

DfT Submission to the Commission on Travel Demand

Summary

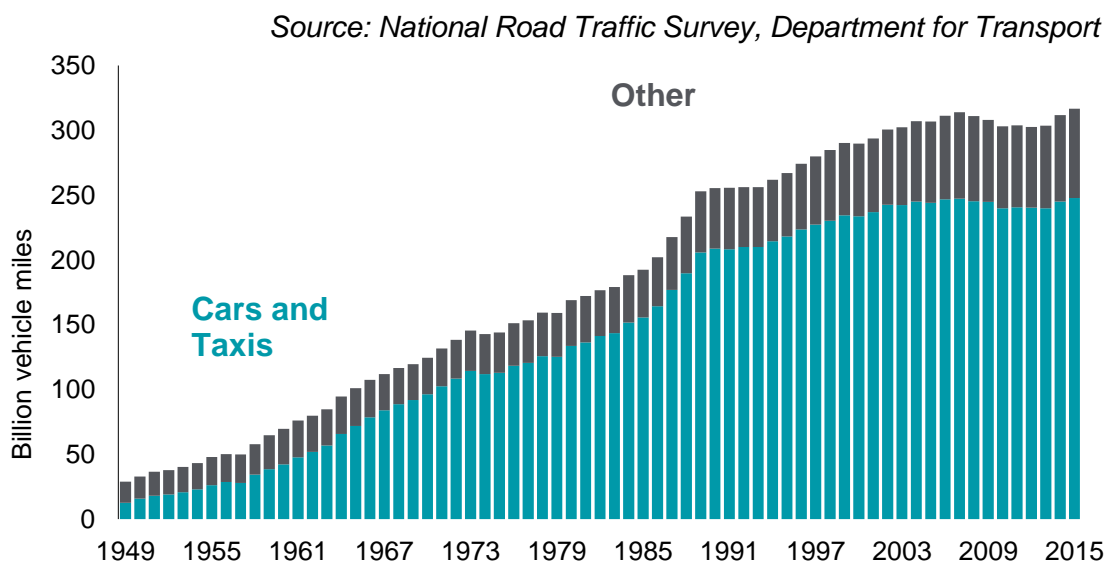
- In recent years we have observed significant changes in travel demand trends. The total distance travelled by car levelled off between 2007 and 2013 after years of growth, though it has risen again since 2014. Meanwhile over recent decades aggregate van traffic has grown steeply, while HGV traffic has been fairly flat. After many years of declining rail patronage, rail demand has also grown strongly since 1994/1995.
- The Department for Transport (DfT) has been active in working to understand the underlying drivers of these trends in aggregate traffic: undertaking and commissioning research, engaging with stakeholders and the wider academic community and bringing together evidence to inform our modelling and appraisal frameworks.
- This work has suggested that there are diverse factors underlying these trends, some of which are better understood than others. People's travel behaviour has become more complex and less uniform. Evidence suggests varying changes in travel behaviour across different sectors of the population with young people and men generally travelling less than previously, while women and older people drive more. This has been driven by social change: activities associated with wellbeing rather than economic growth – such as visiting friends and family – have become more important in driving travel demand; trip chaining has increased; and single purpose home-to-workplace trips have declined.
- As we look to the future, not only do we need to try and understand how those trends in travel behaviour may develop further, but new and rapidly emerging technologies such as connected and autonomous vehicles will also have an impact on travel demand.
- Recent research and evidence reviews in this area suggest that key drivers of transport demand, including population, GDP growth and employment, are still some of the most relevant drivers and these are well-represented in core DfT forecasting models. Where there remains uncertainty about how those drivers will evolve over time, we consider how best to represent this in our forecasts, including through increasing use of scenarios to reflect plausible alternative futures.
- The most recent updates to DfT's evidence base discussed below will be summarised in a forthcoming UVITI Progress Report.

Which aspects of travel demand have changed in ways which have not been anticipated by traditional forecasting approaches in the past twenty years?

Observed trends in aggregate travel demand

1. Recent trends in aggregate road travel demand were summarised in Understanding the Drivers of Road Travel¹ and include:
 - The overall rate of growth in road traffic has slowed over time.
 - There was a levelling off of car travel at aggregate level between 2007 and 2013 (see Figure 1) though, since 2014, growth has returned.
 - There has been significant sustained growth in LGV mileage over the last 30 years, while HGV mileage has remained broadly flat over a similar period.
 - Walking trips per person have declined by almost a third in the last twenty years, although the average distance per trip has increased: this has led to a decline in total distance walked. The number of cycling trips has remained broadly constant but average trip length has increased as has the average distance cycled per person².

Figure 1: Total distance travelled by cars and taxis, and other motor vehicles 1949-2015



2. Meanwhile, observed trends across non-road modes include:
 - Over the past 20 years, rail journeys have more than doubled, with strong growth even through the recent recession. There has also been strong growth in rail demand across cities in the North.
 - Aviation has seen fast growth, but with a downturn during the recession.

¹ Understanding the Drivers of Road Travel, DfT (2015)

² DfT Road Use Statistics (2016), <https://www.gov.uk/government/statistics/road-use-statistics-2016>

Drivers of travel demand

3. DfT has been actively working to understand the key drivers of the observed trends in aggregate traffic levels summarised above. National Travel Survey (NTS) data has provided some indication of shifts in underlying behaviour which are driving these trends, including changes in trip rates over time, by trip purpose and by mode. Early research into trip-making behaviour was summarised in the 2014 UVITI Progress Report³ and more recent research on trip rates has been incorporated into DfT's National Trip End Model.
4. To better understand the factors which underlie the observed changes in both aggregate travel demand and individual behaviour DfT has undertaken several pieces of further research. This includes the work on Understanding the Drivers of Road Travel as well as research targeted at understanding the travel behaviour of specific groups such as young people and trends in commuting. In addition, we have carried out analysis to quantify the impact of different factors (e.g. age, employment status, location) on car travel and to develop a better understanding of the factors behind the decline in individual (average) car use over time. Finally research has also been undertaken to understand whether new rail demand drivers should be incorporated in rail forecasting models.

Efficacy of traditional forecasting approaches

5. Recent evidence⁴ commissioned by DfT suggests that the traditional drivers of travel demand continue to play an important role in determining observed levels of road, rail and air traffic. These include the key economic drivers: income (GDP) and fuel costs, as well as population, where a review of evidence across recent studies suggest that traditional relationships continue to hold.
6. Analysis of previous transport forecasts at an aggregate level suggests that where demand has been over-forecast, this is substantially attributable to over-forecasts in key inputs to the model rather than modelling error. When outturn data on drivers such as GDP growth and fuel costs are incorporated in transport models, the models are more effective at estimating outturn traffic. This leads us to believe that transport demand is, and will continue to be, explained by these key drivers to a reasonable extent.
7. DfT transport forecasts are underpinned by a forecast of future travel demand produced by the National Trip End Model (NTEM). The model takes as inputs detailed forecasts of population growth, employment and housing supply, as well as

³ Understanding and Valuing the Impacts of Transport Investment (UVITI), Progress Report 2014, DfT (2014), <https://www.gov.uk/government/publications/transport-appraisal-in-investment-decisions-understanding-and-valuing-the-impacts-of-transport-investment>

⁴ Road traffic demand elasticities, a rapid evidence assessment, RAND Europe for DfT, December 2014

NTS data on trip rates and journey purpose to forecast future trip ends. While NTEM draws on years of research and evidence, the Department recognises the need to keep the input assumptions under review to ensure forecasts reflect key drivers of travel behaviour.

8. For rail, forecasts for the recession period did not predict the strong growth in demand we saw. This suggested that the relationship between the traditional drivers of demand (rail fares, car cost, GDP growth and employment) and rail demand may have changed. Research in this area has focused on looking at how employment broken down by sector and occupation can have different impacts on rail demand.

How do these changes relate to the way in which the activities that we participate in have changed? What other factors might explain the change?

9. Understanding the Drivers of Road Travel (2015) explored factors affecting road travel, as well as identifying areas of uncertainty around the levelling off of road traffic growth, market saturation for car travel, and changes to young people's travel behaviour. The Department has conducted an econometric analysis quantifying the impact of some of those factors on car travel demand.
10. The analysis uses NTS data to examine the factors that influence licence holding, car access and mileage, which collectively determine an individual's car travel demand. The analysis finds that the probability of licence holding and car access are strongly impacted by income related factors (employment type, occupational status, and income), age, location (urban vs rural), household structure and gender. Mileage is also affected by these factors, though to a lesser extent, hence it is a more stable statistic than licence holding and car access.
11. The econometric work also examined changes in the impact of each factor over time. Most factors have remained stable between 1995 and 2014, though the relationship between income and car travel has weakened. The manner in which this relationship will change in the future is uncertain.

Changes in young people's travel behaviours (particularly car use)

12. The econometric work supported the trends found in Understanding the Drivers of Road Travel relating to younger people. Using cohort variables, the report finds that the more recent a cohort that a person was born in, the greater the downward impact is upon mileage. This is most noticeable for those born in the 1970s onwards.
13. To explore this trend further, DfT has commissioned research to explore the links between social change and changing patterns in young people's travel behaviour. Factors covered in the analysis include the decline in private home ownership and re-urbanisation; employment related factors, such as the rise of precarious work and a decline in disposable income; costs of transport, such as fuel and insurance costs;

and the impact of attitudinal changes, such as more pro-environmental attitudes and a decline in the car as a status symbol.

Implications of an ageing population

14. Older people have different transport needs, partly because they are far more likely to have mobility issues and evidence shows that people with disabilities have different travel behaviours⁵. Older people are also much more likely to live in rural areas⁶.
15. Older people mostly travel by car, either as a driver or a passenger, with more people aged 70 and over holding a driving licence than previously. Location helps to explain why as people age they become more car dependent.
16. In future, people are also expected to work for longer and this will have an impact on commuting trends, particularly if many of them live outside cities and are reliant on cars for part or all of the journey.

Changes to commuting patterns

17. The Department has commissioned research into the decline in commuting trips⁷. The report drew on a number of datasets, anchored by the National Travel Survey, finding that the relative decline in commuting trips has been greater than the decline in overall trips, with commuting trips falling from 7.1 journeys per worker per week in 1988/92 to 5.7 journeys per worker per week in 2013/14.
18. The report reports that there has been an increase in trip chaining, in which a person makes intermediate stops within a single trip, leading to a decline in traditional home-work commutes, as well as a rise in respondents to the NTS who do not report a fixed usual workplace. These changes mean that these journeys are not classified as 'commutes' in the NTS and hence some commuting-type trips are no longer captured in data. The report raises the question of whether the NTS definition is therefore too narrow.
19. In addition, whilst the average working day is longer, the overall working week has decreased in hourly terms; consequently, fewer people commute on 6 or more days. Working from home has also increased. Working from home is meant in the sense of increased provision for working outside of a usual workplace, and also a growing number of workers finding employment that does not require them to commute in a traditional sense.

⁵ See summary in Disability and Travel Factsheet 2007-2014 (DfT, 2014),

<https://www.gov.uk/government/publications/nts-factsheets>

⁶ <https://www.gov.uk/government/publications/rural-population-and-migration/rural-population-201415>

⁷ LeVine S., Polak J., Humphrey A., Commuting Trends in England (forthcoming)

Potential impact of emerging technologies on travel behaviour

20. DfT is actively involved in considering how trends in travel behaviour may evolve over time, and as part of this is considering how emerging technologies such as connected and autonomous vehicles will impact on future travel demand.
21. The bulk of research carried out to date on Autonomous Vehicles (AVs) has a strong focus on technology driving changes and often talks of AVs becoming commonplace within a relatively short time period, with the assumption that any social concerns or behavioural issues will be readily ameliorated, if/when they arise. In contrast, a scoping study commissioned by the Department found that many stakeholders believe that social and behavioural issues are of central importance and may in turn influence the development and take-up of the technology.⁸
22. Changes in working patterns may allow services such as Mobility as a Service (MaaS) to take root with the potential to impact on travel demand. Although there remain barriers to a widespread move to MaaS (e.g. around consumer and data protection, and interoperability) there is the potential for MaaS to blur the perceived differences between public and private transport vehicle use and increased relevance to consumers of the 'access over ownership' models. This could lead to a reduction in single occupancy vehicle use with a knock-on effect on travel demand.
23. Finally, an emerging area of work is Smart Cities⁹ looking at the impact of technology on transport, energy and data, and what this means for cities of the future. The challenge for DfT and other departments will be to build on and incorporate this into our long-term planning for transport policy in cities, for example ensuring that any negative consequences on the environment associated with promoting vehicle usage over public transport are mitigated.

How do these vary spatially? Are there distinctions between central, suburban and rural areas and are there differences between cities?

24. Understanding the Drivers of Road Transport identified variations in traffic growth across road types, with growth in traffic on the strategic road network (SRN) and on rural roads, but with traffic on urban roads levelling off over time.
25. DfT's understanding of the spatial variations in travel demand has also been informed by the car travel econometric work which finds that as the degree of urbanisation increases the likelihood of holding a licence and having access to a car decreases and has a downward impact upon mileage. This analysis also considered

⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/585545/social-and-behavioural-questions-associated-with-automated-vehicles-final-report.pdf

⁹ Smart cities are enhanced city systems which use data and technology to monitor, manage and improve key infrastructure and transport services for citizens

how the factors influencing car travel vary by region, finding that the factors are broadly consistent across different regions, with the exception of occupation type.

26. Whilst the *Commuting Trends in England* report did not give substantial attention to spatial differentiation, it did note that commutes are of a longer duration and shorter distance in urbanised areas, especially London.

How do they vary over time? Are there particular times in the week where demand has changed or seasonal variations which have emerged?

27. The *Commuting Trends in England* report documents that work-home trips have become more concentrated within a shorter period in the afternoon, though there is no such trend for home-work journeys in the morning. The report also explores the difference between term time and school holidays, finding that part time workers are three times more likely than full time workers to make escort journeys during term time.

What methods can be used to incorporate greater uncertainty in demand? Have they been deployed and to what effect?

28. When forecasting demand over 30 or more years, considerable uncertainties arise. Traditionally, the Department has incorporated uncertainty analysis in its forecasts by considering high-low sensitivities around assumptions on core economic drivers such as GDP growth and fuel prices.
29. Our latest thinking on the treatment of uncertainty is set out in the forthcoming UVITI progress report and covers the following areas:
- Capturing uncertainty in the key building blocks of modelling and appraisal
 - Developing our understanding of our forecasting capability through ex-post evaluation
 - Enhancing the approach to modelling benefits in the long term; and
 - Communicating uncertainty to decision makers through different technical methods such as scenario analysis
30. Scenario analysis was incorporated into our published National Road Traffic Forecasts in 2015 and the Department continues to explore how best to use scenarios to present uncertainty in policy making. The use of scenarios will allow us to explore both uncertainties around key drivers such as trends in trip rates, as well as taking account of the uncertainty posed by emerging technologies such as connected and autonomous vehicles.
31. Additional options for future scenario analysis will be developed in the Future of Mobility Foresight study, to be completed by Government Office for Science by summer 2018. The study will examine the technological, demographic, behavioural, environmental and other trends that will affect mobility out to 2040, and provide new types of scenario against which policy options can be tested.

Conclusion

DfT welcomes the work of the Commission on Travel Demand and we are pleased to provide this submission summarising evidence from our recent research in this area, which has provided considerable insight into the key drivers of travel demand which underpin trends observed in aggregate data. DfT is committed to continuing work in this area and to developing a better understanding of the uncertainty around key drivers. We look forward to continuing to engage with experts and stakeholders as we do this, including with the Commission.