Freight Traffic Control 2050 (FTC2050): transforming the energy demands of last-mile urban freight through collaborative logistics

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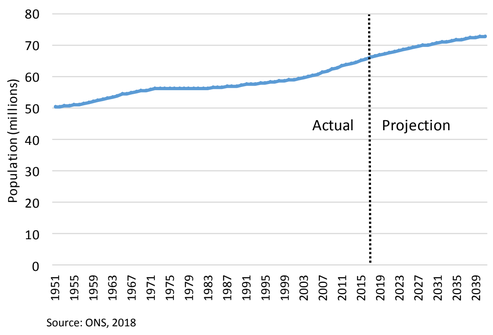
FTC2050 RESEARCH AIMS:

- How to improve the efficiency and sustainability of current urban freight operations?
- Investigating the scope for closer operational collaboration between freight operators to reduce urban traffic and energy demand
- Understanding the potential role of a 3rd party '**Freight Traffic Controlle**r' to ensure the equitable distribution of demand across an urban area

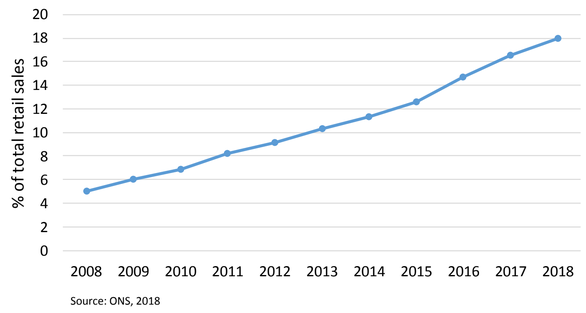
CONTEXT OF FTC2050 PROJECT:

1) Growing demand for ecommerce and same-day delivery
2) Increasing growth of urban populations
3) Further growth in the service-based economy
4) Logistics sprawl, with depots and warehouses relocated to the edge of the urban area resulting in longer journeys
5) Increasing urban freight vehicle activity and environmental impacts unless delivery operations change

UK population 1951-2041 (actual and projection)



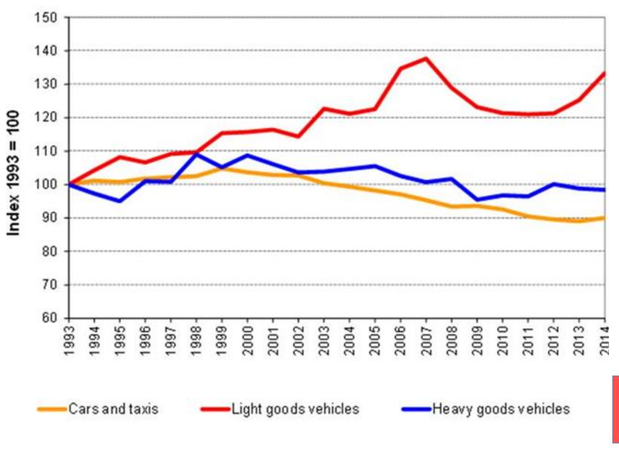
Online sales as a % of total retail sales in the UK



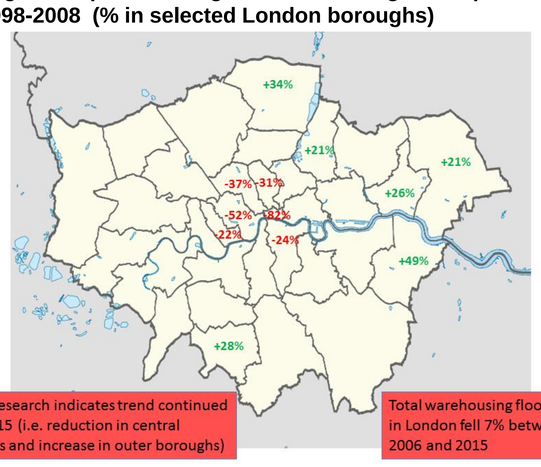
The UK freight sector has few barriers to entry and is highly competitive with low profit margins. Fierce competition leads carriers to operate in isolation with poor vehicle utilisation and delivery rounds that overlap, leading to increased traffic congestion, pollution, and energy consumption.

Operations continue to show poor utilisation rates, with multiple carriers making deliveries to the same addresses and streets each day. New entrants are entering the parcels sector from other business backgrounds such as Amazon and Uber.

Growth in van activity in London (1993-2014)



Logistics sprawl: change in warehousing floor-space 1998-2008 (% in selected London boroughs)



- Pressure on **road transport infrastructure** (roadspace and kerbside)
- Impact on the **sustainability agenda** of many urban authorities
- The project is investigating these **difficulties, challenges and barriers** that lead to sub-optimal operational efficiencies in **the parcels sector**
- The **potential for transfer** of such solutions to other urban freight sectors are also being considered

ACTIVITIES BEING UNDERTAKEN IN FTC2050:

- Developing a suite of techniques to collect various levels and types of operational data from freight carriers
- Gaining a detailed understanding of business-as-usual delivery operations (including driving and walking operations and vehicle stopping times)
- Developing new vehicle routing and scheduling optimisation solutions that take account of driving and walking components
- Identifying the multiplicity of tasks involved in carrying out parcel operations
- Investigating performance differences between experienced and new drivers and the scope for technology to close the gap
- Visualising multi-carrier collection and delivery schedules across carriers in central London
- Heat mapping parcel carrier manifest data to understand trip generation
- Designing a software 'Hub' platform for integrating different carrier datasets
- Analysing the extent to which GPS tracking data can be used to understand urban freight operating patterns
- Evaluating business models, data handling procedures and privacy issues to enable parcel carriers to collaborate in an optimal manner
- Investigating the possible forms of the 'Freight Traffic Controller' concept and how this could function in practice
- Demonstrating a portering (walking courier) operation in central London in which van drivers hand goods to porters for final delivery on foot (with scope for future use with autonomous vehicles and drones)

FTC2050 visualisation of parcel carrier activity in central London

WHO CAN BENEFIT?

- **Parcel carriers** providing data and commercial expertise may benefit from research outcomes
- Policy inputs for **Transport for London, City of London** and other urban planning authorities related to applying the FTC concepts in urban centres with relevance to the **EU** target of essentially CO_2-free city logistics by 2030
- **System designers (future FTC concepts)** gain insights from our approaches for integrating, modelling and visualising big data sets for collaborative decision support, and how to navigate the commercial and privacy issues associated with handling multi-client data
- The **Operational Research community** may gain insights into how optimisation and gaming models can be used with very large data sets.
- **Researchers** benefit from detailed vehicle round information, vehicle time utilisation, complexities and delays caused by loading/unloading, and the difficulties involved in the final delivery leg from the vehicle to the receiver

Project reports and other outputs – see FTC2050 website:

- An analysis of road freight in London and the UK: traffic, activity and sustainability
- An analysis of the UK next-day and economy parcels market and its operations
- An analysis of the UK same-day delivery market and its operations
- An analysis of the ecommerce market and its logistics operations in the UK
- Submissions made to various national & London transport and planning policy consultations
- Oral evidence given to the House of Common Transport Select Committee

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Academic project partners:

University of Southampton, Lancaster University, UCL, University of Westminster, University of Liverpool

Industrial project partners:

Transport for London, Corporation of London, gnewt cargo, TNT, CitySprint We deliver

EPSRC Engineering and Physical Sciences Research Council

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