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## Understanding the impact of e-commerce on last-mile light goods vehicle activity in urban areas: The case of London

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### ABSTRACT

Growth in e-commerce has led to increasing use of light goods vehicles for parcel deliveries in urban areas. This paper provides an insight into the reasons behind this growth and the resulting effort required to meet the exacting delivery services offered by e-retailers which often lead to poor vehicle utilisation in the last-mile operation, as well as the duplication of delivery services in urban centres as competitors vie for business. A case study investigating current parcel delivery operations in central London identified the scale of the challenge facing the last-mile parcel delivery driver, highlighting the importance of walking which can account for 62% of the total vehicle round time and 40% of the total round distance in the operations studied. The characteristics of these operations are in direct conflict with the urban infrastructure which is being increasingly redesigned in favour of walking, cycling and public transport, reducing the kerbside accessibility for last-mile operations. The paper highlights other pressures on last-mile operators associated with managing seasonal peaks in demand; reduced lead times between customers placing orders and deliveries being made; meeting delivery time windows; first-time delivery failure rates and the need to manage high levels of product returns. It concludes by describing a range of initiatives that retailers and parcel carriers, sometimes in conjunction with city authorities, can implement to reduce the costs associated with last-mile delivery, without negatively impacting on customer service levels.

### 1. Introduction

Light goods vehicles (LGVs – up to and including 3.5 tonnes gross weight) have experienced substantial traffic growth across London and the UK since the late 1990s whilst heavy goods vehicles (HGV – over 3.5 tonnes gross weight) and car traffic have remained relatively constant across the country, and have fallen in London (Department for Transport, 2016a; Transport for London, 2016). LGVs are used for many different purposes including goods transport, servicing activities and commuting with the former making up a significant component of total LGV activity in urban areas (Allen et al., 2012a). As business-to-business and business-to-consumer e-commerce has grown, (business-to-consumer e-commerce accounted for approximately 14% of total retail sales in the UK in 2016, and is expected to account for just over 20% of all retail sales by 2021, (Mintel, 2016a; Office for National Statistics, 2016)),

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the last-mile movement of parcels in our urban centres is increasing. The parcel distribution sector is highly competitive with many independent players operating with poor vehicle utilisation for low profit margins in a ‘customer-focussed’ delivery culture. This results in considerable duplication of effort as ‘everyone-delivers-everywhere’ (Browne et al., 2014), and the collective impacts of such insular behaviours on urban street performance are not well understood.

We make three contributions in this paper; firstly we provide an overview of road traffic trends in London and Britain, focussing on the growth in LGV use. We then consider the under-researched area of LGV activity including goods transport, service functions and specifically, parcel collection and delivery. Current last-mile delivery operations for packages and parcels (non-food) are examined along with the important operational factors involved, impacting on the profitability of UK online shopping retailers and parcel carriers. The results of a case study investigating current parcel delivery activity in a specific geographical location in central London are presented to illustrate the nature of these operations and the challenges they present. Finally, we identify a series of initiatives that can be used by retailers, logistics providers, local authorities and the public to improve the efficiency of business-to-consumer (B2C) and business-to-business (B2B) parcel deliveries in urban areas.

## 2. The importance of light goods vehicle operations in Britain and London

In 2015, 3.6 million LGVs were licensed in Britain, compared with 483,000 HGVs, and since 2005, the number of LGVs has increased by 23% relative to HGVs, which have fallen by 5%. Over the period from 1995 to 2015, the number of LGVs and HGVs licensed in Britain increased by 70% and 15% respectively (Department for Transport, 2016b).

### 2.1. Light goods vehicle journey purposes

Unlike HGVs (which are almost entirely used for goods movement), LGVs are used for a wider range of purposes, including the provision of services, the transportation of goods and commuting (as many LGVs are taken home by workers overnight). Fig. 1 illustrates the LGV sector in terms of the distinction between fleet LGVs (i.e. those operated by companies with sizeable fleets) and those operated by self-employed individuals and small businesses. It is also important to note that the van owner and van user can differ, and that vehicles may be sold to a company considered by the vehicle manufacturer to be a fleet buyer (for example the rental and leasing companies) although these vehicles may subsequently be rented or leased to another company, small business or individual.

Little work has been undertaken looking into the purpose of van activity with the most reliable resource being the Department for Transport (DfT) (Department for Transport, 2004; 2007; 2009). Considering ownership and distance travelled, in the case of company-owned vans, goods collection and delivery, servicing, and commuting journeys each accounted for a similar proportion of vehicle kilometres (34%, 30% and 32% respectively) with personal trips only accounting for 4% of vehicle kilometres (Department for Transport, 2007). By comparison, for privately-owned vans, commuting accounted for the greatest proportion of vehicle kilometres (45%), followed by goods collection and delivery (23%). Servicing journeys accounted for 15% of vehicle kilometres, while personal trips accounted for 17% (far greater than for company-owned vans), Department for Transport (2004). When the data for company-owned and privately-owned vans is combined, the most important journey purposes in terms of total vehicle kilometres

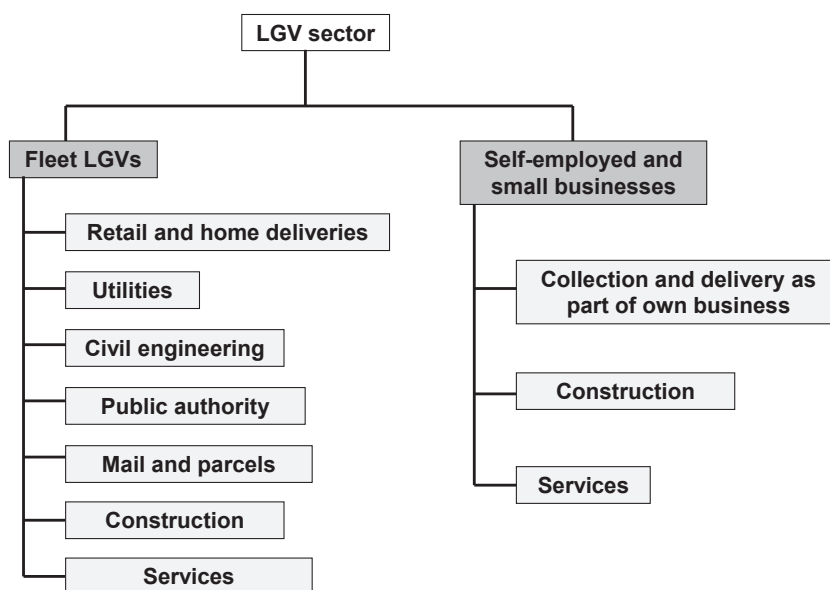


Fig. 1. The LGV sector.

Source: Adapted from CFT (2010).

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