grocery sales accounted for approximately 7% of its total sales in 2015, compared with approximately 5% for Sainsbury's and Waitrose and 4% for Asda – see **Table 2.11**. In addition, online general merchandise sales accounted for an additional 1-1.5% of total sales for these retailers in 2015 (Mintel, 2016).

Table 2.11: Leading online grocery retailers' online sales as % of their total UK sales in 2015

UK grocery retailer	Online sales as % of total group sales
Tesco	7.0%
Sainsbury's	4.7%
Waitrose	4.7%
Asda	4.3%
Morrisons	1.4%

Note: Companies' online sales include non-grocery categories, except for Tesco.
Source: Fung Global Retail & Technology, 2016.

For several years since its establishment Ocado had been the only online-only grocery retailer in the UK. However, Amazon has now entered this market in the UK. Amazon directly entered the online grocery market in 2015 by offering a small ambient food product range, through a division called Amazon Pantry. Over time Amazon Pantry has continued to expand its range, however has a distinct lack of fresh produce which many online customers would need to acquire from elsewhere.

Expanding on its existing Amazon Pantry offer, Amazon introduced Amazon Fresh in the UK in June 2016. This service offers approximately 15,000 items, including fresh food, perishables as well as branded goods such as Coca-Cola, Kellogg's and Danone. As part of this service, Amazon has also signed a deal with Morrisons to supply fresh and packaged private-label products as well as products from about fifty premium local producers, shops and markets in London. The Amazon Fresh service is available to Amazon Prime members (a subscription service that costs £79 per year in the UK. Members pay an additional £6.99 per month for Amazon Fresh). Amazon Fresh provides same-day delivery for orders placed before 13:00 see **section 3.9.2** for further details).

2.8.2 Smaller and non-specialist retailers

There are also many smaller online food retailers in the UK who do not offer a full range of groceries. Some specialise in particular products such as specific foods, including wine, or vegetable or other food boxes (such as Graze, Abel & Cole, Riverford and HelloFresh). **Table 2.12** shows the most important of these other online food retailers in terms of net revenues together with their market shares.

Table 2.12: Smaller online grocery retailers' estimated net revenues and market share of the online grocery sector in the UK in 2014

Retailer	Net sales (£ million)	Online market share (%)
Direct Wines	186.6	2.6
Graze	68.1	1.0
Abel & Cole	73.5	1.0
The Wine Society	75.8	1.1
M&S online	63.7	0.9
Naked Wines	45.2	0.6
Milk&more	57.0	0.8
Amazon est.	44.1	0.6
Riverford	47.2	0.7
Virgin Wine	35.7	0.5
Majestic Wines	31.1	0.4
HelloFresh	9.0	0.1
Sum of the above	737.0	10.4

Source: Mintel, 2016c (from companies' reports and accounts and Office of National Statistics)

2.9 Takeaway and other restaurant home-delivered meals market and market developments

It has been estimated that the UK takeaway and other restaurant home-delivered food market was worth approximately £6.7 billion in 2015, up from £4.4 billion four years ago (Fedor, 2016; Martin, 2016). This is forecast to increase to £7.6 billion by 2020 (Euromonitor International quoted in Ruddick, 2015). This sector consists of ready to eat meals from both takeaway and eat-in restaurants.

The current and forecast growth in the takeaway and restaurant home-delivered meal market are based on many consumers wanting to save meal planning, cooking and shopping time for more important or enjoyable activities, while also enjoying food from their favourite restaurants. Over time, it is likely that this desire for convenience will result in ever-greater levels of home delivery of groceries, prepared ingredients/recipes and ready-to-eat meals, which will erode the dominance of traditional store-based grocery retailers (Mignot, 2015).

Whilst individual restaurants and restaurant chains have been expanding their home delivery services in a gradual manner, most of the growth in the market has resulted from the launch and growth of third-party service providers, who offer meal deliveries from multiple restaurants. These third-party providers are intermediaries between the restaurant and customer and vary in terms of the services they provide to restaurants. Some offer full offer ordering, payment and delivery services, while at the opposite end others simply provide a website or app to put

the consumer in contact with the restaurant, which is then responsible for delivery and communication with the customer. Companies that do not provide their own delivery services (such as Just Eat and Hungry House) charge commission of around 10-15% of each order value (BMI Research, 2016). This compares with commission charges that can be even higher in the case of online meal providers that do provide their own delivery services (such as Deliveroo, UberEATS and Amazon) (see **section 3.10** for further details). **Table 2.13** shows a selection of the major third-party service providers in the UK, their coverage and the range of services they offer (either just ordering or ordering and delivery).

Table 2.13: Selected leading takeaway and restaurant meal delivery third-party online providers in the UK in 2016

Brand	Website	Service type	Number of UK restaurants delivered from
Just Eat	just-eat.com	Ordering platform	26,700
Hungry House	hungryhouse.co.uk	Ordering platform	10,000+
Takeaway.com	takeaway.com	Ordering platform	5,000+
Deliveroo	Deliveroo.co.uk	Ordering & delivery platform	2,000+
One Delivery	one-delivery.co.uk	Ordering & delivery platform	500+
Just-FastFood	just-fastfood.com	Ordering & delivery platform	N/A
Take Eat Easy	takeeateasy.co.uk	Ordering & delivery platform	140+

Notes:

As at April 2016.

N/A – not available.

Takeaway exited the UK market in August 2016 trading its restaurant base with Just Eat in return for the latter's Benelux business (discussed in text below).

Just Eat purchased Hungry House in December 2016 for £200 million plus performance related bonuses – the deal will need to be approved by the Competition and Markets Authority (Ambrose, 2016).

Source: Mintel, 2016b.

There has been substantial investment in the takeaway and home-delivered meal market in the last few years. It has been estimated that nearly \$10 billion (8.9 billion euros) was invested into 421 meal delivery deals since the start of 2014 according to research from CBInsights (quoted in Auchard, 2016).

Delivery Hero, established in Germany in 2011, was a small start-up company with 7 staff (Martin, 2016). However, it has grown quickly over recent years – it now operates in 34 countries, has annual sales of more than £25 million and has more than 2,500 employees. It purchased Hungry House in the UK in 2012 (BMI Research, 2016; Martin, 2016). It provides a third-party platform linking consumers and more than 200,000 restaurants, of which approximately 11,000 are in the UK, and handles approximately 30 million orders for meals worldwide each month (Martin, 2016). In 2015 it was valued at \$3.1bn (£2.18bn), making it Europe's second most valuable privately-owned internet company. It does not operate its own delivery services.

Like Delivery Hero, Just Eat is another third-party provider without its own delivery services. It has grown rapidly over recent years, with annual sales increasing from approximately £10

million in 2009 to £157 million in 2014 to £248 million in 2015 (BMI Research, 2016; Martin, 2016). In 2015 its order numbers increased by 57% on the previous year to 96 million, with a total food spend of £1.7 billion. It is Europe's largest third-party home-delivered meal platform provider.

The marketplace for takeaway and other home-delivered meals is exceptionally competitive. Some market analysts are sceptical about the extent to which companies that do not provide its own delivery services (such as Delivery Hero/Hungry House and Just Eats) can continue to expand at such rapid rates, believing instead that the future lies in companies that provide an entire service including delivery (see **section 3.10.2** for further discussion of this issue).

For instance, Deliveroo launched its meal home delivery service in the UK 2013. It currently operates in 81 cities globally, working with 15,000 restaurants that wouldn't otherwise offer deliver including Pizza Express, Prezzo and Gourmet Burger Kitchen. Deliveroo's daily orders have grown tenfold since January 2015 (Tugby, 2016). Deliveroo tends to currently focus on more expensive restaurants and uses its own couriers (self-employed and mostly bicycle-based) to make the meal deliveries to consumers. It presently has about 3,000 delivery couriers (who went on strike in August 2016 over their pay rates - Farrell, 2016). Domino's Pizza, which operates its own takeaway and home delivery pizza restaurants together with its own in-house motorcycle-based delivery services, has also experienced major sales growth in the UK, with a 21% increase in its quarterly sales in Autumn 2015 (Ruddick, 2015).

Uber (UberEATS) and Amazon have both recently commenced services in the UK meal home delivery market and, as with Deliveroo, both have their own delivery services (Auchard, 2016). Amazon commenced its delivery service with 100 restaurants in specific London postcodes in September 2016. The service is currently only available to Amazon Prime customers, which costs £7.99 per month or £79 per year. Customers order their meals via an Amazon app and receive free delivery within 60 minutes on orders of £15 or above and are not charged any mark-ups on the restaurants' normal prices. Restaurants using this Amazon service include the Italian chain restaurant Strada, specialist ethnic chain restaurants, and a Michelin-starred Indian restaurant (Farrell, 2016).

UberEATS was launched in London in June 2016 providing a guaranteed 30-minute delivery time, with no minimum order size or delivery fees charged to the customer (with the restaurant paying a commission on the total price charged). This compared with some competitors who charge the customer delivery fees, and some that require minimum order sizes (Auchard, 2016). However, UberEATS has announced it will introduce variable delivery prices soon that will be based on the level of demand in any given location (Dreier, 2016).

Amazon and UberEATS hope that their scale of operation will give them a competitive advantage over their competitors that may not be able to match their scale of operations and logistics capabilities. As their order levels increase they will also benefit from cheaper transport costs due to the reduced distances between restaurants and consumers. However, Amazon and UberEATS will have to compete with other rival companies for the meal delivery market in each city they choose to provide services. They also have to overcome the concerns of restaurant chains to enter into business with them – Amazon's previous efforts to work with major retailers and Uber's difficulties with taxi associations suggest that this will provide them with a challenge (Auchard, 2016).

Some mergers and acquisitions are already taking place in the UK online meal restaurant industry. For example, in August 2016 Just Eat and Takeaway agreed to trade assets, with Takeaway exiting the British market which Just Eat is dominant in, and in exchange Just Eat gave Takeaway, its Benelux business portfolio (Auchard, 2016). In addition, Just Eat purchased Hungry House in December 2016 for £200 million plus another potential £40 million depending on meeting performance targets. As this latter deal involves the largest online meal

platform provider in the UK market purchasing the second largest this deal will require approval from the Competition and Markets Authority (Ambrose, 2016).

In addition, some niche providers are also entering the home-delivered market. A niche third-party platform called Supper, offering meals from top-end restaurants including those that have Michelin stars, was launched in September 2015. Another niche platform provider specialising in vegan lunchbox delivery in London (Mojo Box) was launched in March 2016; while 'Feast' was launched in London in 2015 offering night-time food delivery services between 23:00-05:00 (Mintel, 2016).

Home delivery services for fast food are also being launched. Kentucky Fried Chicken (KFC) began trialling home deliveries in 100 restaurants in the USA in 2015. while Burger King has been trialling home delivery in the UK since 2015. Some third-party providers already offer established fast-food deliveries from major chains in the UK including One Delivery which was launched in 2013 and Just-FastFood (Mintel, 2016).

It should also be noted that, reflecting the ferocity of competition in this market and the extent to which start-up companies were able to receive funding until recently, some companies in marketplaces outside of the UK faced major struggles or went out of business in 2016. In America, SpoonRocket went out of business in March 2016, selling some of its assets to a Brazilian company. Square Inc. has been trying to sell its Caviar food delivery arm, and Munchery, which both cooks and delivers food, was said to be struggling to raise new funds. DoorDash and Postmates (which also delivers non-food goods) managed to raise new funding but found this far more difficult than previously. In addition, several food delivery companies have merged or closed in India in 2016 (Newcomer, 2016).

It has been reported that in the UK, Just Eat, which primarily targets the takeaway market, has typical order values of approximately £16, while Deliveroo which includes far more restaurants has average order values of between £25 and £30 (Fedor, 2016).

2.9.1 The “food-to-go” market

In addition to the takeaway and restaurant home-delivered meals market there is also the increasingly important, broader, so-called “food-to-go” market which includes all ready-to-eat food. This market has become increasingly popular over recent years in the UK as consumer eating trends have shifted substantially at a time when people are becoming increasingly short of time to prepare and consume food and drink. This food-to-go market now includes breakfast, lunch, evening meals, snacks and drinks. An analysis of the food-to-go market in the UK by the Institute of Grocery Distribution (IGD) showed that it was worth £16.1bn, an increase of 6.8% on the previous year (Tugby, 2016). The IGD forecast that this market will grow to £21.7 billion by 2021 (IGD, 2016). The IGD’s breakdown of this food-to-go market into its five constituent segments is shown in **Table 2.14**.

At present the UK food-to-go market does not typically involve home delivery but this is likely to change in future with MacDonalds already having introduced home delivery trials, and Sainsbury’s having acquired Home Retail Group (the owner of Argos) as part of its mission to serve its customers “whenever and wherever” they want, and its recent expansion of same-day deliveries to 30 of its stores (Tugby, 2016).

Table 2.14: The Food-to-Go Market in the UK in 2016

Food-to- go segment	Some key operators	Turnover in 2016
Quick-service restaurants	McDonald’s, Burger King, plus other premium burger chains	£5.0 billion
Food-to-go specialists	Pret a Manger, Greggs, and other sandwich chains	£4.6 billion
Coffee specialists	Costa, Starbucks and Caffè Nero	£2.7 billion
Convenience, forecourt and other retailers	Petrol stations, convenience stores	£2.5 billion
Supermarkets and hypermarkets	All the major supermarkets	£1.2 billion
TOTAL		£16.1 billion

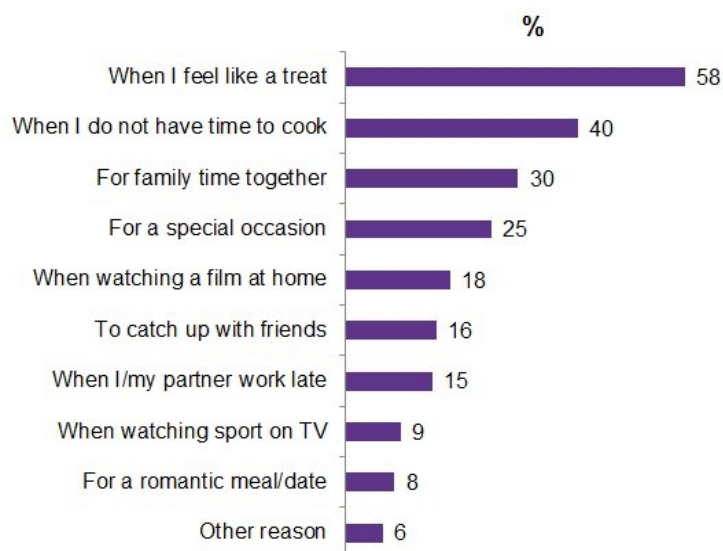
Source: IGD, 2016.

2.9.2 Consumer use of takeaway and other restaurant home-delivered meal services

Research shows that more than 80% of UK consumers make use of takeaway and other restaurant home-delivered meals. However, most people do this on an occasional basis, with only 13% purchasing a meal at least once a week directly from the restaurant and 6% through a third party provider (based on an internet survey of 2,000 respondents - Mintel, 2016).

Eighty-three per cent of UK consumers have ordered a meal for takeaway/home-delivery directly from a restaurant at some time, compared with 43% of consumers who have ordered from a third-party platform. Highest usage rates are among those aged 16-44 (with 19% of these consumers ordering a meal at least once per week) and those consumers with children (Mintel, 2016b).

Figure 2.5: Frequency of home delivery/takeaway usage in the UK (December 2015)



Notes:

Based on responses of 1,677 internet users aged 16+ who use takeaway/home delivery.

Question asked: “For which, if any, of the following reasons would you typically order a takeaway/home delivery?”

Source: Mintel, 2016b.

Convenience is a major factor in the ordering of food takeaways/home deliveries. **Figure 2.5** shows the reasons given by survey respondents for placing orders, with having a treat and saving time underlying many of the answers provided. Convenience is likely to increase as more restaurants and third-party ordering platforms improve their online services. In addition, online ordering allows easy ordering from any location at any time.

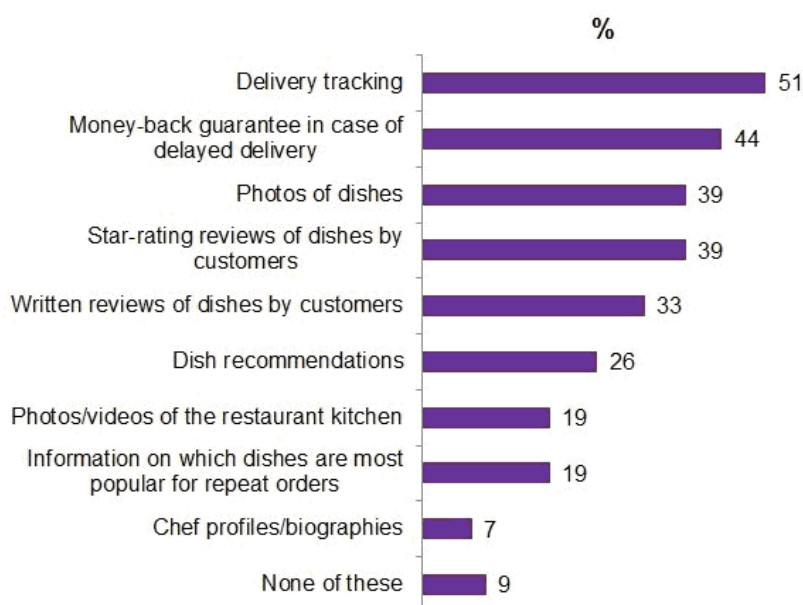
Most commonly mentioned reasons that deter some people from using food takeaways/home deliveries services include: concerns about the healthiness, quality, hygiene and heat of the food, together with delivery charges and waiting times (Mintel, 2016b).

2.9.3 Consumer ordering methods

Consumers still more commonly use the telephone to place their orders for takeaway/home delivered meals rather than ordering by computer. Survey work in 2015 showed that 57% of respondents had ordered by phone, 29% in person at the restaurant/takeaway, and 36% had ordered by computer. Consumers cited ease/convenience as the reason for choosing telephone ordering (Mintel, 2016b). Overall, 83% of respondents had ordered takeaways and other home-delivered meals directly from a restaurant at some time, while 43% had placed such an order through a third-party platform provider (such as Deliveroo or Just Eat) (Mintel, 2016b). However, online ordering has increasing rapidly in recent years, and is expected to continue to do so. Domino's (the pizza chain) which has developed an advanced online ordering system and app generates almost 80% of all its UK deliveries from online ordering (Mintel, 2016b). Third-party platforms such as Just Eats, Hungry House, Deliveroo and Uber Eats have also helped to facilitate growth in online ordering and have also facilitated many smaller, non-chain restaurants to attract online customers.

2.9.4 Online functionalities being developed and demanded

Figure 2.6: Consumer interest in online ordering features for takeaway/home delivery in the UK (December 2015)



Notes: Based on responses of 601 internet users aged 16+ who have ordered takeaway/home delivery online.

Question asked: "Which, if any, of the following features would you be most interested in seeing when ordering a takeaway/home delivery online?"

Source: Mintel, 2016b.

The tracking of meal orders is a feature that is of interest to consumers, so that they have visibility of progress of their meal delivery. Tracking services are already provided by some providers. This is likely to be implemented by more providers in future. Another feature that may be introduced in future is the potential for delivery staff to communicate directly with consumers more easily than at present. Other services being developed included online functionality that allows consumers to search restaurants online by type of dish, rather than by general cuisine type of the restaurant, as is common at present. **Figure 2.6** shows the online meal ordering services that consumers are interested in being made available.

2.10 Profitability in online shopping and home delivery

Despite the growth in consumer spending on online shopping in the UK (see **section 2.1**), profitability in this market is a far more challenging proposition. Research has shown that the average operating profit margins for the UK's top-10 store-based (i.e. multi-channel) retailers have more than halved since 2011, from 6% in 2011 to 2.5% in 2015 (OC&C Strategy Consultants, 2016). This research also indicated that even click-and-collect home delivery services for non-food retail (i.e. which customers collect from store themselves) cost UK retailers four times more than traditional in-store purchases by consumers. Meanwhile, the home delivery of parcels was found to be 5-23 times more expensive than in-store purchases for retailers (depending on parcel size and delivery service). At the same time, consumers were found to be unwilling to meet these home delivery costs – the research indicated that the maximum that consumers were prepared to pay for same-day deliveries is a maximum of £4 per order (OC&C Strategy Consultants, 2016).

However, despite this mismatch between what consumers are willing to pay for online shopping deliveries and the cost of providing these services, this is not currently causing retailers to dramatically rethink their delivery offer and operations. Instead, in their efforts to increase their online sales, retailers are continuing to offer faster delivery services to customers without covering or recouping these costs.

For instance, between 2013 and 2015, the proportion of next-day delivery for non-food online shopping increased grew by 50%. Research indicates that over the same time period, the proportion of consumers willing to wait 3-5 days for their parcel to arrive reduced by 10% (OC&C Strategy Consultants, 2016 - the research involved an online survey of more than 1,000 consumers).

There are concerns about the long-term profitability of online retailing for food, non-food and takeaway food that involves home delivery services provided by the retailer (Oliver Wyman, 2015). In the last couple of years many online-only (i.e. pure-play) retailers have reported ever-increasing revenues but minimal profits or, sometimes, even losses. Examples include Ocado, Asos, AO.com, and until recently Amazon. Jeff Bezos, the head of Amazon, has, for the entire 22-year history of the company insisted that it is playing a long-term game, in which it continuously increases market share rather than focuses on short-term profits (Ruddick, 2015).

Within the last year Amazon has managed to begin making profits. With \$1.37 billion profits in the first six months of 2016. Amazon can make profits in two main ways: through the direct sale to consumers of goods on its website, or by allowing other sellers (merchants) to sell their products via the Amazon website (on which Amazon earns a commission when merchants sell products through the Amazon marketplace). Amazon marketplace commission rates vary by product type from 8% - 25%, with most product categories earning Amazon a commission rate of 15%. In the first half of 2016, Amazon's profit margin on marketplace sales was 3.7%. Merchants are continuously adding more products to Amazon marketplace; this increased by 22% between mid-2015 and mid-2016. In addition, merchants using marketplace can also purchase additional services from Amazon, including the Fulfilment by Amazon (FBA) service

(in which they pay Amazon to store and ship their goods for them), and also pay Amazon to get their products listed as eligible for Prime shipping by Amazon. Also, in America and elsewhere, Amazon is capturing an ever growing proportion of online sales market share. Taking into account both goods it sells itself and goods sold on its marketplace, Amazon's revenue in the USA was \$112.8 billion in 2015, which was equivalent to 33% of all retail goods sold online in the United States compared with 29% in 2014. This sales growth is likely to be substantially linked to the introduction and growth in uptake of its Prime service in which, for an annual membership fee, members receive fast and free shipping, together with other perks. Consumers joining Amazon Prime, tend to consolidate their online shopping with Amazon (Enright, 2016). However, the profitability experienced in Amazon in 2016 is a new phenomenon for the company, and has taken place at the expense of other online retailers. Also, most other online-only do not have the same range of revenue generating sources as Amazon.

The 2014 profit and loss statements of online-only (i.e. pure-play) retailers showed that only 5 of the 13 listed in Internet Retailer's '2015 Top 500 Guide'¹ that were publicly traded (excluding e-retailers that are divisions of larger companies where e-retail net income is not broken out) generated a profit in that year. Meanwhile, their median year-over-year sales increase was approximately 15% (Enright, 2015).

The same profitability problem affects store-based (i.e. multi-channel) retailers in their online retailing, while at the same time experiencing reduced sales levels and hence profitability at their physical retail outlets. Although pure-play retailers do not require retail stores, the costs of websites, advertising and especially home delivery operations are substantial. Warehouses and fulfilment centres, together with transport operations from these stockholding locations to the consumer are extremely expensive. In traditional shop-based retailing the costs of product picking (and packing in the case of grocery retail), and transport to the home are borne by the consumer. By comparison, in the case of online shopping these costs are all borne by the retailer. The revenues that online retailers have traditionally managed to extract from consumers for these logistics and delivery services have in no way met their costs of provision. Some commentators have expressed doubts about whether online-only (pure-play) retailing can ever be as profitable as store-based retailing.

It has been argued that online shopping may be leading to a situation in which online-only (pure-play) retailers will never be profitable. In addition, it is possible that multi-channel retailers will experience diminishing profit levels as a result of online competition from pure-play retailers. Such a scenario would result in a retail sector in which profit rates would be non-existent or low for all retailers (Ruddick, 2015).

Although pure-play retailers do not need to invest in physical shop networks (and the lease costs and business rates associated with them) they do require logistics facilities (warehouses and fulfilment centres) which are still expensive. In addition, pure-play retailers that begin life as small start-up companies can undergo rapid expansion through both organic growth and acquisition activity. Both of these growth models can present difficult challenges in terms of the frequent need to relocate and expand logistics premises when demand requires, in order to continue providing reliable home delivery services to consumers. Such decisions are extremely time-consuming, and errors resulting from lack of action or incorrect action in terms of logistics facilities and logistics operations can lead to serious, or in some cases even terminal, business difficulties for pure-play retailers.

¹ Internet Retailer's Top 500 is compiled from its interactive database of e-commerce leading companies worldwide which contains rankings, profiles and business facts on each of the world's largest e-retailers (the top 1,000 in North America, and the top 500 each in Europe, Latin America, Asia, and China).

Retailers providing online shopping have, until now, felt unable to raise product prices, or even the explicit price charged for logistics and distribution services (where these services are explicitly priced – which they are often not). This is due to the level of competition they face from retail competitors both in terms of price and delivery services offered. In fact, in recent years the level of delivery service offered to the consumer has tended to become ever-more enhanced (in terms of the speed of delivery, specific delivery time slots offered, delivery day guarantees, product returns policies etc.), further increasing logistics and delivery costs to the retailer, whilst overall product prices and any explicit delivery charges have either failed to keep match, or have not increased at all.

In addition to causing profitability problems for the retailers, the under-pricing of home delivery services has also resulted in financial difficulties for logistics companies providing these home delivery services to retailers. For instance, parcel carriers in the UK have experienced ever-growing demands from retail customers for increases in the quality of their logistics services offered, without related increases in the unit prices paid. This has caused severe financial difficulties for some major parcel carriers (see Allen et. al., 2016).

The differential between the cost of home delivery operations and the revenues received for it indicates the importance to retailers of controlling their home delivery costs. This is especially pertinent in relation to the costs of the last mile delivery of the logistics operation, which is the most expensive element of it. To achieve this will involve rethinking warehousing systems and locations, picking and packing arrangements, delivery services offered to consumers, and delivery systems operated from fulfilment centres to the consumer.

It is likely that grocery retailers have never made any profits on online sales, instead making losses on every order ever since the origin on online food sales, but have until recently been prepared to withstand these losses in their efforts to increase sales volumes and market share and keep city analysts appeased. A report from 2001, in the early days of online grocery shopping, highlighted this exact same profitability problem, with losses being made on each order (Browne et al., 2001).

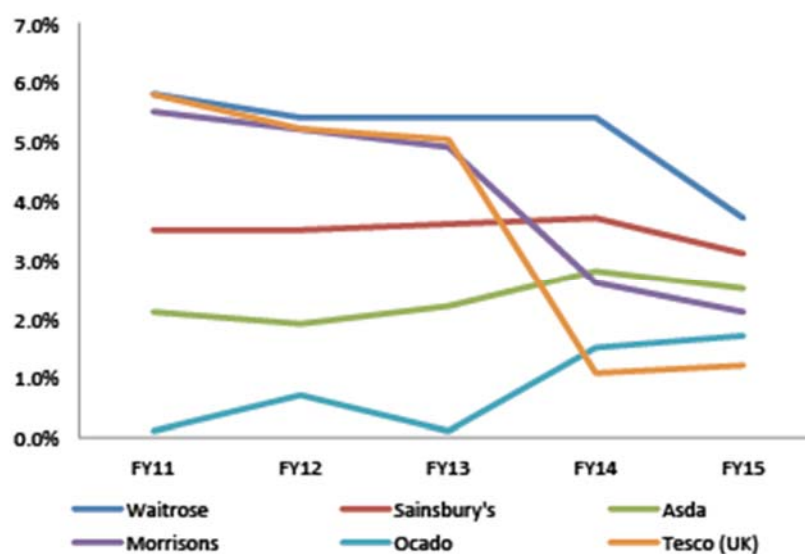
Research carried out in 2015 by Kurt Salmon for Retail Week estimated that the typical cost to a major UK supermarket chain of fulfilling an average £100 online order, in which the grocer picked the items ordered in-store, is between £28 and £30 (taking into account the costs of distribution, wages, marketing, fuel, and vehicle leasing or maintenance). The research indicated that supermarkets were making an average gross margin of approximately £25 for every £100 online order, resulting in each online order for home delivery that they take resulting in a loss to them of £3 to £5. Assuming approximately 90 million annual grocery home delivery orders in the UK, it was calculated that this equated to a total loss to UK supermarkets of approximately £300 million per annum in 2015. The research estimated that the actual operating cost of transporting an average £100 order to a customer's home (i.e. the "final mile" component of the home delivery operation) was £8 - £9, whereas typical delivery charges to consumers were £1 - £6 for home deliveries, depending on the order size (Tugby, 2015). The research suggested that supermarkets were incorporating the picking and delivery costs associated with online orders in store operating costs, while other costs including online advertising were being allocated under marketing budgets (Tugby, 2015). The head of Sainsbury's online services stated that supermarkets had "destroyed" the value of online grocery by under-charging for deliveries. He said that grocers needed to "learn to charge for these amazing services we offer our customers". Meanwhile, Aldi's UK head admitted that he could not see a means of achieving profitability in online grocery "anywhere in the market" (Tugby, 2015).

In the UK grocery home shopping market, the top four physical retailers with online businesses are Tesco, Sainsbury's, Asda and Morrisons. Ocado is the country's only grocery pure play retailer of any scale. However, in June 2016 Amazon Fresh commenced trading in the UK

thereby increasing competition in the sector. Amazon is likely to gain grocery market share from these other, more established grocery online retailers in the UK, with the latter having to implement measures to try to prevent this from happening – they have already begun to implement some initiatives to try to improve their competitiveness but the success of this, and its impact on sales and profitability, remain to be seen. It is possible that these companies will not be able to both retain market share and improve profitability (Fung Global Retail & Technology, 2016).

Grocery companies in the UK (store-based and online selling) have been struggling in recent years from the degree of competition, resulting in price deflation and falling profit levels. **Figure 2.7** shows underlying operating profit margins of the five largest physical grocery retailers that also offer online shopping, together with the pure play retailer, Ocado.

Figure 2.7: UK Grocery Retailers’ Underlying Operating Profit Margins



Source: Fung Global Retail & Technology, 2016 (compiled from company accounts).

Ocado was first listed on the UK stock market in 2010 and did not report its first net profit until 2014. However this profit was negligible and this continues to be the case. In its fiscal year 2015 net profit margin at Ocado was 0.01% (Fung Global Retail & Technology, 2016).

Research by PwC (PriceWaterhouseCoopers) and the supply chain firm JDA indicated that only one in five of the heads of the top 250 retailers globally felt that they could fulfil multi-channel retailing profitably. These retail heads believed that the biggest challenge to achieving profitability was meeting online customer expectations, particularly given that retailers are now expected to offer next-day delivery as standard (Neville, 2015).

However, there are now the first signs of a response to these profitability problems from some multi-channel grocery retailers in an attempt to begin to address these profitability problems associated with online shipping. For instance, last year both Tesco and Asda announced that they were increasing their minimum online grocery order value for home delivery (in the case of Tesco from £25 to £40) otherwise an additional delivery charge would apply (Fargin, 2016).

The current state of profitability is difficult to ascertain in the takeaway and other restaurant home-delivered meals market. Many retailers impose minimum order values on deliveries, and some charge an additional fee for delivery (but some also offer free delivery). Given that most of these online meal retailers do not publish even their sales revenues makes such

consideration especially difficult. These retailers earn income from the commission rate that they charge restaurant, which can range from 10-30% of the order value, together with any delivery prices that they charge (if they offer in-house delivery services) (Minlot, 2015).

However, David Buttress, Chief Executive Just Eats, the leading meal provider that does not offers its own delivery service (leaving this to the restaurants) has stated that only the market leader for online meal services in any given city or country can be profitable, “In 10 years, I’ve never seen the number two player [in a country] break even, let alone turn a profit..... It has never happened in this industry”. This view is supported by a financial analyst working in the sector, who has explained that the market leader for online meal services in any given location benefits from the preference of most restaurants to work with as few online partners as possible, to avoid the need to integrate with many different online systems and technologies. As a result restaurants often only want to work with one or two online platforms that have the greatest number of customers. In addition, consumers naturally prefer online home-delivered meal providers that have the greatest restaurant coverage. This results in a situation in which the market leader in a given location tends to generate far greater revenues than its competitors (Ahmed, 2016).

So to summarise, retailers in all online sectors in the UK are facing a very difficult problem with respect to online sales: how to improve the existing profitability of these services. This is made especially challenging when research indicates that few consumers are prepared to pay more for home deliveries. Survey work has indicated that in the UK 83% of online consumers select the cheapest delivery option, and when asked, 81% of online consumers state that higher delivery or collection costs would put them off ordering online (Mintel, 2016a, 2016d).

2.11 Methods by which online retailers could increase profitability

Online retailers could take action to increase the profitability of their businesses. However, as discussed in **section 2.10**, many have tended to avoid such action for two main reasons: (i) they view increasing the size of their business and therefore sales revenue as far more important than profitability (and typically expect profitability to be achieved at a later stage in their business evolution – this is especially common among pure-play online retailers), and (ii) they are concerned about their market share and any actions that reduce this (through reducing sales) is generally viewed negatively by the companies and investment analysts (who play an important role in terms of the potential to raise investment and in share prices).

However, several commentators have identified methods by which online retailers could improve their profitability (or reduce losses). These can be divided into two strands: (i) methods that address logistics- and delivery-related issues (as these represent one important activity area associated with low profitability and loss-making), and (ii) methods that focus on other areas of retail activity. These methods are presented in **Tables 2.15 and 2.16**.

Table 2.15: Methods of improving the profitability of online retailing – logistics-related

Method	Source
Shipping from stores closer to customers' homes	Rigby, 2016
Improving delivery drop density of deliverers/drivers in particular areas	Rigby, 2016
Using more flexible labour models in home delivery work	Rigby, 2016
Considering mutually beneficial partnerships to fulfil the last mile, to make it faster and less capital intensive (e.g. Uniqlo partnership with 7-Eleven in USA, and Alibaba partnership with Suning in China).	Rigby, 2016
Use of Delivery Passes to retain consumers and increase their spend (and hence increase delivery drop density)	Rigby, 2016
Continuous review of fulfilment and delivery costs, consumer charges, and net margin. Increase delivery price when necessary	Fargin, 2016; Paxton, 2016
Increase minimum order values for free / cheaper delivery	Fargin, 2016
Enable delivery vehicles to deliver a mixture of product types (e.g. bring takeaway and home-delivered meal and online grocery deliveries together)	Fargin, 2016
Further invest in Click & Collect format: charge a premium for home delivery (to reduce demand) and instead encourage customers to collect orders themselves	Fargin, 2016; Tugby 2015
Use home delivery network to offer delivery services on behalf of other retailers/ businesses.	Fargin, 2016
Retailers should outsource home delivery to specialist carriers and logistics companies	Fargin, 2016
Make use of crowdshipping delivery services	Fargin, 2016
Allocate supply chain and home delivery costs properly in case of store-based retailers	Paxton, 2014

Table 2.16: Methods of improving the profitability of online retailing – other areas of retail activity

Method	Source
Consumers may shop in-store rather than online if store items are available locally, and stock can be checked on the internet	Rigby, 2016
Consider how to achieve a better profit margin-mix in each customer basket	Fargin, 2016
Improve access to, and visibility of the cost of online retail activities	Paxton, 2014
Carry out 'Product Portfolio Review' to categorise products based on measures of net revenue and profit margin and then apply different retail strategies for each category	Paxton, 2014
Sourcing decisions, especially for private label goods, can also be influenced by more detailed visibility of costs	Paxton, 2014
Retailers should work more closely with product suppliers to reduce supply chain costs for both organisations (e.g. shared storage facilities)	Paxton, 2014
Retailers should determine whether products are sold in all channels, online only or stockless (i.e. orders routed to a supplier for direct delivery e.g. white goods)	Paxton, 2014

3. HOME DELIVERY OF ONLINE SHOPPING

3.1 Overview of home delivery operations supporting online shopping

The successful home delivery of products is an essential component of all online shopping. However the distribution operations required vary in their detail depending on the sector involved and the level of service offered. This chapter provides insight into the home delivery operations and challenges in each of the online shopping sectors reviewed in this report: grocery, non-food, and takeaway and other restaurant home-delivered meals.

Using the estimated annual sales revenue associated with each of the online shopping sectors (see **section 2.2**), the number of annual home deliveries associated with these sales have been estimated (see **Table 3.1**). As **Table 3.1** shows, the home delivery sector that generates by far the greatest quantity of home delivery activity is the non-food small items sector (i.e. parcels and packages). This is followed in terms of delivery activity levels by the takeaways and other home-delivered meals sector, the grocery deliveries sector, and the non-food large item sector (e.g. washing machines, cookers, furniture, floorcoverings etc.).

Table 3.1: Estimated online retail sales and home deliveries in the UK by sector in 2015

Type of online retailing sector	Annual sales in £ billion	Annual deliveries***
Grocery	£8.6 billion	86 million orders
Non-food small items*	£31.8 billion	900 million parcels
Non-food large items**	£4.3 billion	8.6 million items
Takeaways & other home-delivered meals	£6.7 billion	270 million orders

Notes:

* - Comprising parcels and & packages.

** - Defined as requiring two-person crew for delivery.

See sections 2.2, 2.7, and 2.8 for further details of the sizes of each of these online sectors.

*** based on following assumed values per order: online grocery – £100; Non-food online shopping (large items) - £500; Takeaways & home delivered meals - £25. Estimate of 900 million parcels delivered per annum in the UK from section 3.8.4 also used, which given a sector value of £31.8 billion is equivalent to an average order value of approximately £35.

Prior to considering each of these sectors individually, it is worth making some general comparisons between these online shopping sectors and their home delivery operations. In the case of grocery home delivery, and takeaways and other restaurant home-delivered meals, both sectors exhibit relatively little variation in terms of the distribution operations involved. The greatest differences in the grocery home delivery sector involve where the goods are picked (either in-store or at a distribution centre) and whether the delivery is made to the customer's home (which is by far the most common arrangement) or to some alternative collection point (such as a selected grocery store - i.e. Click & Collect – or a railway station car park). In the case of takeaway and other restaurant home-delivered meals differences include whether the restaurant, the online platform provider or a specialist carrier is responsible for organising and providing the delivery service. There are also some variations in vehicle type used for takeaways and restaurant home-delivered meals (in terms of bicycles, motorbikes and cars). This vehicle choice is usually dependent on the driver's available mode of transport, as well as the distances to be travelled and the quantity of food ordered. Neither grocery home deliveries, or takeaways and other restaurant home-delivered meals are typically subject to first time delivery failures (i.e. where the deliverer/driver finds that no-one

is present to receive the delivery (as in both cases the customers has a time-window for delivery, and product return rates are also low in both sectors).

By comparison, non-food home delivery operations exhibit far more variety which is based on several factors: (i) the type of product involved (as parcels and large white and brown goods will require very different arrangements and have very different operating patterns – given that the latter often require a two-person vehicle crew, installation at the delivery address and removal/disposal of old equipment); (ii) the type of carrier delivering the goods (which can be a traditional next-day parcel carrier, a same-day courier, of a crowdshipping platform provider); (iii) the location to which the delivery is made (i.e. customer's home, locker bank, collection point, or store – Click & Collect); (iv) the type of vehicle used (which can include bicycles, motor bikes, cars, vans and heavier/larger goods vehicles); (v) product return rates and arrangement (which vary by product type and retailer); and (vi) first time delivery failure rates (which are typically quite high in the case of B2C parcel deliveries, but low in the case of large brown and high goods). **Table 3.2** summarises differences in markets served and delivery service arrangements between and within these three online shopping home delivery sectors. Grocery deliveries, large non-food item deliveries, and restaurant and takeaway deliveries are each given a single common, given that there is relatively little variation in how these services are performed. However, given the far greater variation that exists in the home delivery of small non-food items, these deliveries have been given three separate columns to reflect the significant operational differences in how these goods are delivered to consumers. These three options reflected in **Table 3.2** are packages and parcels (i.e. non-food small item) delivered by: (i) parcel carriers (i.e. next-day delivery professional carriers), (ii) couriers (i.e. same-day delivery professional carriers), and (iii) crowdshipping (i.e. same- or next-day delivery by individuals).

Home delivery services offered, in terms of their responsiveness, flexibility and price, play an extremely important role in consumers' shopping decisions. As a recent report discussed, "When six in ten shoppers abandoning baskets online are doing so because of issues relating to the last mile, it's clear that investing only in the front end of e-commerce is no longer sufficient. The last mile is fast becoming the ultimate battleground for retailers as shoppers demand more convenience. Being able to offer predictable delivery slots, free next-day delivery and an accessibly priced same-day service is becoming the norm. The challenge retailers face is how to meet these changing expectations while making the economics work for their business" (OC&C Strategy Consultants, 2016).

Balancing the delivery demands and expectations of consumers in order to generate sales, with the costs of home delivery services (and their impact on profitability) is a major concern for all online retailers. At the same time, retailers have to provide good quality, but good value, delivery services as this is crucial to consumers choosing to place orders with them. The following sub-sections consider key issues and developments that are of importance to home delivery operations in the UK. These include: Click and Collect and PUDO services (**section 3.2**), product returns (**section 3.3**), delivery passes (**section 3.4**), crowdshipping (**section 3.5**), employment issues raised by crowdshipping (**section 3.6**), and logistics land use issues (**section 3.7**). Detailed attention is then turned to each of the three online shopping sectors (**sections 3.8 – 3.10**).

Table 3.2: Service arrangements and operations in online shopping home delivery systems by sector and provider

Sector	Grocery retail	Non-food retail			Non-food retail	Takeaways and home-delivered meals
Products delivered	Food shopping	Parcels and packages – by parcel carrier	Parcels and packages – by courier	Parcels and packages – by crowdshipping*	Large white and brown goods	Ready to eat meals
Size of sector**	£8.6 billion	£31.8 billion			£4.3 billion	£6.7 billion
Total number of orders delivered in UK per year***	86 million	900 million parcels			8.6 million	270 million
Markets served	Predominantly B2C; limited B2B	B2C, B2B and C2C	B2C and B2B	B2C, B2B and C2C	Predominantly B2C; limited B2B	Predominantly B2C; limited B2B
Explicit delivery charge?	Varies (sometimes requires minimum order size)	Varies – but often not	Yes	Varies – but often not	Yes	Varies (sometimes requires minimum order size)
Change in pricing model in last 12 months?	Minimum order size for free delivery increased. Membership fees.	Some retailers using membership fees	No	No	No	Some retailers using membership fees.
Typical lead time from order to delivery (i.e. responsiveness of delivery)	1 or more days (but 30-60 minutes same-day in new rapid response services)	1 or more days	Same day	Same-day and economy	1 day to several weeks	Usually within 15-60 minutes
Typical time taken per delivery (i.e. unloading time)	Less than 10 minutes	Less than 2 minutes (except in multi-storey buildings or busy areas with little parking)	Less than 2 minutes (except in multi-storey buildings or busy areas with little parking)	Less than 2 minutes (except in multi-storey buildings or busy areas with little parking)	10-60 minutes (due to installation)	Less than 2 minutes (except in multi-storey buildings)
Incidence of first-time delivery failure	Very low	High	Low-medium	Low	Very low	Very low
Return rates	Low	High	Low	High	Very low	Very low
Type of delivery operation	Multi-drop rounds	Multi-drop rounds	Single drop rounds (point to point)	Single drop rounds (point to point)	Multi-drop rounds	Single drop rounds (point to point)
Bookable delivery times available?	Yes, 1- or 2-hour delivery slots	Often not. But some carriers allow consumer selection of delivery day or time (often for an additional charge). And some carriers send message to consumer either one hour or the day before delivery			Some offer 1- or 2-hour delivery slots for extra charge	No, but usually within 15-60 mins of order

Table 3.2: Service arrangements and operations in online shopping home delivery systems by sector and provider (continued)

Sector	Grocery retail	Non-food retail			Non-food retail	Takeaways and home-delivered meals
Products delivered	Food shopping	Parcels and packages – by parcel carrier	Parcels and packages – by courier	Parcels and packages – by crowdshipping*	Large white and brown goods	Ready to eat meals
Type of vehicle/s used for home delivery	Vans (with some motorbikes and bicycles)	Vans (with some cars for deliveries to residential addresses)	Motorbikes, bicycles, vans and cars	Motorbikes, bicycles, cars, air and public transport	Lorries	Motorbikes, bicycles and some cars
Typical number of orders delivered per round trip	10-15	50-200	1-5	1	5-10	1
Average size of delivery	Several bags full	From one parcel (residential) to multiple parcels (businesses)	Usually one parcel or letter	Usually one parcel	Single item but large and heavy	Single bag/box
Number of people on/in vehicle	One	One	One	One	Two	One
Are collections also made on delivery rounds?	No (with exception of carrier bag recycling)	Quite often – collections of new parcel flows from customers	No, not usually	No	Sometimes – removal of old item from delivery address	No
Variation in product volumes during week	Low	Low	Low	Low	Low	High (most demand at lunch, evenings & weekends)
Seasonality in product volumes	Moderate – Christmas peak	High – Christmas peak	Low	High – Christmas peak	Low	Moderate – peak during holidays
Busiest time of delivery operations	Fri and Sat/Sun morning	Daytime	Daytime	Daytime	Daytime	Evening
Deliveries out of hours (before 07:00 or after 18:00)	After 18:00	Limited services at evenings	Yes	Limited services at evenings	Limited services at evenings	After 18:00
No. of delivery days per week	Seven	Usually five or six (often not Sunday)****	Usually seven	Usually five or six (often not Sunday)	Six (plus occasionally Sunday)	Seven
Locations from which delivery vehicles are despatched	Shops (supermarkets) and fulfilment centres	Logistics depots	Point-to-point: driver does not return to depot between each delivery and collection	Logistics depots or point-to-point	Logistics depots	Shops (restaurants and takeaways)

Table 3.2: Service arrangements and operations in online shopping home delivery systems by sector and provider (continued)

Sector	Grocery retail	Non-food retail			Non-food retail	Takeaways and home-delivered meals
Products delivered	Food shopping	Parcels and packages – by parcel carrier	Parcels and packages – by courier	Parcels and packages – by crowdshipping*	Large white and brown goods	Ready to eat meals
Receivers to which deliveries are made	Predominantly residential	Residential and businesses	Residential and businesses	Residential and businesses	Predominantly residential	Mostly residential but also businesses
Is Click & Collect at store possible (for items purchased from physical retailers)?	Yes	Yes	Yes	Yes	Not normally	Usually only if ordered direct from restaurant
Are collection points and/or locker banks used	Collection points - No Locker banks – Occasionally	Collection points – Yes Locker banks – Yes	No	No	No	No
Where vehicles are stored	Shop car parks and fulfilment centres	Logistics depots and residential addresses (on- and off-street)	Logistics depots and residential addresses (on- and off-street)	Residential addresses (on- and off-street)	Logistics depots	Shop car parks and residential addresses (on- and off-street)
Who carries out the delivery operations	Supermarket	Parcel carrier	Courier or parcel carrier	Platform provider with driver/cyclist	Logistics carrier	Restaurant or platform provider with driver/cyclist
Change in delivery speed and service over last two years	Longer working day. Click & Collect service improvement	Faster delivery. Click & Collect service improvement	No change	Faster delivery	More choice of time slots	Faster delivery

Notes:
 - “Parcels and packages by crowdshipping” in this table is defined in its original meaning of an individual transporting a parcel or package on an existing passenger journey. For crowdshipping of parcels/packages that involves dedicated delivery drivers doing multi-drop vehicle rounds (such as Amazon Flex), see “Parcels and packages by parcel carrier”.
 ** - see sections 2.2, 2.7 and 2.8 for further details of the sizes of each of these online sectors.
 *** based on following assumed values per order: online grocery – £100; Non-food online shopping (large items) - £500; Takeaways & other home-delivered meals - £25. Estimate of 900 million parcels delivered per annum in the UK from section 3.8.4 also used, which given a sector value of £31.8 billion is equivalent to an average order value of approximately £35.
 **** - but Sunday deliveries becoming more common among independent delivery drivers working for retailers such as Amazon.
 Source: based on the authors’ own judgement.

3.2 Click & Collect services, collection points and locker banks

Rather than deliver goods to customers' homes or workplaces, fulfilment channels that offer deliveries to other locations are growing in importance. These include "Click & Collect" and "pick up and drop off point" (also known as PUDO). "Click & Collect" is a fulfilment channel for online shopping which allows customers to order goods from a retailer's website and then collect them from a physical store or other standalone collection facility operated by the retailer. For example, as well as providing Click & Collect facilities in its stores, Asda has also launched them at business parks, universities and London Underground stations. "Pick up and drop off point (PUDO)" is a place where goods can be left for customers for collection, or where customers can drop off goods to be returned. It can be a staffed or unstaffed locker bank, or a staffed counter in a building such as a shop or dedicated facility run by a third party (i.e. a collection point) (DHL, 2014). The concept first emerged for field engineers requiring parts for their daily activities, but was later transferred to online shopping as a customer fulfilment channel. It therefore includes locker banks (such as those operated by DHL, Amazon, and InPost) as well as collection points (including the Post Office, Collect+ and Duddle). Locker banks can be located at railway stations, petrol stations, shopping centres, workplaces and residential estates. Locker banks in the UK have been provided by online-retailers (such as Amazon), parcels carriers (such as DHL), and specialist locker bank providers (such as InPost). Collection points are located in either dedicated shops (in high streets or shopping centres), in railway stations (such as Duddle's outlets) or in existing retail outlets (for instance Collect+ in the UK has counters in branches of Asda, Costcutter, Nisa, Spar and McColls - CollectPlus, 2017). There are some key differences in the attributes of locker banks and collection points (see **Table 3.3**). These collection services are suitable for both grocery and non-food small items ordered online. However, they are unsuited to non-food large items (given the storage and installation requirements) and to takeaways and other home-delivered meals given their deterioration and the fact that the consumer wants to have it delivered to their home and as soon as possible.

In deciding whether to make use of Click & Collect services, collection points, or locker banks, consumers have to weigh up the charges involved with the convenience offered, and compare these with alternative delivery options (to home, work, with neighbour etc.). Click & Collect services offered by store-based online retailers are usually made freely available to consumers, and can prove convenient to them when located in stores they pass on regular journeys that they make. **Table 3.4** shows the reasons cited by survey respondents for using Click & Collect services. Retailers like consumers to use their Click & Collect services for main two reasons: (i) it helps them to avoid performing loss-making home delivery operations and can thereby improve their profit margins, and (ii) it results in the consumer visiting the store and possibly carrying out more shopping while collecting the goods. In relation to this latter point, survey work has shown that across all types of purchases, 4% of respondents state that they always make additional purchases when collecting their goods from a store, 11% sometimes do, 60% sometimes do and 25% never do. Purchases from grocery stores have the lowest likelihood of nothing additional being purchased by Click & Collect users when collecting their goods, with 19% of respondents stating that this was the case (Verdict, 2016b).

Table 3.3: Comparison of attributes of locker banks, collection points and click & collect facilities

Attribute	Locker bank	Collection point	Click & Collect facility
Space requirements	Limited	Greater – usually part of or entire retail outlet	Part of a large retail store
Operating costs	Low	Higher – due to space and staffing requirements	Higher – due to space and staffing requirements
Opening hours	Typically 24/7	Typically convenience store hours (i.e. early morning until 8-11pm)	Same as retail store
Labour requirements	None	Staffed	Staffed
Dedicated to a single retailer	Sometimes (e.g. Amazon lockers)	No	Usually (but some exceptions)
Facility for goods return	Sometimes offered – sometimes not due to security concerns	Yes	Yes
Facility for sending goods	Never	Often	No
Customer concerns about how to use	More likely	Uncommon	No
Goods throughput	Low – due to small size/number of lockers	Higher	Higher
Specific operating problems	Lockers unavailable for reuse until customer collects	None	None

Table 3.4: Reasons mentioned as important for using Click & Collect in the UK in 2015

Reason for using Click & Collect services	Proportion of respondents mentioning this (%)
To avoid paying home delivery charges	47%
To ensure that stock is available when I visit the store	44%
To minimise the time I spend in stores	31%
Because I don't want to wait in for home deliveries	27%
Because it is the quickest way to get the items	19%

Source: Verdict, 2016b.

Click & Collect services are therefore proving popular with both store-based retailers and their consumers. For example, more than half of John Lewis's online orders were collected in store

in its 2015/16 financial year (Retail Week in partnership with Metapack, 2016). All of the major grocery retailers offering online shopping (with the exception of Morrisons) offer free Click & Collect services to their consumers. Waitrose offers a free service for orders of £30 and above (otherwise £2), Asda requires a minimum shopping value of £40, while Sainsbury's and Tesco both offer a free service for orders over £40, and charge £4 for orders below this value. Tesco is the only grocery retailer to offer a free same-day Click & Collect service (order by 13:00 for collection after 16:00). The online-only retailer, Ocado, has the smallest Click & Collect network of the grocers, having only set up only an arrangement with Doodle collection point shops and trial sites at London Underground stations.

Sports Direct introduced a Click & Collect service that attempt to generate in-store sales as well. Consumers are charged £4.99 for Click & Collect orders, but in return are provided with a £5 voucher, that can only be spent in-store. In this way consumers who use the voucher feel they are getting free Click & Collect services while Sports Direct increases its in-store sales. The department store, Debenhams, has a standard Click & Collect service that is similar to John Lewis (free on orders over £20, and £2 for orders below this) but has also used the same approach as Sport Direct (a free £5 voucher for in-store use only) for online orders of £30 or more on an occasional, promotional basis.

Table 3.5 shows the importance of the use of Click & Collect services as a proportion of total online shopping by product category and also its relative importance across all product categories. Online sales that made use of Click & Collect services in 2016 accounted for 11% of total online sales, and 25% of all online clothing and footwear sales (Verdict, 2016a).

Table 3.5: Importance of Click & Collect by product type in the UK in 2016

Product type	Online sales via click & collect (£ million)	% of total click & collect sales	Click & collect as % of total online sales
Clothing & footwear	2,916	54%	25.0%
Electricals	1,318	25%	11.6%
Food & grocery	301	6%	2.9%
Other	400	7%	7.0%
Furniture & floorcoverings	20	0%	1.1%
Health & beauty	147	3%	8.9%
Homewares	178	3%	11.5%
Books	14	0%	0.9%
DIY & gardening	78	1%	8.4%
Music & film	1	0%	0.1%
TOTAL	5,372	100%	11.3%

Source: calculated from data in Verdict, 2016a.

Some retailers with Click & Collect facilities in their stores are opening these facilities up to online-only (pure-play) retailers who can use them as a collection point for their goods. This generates a new revenue stream for store-based online retailers. For example, Boots the Chemist has allowed its stores to be used for ASOS consumer collections, while Argos provides a similar service for eBay consumer collections (Retail Week in partnership with Metapack, 2016).

Table 3.6 shows the importance of the use of PUDO (pick-up and drop-off) services as a proportion of total online shopping by product category and also its relative importance across all product categories. PUDO is far less widely used than Click & Collect services accounting for only 1% of total online sales in 2016 (due to the delivery charges involved in using collection points and lockers). The two product types most commonly collected from PUDOs are electrical goods, and clothing and footwear (Verdict, 2016a). Locker banks are far less commonly used than Click & Collect and collection point services for by online consumers and will not grow in importance unless more retailers decide to use them and more locker banks are installed nationally (Verdict, 2016c).

Table 3.6: Importance of PUDO by product type in the UK in 2016

Product type	Online sales via PUDO (£ million)	% of total PUDO sales	PUDO as % of total online sales
Clothing & footwear	175	33%	1.5%
Electricals	237	44%	2.1%
Food & grocery	17	3%	0.2%
Other	30	6%	0.5%
Furniture & floorcoverings	0	0%	0.0%
Health & beauty	13	3%	0.8%
Homewares	37	7%	2.4%
Books	5	1%	0.3%
DIY & gardening	17	3%	1.8%
Music & film	2	0%	0.3%
TOTAL	534	100%	1.1%

Note: PUDO: “pick up and drop off” – independent collection points and locker banks.
Source: calculated from data in Verdict, 2016a.

Delivering online orders to places other than customers’ homes can also help retailers and logistics carriers to eliminate failed home deliveries (i.e. when the delivery is made at a time when the consumer is not home to receive it) especially in relation to non-food parcels deliveries (which have high first time delivery failure rates – see **section 3.8.7**). Failed deliveries can delay consumers receiving their goods and are costly for retailers / carriers (or for consumers if these costs are passed on to them).

Also, as a goods vehicle delivers far more items to a single location items when locker banks and collection points are used than in the case of deliveries to consumers’ homes, this helps to reduce the distance travelled per item delivered and the associated environmental impacts. It is also important to note that locker banks and collection points result in additional freight and passenger transport activity at the places they are located.

Some online shoppers opt to have personal deliveries (typically of packages and parcels) delivered to their workplace, to avoid missing the delivery as they know they will not be at home to receive it. While this helps to reduce delivery failure rates, it can have other negative consequences both for the company and for society. These include the detrimental impact of these product flows on their delivery bays, internal building logistics and post-rooms (requiring staff employed to perform these activities using their time for non-company work), which is a hindrance to the efficient flow of essential business deliveries within the building. It can also

add to the total number of deliveries made to the building, which can be especially problematic in terms of adding to traffic levels if the building is sited in a busy location. Small-scale research in central London suggests that personal parcel deliveries can represent up to 40-60% of parcel throughput in medium-larger sized multi-tenanted offices, and up to 90% of parcel throughput at these building during the Christmas peak (Browne et al., 2017). As a result of these issues, a few companies are deciding to ban personal deliveries among their staff (either due to the impact on the efficiency of their internal building logistics, or as part of their sustainability agendas. However, some other employers see personal deliveries to the building as a staff perk. Survey work in offices in London indicates that 3% of offices ban staff from receiving personal deliveries at workplace and these deliveries do not take place, 5% of offices ban staff from receiving personal deliveries at workplace but these deliveries do take place, 17% of offices discourage staff from receiving personal deliveries at workplace, but staff can receive them if they wish, and 75% of offices allow staff to have personal deliveries sent to workplace (Transport for London, 2015). It remains to be seen whether the number of companies banning personal deliveries at the workplace will increase in future but this is an action called for by London Assembly in its recent report on traffic congestion in London (London Assembly, 2017). A project initiative by Cross River Partnership has established a website to assist companies and their staff to determine suitable Click & Collect facilities, collection points and locker banks from which personal online shopping can be collected instead from a workplace (Cross River Partnership, 2016). See **section 3.8.9** for further discussion of Click & Collect facilities, collection points and locker banks for non-food small items ordered online.

3.3 Returns of online shopping

It is necessary for consumers to return some products purchased online to the retailer. This can take place for many different reasons. **Table 3.7** shows survey results for the reasons given by consumers across all product types. Dealing with returned goods is a major logistical challenge in any supply chain. Product return is far less of a problem in large items such as furniture and major electrical goods, than it is among smaller non-food items. By comparison relatively few online grocery purchases are returned, and hardly any takeaways and other home-delivered meals require returning.

Table 3.7: Importance of product returns in online shopping by product type in the UK in 2016

Reason for returning online purchases	Proportion of respondents mentioning this
Doesn't fit properly	45.1%
Item faulty	27.4%
Incorrect item received	23.3%
Item was of poor quality	20.2%
Looks different to image on site	19.5%
Changed my mind	16.9%
Item/Parcel damaged on arrival	16.7%
Ordered multiple items expecting to return...	15.0%
Arrived too Late	3.4%
Other	2.6%

Source: Verdict, 2016a.

Table 3.8 shows the importance of product returns as a proportion of total online shopping by product category and also its relative importance across all product categories. In 2016 approximately 8% by value of all products purchased online were returned. As can be seen, clothing and footwear has a far greater product return rate than other product categories, with approximately 20% of all clothing and footwear by value being returned by consumers (Verdict, 2016a). By comparison, data from approximately 50 Kurt Salmon clients shows that, on average, online consumers return 20-30% of orders of clothing and other 'soft' goods. By contrast, 'hard' goods like gifts, home products and toys were shown to have return rates of less than 10% (Tugby, 2015).

Table 3.8: Importance of product returns in online shopping by product type in the UK in 2016

Returns	Value (£m)	As a % of all returns (by sales)	Returns as % of total sales
Clothing & footwear	2,396	66%	21%
Electricals	712	20%	6%
Food & grocery	67	2%	1%
Furniture & floorcoverings	140	4%	7%
Health & beauty	74	2%	4%
Homewares	138	4%	9%
Books	32	1%	2%
DIY & gardening	73	2%	8%
Music & film	15	0%	2%
TOTAL	3,647	100%	8%

Source: calculated from data in Verdict, 2016a.

Further details of product returns in the sector most affected, namely non-food small items, can be found in **section 3.8.7**.

Retailers look closely at changes in product return rates as it can be an indication of problems in the information on their websites, call centre advice and guidance or incorrect picking and packing fulfilment operations. Low product return rates typically reflect high levels of customer satisfaction (Briggs, 2013).

In terms of the shipping method by which consumers return goods that were purchased online, survey work indicates that approximately half of all respondents had returned good via the Royal Mail postal service, and half had returned goods to a store-based retailer's shop. One quarter of respondents had returned goods via a delivery agent or parcel company that collected the goods from their home, about 15% had returned goods via a collection point service, while only 2% had returned goods via a locker bank (Verdict, 2016a).

3.4 Delivery passes

In the last couple of years several major online retailers have introduced what are referred to as 'delivery passes'. These are membership schemes that provide members with 'free' home deliveries. Members have to pay either a monthly or annual subscription for their delivery pass, and often, in the case of grocers, still have to spend a minimum amount to qualify for free home delivery. Annual subscription fees typically range from £60-80 per retailer. In addition, members are also normally limited to one 'free' delivery per day. All of the major online grocery

retailers, except Waitrose, have introduced delivery passes; while the best known delivery pass is the one available from Amazon, which is known as 'Amazon Prime'. ASOS, the online-only clothes retailer, also offers a delivery pass. Some of these retailers offer peak and off-peak delivery passes, each with a different subscription rate, which vary in terms of the times or days on which home deliveries are made to members. Some retailers also provide members with additional perks in addition to their 'free' home deliveries. In the case of Amazon it provides free same-day deliveries (where available) as part of its 'Prime' service.

Survey work has shown that approximately 20% of all online grocery shoppers currently have delivery passes, while 35% of consumers who do all their grocery shopping online currently have one. Thirteen percent of all online grocery shoppers previously had one but no longer subscribe, while approximately 30% of all online grocery shoppers who currently do not have a delivery pass expressed an interest in subscribing in the future (Mintel, 2016c).

Some online takeaway and other restaurant home-delivered meal retailers also provide delivery passes. In the case of Deliveroo, for example, Deliveroo Plus is a subscription programme which allows customers to pay a monthly or annual fee instead of delivery fees on each Deliveroo order placed in the UK. The annual price for this service is £89 (Deliveroo, 2017)

Retailers have introduced these passes for two main reasons. First, to generate loyalty among their customers. Once a consumer has signed up for a delivery pass they are likely to use that retailer exclusively for their online shopping requirements which is likely to result in them placing more frequent orders. Research indicates that approximately three-quarters of Amazon Prime customers shop at Amazon at least two to three times a month, compared with approximately 20% of non-Prime customers (Retail Week in partnership with Metapack, 2016). Second, delivery passes are intended to overcome the dislike that regular online shoppers have for delivery charges on a per order basis.

However, it is important to note that 'free' delivery membership schemes of this type are only likely to be relevant to online retailers in high-frequency sectors such as grocery, clothing and general retailing, and in which consumers are prepared to show brand loyalty. In addition, although helping to increase spending per head, these schemes can also result in higher product return rates among users.

3.5 Crowdshipping

Crowdshipping involves, 'enlisting people who are already travelling from points A to B to take a package along with them, making a stop along the way to drop it off' (US Postal Service, 2014). It therefore makes use of members of the public who are making journeys to act as couriers for the distribution of parcels and other small items, thereby creating new informal logistics networks. Such services have emerged over approximately the last five years, and have recently expanded to include journeys made especially to deliver a package, largely precipitated by the entry of UberRUSH into the marketplace (discussed below) (McKinnon, 2016). Crowdshipping is provided via crowdshipping online platforms such as Postmates, Zipments, Deliv, Roadie (In America, where there are currently more crowdshipping services than anywhere else), PostRope (Australia), Renren Kuaidi (China), Nimber (Norway), Trunkrs (Netherlands), and PiggyBaggy (Finland) (McKinnon, 2016).

Originally crowdshipping was intended to make use of the spare delivery capacity of courier-passengers to deliver parcels and items that are travelling between the same locations as the courier-passenger already intended to travel for their own purposes. Therefore the crowdshipped item will not create any more transport activity than would have been generated by the courier-passenger anyway (or possibly only slightly more is the dispatch and delivery

collections differ a little from the courier-passenger's starting and ending locations for their own journey). In addition, crowdshipping did not originally require additional transport vehicles than those already used by the courier-passenger for their own journey that they intended to make anyway, regardless of whether or not they had a parcel or other goods to transport. The courier-passengers who collect and deliver the parcels only provide this service on a part-time basis in accordance and conjunction with their already planned passenger journeys.

Uber, the online taxi business, entered the American crowdshipping market with a service called UberRUSH in 2014, thereby allowing its existing drivers to transport parcels as well as passengers. This changed the shape and direction of crowdshipping, as it was aimed primarily at those looking to move goods for a living rather than as part of an existing passenger journey. At the launch of this service, the general manager of Uber in New York described UberRUSH as, 'an Uber for things' (Prigg, 2014). Uber's technology could potentially allow customers to specify the maximum price they are prepared to pay. During 2015, UberRUSH was primarily a courier service by bike or on foot in New York, but also quickly included a business-to-customer (B2C) service option. This vehicle-based delivery service was also extended to San Francisco and Chicago by UberRUSH in 2015, and delivered goods from retailers to consumers (Jinks, 2016). Amazon Flex which was launched in American cities in 2015; it aims to sign up self-employed drivers to carry out the last-mile delivery of its goods to consumers. Meanwhile, Shuttl provides a delivery service in the UK that collects parcels from and deliver them to any address, both residential and commercial, with the consumer booking their delivery requirement online or via mobile phone. This delivery request is provided to available Shuttl-approved couriers/passengers in the vicinity of the collection address. The first respondent to accept the delivery assignment secures the job and becomes responsible for its collection and delivery (Shuttl, 2016).

Amazon has also begun to use a delivery model that some would describe as a dedicated (i.e. non-passenger transport) form of crowdshipping. Amazon has approximately 16 fulfilment centres in the UK. Traditionally, Amazon worked with several national parcel carriers to carry out its last-mile delivery of products to consumers (including Royal Mail, Citylink, DPD) who collected parcels from Amazon fulfilment centres, transported them to their own sortation centres, sorted them and transported them to a local delivery depot, and then made local deliveries to Amazon's customers. In recent years Amazon has established its own technology and logistics platform (which it calls Amazon Logistics), through which independent carriers (usually local or regional businesses) work with Amazon to deliver parcels to consumers. Amazon Logistics consists of these fulfilment centres, together with eleven local delivery stations and make use of Amazon-developed technology. Amazon Logistics sorts goods by region and transports them from its sortation centres to its local delivery stations. These independent carriers, who have their own vehicle fleets and drivers, collect pre-sorted packages from Amazon's local delivery stations, and deliver them to consumers in a local area, following a route determined by Amazon's own algorithms and using a hand-held device incorporating a scanner and a GPS. These carriers provide Amazon with additional capacity and the flexibility to alter the speed of delivery, allowing Amazon to achieve next-day delivery. In total Amazon Logistics works with about 30 parcel carriers, both national and local independent ones, across the UK (Amazon, 2014). However, over time, Amazon is placing greater emphasis and putting ever-greater parcel volume through its independent carrier network. These independent carriers often make use of a casual workforce that are employed as independent contractors.

In addition, people wishing to deliver Amazon parcels can also sign up to Amazon Flex. They require their own vehicle (car, van or motorbike with box storage) and an Android mobile phone. Amazon refers to these people as their 'Delivery Partners'. These deliverers collect their parcels from local Amazon delivery stations in their area. Amazon describes this work as 'flexible' for those who want to 'turn free time into supplementary income'. Delivery Partners are given periods of time (referred to as 'blocks') that vary in length from 1 to 6 hours,

depending on the delivery service that the parcels are being delivered for. One- and two-hour working blocks are available for Prime Now deliveries, as customer addresses are closer to the delivery station the parcels are collected from. In the case of same-day and next-day deliveries working blocks are often 4-6 hours as the area served by a delivery station is larger and greater transport distances to customers' homes are involved. Amazon notes that the delivery blocks available to Delivery Partners may fluctuate week-to-week and are not guaranteed. Earnings are based on delivering a number of parcels in a given block (of time) – Amazon states that it takes traffic congestion into account in determining the number of parcels it expects a Partner to deliver in a given block but that the actual time taken per delivery may vary depending on actual road conditions, so earnings per hour may vary (Amazon, 2017).

As noted by McKinnon (2016), there are several key service attributes of crowdshipping services and varieties within each of these: (i) it can be used for all types of delivery: customer to customer (C2C), business to customer (B2C), customer to business (C2B), and business to business (B2B); (ii) pricing – in some cases couriers/passengers have freedom to quote their prices, while in other cases deliveries couriers bid for the work, competing on delivery time and cost; (iii) geographical coverage: most crowdshipping takes place in urban areas. However a few crowdshippers offer long haul and global services; (iv) travel type: whether the goods are carried as part of an existing passenger journey, the journey is specifically made for transporting goods, or it is a combination of the two with deviation at one or both ends of passenger journey; (v) commodity types – the crowdshipping platforms typically accept a wide range of item sizes and weights - it is typically left to the couriers to decide what maximum size and weight of item they wish to transport; and (vi) transport mode – some crowdshipping platforms focus on motorised vehicle types while other specialise in bicycle transport.

Crowdshipping is therefore intended to provide an alternative freight distribution model for parcels and small items to that offered by professional carriers (such as parcels companies). Given that the journeys involved were taking place anyway, crowdshipping is intended to reduce logistics costs, especially those associated with for the last-mile delivery, particularly in congested urban areas or remote rural locations which are expensive to service. These potential logistics cost reductions are associated with the lack of need for warehouses, employed vehicle drivers, and vehicles. The potential traffic and environmental benefits of crowdshipping are derived from the use of a single journey for both passenger and goods transport, rather than both journeys occurring in separate vehicles, potentially resulting in reduced total vehicle travel, energy use and emissions. However these traffic and environmental benefits are only realised in the original form of crowdshipping, in which the goods are carried by someone who already intended to make a passenger journey anyway, regardless of whether they also transport goods.

There are several risks and challenges associated with crowdshipping. These include: (i) reliability concerns (i.e. that the courier/passenger may be less reliable than professional carrier companies, and courier/passenger turnover rates at crowdshipping companies are very high); (ii) safety concerns (that theft, fraud, damage of parcels and late delivery may occur); (iii) privacy and security concerns (due to potential problems that may arise from giving couriers/passengers information concerning private individuals, their home addresses and preferred delivery times); and (iv) there may be additional costs arising from factors including insurance, lawsuits and training of part-time couriers/passengers.

Therefore, many potential problems remain to be addressed before crowdshipping can become widespread. These include: safety and privacy issues, legal issues, questions concerning liability, and reputational risks to companies using these services. In addition, the demand for such services and hence their financial viability and profitability are currently uncertain. Whether or not the supply of couriers/passengers can meet current and future demand patterns in terms of times and locations at which customers require services also

remains unclear. As are the traffic and environmental impact of crowdshipping, in terms of whether or not it will alter transport activity in a positive way (Fung Business Intelligence Centre, 2015).

It has been noted that crowdshipping may come to feature most strongly in larger platform providers and major carriers using the approach to “mobilise a new workforce of ‘casual couriers’ interested in earning some extra money by distributing packages” utilising smart phone and social media applications (McKinnon, 2016). Such a model would be likely to reduce delivery costs and transit times, making same day delivery potentially more financially and operationally viable, and may provide online retailing with the lower costs operating model it requires to become more profitable. This would be an extension of the agent-based final-leg home delivery services used by major home shopping retailers for many decades. However, such a future would involve crowdshipping replacing much of the existing model used by the parcels industry in urban areas involving employed staff using company-owned vehicles. This would be a very different vision to that outlined when crowdshipping first commenced – as an additional freight delivery service that could be incorporated into existing passenger journeys, and potentially allowing both to become more efficient.

If the former prevails, then the total transport and environmental impact on a per journey basis may be similar to the current parcels sector model, or could potentially even fall if it results in existing spare capacity on vehicles being used. However, if the growth in supply of crowdshipping permits ever-cheaper, ever-faster last-mile delivery services then this could permit a substantial growth in the demand for rapid response online retailing and hence ever-greater total traffic activity in urban areas. The latter is likely to provide greater opportunities for reductions in total transport activity, energy use and emissions, but is probably a less likely prospect given recent business developments in crowdshipping, the parcels industry and online retailing.

Crowdshipping can potentially, and already is, used in each of the online shopping markets discussed in this report namely: non-food shopping, grocery shopping, and takeaway and home-delivered meals. In its originally defined form it was only truly suited to point to point, same day and on-demand delivery work – this would be most appropriate to same day parcel deliveries and takeaway / home delivered meal deliveries. This form of service is ideally suited to likes of Uber with its existing passenger taxi services (Jinks, 2016). However, more recently, crowdshipping has come to mean something far broader concerning the use of independent drivers / deliverers in existing freight networks in which depots are used to consolidate flows along the supply chain and then crowdshipping is then used for final deliveries from the depot to the consumer (i.e. not necessarily a short same-day delivery) In this definition, crowdshipping could be applied to any sector in the online shopping market, and could be used as a means by which to drive down the labour costs associated with home delivery services (and thereby assisting online retailers and logistics carriers in trying to improve the profitability of these services). Concerns about the status of delivery drivers working in these sectors and their remuneration and rights have led to legal action and strikes in the UK in 2015 and 2016, backed by the Independent Workers Union of Great Britain (IWGB) - see **section 3.3** for further discussion.

3.6 Employment status of those making home deliveries

Parcel carriers have, for many years, made use of self-employed drivers and independent contractors to supplement their directly employed driver crews. This helped to cope with peaks in demand, hiring in more drivers with their own vehicles, as and when required. With the rise of internet based platform providers of taxi services and takeaway food delivery this method of hiring drivers has been growing rapidly. Now, rather than using such non-employed drivers, as a supplement to the employed workforce, as was traditionally the case in the parcels sector, new entrants such as UberRUSH, Deliveroo and Amazon Fresh are using this model of driver recruitment for their entire delivery workforce.

Whilst these methods of remuneration (i.e. self-employed drivers who are called 'independent contractors') suit some people, others are less happy and would prefer to have 'worker' or 'employee' status. Legally 'independent contractors' forgo their employment rights but can refuse work, set their own hours and subcontract jobs to others. The employment rights that independent contractors forgo include the right to the minimum wage, paid holidays and the right to protection against discrimination. Many working as deliverers in the online shopping market (and as drivers for courier and parcels companies) argue that cannot refuse work or set their own hours, can be asked to wear uniforms and identification, and need company permission to take holidays and that therefore they should be reclassified as 'workers' (Chakraborty, 2016).

This led in 2015 to the start of efforts by deliverers/drivers to negotiate with courier and parcels delivery companies and protests against them. This action was been supported by the relatively recently formed Independent Workers Union of Great Britain (IWGB). The IWGB had initially requested CitySprint to increase their pay rates in London to the London Living Wage. However CitySprint refused. This led to the IWGB helping to organise protests, contacting CitySprint clients to explain the situation, a social media campaign, and mainstream press coverage. In December 2015, as a result of this action, CitySprint announced its first pay increase in over 15 years, which was equivalent to a 20% increase as well as removing equipment hire fees.

Following this success with CitySprint, IWGB turned its attention to another courier, eCourier. This featured a high profile living wage campaign against eCourier. A large protest was also planned, but prior to this eCourier entered negotiations with the IWGB, leading to a 28% pay increase for eCourier cycle riders, together with the ending of uniform fees, the altering of an unpopular bonus scheme, and a 10 pence per mile compensation for vehicle maintenance costs (IWGB, 2016b).

The IWGB then turned its focus to G Thompson, a courier/logistics organisation with thirteen company brands the best-known of which is Mach1. Mach1 welcomed negotiations with the IWGB as it did not want to face a campaign against it, and had happened at CitySprint. This again led to increased pay for deliverers, the removal of former equipment rental fees, and an agreement to provide or subsidise the cost of clothing necessary to the role (IWGB, 2016c).

In 2016 legal action was commenced against CitySprint (as well as Excel, Addison Lee and eCourier) by one of their deliverers, Maggie Dewhurst, which was supported by the IWGB as well as the GMB. This resulted in an employment tribunal hearing at which contractors bringing the case sought to be recognised as 'workers', which would lead to automatic entitlements to the national living wage, sick pay and holiday pay. The judge presiding in the employment tribunal ruled in early January 2017 in favour of Ms Dewhurst, agreeing with her that she was a worker for the company and not a self-employed contractor. The judge ruled that CitySprint had therefore unlawfully failed to pay Ms Dewhurst for two days' holiday. CitySprint, stated that it was disappointed with the ruling but that it only applied to a single individual. Ms Dewhurst's lawyers said they expected thousands of couriers across London to make similar

claims for back-pay (O'Connor, 2017). The Labour MP Frank Field has also called for a parliamentary inquiry into the working practices at Hermes, concerning what he refers to as, "bogus self-employment" (Wood, 2016).

In July 2016 a claim was brought against Uber that its drivers are, in fact, workers. In October 2016 an employment court in the UK ruled that Uber drivers were not self-employed and should therefore be paid the national living wage. Uber is currently appealing the ruling (Thuburn, 2016). In addition, UberEATS faced wildcat strike action from its deliverers on 28 August in protest about pay rates (IWGB, 2016e).

Couriers for restaurant delivery firm Deliveroo are also uniformed but engaged as 'independent contractors' rather than 'workers'. In August 2016 some Deliveroo deliverers went on strike at being told to sign new terms and conditions or face the sack; Deliveroo ultimately removed this threat as a result of the strike action (IWGB, 2016d). Since November 2016 the IWGB has been attempting to gain recognition via a collective bargaining agreement from Deliveroo in north London. If the IWGB is successful, it will be the first collective bargaining agreement in the UK's online shopping and delivery market (also known as the "gig economy") and will require Deliveroo to recognise their deliverers as workers. Deliveroo rejected the initial request, but the union is continuing its campaign and a tribunal case is currently pending (Labour Start, 2016).

Legal cases are also taking place in other countries. Uber paid \$100 million (£68 million) to settle a case in California and Massachusetts to keep its drivers as independent contractors. (Lynch, 2016).

The president of the IWGB, Jason Moyer-Lee, believes that how workers are being treated in the online courier and parcel delivery business is actually going to become far more widespread, saying that "The whole economy is going to head in that direction if we're not careful". There has been a substantial rise in self-employment in the UK in recent years (in March 2016, there were 4.7 million self-employed, or 15% of the workforce). While some are genuine 'independent contractors', others are likely to have been given this self-employed status to deny them their lawful employment rights (Lynch, 2016).

A BBC undercover investigation into one of the independent carriers that provides delivery services to Amazon Logistics' operations found that their independent contractors (i.e. drivers) received a fixed rate of £110 per route per day, which typically involved more than 11 hours work per day. These driver-contractors were charged for vehicle rental, insurance, and administration costs imposed by the carrier. These contractors did not receive holiday or sick pay, and some reported that when taking into account the hours they worked delivering parcels, earned below the minimum wage. A professor of labour law who was presented with the information said that in her opinion the drivers contracted by the independent carrier should not be classed as self-employed, as they do not determine their own routes, days of work or rest periods, and should instead be considered to be workers or agency workers, and receiving the national minimum wage (BBC, 2016a).

3.7 Logistics land use, fulfilment centres and home delivery services

Rising land prices in urban areas have forced freight operators to relocate central urban depots and warehouses to locations with relatively lower prices (Hesse, 2008). This has led to the suburbanisation of warehousing, being relocated to the edge of the urban area or even outside (Cidell, 2010; Hesse, 2008; Dablanc and Rakotonarivo, 2010). This is often referred to as "logistics sprawl" (Dablanc et al., 2014).

In Greater London, for example, warehousing floor-space fell in all central London boroughs over the decade from 1998-2008 (by 82% in the City of London, 51% in Westminster, 37% in Camden, and 22% in Kensington and Chelsea), and also fell in many other inner London boroughs (by 42% in Hackney, 31% in Islington, and 24% in Southwark for instance). Meanwhile growth in warehousing floor-space was strong in many outer London boroughs over the same period (49% in Bexley, 34% in Enfield, 26% in Barking, 28% in Sutton and 21% in both Havering and Waltham Forest) (Allen et al., 2012).

This logistics sprawl has resulted in longer urban journey distances from logistics depot to customer (Dablanc and Rakotonarivo, 2010; McKinnon, 2009). In the case of Paris, research has indicated that between 1974 and 2010 the typical distance of parcel companies' depots to their delivery areas resulted in a 12 kilometre increase (from 6 km to 18 km) (Dablanc et al., 2016).

In addition, high urban land prices have encouraged retailers and other users of commercial floor-space to limit storage space, and hence stockholding levels, in their premises. They have converted this space for activities which will provide better financial returns (e.g. increased sales areas). Originally, a high street retailer would typically have had a ratio of 60:40 retail floor space to backroom stock space. This is usually now closer to 80:20 thereby relying more on freight vehicle activity and logistics activities to rapidly supply the goods as and when required (Hobart, 2017). This has resulted in a growing demand for smaller, more frequent deliveries, and hence, ever-growing quantities of goods vehicle movements, especially those involving vans.

However, in the last couple of years there are some initial signs of a limited quantity of warehousing facilities returning to central and inner urban areas. This is being driven by several factors:

1. The requirements of the online shopping market that requires fulfilment centres in urban locations. These centres are used for vehicle despatch for last-mile deliveries to consumers in both residential and commercial properties. These centres can also be used in the return flow of goods from consumers to online retailers (Addleshaw Goddard, 2017).
2. New innovative delivery solutions developed by logistics operators serving the parcels sectors that require relatively small depots in central locations which are used for goods transshipment, the despatch of vehicles performing delivery rounds to final customers, and the overnight storing of vehicles. These facilities are required by logistics operators to avoid the traffic unreliability associated with long distance journeys from depots on the edge of, or outside, the urban area to central locations, especially in situations in which delivery is guaranteed within short lead times and narrow time windows. Examples of operators establishing these central depots include Amazon and Gnewt Cargo in London (Gnewt, 2014).
3. Efforts by some urban authorities (outside of the UK) to ensure that centrally-located logistics facilities and depots are made available in order to reduce the vehicle stem distances otherwise necessary from remote depots and to help encourage the use of intermodal solutions. The front runner in the provision of such facilities is the municipality of Paris. The municipality of Paris is working jointly with industrial partners in an effort to overcome the potentially detrimental effect of these depot relocations on traffic and environmental impacts in the urban area through land use planning. The intention is to increase the mix of activities taking place in specific locations within Paris (to include logistics, leisure, retail, sport and office facilities). It is hoped that including efficient, modern logistics depots in this mixed-use development will help to reduce freight vehicle journey distances in the urban area and also provide the opportunity to transfer goods to cleaner, alternatively-fuelled vehicles for final delivery. This approach is being

implemented at Beaugrenelle (a 3000 square metre parking facility turned into a parcel cross-dock facility), and at Chapelle International (a rail-connected site). These two sites are referred to by the Paris authority as “logistics hotels”. The 2016 zoning ordinance of the city of Paris provides dedicated areas and land parcels for future logistics land uses (Allen et al., 2016).

In relation to point 1 above, the need for online retailers to fulfil next-day and same-day shopping deliveries is having important consequences for physical stockholding and warehousing requirements in the supply chain. As a result, the property sector has had to alter its understanding rapidly. Retail landlords, such as Hammerson, British Land, Land Securities and Westfield, have embraced, “an omni-channel and more leisure-focused retail experience”. The greatest beneficiaries of the growing warehousing needs of online shipping have been industrial landlords. Whereas warehouse portfolios had vacancy rates of 20-30% in 2008, these portfolios are now at record levels. Online retailers will pay a premium for relatively small, well-located and well-equipped sites that allow them to gain an advantage over their competitors’ fulfilment times, particularly in terms of sites located in or near urban conurbations from which they can make deliveries to consumers. Whereas such prime smaller warehousing facilities in areas such as Enfield in north London were achieving prices of £8.50 per square foot four years ago, these sites are now achieving prices of £11 per square foot now (Addleshaw Goddard, 2017).

It has been recognised that there is not currently sufficient availability in UK cities for the urban logistics warehouses needed for last-mile fulfilment. The property sector therefore needs to be responsive to meet this demand. There is a wide range of warehousing facilities in easily accessible locations are required to meet this demand, ranging from sites with large footprints and on several levels to maximise floorspace, often with highly automated technology for the pre-packing of online orders, through to small local fulfilment centres in urban areas that can be used for the dispatching of vehicles for the final delivery journey to the consumer.

Research by Prologis and Aberdeen Asset Management shows that three times as much warehousing space is required for online fulfilment compared with retail store-based fulfilment. In addition, this research also indicates that for every €1bn spent online, an additional 775,000 square feet of warehousing space is required. According to estimates by Colliers, in order to meet the needs of an expanding online shopping and ecommerce market, the UK and Ireland market will require 18 million square feet of logistics space to be built annually (which far exceeds current projections by Savills of what is being built over the next 12 months which is approximately 3.5 million square feet) (Addleshaw Goddard, 2017).

There is therefore a need for far greater quantities of suitable, viable land to be developed for these online shopping and ecommerce requirements. This is likely to require speeding up of the local planning system to facilitate faster approvals for the development of applications that are uncontentious. Obtaining suitable land in urban areas for an ever-increasing number of ‘fulfilment centres’ to serve the growing home shopping and ecommerce market is likely to become of great importance to the successful expansion of this sector and the maintenance of reliable and ever-faster home deliveries, as offered by online retailers and demanded by their customers. However, locating and acquiring suitable land for such purposes is likely to become increasingly difficult due to the high level of demand for land and its resultant high and ever-increasing price. This is made even more difficult by the competition for land from the residential housing market, which is attempting to service the expanding populations in many urban centres, and which can generally attract higher rates of return, thereby outbidding logistics-related uses. Also, gaining permission for urban logistics sites can be problematic given the vehicle activity and noise associated with such facilities, which is often in close proximity to residential developments.

3.8 Delivery operations for non-food online shopping

3.8.1 Pressures in non-food home delivery operations

Non-food online retailers in the UK do not usually have their own in-house delivery operations. Instead they contract parcel and courier companies, and other logistics companies in the case of large items requiring installation such as furniture and white goods, to carry out these delivery services on their behalf.

Survey work shows that non-food online retailers most frequently cite coping with peak seasonal times especially, in the run-up to Christmas, as a key problem that they face (67% of retail respondents mentioned this). More than 50% of retailers also cited integrating IT systems across retail platforms, demand forecasting and managing costs as other key areas of concern (see **Table 3.9** - Barclays, 2014).

Table 3.9: Percentage of retailers mentioning that certain factors cause them problems in online shopping

Factor	Percentage of firms mentioning this
Coping with peak times	67%
Integrating systems	61%
Managing costs	53%
Demand forecasting	50%
Meeting consumer expectations	45%
Having a single view of stock	40%
Handling returns	35%
Consumer service issues	31%
Managing inventory	29%
Managing carriers / courier firms	17%
Warehouse capacity	10%

Note: rounded to nearest whole percentage.

Source: Barclays, 2014.

Survey work shows that parcel carriers most frequently indicate that successfully delivering goods to consumers' homes is a problem they face in terms of the operational efficiency of home deliveries (63% of carriers' responding stated this represented a problem for them). Managing the cost of home delivery operations and peak time demand are other commonly quoted problems faced by the majority of carriers (see **Table 3.10** – Barclays, 2014).

Table 3.10: Percentage of parcel carriers mentioning that certain factors cause them problems in making home deliveries

Factor	Percentage of firms mentioning this
Consumers not being in to receive delivery	63%
Managing costs	57%
Managing peak times (e.g. Christmas)	55%
Issues caused by poor packaging	30%
Handling consumer complaints	20%
Managing retailer expectations	15%
Wrong items from retailers	14%
Systems and technology issues	12%
Insufficient warehouse capacity	11%
Keeping track of deliveries	6%

Note: rounded to nearest whole percentage.
Source: Barclays, 2014.

There has been a substantial growth in total parcel volumes in the UK in recent years, largely due to growth in online retailing (Allen et al., 2016). However, as is the case for the retailers, many parcels and courier companies providing delivery services to these retailers in the UK have also been struggling to be financially profitable in recent times (Consultancy.uk, 2015). There are several important factors involved in the profitability difficulties of UK online shopping retailers and parcel carriers.

First, the difficulty for carriers to cope with the ever-growing additional demand for parcel deliveries during peak periods and the infrastructure investment that this requires. Retailers are adding to these peak demand pressures as they seek to boost sales and their competitive position by importing ‘shopping frenzy’ with concepts from the USA such as ‘Black Friday’ and ‘Cyber Monday’ (Herson, 2015).

Second, the increasingly complex demands of consumers for fast, reliable and convenient delivery services which has led carriers to develop and grow timed delivery windows, parcel traceability and alternative delivery location options, including collection points and locker banks, all of which have cost and investment implications and can involve double handling (Copenhagen Economics, 2013; Post and Parcel, 2015). Survey work has shown 43% of consumers report that they have had a negative experience of the delivery of online orders, and that 66% of consumers have chosen one online retailer in preference to another because they provided a greater range of delivery options (Metapack, 2015a). In addition, 45% of consumers in a survey said that they would be unlikely to shop with an online retailer again following a poor delivery experience. Retailers are also urging carriers to accept later cut-off times for next day deliveries to gain customer share (Herson, 2015).

Third, there is probable overcapacity in the parcels sector, which is thought to be leading to downward pressure on prices. The Royal Mail (the formally nationalised post and parcel carrier in the UK) has estimated that there is approximately 20% annual spare capacity in the parcel market (Post and Parcel, 2015). New entrants to the home delivery market with new logistics business models such as Amazon and Uber are likely to further exacerbate overcapacity and put further pressure on prices (Bourke, 2015; Jinks, 2016; Lieb and Lieb, 2014; Oliver Wyman, 2015; Sumner-Rivers, 2015).

Fourth, the growth in demand for B2C and C2C deliveries which generate lower average revenues than B2B deliveries for parcel carriers, but which also have attributes that make their delivery less efficient than B2B. These include the sizeable first-time failure rates associated with parcel deliveries to residential customers have has a detrimental impact on delivery efficiency, and also that such deliveries usually involve a single parcel compared with greater numbers of items per address in B2B operations. B2C and C2C deliveries also involve more suburban and ex-urban delivery locations, with lower drop densities and higher inter-drop distances than B2B delivery operations.

Fifth, unlike in many other supply chains, returned products, especially from online B2C and C2C parcel volumes, represents a sizeable proportion of all goods delivered, and has to be catered for in logistics planning and operations.

Sixth, the decision by many retailers to provide 'free' delivery options to their customers in order to attract custom, which has resulted in retailers requiring low pricing models from carriers (Consultancy.uk, 2015). A 2014 study in the UK found that 16% of online retailers offered free delivery as standard, and 70% of these retailers provided free delivery as standard or offered it if the consumer spent a certain amount on their order. This compared with 62% in 2012. The free delivery order thresholds ranged from £10 to £600. The median average spend for free delivery was £50, while the mode average was £100. This data was based on an analysis of 239 UK retail websites to visits to 100 UK retail stores (Micros, 2014). A 2016 survey of 350 online retailers also found that 16% of online retailers offered free delivery as standard, with 55% offering free delivery on orders exceeding a specified value threshold. Fifty nine percent of these retailers charged less than £5 for delivery if the free delivery threshold was not met (Oracle, 2016). Ofcom research has found that, "56% of adults said that free delivery was an important factor when choosing a retailer and 55% of those who had not completed an order did so because the cost of delivery was too high" (Ofcom, 2015). Another survey by Metapack found that more than 85% of consumers wanted free delivery, with the proportion lowest among 18-26 year olds (83%) and highest among 39-52 year olds (Metapack, 2015a).

Seventh, worsening road conditions in busy urban areas and difficulties in finding suitable kerbside parking space is making parcel deliveries ever-more difficult to perform in the timely manner required. Taking London as an example, average traffic speeds have been declining at all time periods of the day between 2008/9 and 2014/5. These deteriorations in average traffic speeds have ranged between 2% and 9%, depending on time period and location (Transport for London, 2016). Road traffic vehicle delays have also risen over this same time period by between 17-31% in central London (varying in severity by time of day) (Transport for London, 2016). Journey time reliability has also deteriorated over this period as a result of rising traffic volumes and increased disruption on the network. These traffic delays and unreliability add to operating costs and increase the risk of carriers failing to meet delivery time guarantees which may incur financial penalties. Also, parking difficulties are leading to drivers having to park further from the point of delivery and then having to cover increasing distances and spend increasing periods of time on foot delivering the product to the receiver.

In addition, affordable local depots from which to operate last mile parcel deliveries are becoming increasingly difficult to find in urban areas, due to sharp increases in land values (see **section 3.7**).

All of these factors have an important bearing on current and likely future operating patterns in the UK parcel sector. These issues are discussed in **sections 3.8.2 to 3.8.9**. **Section 3.8.10** discusses online retailers' views concerning immediate needs in relation to improving customer satisfaction in relation to delivery and fulfilment of orders, and the investment decisions these needs are related to. **Section 3.8.11** considers the role that collaboration between parcels carriers and also with and between online retailers could play in resolving

some of the operational and profit-related difficulties in the delivery and fulfilment of non-food online shopping orders.

3.8.2 Home delivery services offered by retailers of large non-food items

The home delivery services offered by retailers of non-food items including furniture, white goods (fridges, freezers, washing machines, dishwashers etc.), other large electrical goods and carpets are typically somewhat less responsive than those offered for small non-food goods (see **section 3.8.3**). This is due to several factors including: (i) that these goods are not always held in stock and may require ordering from manufacturers, (ii) most large items are expensive to store and handle due to their size and weight resulting in them being stored either in a national distribution centre or in several regional distribution centres, and then having to be distributed over relatively long distances to customers' homes, (iii) the need for a two-person crew for these larger, heavier deliveries, (iv) the smaller fleets of large heavy goods vehicles operated by retailer and their logistics providers required for these deliveries, and (v) the far smaller number of deliveries these crews are able to make per day compared to parcel delivery drivers, due to the longer distances between depots and consumers' homes, the greater inter-drop distances between consumers on any given vehicle round, and the time taken per delivery once arrived at the consumer's home (given that goods have to be carried into the home and installed, and in some cases old items have to be removed for disposal).

However, there is still much competition between the retailers of these large, bulky goods in terms of the home delivery services offered and prices charged. **Table 3.11** shows the current (2017) home delivery services and prices charged by a selection of retailers in this large item market for comparison purposes.

Table 3.11 can be compared with **Table 3.12** which contains the same home delivery service and pricing information for the same retailers (with the exception of Comet – which no longer exists - being included instead of Currys) but which was compiled in 2001. Comparing the changes in home delivery service offer and pricing of the each of these retailers over this 16 year period helps to illustrate the improvement in services offered without a concomitant change in prices charged.

Unlike, small non-food home deliveries, same-day deliveries are not offered in the large items sector due to the issues discussed above.

It is important that goods vehicles delivering large items to consumers' homes can park close to the point of delivery, as it is often not desirable or possible to transport heavy, large items by hand over more than a few metres.

Large items, due to their weight and size dimensions are unsuitable to certain home delivery services including Click & Collect in-store, alternative collection points and locker banks. Instead they are only suited to direct delivery to consumers' home.

Table 3.11: Home delivery arrangements offered by a selection of retailers of non-food large items in the UK in 2017

	Argos	Currys	Ikea	Habitat	John Lewis
Cost of delivery	£6.95 for standard delivery £8.95 for standard delivery with time slot £14.95 for next-day delivery £19.99 for next-day delivery with time slot	Standard delivery - free Next-day delivery - £9.99 Saturday deliver - £4.99 Next-day delivery with time slot - £19.99 Saturday deliver with time slot - £24.98	£35.00	Free for goods over £500; otherwise £9.95	Free for standard delivery on orders over £50 (£3.50 for orders under £50). Standard 6-7-hour time slot: free Next day: £19.95 4-hour slot: £8.50 2-hour slot: £19.00
Delivery times	7am-6pm	7am-8pm	Parcelforce: 7am-6pm	N/A	7am-9pm
Weekend deliveries	Yes – Sat and Sun	Yes – Sat and Sun	Parcelforce: No. IKEA store: Yes – Sat and Sun.	Yes: Sat	No
Delivery time arrangements with customer	We'll text you with a 2-hour delivery window the evening before or morning of your delivery Four time slots if paid for: 7am - 12 noon 10am - 2pm 12 noon - 6pm 6pm - 9pm	Four time slots if paid for: 7am - 8pm 7am-11am 11am-3pm 1pm-5pm	In-store orders: delivery crew contact consumer one hour before arrival. Online orders: allocated four hour time slot plus call from crew one hour before arrival.	No. But progress of delivery crew on day of delivery in relation to your delivery is trackable online.	Standard delivery time-slots: 7am-2pm, 11am - 5pm, 2pm - 9pm. Plus delivery crew call at any time up to 30 minutes before arrival. Plus next-day and 2- or 4-hour time slots available for fee.

Source: from retailers' websites, 2017.

Table 3.12: Home delivery arrangements offered by a selection of retailers of non-food large items in the UK in 2001

	Argos	Comet	Ikea	Habitat	John Lewis
Cost of delivery	Free for off-site goods	£11.95	Free for sofas and kitchens; otherwise priced by weight.	Free for goods over £1,000; otherwise £25	Free for goods within 30 miles; £10-35 depending on area
Delivery times	8am-8pm	8am-6pm	9am-5pm	N/A	7am-9pm
Weekend deliveries	No	Yes	Saturdays; some areas Sundays.	Saturdays	No
Delivery time arrangements with customer	Choice of AM or PM	Choice of AM or PM	Choice of AM or PM	Choice of AM or PM	AM or PM; two-hour slots for £15 fee

Source: Browne et al., 2001.

3.8.3 Home delivery services offered by retailers of small non-food items

There is much competition between retailers of small non-food items concerning the home delivery services and prices that they offer, as it is viewed as an important means by which to attract consumers and hence sales revenue. As previously noted, this has resulted in home delivery services being offered becoming increasingly responsive over recent years, with little in the way of increases in prices charged for these services.

Table 3.13 shows the current (2017) home delivery services and prices charged by a selection of retailers in the small non-food shopping market. For comparison purposes. This includes both store-based online retailers (Argos, Currys and John Lewis) together with online-only retailers (Asos and Amazon).

Table 3.13: Home delivery arrangements offered by a selection of retailers of non-food small parcels in the UK in 2017

	Argos	Currys	ASOS	Amazon	John Lewis
Delivery deadlines	Same-day up to 4 working days depending on service purchased.	Next-day to 5 working days depending on service purchased.	Next-day to 3 working days depending on service purchased.	Same-day up to 5 working days depending on service purchased.	Next-day up to within 5 working days depending on service purchased.
Cost of delivery	Free for delivery by Royal Mail within 4 working days. £3.95 for same-day or next-day by Argos	Standard delivery: free. Next-day: £3.95 Same day: £3.95 Time slots (various): £9.99-£11.99. Sunday: £11.99	Standard: £3.00 (but free on orders over £20). Next-day: £5.95 (but free on orders over £100). Evening next day: £7.95 Precise delivery (choose day and 1-hour lot): £7.95	Standard delivery: depends on item/s (free delivery on more than £10 of books and £25 of other goods). Next-day: £3.95 -7.99 (depending on items) Amazon Locker: £1.99	Free for standard delivery on orders over £50 (£3.50 for orders under £50). Next-day: £6.95 Next-day before 10.30am: £9.95 Named day: £6.95
Delivery times	7am-10pm (Argos)	8am-5pm 8am-12pm on Sat 2.30-6pm on Sun Same-day: 6.30-10pm	Standard or next day: anytime Evening next day: 6-10pm. Precise: 1 hour slot.	N/A but includes evening deliveries	7.30am-6pm
Weekend deliveries	Yes – Sat	Yes – Sat and Sun	Yes – Sat and Sun	Yes – Sat and Sun	No
Delivery time arrangements with customer	Time slots: 7am-10am, 10am-1pm, 2pm-6pm, 7pm-10pm 7 days per week (for deliveries by Argos)	Time slot if paid for. Otherwise 8.30-5pm	Precise delivery service provides 1 hour time slot on chosen day.	Anytime during working day.	No
Same-day deliveries?	Yes, order by 6pm and delivery by 10pm. Plus above time slots.	Yes	No	Yes, delivery between 6-10pm £9.99 per delivery	No
Click & Collect service in-store?	Yes, free	No	No	No	Yes, free for orders £30 and over. Otherwise £2.
Collect from Collect + or other collection point service?	No	No	Yes. Standard: £3.00 (but free on orders over £20). Next-day: £5.95 (but free on orders over £100).	Yes, from Pass My Parcel, Local Collect, Doodle or Amazon Locker. Additional £1.99 to £4.75 but free on orders over specified values.	Yes, £3.50
Online shopping returns service	Free		Free – via Royal Mail, Asda and many collection point services.	Free	Free

Source: from retailers' websites, 2017.

3.8.4 The scale of non-food deliveries by parcel

It has been estimated that online shopping in the UK in 2013 resulted in the delivery of a total of 890 million parcels and packages. Of these, it is estimated that 72% were delivered directly to consumers' homes or workplaces, 26% were delivered via Click & Collect services (i.e. collected by consumers from physical retail stores), and 2% were delivered via other means (including collection points and locker banks) (Barclays, 2014). Metapack and IMRG have provided an annual estimate of online shopping in the UK resulting in 920 million parcels in 2014 (Metapack, 2015b). For the purposes of this report it has therefore been estimated that online sales in the UK accounts for approximately 900 million non-food parcels and packages per year.

In terms of the size of packages and parcels generated by online shopping orders, one study has shown that letterbox-sized packages accounted for 21% of all parcel deliveries in the UK in 2013 (equating to 185 million parcels), small parcels (i.e. no larger than a shoe box) accounted for 39% (equating to 345 million parcels), and large parcels (bigger than a shoebox) accounted for 40% (equating to 360 million parcels) (Barclays, 2014).

Another study estimated the number of non-food online shopping parcels delivered in the UK in 2014 (that do not fit through letterboxes) to be 333 million. The importance of various product categories is shown in **Table 3.14** – Sambrook Research International, 2014).

Table 3.14: Segmentation of the online shopping parcels market by product type in 2014

	Parcels despatched per annum	Market share (%)
Clothing and footwear	100 million	30%
General domestic merchandise / giftware	78 million	23%
Consumer electrical products	50 million	15%
Media (physical items – e.g. books and CDs)	22 million	7%
Others*	83 million	25%
Total	333 million	100%

Notes:

Rounded to nearest whole number. Carried out through desk research and in-depth telephone interviews.

* - "Others" includes toys, DIY products, cosmetics and toiletries, fitness products, personal items, jewellery, feminine care and baby care products, and garden products.

Source: adapted from information in Sambrook Research International, 2014.

Research also indicates how the total parcels despatched in the UK as a result of online shopping are split by size of retailer (See **Table 3.15**).

Table 3.15 Segmentation of the online shopping parcels market by size of online retailer in 2015

Size of retailer	Parcels despatched per annum	Market share (%)
Large companies	201 million	60%
Medium-sized companies	72 million	22%
Small companies	60 million	18%
Total	333 million	100%

Notes:

Rounded to nearest whole number. Carried out through desk research and in-depth telephone interviews.

Large medium and small retailers as used in the above table is used solely in relation to each company's involvement in the online shipping market, as for many physical retailers this is only a small part of their operation. For the purpose of this report, large companies comprise those that despatch more than 3 million parcels a year, medium-sized companies despatch 0.5 – 3 million parcels, and small companies despatch less than 0.5 million parcels per year.

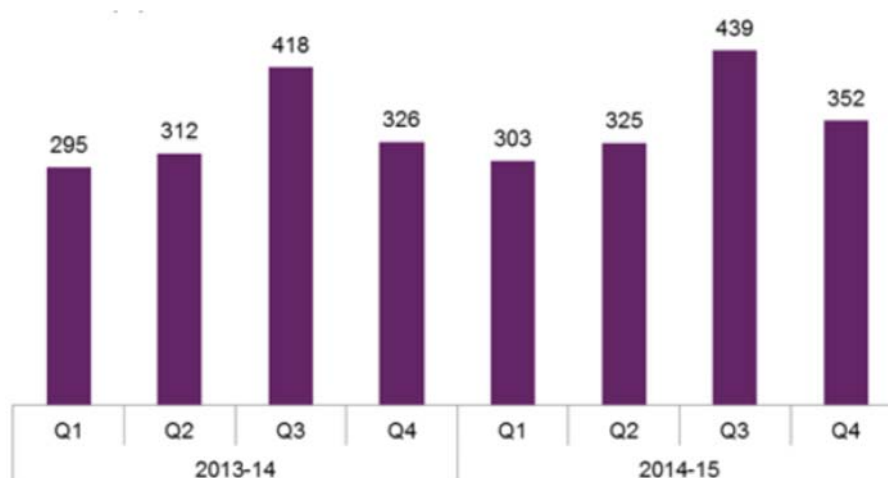
Source: Sambrook Research International, 2015.

3.8.5 Seasonal fluctuations in parcel volumes

The number of parcels handled by parcel carriers varies by time of year, with Christmas resulting in a major peak in retail parcel flows. **Figure 3.1** shows the national volumes of these parcel carriers on a quarterly basis (Christmas is included in quarter 3 data period) (Ofcom, 2015). This seasonal peak in parcel volumes requires carriers to have depot infrastructures and parcel handling systems to cope with this peak demand, and to have sufficient drivers and vehicles available for collection and delivery work.

UK retailers are adding to peak demand pressures in the parcels sector as they try to increase their sales and gain competitive advantage over their rivals. This has involved them 'shopping frenzy' with concepts from the USA such as 'Black Friday' and 'Cyber Monday' which generate mini-peaks in demand for parcel deliveries (Herson, 2015; IMRG, 2015).

Figure 3.1: Quarterly measured volumes for domestic parcels



Source: Operator returns to Ofcom (does not include Access volumes) (Ofcom, 2015)

3.8.6 Meeting time window constraints

Analysis of parcels deliveries for UK online retailers shows that 37% of orders despatched to consumers in July 2016 were sent 'economy' (i.e. with no assured delivery lead time, no specific delivery day or time-slot), 32% were despatched for next day delivery, 4% were despatched using delivery services with even better than next day (including same day, next day before 12:00, next day after 12:00, next day after 17:00, and Saturday or Sunday delivery), while 27% were despatched internationally. These findings were based on data from more than 200 retailers with in excess of 6 million orders in the month (IMRG Metapack, 2016). Since 2013, this data indicates an important increase in the proportion of parcels sent for next-day delivery and a related decline in parcels sent by economy service (See Table 3.16 - IMRG Metapack, 2014; 2015; 2016).

Table 3.16: Online shopping parcel delivery service in the UK – percentage of total parcels and orders

Month	Economy	Next day	Better than next day	International
July 2013	51%	20%	3%	26%
July 2014	43%	27%	4%	26%
July 2015	43%	29%	4%	24%
July 2016	37%	32%	4%	27%

Notes:

Better than next day includes the following services: same day, time-guaranteed next-day (i.e. before 10:00, before 12:00, after 17:00), and Saturday and Sunday.

Based on data from more than 200 retailers with in excess of 6 million orders per month.

Data has been rounded to nearest whole number.

Source: IMRG Metapack, 2014; 2015; 2016

The results of survey work concerning the number of days for delivery of goods by online retailers in the UK when using their standard delivery service is shown in Table 3.17. As can be seen, the most common period from ordering to receiving goods among UK online retailers in 4-5 working days, followed by 2-3 working days.

Table 3.17: Timescale for standard delivery of goods by online retailers in the UK

Timescale	Proportion of retailers
Next working day	6%
2-3 working days	29%
4-5 working days	54%
6-7 working days	3%
8-9 working days	1%
10 working days and over	3%
Varies	4%
TOTAL	100%

Note: based on survey work with 350 online retailers.

Source: Oracle, 2016.

Over time, online retailers are expanding the range of delivery options they provide to consumers in order to enhance the convenience and speed of delivery offered. Standard

delivery services may typically be free or low-cost, while deliveries with higher service levels (such as same-day, next-day, specified time slot, evening, weekend etc.) will be charged for. **Table 3.18** shows the results of survey work into the number of delivery options provided by online retailers in the UK. The proportion of UK online retailers offering 6 or more delivery options to consumers increased from 3% in 2015 to 10% in 2016. Similarly, the proportion of retailers offering either one or two delivery options reduced from 55% in 2015 to 35% in 2016. These developments indicate the extent to which some retailers are attempting to provide greater choice and convenience to consumers with respect to deliveries (Oracle, 2016).

Table 3.18: Number of delivery options provided by online retailers in the UK

Delivery options	Proportion of retailers
1 option	15%
2 options	20%
3 options	26%
4 options	16%
5 options	11%
6 options	6%
7 options	2%
8 options	< 1%
9 options	< 1%
10 options	< 1%
Not available	2%
TOTAL	100%

Note: based on survey work with 350 online retailers.

Source: Oracle, 2016.

In this same survey 74% of online retailers offered next day delivery services, while only 4% offered same day deliveries. Nominated delivery time slots were offered by 18% of retailers (compared with 12% in the previous year's survey), and Saturday delivery was offered by 35% of retailers (Oracle, 2016). Sunday deliveries of non-food online shopping orders are not commonly made in the UK, but survey work in 2013 indicated that approximately 70% of consumers wanted this service (Barclays, 2014).

Online retailers are also exerting pressure on parcel carriers to gain a competitive edge on their competitors. This has involved these businesses requesting parcel carriers to accept ever-later evening cut-offs for parcel collections (Herson, 2015).

As mentioned above timed delivery slots are also becoming more commonly offered by retailers and provided by parcel carriers in the B2C sector. For example, DPD has introduced its 'Predict' service which offers receivers one-hour delivery slots which are notified by text or email. Meanwhile, Hermes has developed a service called 'Hermes ETA' – which commenced in August 2015 offering receivers a four-hour delivery window. Hermes aspires to reduce this over time to a two-hour and then one-hour delivery slot (Herson, 2015). UPS has introduced 'My Choice 24' which provides receivers with the opportunity to accelerate and improve the delivery experience for an additional fee (Accenture, 2016).

Growing uncertainty about traffic urban traffic conditions and the availability of parking space near to the point of delivery add to the pressures involved in meeting these time constraints. Failure by parcel carriers to meet the delivery time guarantees can result in financial penalties being triggered.

3.8.7 Failed deliveries

It has been estimated that in 2013 approximately 20% of all parcels ordered online for delivery in the UK were of a size that would fit through a UK letterbox, while 80% would not. Of those that would not fit, half were up to the size of a shoebox, while the other half were larger (Barclays, 2014). Parcels larger than the size of a small book will not fit through UK letterboxes. Not all parcel deliveries above this size succeed on the first attempt due to the limited size of letterboxes, the frequency with which there is no-one available to receive goods at residential addresses, and the fact that receiver's signatures are required for some deliveries. Parcel deliveries made to residential addresses are far more likely to be unsuccessful than those made to businesses. It has been estimated that in total 13-14% of all e-commerce deliveries in the UK arrive either late or when the customer is not at home (IMRG, 2014a).

The IMRG has estimated that in 2014 the cost of these 'failed' deliveries to retailers and other traders for goods sold online in the UK was £771 million (IMRG, 2014b). In calculating these costs to companies IMRG considered six delivery failure scenarios: failed first-time delivery that requires a redelivery; failed first-time delivery that is subsequently collected by the customer; failed delivery that is returned to the sender; late delivery; lost goods for which a replacement has to be sent; and lost goods that result in cancellation of the order by the customer (IMRG, 2014b). In addition to the costs to retailers and traders, there are also the costs to customers of taking time off work to receive deliveries and the opportunity cost of foregoing other activities.

Therefore, failed deliveries can delay consumers receiving their goods and are costly for retailers and carriers (and for consumers if these costs are passed on to them). Delivering orders to places other than customers' homes can help to eliminate failed home deliveries. Referred to as 'unattended' deliveries, these solutions include the use of collection points and locker banks. However, at present these 'unattended' last mile solutions only account for a small proportion of all parcel deliveries in the UK. One of the reasons for their limited uptake so far is that they introduce additional investment and operating costs into the parcel supply chain, and which the various supply chain parties would need to bear the cost. In addition, research indicates that many customers are currently unwilling to pay more for their deliveries. However other alternative delivery arrangements continue to prove more popular to most online shoppers than collection point and locker bank services. A recent UK survey showed that when asked about their choice of alternative delivery channel (if not delivered to their home) 43% said their neighbour's home, 15% said a friends' or family member's home, 12% said a post office, 11% said a Royal Mail sorting office, 11% said a work address, and 6% said a convenience store (Royal Mail, 2014). The lack of willingness on the part of many consumers to pay more for a wider choice of delivery solutions such as collection points and locker banks make such investments difficult for companies to justify and generate a financial return on.

3.8.8 Returned products

In addition to goods that fail to be delivered to the customer first time, there is also the issue of goods purchased online that are returned by customers. Factors causing customers to return products can include: customers deciding the products are inappropriate once they see them or try them on; impulse purchases that customers later decide were not necessary; and customers ordering more goods than they intend to buy to obtain free delivery that is offered more than a certain total amount of money is spent. Dealing with returned goods is a major logistical challenge, especially in a parcels distribution system that has been established primarily for deliveries to customers. Product returns is far less of a problem in large items such as furniture and major electrical goods, than it is among smaller non-food items.

One study suggests that clothing and footwear is the product type most often returned, with 43% of clothing shoppers in the UK having returned items bought online in 2013 with a value of £1.16 billion, while electrical goods returns (which has the second largest returns rate) had a value of £733 million (Clipper, 2014). A second study estimates that approximately 30% of all clothing and footwear deliveries in the UK in 2013 were returned by consumers. Of these returned items, 77% were estimated to have been paid for by consumers, while 23% were paid for by consumers (Barclays, 2014). A third study estimates that £2.4 billion of clothing and footwear were returned in 2016, which was three times greater in value than the next largest returns category of electrical goods, and was equivalent to approximately 20% of all clothing and footwear purchased by value (see **section 3.3** - Verdict, 2016b).

A survey of 350 online retailers of non-food products in the UK showed that 51% of these retailers pay for the product return (Oracle, 2016). One survey showed that approximately 35% of UK online returns are taken to the Post Office, 10% to another collection point, 35% are collected by courier from home or work and 20% are taken to store (Verdict, 2014). By comparison, another survey of online non-food retailers showed that 47% of UK online retailers require returns via the Post Office, 13% of retailers require the return to be taken to a collection point, 13% of retailers arrange collection from the consumer from home or work, 25% of retailers require returns to be taken to store, and 2% of retailers require the consumer to contact them to discuss return (Oracle, 2015). Returns are forecast to grow by 50% over the next five years as online sales increase and retailers make it easier to return products (Verdict, 2014).

Survey work has indicated that approximately 80% of consumers would be more likely to shop with an online non-food retailer who makes returning goods easier. However, only approximately 40% of consumers are prepared to pay more for a more convenient goods return system (Metapack, 2015a).

A Czech online-only retailer, ZOOT, has implemented a new approach in which clothing ordered by customers can be delivered to a 'Try & Buy' store. Goods ordered by consumers are delivered to the Try & Buy facility which the customer visits to try on the clothes and decide if they are suitable. Half of all orders are delivered to the Try & Buy facility within 24 hours of the order being placed and some deliveries take as little as 3 hours. Consumers only have to buy the goods after trying them on (Intel, 2016d).

3.8.9 Developments in non-food delivery locations

As a result of competition in the online shopping market, pressure from consumers, together with developments in IT there has been much recent innovation in the locations to which carriers make parcel deliveries (and collections). Parcel carriers in the online shopping market are now delivering parcels to a wide range of locations (home, neighbours, retail shops, collection points, and locker banks) and these B2C deliveries are now taking place over a long working day (extending into the evening) and 7 days per week.

In terms of collection points, Royal Mail has a network of 11,500 Post Offices and delivery offices from which recipients can collect their parcels, Hermes has a network of 5,000 collection points located in independent shops and local convenience stores for parcel deliveries and collections, while DPD has a network of 2,500 shop-based collection points in the UK (Herson, 2015). The UK is lagging behind some other European countries in terms of the use of collection points and lockers. For instance, in Germany DHL has 250,000 lockers and 20,000 parcel shops, while in France, 60 million parcels are sent to pick-up points or lockers (Heasman, 2015). A survey of UK online retailers offering collection point services found that approximately 70% of these retailers charged consumers for deliveries that used this service (Oracle, 2016).

The largest dedicated collection point provider for online deliveries in the UK is Collect+ which has a network of approximately 6,000 newsagents, convenience stores, supermarkets and petrol stations. It has counters in several convenience stores chains including Costcutter, Nisa, Spar, Londis and McColls. Consumers can arrange to have online purchases from approximately 90 major retail brands delivered to a Collect+ counter for them to then collect their purchases from. These collection points can also be used to return goods to online retailers, as well as for private individuals to send parcels from (Collectplus, 2017).

A joint venture between Network Rail and Lloyd Dorfman has resulted in the development of Duddle, a new collection point service that commenced in the UK in autumn 2014. The service allows customers to collect goods ordered online from dedicated Duddle “shops” that are based at railway stations. These “shops” can be used to collect goods ordered from and delivered by a range of online retailers. A pilot scheme was trialled at Milton Keynes station. Duddle has opened collection point “shops” at several UK stations and has plans to be operating from 300 locations (BBC, 2014; Network Rail, 2014).

Another UK provider, Parcelly has, since December 2014, been offering consumers a similarly new concept in collection points. In this approach, as with Collect+ and Duddle, rather than collection points being dedicated to a specific delivery company, Parcelly has teamed up with 250 independent retail outlets to offer collection points capable of handling incoming and returned goods from any parcel carrier. Using a mobile phone-based app service, Parcelly permits consumers to shop online with any retailer as well as to track the progress of the parcel delivery at any time. Parcelly currently charges £1.99 per parcel for a collection within 7 days service, and £2.99 per parcel for a collection within 14 days service, together with a monthly subscription service for unlimited parcel deliveries (Parcelly, 2016).

Locker banks for are also forecast to expand rapidly in the next five years as the likes of Amazon and InPost continue to increase their facilities. However, it is reported there is currently a lack of penetration of locker banks in some European countries, and that customers hold concerns about the use of locker banks and the service offered by their providers. In a 2013 survey, 85 per cent of respondents who had never used locker banks stated that they did not intend to in the future. These concerns include that locker banks are generally unstaffed, and therefore no help is available at the point of use. It is argued that getting customers to use locker banks for the first time is the major challenge facing providers – this could be achieved by providing staff to assist for a temporary, start-up period (Verdict, 2014).

Locker bank providers include: ByBox, InPost (which has 1000 locker banks in the UK), and Amazon (whose locker banks are dedicated for their own use at present) Cleveron (an Estonian companies with networks in several countries including Finland; Keba (an Austrian company), which assisted DHL/Deutsche Post in establishing its Packstation network in Germany, and is now establishing a network in the Czech Republic (Morganti, 2014a; Morganti et al., 2014b; Fulfillment and eLogistics, 2013).

Locker banks have several benefits as a means of receiving home shopping including their accessibility at any time of day or day of week, and their security. However, current limitations of locker banks include their limited size which prevents their use for larger products such as furniture, certain electrical products, clothing, DIY and gardening products, and their inability to handle chilled or frozen food. Locker banks are likely to continue to be most suited to shoebox-sized parcels. Many staffed collection points located in existing retail outlets also tend to have limited storage space which also affects the goods they can hold for collection, and their ability to handle larger returns (Verdict, 2014). Locker banks have been taken up far more rapidly in Germany in the UK. DHL has installed Packstations in all German cities with populations of more than 100,000 inhabitants, and 2,400 of them are located in railway stations. In total DHL Packstations have approximately 800,000 customers in Germany (SUGAR, 2011).

Online retailers with a network of physical stores are increasingly offering Click & Collect services as an alternative to home delivery, as a means by which they control delivery costs. This approach is being used among non-food and grocery retailers with physical store presence. In this approach, the consumer orders online and opts to collect the goods at their local branch of the retailer. Click & Collect services have existed for about 15 years but have only become prominent since 2012 (IMRG and Collect +, 2016). A survey of UK online retailers with Click & Collect in store found that approximately 90% of these retailers offered free deliveries to consumers using the service (Oracle, 2016). **Table 3.19** shows the results of survey work among online retailers to ascertain the time taken for online orders to become available in store for collection.

Table 3.19: Timescale for Click & Collect goods to become available in store in the UK

Timescale	Proportion of retailers
Same working day	6%
Next working day	19%
2-3 working days	19%
4-5 working days	19%
6-7 working days	15%
8-9 working days	1%
10 working days and over	2%
Varied on product	9%
Not available	10%
TOTAL	100%

Note: based on survey work with 350 online retailers.
Source: Oracle, 2015.

Survey work among consumers has indicated that Click & Collect is the most preferred option as an alternative to delivery to the home. When asked, 50% of consumers responded that Click & Collect services would make receiving deliveries more convenient to them. By comparison, collection points (such as in a local convenience store or petrol station) and locker banks were viewed as helping to make the receiving of deliveries easier by 37% and 31% of respondents respectively (IMRG and Collect +, 2015).

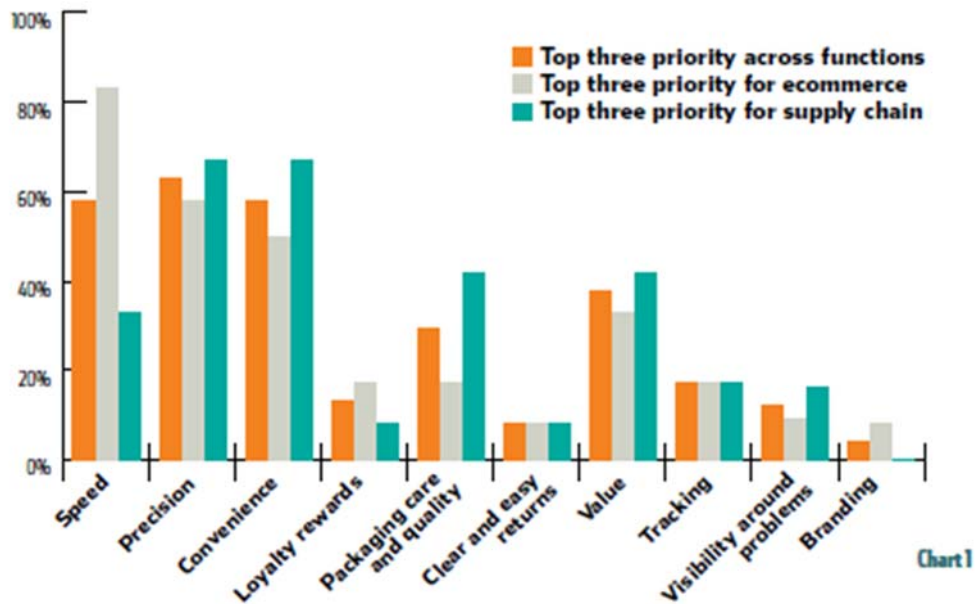
Customer charges for locker banks and collection points are a deterrent in their use. A 2012 European survey indicated that free delivery is the most important and appealing factor for online grocery shoppers (Verdict, 2012). Survey work in 2010 showed that 22% of respondents in the UK stated that they would be more likely to use home shopping for clothing and footwear purchases in delivery charges were lower, and 26% would be more like to purchase health and beauty products online (Verdict, 2011). The lack of delivery charges are an important factor in the popularity of Click & Collect as a fulfilment channel (Verdict, 2011). Click & Collect is also beneficial to retailers as it helps prevent the costs of failed home deliveries, and increases the density of goods to collection facilities.

The growth in these alternative parcel delivery and collection locations have cost implications for carriers, due to double handling of parcels and infrastructure costs associated with these additional facilities. Whether these options prove cost-effective depends on the ability of carriers and retailers to recover these additional operating costs from customers in delivery charges and the reduction in savings resulting from reducing delivery failures to residential addresses.

3.8.10 Industry views on the immediate future of non-food deliveries

Recent interview work carried out with two different categories of personnel in online retailers (namely supply chain executives and ecommerce executives) indicates that overall speed, precision and convenience of deliveries are viewed as most important to boosting consumer satisfaction (see **Figure 3.2** - Retail Week in partnership with Metapack, 2016).

Figure 3.2: Online retailers' views on top priorities to boosting consumer satisfaction in delivery and fulfilment



Notes: Question asked - Which three of the below do you think are most important to boosting consumer satisfaction when it comes to delivery and fulfilment?

Source: Retail Week in partnership with Metapack, 2016.

Specific views expressed by participants concerning how best to achieve these priorities included: offering delivery time slots to consumers (as already provided by online grocery retailers), offering more same day deliveries, and making the order cut-off time for next day deliveries later in the evening. The participants' reasoning about these priorities mostly concerned matching the offer of their competitors and generating sales revenues. Investment in systems (front- and back-end), new software and technology were viewed as important in achieving these delivery and fulfilment improvements (see **Figure 3.3** - Retail Week in partnership with Metapack, 2016).

Figure 3.3: Online retailers' views on top investment priorities in delivery and fulfilment

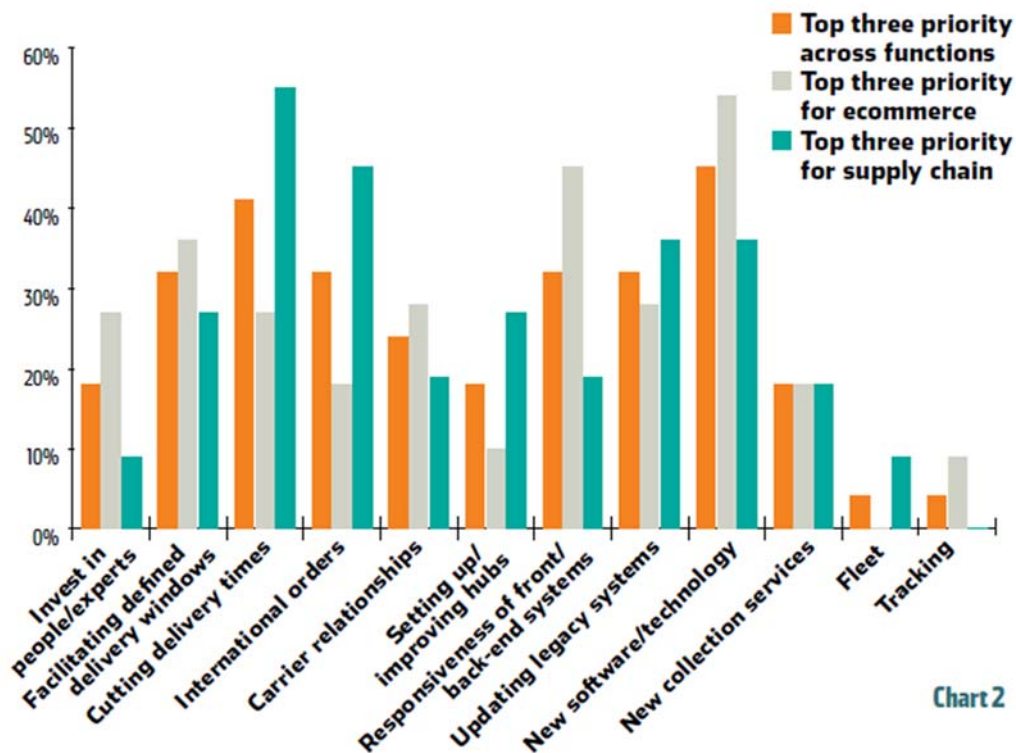


Chart 2

Notes: Question asked - Which three areas of delivery/fulfilment do you think should be an investment priority?

Source: Retail Week in partnership with Metapack, 2016.

However, retailers need to think carefully before rushing to provide enhanced delivery services, even if they believe this is necessary to match the offer of competitors and keep revenues growing. They need to take into account the impact that improved delivery services are likely to have on profitability and longer-term success. Also, although many consumers express a desire for enhanced delivery options, such as same-day services, they have a stronger preference for free shipping and returns. This is not a compelling mix of views from a business perspective. In addition, offer enhanced delivery services, such as same-day delivery, can result in putting pressure on associated fulfilment services and spread total deliveries even more thinly across the delivery network, leading to even greater pressures on profitability. Putting in place enhanced delivery services requires new and improved capabilities and infrastructure in terms of order processing (and the associated technologies that support this), product handling, and vehicle operations and therefore is likely to result in greater investment and/or costs (Metapack, 2015c).

3.8.11 Collaboration in the parcels sector

There is scope for UK parcel carriers to collaborate with one another in making last-mile deliveries of online shopping orders in order to reduce their infrastructure requirements and enhance the efficiency of their operations. However, traditionally parcels carriers have viewed each other as competitors and have not countenanced such concepts. Albeit with one exception, that of deliveries to and collections, from the most remote, rural locations in the UK that are difficult to serve. In this situation carriers have accepted that it makes economic sense to pass their parcels to a single local carrier for final last-mile delivery to customers. Such

collaborative services exist and are well used by major carriers for the Scottish Highlands and Islands, and the Isle of Man (see case studies in Allen et al., 2016).

It is becoming increasingly difficult, expensive and inefficient for parcel carriers to serve major urban areas in the UK and elsewhere. This is due to a combination of the cost of acquiring suitably-located local depots, the increasing degree of traffic congestion and journey unreliability, and the lack of suitable kerbside space available for vehicle stopping while making collections and deliveries. Given these challenges, and the extent to which they are likely to worsen over time, it is potentially feasible for such a collaborative last-mile approach to also be applicable to the urban environment. One approach that has been seen in practice is the use of a 'carrier's carrier' for the last mile. In this approach one carrier hands over parcels to another carrier who may be better placed to make the final deliveries due to, for example, their location or their use of electric vehicles, which may be better suited, especially in cities that offer preferential access and parking conditions for environmentally-friendly vehicles.

However, resistance to such collaborative arrangements to improve delivery efficiency and reduce delivery costs remain among major parcel carriers, and also between online retailers. This is preventing the potential benefits of sharing of non-food online shopping flows on last-mile delivery vehicles in the UK from being realised.

3.9 Home delivery operations for online grocery shopping

3.9.1 Overview of grocery home delivery operations

Home deliveries made by the major retailers in the UK online grocery sector share several key operational features: (i) they are made in vans (i.e. goods vehicles with gross weights of up to 3.5 tonnes), (ii) these vehicles are despatched from local stores and fulfilment centres to customers' home (resulting in relatively low stem mileages from the despatch point to the first delivery), (iii) they take place in pre-booked time slots selected by consumers (thereby avoiding the first time delivery failure rates associated with non-food parcel deliveries), and (iv) they are associated with far lower product return rates than many categories of non-food orders (thereby making the reverse logistics less important and complicated).

The grocery deliveries made by store-based and online-only retailers differ in two key ways: (i) store-based retailers have typically carried out order picking at local stores, from where the local delivery vehicles are despatched, whereas online-only retailers pick and despatch vehicles from purpose built fulfilment centres, and (ii) store-based retailers offer Click & Collect services to their consumers in which the consumer collects their ready-picked groceries from their local store (obviously online-only retailers cannot offer this service).

Grocery home deliveries take place over a longer period of the day than most non-food parcel deliveries. Typically delivery slots are offered to consumers commence from 06:00-07:00 and continue until 22:00-23:00. In addition, unlike many non-food parcel deliveries, grocery home deliveries are operated seven days per week.

Unlike non-food parcel deliveries which end of the consumer's front door, grocery deliveries can involve the driver in taking the goods into the consumer's kitchen. In addition, grocery deliveries often involve large quantities of goods and therefore can require the driver to make several trips between the vehicle and the consumer's home.

As noted in **section 2.10**, grocery retailers in the UK are struggling to make profits from the online services that they offer, primarily due to the costs of order picking and deliveries and the amount that consumers are charged for these services. Ever since the introduction of

online grocery services, retailers have focused almost exclusively on increasing sales and gaining market share from their competitors rather than focusing on profitability.

Until very recently in-store grocery retailers have been competing among themselves and with Ocado, the only major online-only (i.e. pure-play) grocery retailer in the UK. However 2016 saw the entry of Amazon Fresh into the online grocery business, and this has intensified the competition for market share that exists in the sector.

3.9.2 Consumer views about grocery home delivery services

Table 3.20 shows the home delivery service offered by the major online grocery retailers in the UK. Amazon Fresh (not included in **Table 3.20**) was launched in June 2016 in selected London postcodes. The service is available to Amazon Prime members (a subscription service that costs £79 per year in the UK). Members pay an additional £6.99 a month for Amazon Fresh. The service is available 7 days per week, with one-hour delivery slots available from 07:00-23:00 each day. For deliveries placed by 13:00, same-day delivery is available from 17:00-23:00. Deliveries made within a two-hour delivery slot do not incur additional charges and neither do orders over £40. Amazon Fresh is using independent couriers with their own temperature-controlled vans to make these deliveries.

Table 3.20: Home delivery services offered by major online grocery retailers in the UK

Retailer	Minimum spend	Delivery times			Delivery slot times	Bag-less delivery?
		Mon-Fri	Sat	Sun		
Tesco	No minimum, £4 charge for delivery under £40, for orders over £40 delivery fees range between £1-6	8am-11pm	9am-11pm	9am-10pm	1 or 4 hour delivery slots	Yes
Sainsbury's	£25 minimum spend, orders over £40 charged fees of between £1-6, orders under £40 charged £6.95. No fee over £100 for deliveries on Monday-Thursday after 2pm	8am-11pm	8am-10pm	8am-10pm	1-hour delivery slots	Yes
Asda	£25 minimum spend, delivery charges range from £6 during peak times to £1 during off-peak	6am-11pm	6am-11pm	6am-11pm	2 hour delivery slots	Yes
Morrisons	£40 minimum spend, order charge varies between £1-5	7am-11.30pm	6am-11.30pm	6am-11.30pm	1-hour delivery slots	No
Ocado	£40 minimum spend, order charge varies between £3-7, free delivery of £70	6am-11.30pm	6am-11.30pm	6am-11.30pm	1-hour delivery slots	No
Waitrose	Minimum order £60, free delivery	9am-10pm	9am-10pm	9am-6pm	1-hour delivery slots	Yes

Source: Mintel, 2016c

The majority of users of online grocery food services appear to be satisfied with the delivery services offered. In 2015, a survey of almost 1,000 customers found that 85% of respondents were satisfied with the speed of delivery, compared with 3% who were dissatisfied, and 13% who were neither satisfied or dissatisfied. Similarly, 85% of respondents were satisfied with

the delivery options, compared with 2% who were dissatisfied, and 14% who were neither satisfied or dissatisfied. The issues which customers were least satisfied with were ease of returns/refunds (72% of respondents were satisfied), product substitutions (63% of respondents were satisfied) and product recommendations (63% of respondents were satisfied) (Mintel, 2016c).

The daily delivery time window offered by retailers to their consumers has been progressively extended over time, especially in the evening and at weekends, to improve the convenience and quality of the home delivery services in efforts to respond to consumer feedback and match or surpass the offer of their competitors, thereby maintaining or gaining market share.

The introduction of Click & Collect services by store-based grocery retailers was both an effort to improve consumer service and choice, as well as to put in place a lower cost delivery model. This also led to some retailers putting in place more expensive delivery charges for the most preferred delivery time-slots, or raising their minimum order values.

However, survey work has indicated that only approximately 10% of consumers are willing to pay extra for the most preferred peak delivery time-slots (on Fridays and on Saturday and Sunday mornings). This same research found that approximately 30% of respondents struggle to find an available home delivery time-slot that suits them. Additionally, 26% of consumers who have either stopped or are shopping less for groceries online have done so due to higher delivery charges. (Mintel, 2016c).

3.9.3 Recently introduced grocery delivery service innovations

There have been many efforts by online grocery retailers to improve consumer service since online retailing was first introduced in an attempt to increase sales and win market share. Such innovations continued to be introduced. However, in more recent times the entry of Amazon Fresh, together with the profitability challenges faced by the existing online retailers, has led to other changes and innovations in the delivery service and pricing that aim to improve profitability. Some of these are innovations implemented by UK grocery retailers are discussed below.

Tesco has begun offering a same-day Click & Collect service from 300 of its stores, with consumers able to collect their goods 3 hours after ordering (Mintel, 2016e). Asda has introduced stand-alone collection points at railway stations and other dense population locations in addition to drive-through collection points at its own stores. Ocado is planning to extend its same-day delivery services to more of its consumers as it opens new fulfilment centres Sainsbury's recently has opened its first purpose-built urban fulfilment centre, which can handle 25,000 order per week, from which it has been trialling same-day deliveries. It is also planning to operate same-day home deliveries from stores, and is testing an app that will permit deliveries of up to 20 items within one hour of order for consumers living within 3 km of a store. It is also planning to double the number of its stores offering Click & Collect services and to trial same-day Click & Collect (Fung Global Retail & Technology, 2016).

Most UK grocery retailers have also recently introduced Delivery Passes (see **section 3.4**).

Internationally, Sweden's leading grocery retailer ICA has introduced a trial in Stockholm with a technology provider and a logistics provider in which online food and drink orders are delivered direct to the consumer's refrigerator without them needing to be at home to receive them. The trial, called, "In-Fridge Delivery", uses digital local and key technology to provide the deliverer access to the home and fridge (Mintel, 2016f). Another innovative scheme is also being trialled in America, in which Samsung, in conjunction with Mastercard, developed a smart fridge, that allow consumers to use a Mastercard app connected to it to make shopping lists and place orders to be delivered to their home (Mintel, 2016g).

3.10 Delivery operations for takeaway and other restaurant home-delivered meals

3.10.1 Types of takeaway and restaurant home-delivered meal service providers

Some independent takeaways and restaurants in the UK have offered home delivery services for many years. This traditionally involved receiving orders by telephone and then dispatching these orders by staff on motorbikes or in cars. Some major chains, such as Domino's Pizza and Pizza Hut, have always based their entire or the majority of their business around in-house home delivery service provided by food delivery staff using motorbikes. These chains are likely to continue to operate their own in-house delivery services in order to retain the entire revenue for themselves.

Other, smaller independent restaurants that have traditionally provided their own home delivery services using cars and motorbikes may choose to continue to do so in future, but also have the potential to consider using third-party delivery service providers. Even if these restaurants choose to retain their own in-house delivery services, the opportunities offered to increased order volumes provided by online (ordering-only) restaurant marketplaces is proving popular (see below for further discussion).

Many restaurant chains and more upmarket independent restaurants have never offered takeaways or home deliveries in the past. The growth of restaurant marketplaces that provide ordering and delivery services has allowed them the opportunity to enter this fast-growing and potentially lucrative market for the first time.

In recent years, specialist service providers have taken the role of intermediaries between the restaurant and customer in the provision of takeaway and home-delivered meals. They have replaced the traditional system of consumers having to phone the restaurant directly. Instead they provide websites and mobile phone apps that provide meals for multiple restaurants.

These service providers vary in terms of the services they provide to restaurants. Some offer full ordering, payment and delivery services, while at the opposite end of the spectrum, others simply provide a website or app to put the consumer in contact with the restaurant, with the latter then responsible for delivery and communication with the customer. Ordering a meal online involves three key steps (Mignot, 2015):

1. Ordering
2. Cooking
3. Delivering

The first generation of restaurant marketplaces (which includes JustEat and Delivery Hero) focus on the first step of ordering, and are therefore often referred to as "software-only" marketplaces. They provide online websites and mobile phone apps to the consumer. Some simply put the customer in contact with the restaurant while the more sophisticated deal with the ordering and payment process. These service providers provide customers with, predominantly, independent restaurants (many of which are takeaways such as burgers, Chinese and pizza food). The restaurant or takeaway remaining responsible for delivery of the food to the consumer, and therefore having to organise their own delivery staff (often referred to as "couriers"). These service providers that do not provide their own delivery services (such as Just Eat and Hungry House) usually charge commission of around 10-15% of each order value (BMI Research, 2016). These "ordering only" service providers can easily add new restaurants to their consumer offering and have experienced rapid growth in recent years. However, they do not control the speed and quality of the delivery, and have no potential to optimise it (Mignot, 2015).

The second generation of restaurant marketplaces (including Deliveroo), which have been established in the last 3 years, focus on steps 1 and 3 of the process (ordering and delivery). Therefore, in addition to the online and apps ordering systems of the first generation providers, they also manage the delivery for them, through their fleet of independent couriers, who use mobile apps to receive notifications of their jobs. These companies are often referred to as “on-demand” marketplaces.

These companies are therefore offering both software and logistics services. Providing these meal delivery services involves them in logistics operations; tasks include the hiring and training of couriers, couriers’ hiring and training, equipment maintenance, shift planning, etc.). They also offer a far wider range of restaurants and price levels than the first generation providers (who typically only offer food from takeaway restaurants). They also offer the consumer with deliveries that are both fast and reliable.

Due to providing the delivery services, these restaurant marketplaces are not as easy to scale-up as the first generation (which only provide ordering services). However, they benefit from greater protection from competitors due to far greater set-up costs and the advantage of an efficient network of restaurants and couriers, once they have achieved their desired penetration rates within an urban area. As their order volumes increase they can benefit from optimising delivery routes and pick-up/drop-offs patterns. The commission rate charged by these second generation restaurant marketplaces for ordering and delivery is typically 25-30% of the purchase price. This rate is charged to the restaurant, with the consumer paying the same rate as those dining in the restaurants.

The third category of restaurant marketplaces includes start-up business in the USA such as Spoonrocket, Maple and Sprig, and are referred to by some as “Fast food 2.0” (Spoonrocket went out of Business in March 2016). They offer a fully integrated food delivery service – providing their own app through which consumers can order a limited range of meals. These meals are reheated in the companies’ own fleet of cars as orders are placed, and delivered to the customer within 15 minutes. This response time is made possible by the time saved on kitchen preparation and cooking). They therefore offer the entire range of ordering, cooking and delivery services (Mignot, 2015). A London-based start-up came to market in August 2015 offering to take orders, cook and deliver meals. It raised £1 million in investment, and offered to delivery healthy meals to the door or desk within 20 minutes (Butcher, 2015). However, Pronto had ceased trading by 2016 (Auchard, 2016).

Given that a restaurant typically has high fixed costs in terms of the running and staffing of the building, additional orders that restaurants can generate result in greater revenue with a proportional increase in costs. However for restaurants attracting customers is an expensive and difficult business. These restaurant service providers can assist restaurants and takeaways by generating new customers for them and increasing their food throughput. These restaurants do not particularly want to work with many different service providers, but ideally instead prefer to work with a small number who can generate large volumes of orders for them. Therefore, over time it is likely that this market will become increasingly concentrated with one or two key service providers emerging. At this stage it is unclear whether the “ordering only” or “ordering and delivery” service providers will become most dominant.

3.10.2 Home delivery services provided by takeaways and restaurants

Deliveries of takeaway and other restaurant meals to consumers take place using various types of vehicle including bicycles, motorbikes and cars. The choice of vehicle depends on the quantity of food and travel distances involved.

These deliveries made by both restaurant staff and deliverers contracted to work by the online platform providers (such as Deliveroo and UberEATS) share several key operational features:

(i) these vehicles are despatched from the restaurant to the consumer's home with only one order typically carried by the deliverer; these are therefore point-to-point single drop delivery operations rather than the multi-drop vehicle operations associated with grocery, parcel and large non-food item home deliveries; (ii) the journey distances from the restaurant to the consumer's home are usually relatively low (i.e. less than 2-3 miles) in order to keep down the costs of delivery (with restaurants placing maximum catchment distances on their delivery area), (iii) by the nature of the service and the demand for meals, these are same-day deliveries, usually taking place within 15-45 minutes of orders being placed, (iv) given the nature of the demand these meal deliveries only rarely experience the problem of delivery failure (i.e. when the consumer is not at home to receive the delivery), (iv) similarly these deliveries are not associated with the problem of product returns that exist in non-food home delivery sector, (v) restaurants, takeaways and platform providers have to decide whether or not to charge an explicit price for these home delivery services (some do, some offer free delivery over a certain order value and some offer free delivery), and (vi) most takeaways, restaurants, and platform providers only offer home delivery on orders over a certain minimum spend, and (vii) some of these meal delivery services offer price reductions or free food if the delivery fails to meet specified response times.

The prices charged for these home-delivered meals ordered online are supposed to be the same as those charged to customers presenting themselves in person at takeaways and dining in restaurants. For instance, Just Eat, the online platform provider, provides its consumers with a price promise that if they order a meal from Just Eat that they subsequently find advertised by the restaurant for less elsewhere (such as in a takeaway menu or on their own website) and report this to Just Eat, they will be sent double the financial difference in the form of a Just Eat voucher (Just Eat, 2017a). However, it is unclear whether this is always the case following an investigation by a national newspaper. This investigation found three cases of restaurant chains charging 15% more for their meals ordered via Deliveroo than on their menus together with a £2.50 delivery charge. One of the restaurants involved said that it charged higher prices for its meals purchased via Deliveroo than it did in its restaurants to reflect the commission charge that it is charged by Deliveroo. Whilst this is not unlawful, it is not made transparent to the consumer (Jones, 2016).

Although meal delivery services often commence in the morning or at lunchtime and continue throughout the day (for instance Deliveroo offers its services from 12:00 to 23:00 daily; by comparison UberEATS is available from 07:00 to midnight daily – Deliveroo, 2017; UberEATS, 2017), the greatest periods of meal delivery activity takes place during lunchtime and the evening. Weekend delivery activity is usually greater than that on weekdays. For independent takeaways and restaurants operating their own ordering and delivery systems, the meal delivery can take longer than for other competitors, as the deliverer/driver is sometimes responsible for collecting payment on delivery.

The adoption of smartphone technology has made it possible for many people to become food deliverers/drivers in recent years as these online platform providers have expanded their meal delivery services. By this method, crowdshipping has become a commonly adopted form of sourcing deliverers and rapidly building delivery fleets and personnel by the online platform providers such as Deliveroo and UberEATS at low cost to them. **Table 3.21** shows the delivery charges and delivery time guarantees (if any) of the main online meal platform providers.

Table 3.21: The delivery services provided by the main online meal platform providers in the UK, 2016

Online meal Provider	Operates Home delivery service?*	Delivery charge per order?	Delivery pricing membership service?	Delivery time guarantee
Just Eat	No	Yes (set by restaurant)	No	No
Hungry House	No	Yes (set by restaurant)	No	No (used to offer free next meal if delivery within 45 minute not met but since removed)
Deliveroo	Yes	£2.50 per order plus £15 minimum spend per order (but free deliveries if a Deliveroo Plus subscriber)	Yes, Deliveroo Plus (£89 per annum) which provides free deliveries	No, but 32 minutes is aimed for
UberEATS	Yes	No (but one is planned to be introduced soon)	No	Yes, 30 minutes (and £20 credit if not met)
Amazon	Yes	No, but minimum spend on £15 and consumer has to be Prime subscriber	Customer has to be an Amazon Prime subscriber to place order (£79 per annum)	No, but 60 minutes is aimed for

Note: * - if the online provider does not operate its own in-house delivery service, then it relies on the restaurants and takeaways with which the order is placed to provide these delivery services.
Source: compiled by the authors from references provided in the text in this section.

Many of Deliveroo's cyclist deliverers/couriers carry out a three-hour shift at lunchtime and another three-hour shift in the evening, because those are the busiest times for the company. Most food delivered by Deliveroo is from restaurants and takeaways, but also includes street vans. Orders can range from entire meals for several people to a single Nutella crepe (Fedor, 2016; Khaleeli, 2016). Deliveroo typically makes its deliveries to consumers within approximately 30 minutes of the order being placed (32 minutes is quoted on the Deliveroo website (Deliveroo, 2017). Deliveroo imposes maximum distance from restaurant to consumer's delivery location to ensure that it maintains its delivery time promises to its consumers.

One Deliveroo courier reports that they typically carry out three deliveries in a three-hour shift (i.e. an average of one delivery per hour – this is based on the level of demand and the number of couriers working rather than their availability to do more deliveries), but once carried out 11 deliveries in a three-hour shift. They also report that consumers rarely tip the courier, presumably partly due to the fact that payments are made by card online at the point of ordering (Khaleeli, 2016). A financial analyst involved in the meal delivery sector reports that even on a busy Saturday night it is difficult for a courier/deliverer to receive more than two deliveries per hour (Fedor, 2016), while another industry insider reports that a maximum of 3-4 deliveries per hour is possible (Martin, 2016). The Deliveroo courier also provides insight into other aspects of the working arrangement with the company, where they are deemed to

be 'independent contractors' with no sick pay or holiday pay, responsible for their own insurance, but with little flexibility concerning swapping shifts with colleagues and generally working the same shifts each week, which are booked in advance (Khaleeli, 2016). (See **sections 3.5 and 3.6** for further discussion of the issues concerning crowdshipping for the delivery of online shopping orders).

In London alone, Deliveroo has a network of more than 3,000 self-employed cyclists who deliver food on its behalf for approximately 2,500 restaurants. It currently operates in 12 countries (Fedor, 2016). Delivery Hero is also investing in logistics subsidiaries (such as its Food Express business) to provide delivery for restaurants (Ahmed, 2016).

UberEats, which launched in 2016 in the UK and uses its own couriers to deliver meal orders, reported that more than 100,000 people downloaded their app shortly after its initial release. It also states that "thousands" of couriers had registered to work for the company in London. Uber offered new couriers a £100 sign-up bonus prior to its launch. UberEats takes a commission from restaurants for every sale. On launching the company initially offered free delivery to consumers and offered a £20 credit to any customer whose order took longer than 30 minutes. However, this is set to change soon, with a variable charge for delivery in which consumers pay more for delivery when they order from restaurants in areas where demand is high but delivery couriers are limited being rolled out first in the USA and then elsewhere. This pricing approach is intended to encourage more couriers to respond to the demand in these busy locations (Dreier, 2016; Fedor, 2016; MacGregor, 2016; Jones, 2016). UberEats has no minimum spend for orders, compared with Deliveroo's £15 minimum spend requirement and £2.50 delivery charge (Fedor, 2016).

Amazon commenced its Amazon Restaurants meal delivery service with approximately 150 restaurants in specific central London postcodes in September 2016. In November 2016 it expand the geographical coverage of the service to parts of inner north and west London and increased the restaurants by another 80. The service is currently only available to Amazon Prime subscribers. Customers receive free delivery within 60 minutes on minimum order values of £15 (Farrell, 2016; Palmer, 2016; Prynne, 2016).

Just Eat, which does not provide its own delivery services, but relies on the takeaways and restaurants sign-up with it to carry these out, makes no guarantees about delivery times, instead just indicating likely times for delivery on its invoices to consumers. Also, delivery charges on Just Eat orders are individually chosen by the takeaway or restaurant (Just Eat, 2017b).

Hungry House, another ordering and payment platform provider with no in-house delivery services (like Just Eat), introduced a service for consumers in May 2014 called Hungry House Express. This provided consumers with the right to claim their next meal free if the delivery was not made within 45 minutes of the order being placed when ordering with selected restaurants. However, Hungry House removed this Hungry House Express service in September 2015. At the time of removing this service, Hungry House said that it was due to the fact that they "were investing in better resolutions for issues such as timely delivery" and that the new promise would mean that it could get the replacement one set up faster. However, this replacement service has still not yet commenced (Edmonds, 2014; Hungry House, 2015; Kentish, 2015). However, in January 2017, Hungry House begun working with urban deliverer Quiq to provide home deliveries from some of its listed restaurants in London (O'Hear, 2017).

At present, of the recent entrants offering their own delivery services, UberEATS and Amazon meal delivery services are only available in certain parts of central London. By comparison Deliveroo is already available in 65 towns and cities in the UK (Blake and Blott, 2016).

In America, GrubHub, a leading ordering and payment platform provider, originally did not offer delivery services as part of its service. But the emergence of rivals offering delivery services as well resulted in GrubHub's share price halving over several months. This resulted in GrubHub deciding to offer delivery services and spending \$90 million in 2015 to acquire three regional delivery companies.

Just Eat, which represents 30,000 restaurants in the UK on its online ordering platform (Farrell, 2016). In January 2016 Just Eat, was reported as having no plans to create their own delivery operations, instead opting to simply offer ordering and payments platforms, with the restaurants having to make the deliveries to consumers. David Buttress, the Chief Executive of Just Eats argued that attempting to provide delivery services was a model that was not "scalable". He said that "Just Eat would need 100,000 drivers for a couple of hours on a Saturday night,"... "The operative words are a couple of hours. You don't need them after that, because this business is so peaky" (Ahmed, 2016). In March 2016, in another interview Mr Buttress, maintained this position arguing that, "It doesn't scale, and the economics of the (home delivery) model are fundamentally very poor". Just Eat is the market leader in 12 of the 13 European countries it operates in and Mr Buttress argued that, "It's taken a decade to build Just Eat in the UK", and explained the deep working relationships it had developed with the restaurants listed on its online platform. He went on to say that, "It's virtually impossible to shift an incumbent once they're in an established market leadership position" (Martin, 2016). However, by July 2016 it was reported that Just Eat was considering options to include delivery services and was investigating partnerships with third-party delivery companies. It also announced that it was testing food deliveries with self-driving robots manufactured by Starship Technologies (Fedor, 2016). In December 2016, Just Eat announced it was purchasing Hungry House the second largest company in the online meal platform provider marketplace in the UK (Ambrose, 2016).

Delivery failures are rare in the meal delivery sector, as the consumer has placed the order shortly before the food is arrived and is expecting it. However, due to foreseen circumstances, there are a small number of cases in which consumers are not at home when the deliverer arrives. Some companies have formal policies about such a situation. In the case of Deliveroo, for example, first the deliverer will try to phone the consumer. If this fails then the customer service team will phone and email the consumer. The deliverer will wait at the address for 10 minutes, after which time they will abandon the delivery. In this relatively rare event, consumers are still charged for their order (Deliveroo, 2017).

One insider has provided two predictions about how the online takeaway and other restaurant home-delivered meal sector could develop (Mignot, 2015). First, an expectation that online providers that currently only offer ordering and payment services will try to develop delivery services as part of their offer, and that restaurants that currently make their own deliveries will outsource this to specialist providers. Second, that as a result of the growth in the delivery capabilities of major online platform providers, restaurateurs will be encouraged to establish new restaurants without a physical presence. Instead they will operate from industrial kitchens in their chosen delivery location without all the overhead costs of running a restaurant.

4. THE FUTURE OF ONLINE SHOPPING AND ITS IMPACTS

4.1 Home delivery operations and their patterns of transport activity

Section 3 discussed the home delivery arrangements that retailer as and logistics providers operate for online orders in the four different product sectors (grocery, non-food small items, non-food large items, and takeaways and other restaurant home-delivered meals). This section considers the traffic impacts of these home delivery operations and the environmental and safety impacts of this transportation.

Table 3.2 summarised the key attributes of home delivery operations in each of these four product sectors. Selected topics shown in **Table 3.2** that have particular relevance to the traffic impacts of these home delivery operators are re-presented in **Table 4.1**.

Table 4.1: Key service features of online shopping home delivery systems by sector and provider

Sector	Grocery retail	Non-food retail			Non-food retail	Takeaways and home-delivered meals
Products delivered	Food shopping	Parcels and packages – by parcel carrier	Parcels and packages – by courier	Parcels and packages – by crowdshipping	Large white and brown goods	Ready to eat meals
Typical lead time from order to delivery (i.e. responsiveness of delivery)	1 or more days (but 30-60 minutes in new rapid response services)	1 or more days	Same day	Same-day and economy	1 day to several weeks	Usually within 15-60 minutes
Incidence of first-time delivery failure	Very low	High	Low-medium	Low	Very low	Very low
Return rates	Low	High	Low	High	Very low	Very low
Type of delivery operation	Multi-drop rounds	Multi-drop rounds	Single drop rounds (point to point)	Single drop rounds (point to point)	Multi-drop rounds	Single drop rounds (point to point)
Type of vehicle/s used for home delivery	Vans (with some motorbikes and bicycles)	Vans (with some cars for deliveries to residential addresses)	Motorbikes, bicycles, vans and cars	Motorbikes, bicycles, cars, air and public transport	Lorries	Motorbikes, bicycles and some cars
Typical number of orders delivered per round trip	10-15	50-200	1-5	1	5-10	1
Average size of delivery	Several bags full	From one parcel (residential) to multiple parcels (businesses)	Usually one parcel or letter	Usually one parcel	Single item but large and heavy	Single bag/box
Bookable delivery times available?	Yes, 1- or 2-hour delivery slots	Often not. But some carriers allow consumer selection of delivery day or time (often for an additional charge). And some carriers send message to consumer either one hour or the day before delivery.			Some offer 1- or 2-hour delivery slots for extra charge	No, but usually within 15-60 mins of order
Number of people on/in vehicle	One	One	One	One	Two	One
Locations from which delivery vehicles are despatched	Shops (supermarkets) and fulfilment centres	Logistics depots	Point-to-point: driver does not return to depot between each delivery and collection	Logistics depots or point-to-point	Logistics depots	Shops (restaurants and takeaways)
Click & Collect / collection point service available?	Yes	Yes	Yes	Yes	Not normally	No
Who carries out the delivery operations	Supermarket	Parcel carrier	Courier or parcel carrier	Platform provider with driver/cyclist	Logistics carrier	Restaurant or platform provider with driver/cyclist
Change in delivery speed and service over last two years	Longer working day. Click & Collect service improvement	Faster delivery. Click & Collect service improvement	No change	Faster delivery	More choice of time slots	Faster delivery

Source: based on the authors' own judgement (this table is an extract from **Table 3.2** – see Table 3.2 for notes).

4.2 Traffic and environmental impacts of online shopping

The traffic impacts of online shopping are dependent on a wide range of factors about how the delivery operation is carried out. These factors are:

- **The type of vehicle used** – the choice of vehicle and its fuel type
- **Vehicle capacity** – the maximum load size and weight that a vehicle is capable of carrying
- **The vehicle load carried** – the actual size and weight of the load carried
- **Distance from point of dispatch to point of delivery** (often referred to as ‘stem distance’) – the transport activity that is expended getting to the delivery location
- **Empty running** – the proportion of total distance over which the vehicle operates empty (i.e. without goods on board)
- **Delivery failure rate** – the incidence of an inability to fulfil the delivery as the consumer is not present to receive it
- **Delivery drop density** – the number of delivery locations to be served in a given unit of area (which affects the driving distance between delivery points as well as the scope to walk between several delivery points making deliveries without having to move the vehicle)
- **Delivery lead time** – the time from the order being placed to it being delivered to the consumer
- **Routeing and scheduling** – the choice of vehicle route and sequence in which deliveries are carried out
- **Time of delivery activity** – the time at which delivery operations are carried out
- **Product return rates** – the extent to which products are returned to retailers by consumers
- **Safe driving** – the extent to which the driver is capable of minimising the risk posed by their driving to other road users
- **Efficient driving** – the extent to which the driver is capable of minimising fuel use through their driving style

These factors are shown in **Table 4.2** together with details of which supply chain party is responsible for each this factor and whether it is related to traffic, environmental or safety impacts of online shopping delivery operations.

Table 4.2: Delivery operation factors and their link to traffic, environmental and safety impacts

Delivery operation factor	Supply chain partner who controls this factor	Impact on road traffic, environmental impacts and/or safety
The type of vehicle used	Logistics company	Environment and safety
Vehicle capacity	Logistics company	Traffic, environment and safety
Size/weight of vehicle load carried	Logistics company and retailer	Traffic, environment and safety
Distance from point of despatch to point of delivery	Logistics company and retailer	Traffic, environment and safety
Empty running	Logistics company and retailer	Traffic, environment and safety
Delivery failure rates	Logistics company and retailer	Traffic, environment and safety
Delivery drop density	Logistics company and retailer	Traffic, environment and safety
Delivery lead time	Retailer (and to a lesser extent logistics company)	Traffic, environment and safety
Routeing and scheduling	Logistics company	Traffic, environment and safety
Time of delivery activity	Retailer and logistics company	Traffic, environment and safety
Product return rates	Retailer	Traffic, environment and safety
Safe driving	Logistics company	Safety
Efficient driving	Logistics company	Environment

Note: In the above table it is assumed that the logistics company and the retailer are two separate entities. However, in some cases, the retailer operates their own logistics and delivery operations. Source: based on the authors' own judgement.

4.3 Consumer transport in the delivery of online orders to their home

Some online deliveries are made direct from the logistics provider's depot to the consumer's home. These types of delivery will only require one transport journey. In terms of the four different categories of online orders, this delivery pattern is the only one available for large, non-food items, and for takeaways and other restaurant home-delivered meals. In the case of grocery shopping and non-food small items, the consumer has the choice of having the goods delivered to a location other than their home, including a Click & Collect facility, a collection point, a locker bank and, in some cases, a workplace (however, as discussed in **section 3.2**, workplace deliveries of personal shopping can have negative impacts on the efficient flow of essential business deliveries within the building).

If the consumer chooses a delivery location other than their home, then they will have to carry out the final transport journey from this intermediate location to their home. In carrying out this journey, the consumer will make decision concerning: (i) the mode of transport used, and (ii) the nature of the journey. In terms of the mode of transport, they may choose to carry this out by walking, cycling, using public transport, motorbike or car. In terms of the nature of the journey, the consumer will decide: (i) the time at which the journey takes place, and (ii) whether the journey is carried out solely for this purpose or whether it is combined with another trip purpose (such as a journey to or from work, a school or leisure trip, or as part of a larger shopping trip). Both the mode of transport and the nature of the journey will have an important bearing on it traffic, environmental and safety impacts. Research has shown that, in general, consumer journeys to transport online orders between collection points and their home by car are less efficient from a traffic perspective (and hence also from an environmental and safety perspective) than carrying out these journeys using a home delivery van (which is capable of carrying multiple consumers' goods on a single vehicle which visits each consumer in turn)

(Browne et al., 2005; Cairns, 1999; Edwards et al., 2009). However, consumer journeys on foot or by bicycle are likely to have lower traffic, environmental and safety impacts than home delivery vans.

There are two other points worth making about online shoppers and its potential relationship with their transport activity. First, it is also important to bear in mind that the time savings that consumers derive from shopping online compared with shopping in person in physical stores can be used by these consumers to make additional car journeys for other purposes (such as leisure trips, or to visit friends and relatives). Given that these non-shopping journey purposes tend to have greater journey distances than shopping trips, the substitution of shopping journeys by car with journeys for other purposes by car are therefore likely to result in an increase in the total motorised road transport activity by these by online consumers who decide to use time saved shopping online to make other car journeys. However, online shoppers who use time saved through online shopping to make journeys by more environmentally-friendly means (such as walking and cycling) and those who do not use these time savings to make additional journeys at all are likely to reduce their total motorised road transport activity.

Second, some online shoppers choose to view the actual goods prior to purchase. This can involve travelling to the shop (either by car or some other mode). If this product-viewing journey is carried out by car there may be no reduction in car-based travel as a result of that particular online order, together with an increase in van-based vehicle traffic associated with the delivery.

4.4 Short- to medium-term developments in home delivery operations

Many of the current features of home deliveries are likely to remain broadly as at present in short- to medium-term (i.e. in the next 1-5 years). However, there are some potential changes that may take place in the home delivery of online shopping orders over this timescale that are worth considering. These are mostly specific to the various sectors of online shopping, and are shown in **Table 4.3**.

Table 4.3: Possible short-medium term developments in home delivery operations in the UK

Possible development	Home delivery sector(s) affected	Possible consequence
Increase in proportion of same-day deliveries	Non-food small items Grocery	Decrease in efficiency of delivery operations; greater total vehicle activity
Ever-later order time cut-off for next day deliveries	Non-food small items	Decrease in efficiency of delivery operations; greater total vehicle activity
Increase in importance of crowdshipping	Non-food small items Takeaway meals	If applied to non-food small items sector, likely to lead to more, poorly loaded, dedicated journeys
Increase in use of Click and Collect services	Non-food small items Grocery	Reduction in van home delivery activity, but increase in consumer transport activity (overall impact on motorised transport activity uncertain)
Greater use of agreed delivery time slots	Non-food small items	Reduction in delivery failure rates, but less efficient vehicle routing (overall

		impact on motorised transport activity uncertain)
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Source: based on the authors' own judgement.

In terms of the possible developments raised in **Table 4.3**, an increase in same-day deliveries in the non-food small item and grocery sectors, if it were to come about, would be likely to be due to online retailers' continuing competition with each other over the quality and speed of delivery services offered to consumers (in an effort to win market share). Such an increase in same-day deliveries would be likely to result in less efficient delivery vehicle operations due to fewer deliveries per vehicle journey, hence smaller vehicle loads, and reduced drop densities on these journeys. This would therefore be likely to have a detrimental effect (i.e. upwards) on motorised total vehicle activity, and hence traffic levels and total environmental impact of this activity. There is also likely to be increasing competition between online retailers for ever-later evening order cut-off times for next-day delivery. Retailers will strive to permit its consumers to place orders up until midnight and still receive their goods the next day. Unless carefully, planned by retailers and their logistics providers, this could also potentially have a negative effect on the efficiency of home delivery operations.

Similarly, the greater use of time slots agreed with the consumer for the home delivery of non-food parcel and packages, if it were to occur, would also be due to increasing competition for market share between online retailers. While time slots for these deliveries would reduce the proportion of failed deliveries (due to consumers not being at home to collect), it would also impose new scheduling restrictions of these delivery vehicle rounds which would make routeings less efficient. The overall effect of such a service enhancement on total motorised transport activity would depend on the precise nature of these changes and may vary from company to company depending on the size of their consumer base. Both increases in same-day deliveries and the implementation of time slots would be likely to cause further deterioration in retailers' profitability margins, unless they are able to determine means by which to get consumers to pay for such delivery service enhancement.

The increase in the speed of delivery service offered to online consumers is not restricted to the UK. For instance, in Japan the home delivery system offered is even faster and more responsive based on consumer expectations and retailers' competition concerning this. Japanese consumers became accustomed to next day delivery and delivery time slots that were introduced by the major parcel carriers such Yamato and Sagawa several decades ago. As a result, online retailers have had to provide a similar next-day delivery offer in conjunction with parcel carriers. Even in 2011, Yamato, the largest parcel carrier (handling 1.4 billion parcels and 2.2 billion mail items annually), had a national logistics infrastructure consisting of 70 depots, 3,900 branch offices and 260,000 agents (which were convenience stores for consumers preferring this option to home delivery). More recently, same-day delivery has begun to be offered by online retailers and parcel carriers. To achieve this Yamato has proposed 'gateway terminals' with automatic sorting machines and 24-hour transport operations between these terminals which receive goods from a wide range of online retailers who would deliver goods directly into these terminals. The network would operate similarly to the next-day system with the exception of waves of goods being moved from terminals to branch offices, rather than only once nightly transfers from depots to branch offices in the next-day system (Visser et al., 2014).

In the UK both Uber and Amazon could look to exploit the any growth in same-day and time guaranteed home delivery services with their vast resources. Given its large existing minicab driving fleet, Uber has a ready workforce in urban areas who have low marginal costs for carrying out goods deliveries in addition to their passenger transport services. Same-day services already account for approximately 10% of the total parcels market by value in the UK and this would if online retailers begin to offer same-day delivery services more widely (Jinks,

2016; Sumner-Rivers, 2016). Such a development would have potentially significant impacts for many existing carriers in the UK parcel industry, especially those that focus specifically on short distance, rapid deliveries in urban areas.

An increase in the use of Click & Collect services by consumers may come about through a growing proportion of store-based online retailers seeing them as a means by which to reduce the number of home deliveries they have to make, and thereby improve their profitability. These store-based retailers may also increasingly offer incentives to use Click & Collect services such as vouchers for in-store use, which also has the effect of potentially increasing in-store sales as well. These retailers are also likely to strive to improve the in-store experience and service for consumers collecting goods from their branches as a means by which to encourage their use. Online-only (i.e. pure-play) retailers may also chose to promote and incentivise greater use of collection points and locker banks to improve their profitability, but would be likely to find this more difficult due to the prices associated with these services that are typically offered by third parties. While greater use of Click & Collect services would reduce the total motorised home delivery activity carried out by retailers and their carriers, it would result in greater transport activity by consumers. The total effect of such a situation on total motorised road transport activity would depend on how consumers chose to carry out these journeys in terms of the transport modes used and the extent to which they are combined, or not, with other journey purposes (see **section 4.3** for further details). Survey work has indicated that in the UK in 2015, 52% of consumers picking up Click & Collect orders made dedicated journeys to pick up these up (which did not involve visiting anywhere else), while 48% visited other stores while picking up these orders (Verdict, 2016b). This suggests that approximately half of Click & Collect journeys made by consumers only included this activity as a journey purpose.

Meanwhile, a potential increase in the use of crowdshipping could come about as: i) a growing proportion of restaurants and takeaways sign-up with online platform providers (i.e. retailers) to take responsibility for their orders, payments and delivery services, and ii) online retailers and parcel carriers make greater use of outsourced labour (i.e. independent contractors) for the final delivery of parcels and packages. The impact of greater use of crowdshipping would depend on the type of crowdshipping used. If it were crowdshipping in which passengers already making journeys chose to carry non-food packages and parcels as part of these existing journeys or parcel carriers making use of spare capacity on their vehicles, this would be likely to result in a reduction in total motorised road transport. However if, as is more likely, the type of crowdshipping used was based on individuals carrying out dedicated home delivery journeys specifically for the purpose of delivering these goods, then the overall effect would be likely to be an increase in total motorised road transport activity.

As previously discussed in **sections 2.10, 3.1, and 3.8.10**, the greatest challenge facing online retailers in the short- to medium-term is how they can improve their profit margins (or stop making losses) without, at the same time, losing revenue and hence market share. The home delivery service offered to consumers in terms of its speed and convenience is likely, in the short- to medium-term to remain to be both a crucial component of the service offered to consumers (and hence generator of orders) as well as a key determinant in the poor profitability of many online retailers. To make home delivery and online shopping more profitable will require that retailers begin to charge delivery prices to consumers that reflect the cost of providing these services. However, it appears that at present, retailers lack the courage and will to take such action. Due to the degree of competition between online retailers, many – especially online-only (i.e. pure-play) retailers who have no high-street presence – currently continue to see free delivery as an essential part of their service offering, and as a mean by which to market and build their brand.

4.5 Potential longer-term developments in online shopping and delivery

In order to consider future disruptive events and technologies that may take place and have an important bearing on online shopping and home deliveries a range of material concerning this topic was reviewed, together with the authors' own insights (Manners-Bell, 2016; Pieczyk et al., 2016; O'Marah, 2016; Visser et al., 2016; Wainwright, 2016). This helped to identify several factors that may have a bearing on online shopping and home delivery in future:

- Electric/alternatively fuelled vehicles – the use of cleaner, renewable fuels will help reduce the environmental impacts of product delivery
- Same-day delivery within one or two hours of order – assuming the existing trend towards ever-improving delivery speeds from retailer to consumer continues, leading to a situation in which goods are delivered within say an hour or two of when they were ordered (this would be a product of retailers continuing to compete with each other over delivery service and failure to charge consumers the actual price of this delivery service)
- The continued dematerialisation of products - as some products become ever-more digital and shipped online rather than physically (such as books and music) thereby reducing the quantity of material goods that need to be physically delivered
- 3-D printing – instead of the need to order various goods and have them physically delivered from retailer to consumer, 3-D printing offers the possibility that these 'goods' could be printed either at home or at a local printing facility, thereby reducing the quantity of material goods that need to be transported to consumers
- Autonomous / driverless vehicles – the role they could play in improving the efficiency and safety of driving (but this does not fully answer the issue of goods unloading and delivery at the consumers' address)
- Drones and self-piloted robots – and the role they could play in carrying out deliveries from retailers to consumers of goods ordered online (especially small items and meals). Drones are an air-based transportation technology, whereas self-piloted robots are ground based, and models currently being worked are being designed to deliver goods by pavement direct to the consumer's door. In 2014 Amazon obtained a patent for what it called an 'airborne fulfilment centre, which consisted of airships used as flying warehouses equipped with fleets of drones for final delivery to consumers. Additional airships would be used to replenish stock at the 'fulfilment centre' airship. It was stated that such a concept could be used to serve sporting events or festivals (BBC, 2016b). In a trial in December 2016, Amazon made its first, fully-autonomous delivery by drone, which consisted of a tablet computer and a packet of popcorn, from one of its fulfilment centres to a customer in a rural part of Cambridgeshire. The delivery was completed 13 minutes after the order was placed (Slide, 2016).
- Other forms of modal shift (including tunnels, and pneumatic systems) to transport and deliver goods from retailers to consumers - which takes traffic out of vans and lorries and off the roads (but these modes would be unlikely to serve individual consumers and their homes and therefore are still likely to require a final transport leg to the consumer by road (or drone/self-piloted robot)
- Crowdshipping – greater use of independent individuals to carry out the delivery of small items (could take place (i) as part of existing passenger journeys so as not to add to total transport activity, or (ii) as dedicated services only for the transport of these goods, in which case do result in additional transport activity

- ‘Big data’ – the harnessing of consumer purchasing data, demographic data, manufacturing data, warehousing and logistics data, traffic data etc. to develop new insight and more efficient approaches to organising and managing product supply chains from producer to consumer, which has the potential to reduce transport activity
- Supply chain collaboration – in terms of companies openly sharing their physical capacity of warehousing and transport as well as working closely together to bring about more optimal and cheaper product fulfilment and delivery possibilities. This possibility takes ‘big data’ and puts it to work for the benefit of companies and societies in an enhanced and slim-line supply chain, which has the potential to reduce transport activity

Table 4.5 indicates the possible traffic, environmental and safety impacts of this disruptive events and technologies should they happen – this has been completed by the authors using their own judgement.

In addition, both Uber and Amazon are slowly expanding their services into a wide range of goods delivery markets. In the case of Amazon they are already co-ordinating and operating home delivery operations in all four of the UK online shopping markets covered in this report. Meanwhile Uber already operates delivery services in meal home delivery (UberEATS) in the UK and has a large minicab fleet operating passenger journeys in the UK. It could soon export its UberRUSH parcels and package delivery service to the UK as well. Between them these two companies, with their transport and fulfilment resources, have the potential to bring fundamental change to home delivery operations and services in the UK in the longer-term.

As mentioned in **section 4.4** (and elsewhere in the report) ever-faster delivery services together with delivery charges that do not cover the cost of these operations are a problem for online retailers. However, this pricing is also a problem for wider society in terms of the decision-making it results in which manifests itself in growing traffic levels, and associated environmental impacts. As discussed in this report, logistics providers and freight carriers can take actions to try to make their operations as efficient as possible. But, depending on the extent of this growth in road traffic associated with online shopping in the UK, a point may be reached where policy makers are forced to take action to address this “free” or under-priced delivery charge problem. An indication of this is provided by the recent publication of the London Assembly in which it identifies home delivery traffic as a problem in the capital, and recommends that the Mayor of London investigates the option of implementing a new road pricing scheme (London Assembly, 2017).

Table 4.5: Potential traffic and environmental impacts of home delivery for various future possibilities

Disruptive event / technology	Product types potentially affected				Effect on motorised road vehicle kilometres	Effect of fossil fuel energy use/ emissions	Effect on local air pollution	Effect on road accidents
	Grocery	Non-food small items	Non-food large items	Takeaway / home delivered meals				
Electric/alternatively fuelled vehicles	✓	✓	✓	✓	None	↓	↓	None
Same-day delivery within one or two hours of order	✓	✓	✓	✓	↑	↑	↑	↑
Dematerialisation of products		✓			↓	↓	↓	↓
3-D printing		✓			↓	↓	↓	↓
Autonomous / driverless vehicles	✓	✓	✓	✓	↓ / None	↓ / None	↓ / None	↓ / None
Drones and self-piloted robots		✓		✓	↓	↓	↓	Unclear
Other modal shift – tunnels, airships etc.	✓	✓		✓	↓	↓	↓	↓
Crowdshipping	✓	✓		✓	↓ / ↑	↓ / ↑	↓ / ↑	↓ / ↑
Big data	✓	✓	✓	✓	↓	↓	↓	↓
Supply chain collaboration	✓	✓	✓	✓	↓	↓	↓	↓

Source: based on the authors' own judgement.

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