

Introduction

1. We welcome the Commission on Travel Demand's Inquiry into shared transport, and we are pleased to provide our response to the call for evidence.
2. Shared transport is an important element of the Future of Mobility. Indeed, DfT's recently published ***Future of Mobility: Urban Strategy***¹ has as one of its nine principles "Mobility innovation must help to reduce congestion through more efficient use of limited road space, for example through sharing rides, increasing occupancy or consolidating freight."
3. New shared mobility models have the potential to make better use of urban space and to reduce congestion and emissions. Research is required to ensure that the development of new services deliver these benefits whilst also building public confidence in using them. As such, the Future of Mobility: Urban Strategy also sets out as a priority for 2019 - understanding the factors that influence the uptake of ride-sharing and vehicle-sharing.
4. Shared transport is not a new concept – public transport has enabled mass sharing for many generations, and on a smaller scale car clubs have grown in popularity. But more recently, new models based on shared use or ownership of vehicles are proliferating, enabled by digital platforms and in line with a shift towards a sharing economy in other sectors. Examples include ride-sharing, peer-to-peer car-sharing, bike-sharing and freight brokerage platforms matching goods and vehicle space.
5. Relevant policy and analytical teams in the Department and the Centre for Connected and Autonomous Vehicles have contributed to this response, which has been co-ordinated by the Social and Behavioural Research team.

Q1: What do data sources tell us about how shared transport is today and how that has changed?

6. DfT's National Travel Survey (NTS)² of people living in England demonstrates that, as a national average, vehicle occupancy rates have remained relatively stable over recent years. However, there is growing evidence from other sources indicating that shared mobility is becoming more prevalent. Digital platforms are enabling different models of sharing to emerge that facilitate sharing journeys and sharing access to vehicles (including cars, bikes and e-scooters).

Sharing journeys

7. The NTS shows that vehicle occupancy rates have seen a small decrease from 1.59 in 2002 to 1.55 in 2017. However, vehicle occupancy rates vary considerably by journey purpose, and were lowest for commuting (1.16 in 2017).
8. The 'lone driver rate' has crept up slightly since 2002, also varying by journey purpose. 62% of all car driver stages were single occupancy in 2017 (compared to 61% in 2002), but the lone driver rate for commuting trips in 2017 was 88%. Looking specifically at commuting, for those who usually travel to

¹ Future of Mobility: Urban Strategy, 2019

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786654/future-of-mobility-strategy.pdf

² National Travel Survey, DfT (2017)

<https://www.gov.uk/government/collections/national-travel-survey-statistics>

work by car, sharing the ride with a work colleague has become less common since 2009 – see Table 1 below.

Table 1: NTS: When travelling to work, how often, if at all do you give a lift to or receive a lift from a work colleague?

	2009	2011	2013	2015	2017
More than twice per month (%)	20	21	18	17	16
Less than once or twice a month, more than once per year (%)	17	16	15	15	12
Less than once per year, or never (%)	64	63	68	68	72
Total	100	100	100	100	100
Total unweighted sample size	5,615	5,167	5,406	5,268	4,855

9. Nevertheless, there are numerous well-established car sharing schemes aimed at encouraging employees to share their vehicles when travelling to and from work. Case studies that we are aware of include those supported by Liftshare (eg Heathrow Airport Ltd; Jaguar Land Rover). Beyond a workplace setting, there are a range of internet and app based car sharing schemes operated by companies such as Liftshare and BlaBlaCar (reportedly having 70 million members in 22 countries). Data on usage of such schemes is harder to find.

Sharing access to vehicles

10. Data from the NTS show a low proportion of full driving licence holders reporting that they were a member of a car club. Looking at combined datasets from across the 5 years surveyed (2013-17), only 0.5% of full driving licence holders in England reported being a member of a car club. The CarPlus Annual Survey³ indicates that car club membership has grown quickly over the last decade: car club members across the UK increased almost eight-fold between 2007 and 2017, to 245,000 members (though this still represents a small proportion of licence holders – consistent with the NTS results). Whilst around three-quarters of these are in London, there is growth in many parts of the UK. This is evident in Scotland, where there was membership growth of 29% between 2016 and 2017.
11. Sharing bikes is also becoming more common. CoMoUK⁴ data shows how bike sharing schemes have grown in popularity over the last few years. In 2018 bike share schemes were operating in 26 UK locations (up from 16 in 2016) involving 24,871 bikes.
12. DfT's Transport and Technology Public Attitudes Tracker⁵ (referred to below as the DfT tracker survey), conducted every 6 months since December 2017, monitors awareness and use of transport services, including car clubs, bike sharing schemes and app based ride sharing schemes.

³ CoMo Annual Survey of Car Clubs 2016-17 London

<https://como.org.uk/wp-content/uploads/2018/06/Carplus-Annual-Survey-of-Car-Clubs-2016-17-London.pdf>

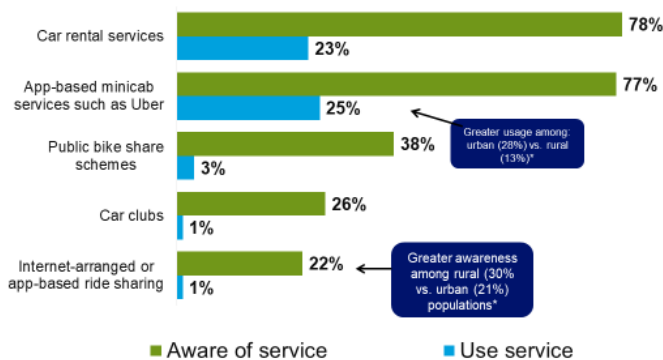
⁴ CoMo Shared Bikes 2018

<https://como.org.uk/shared-mobility/shared-bikes/what>

⁵ Transport and transport technology: public attitudes tracker, DfT (2018)

<https://www.gov.uk/government/publications/transport-and-transport-technology-public-attitudes-tracker>

Figure 1: Awareness and use of transport services



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Q23 Which of the following types of travel services have you heard of? Q24 Do you personally use any of these travel services nowadays?
Base: Q23 asked to all respondents (3,499); Q24 asked to all aware of service but re-based on all respondents
Subgroups: Urban (2,935), Rural (517)

13. Sub group analysis is provided in the published data tables and shows that car owners are more aware of all the transport services listed, including public bike sharing schemes.
14. The most recent wave of the DfT tracker survey (Wave 3, Dec 2018), included new questions on sharing (eg current experiences of sharing, willingness to share in the future, barriers to sharing, etc) and we look forward to sharing the results with the Commission over the next quarter.

Q2: Where is sharing happening most intensively across the UK and what is limiting its spread?

15. Traditional car sharing is most common in urban areas but with CAVs on the horizon, this may change. London is the UK's most popular city for car sharing at present although its popularity is growing elsewhere. The CarPlus Annual Survey highlights that the fastest growing urban car clubs outside London are York, Manchester, and Brighton and Hove, with car clubs' operations in Leeds, Bristol, Cambridge, and Oxford continuing to expand.
16. People's attachment to their car provides important context to understanding what has limited the spread of sharing. Wave 1 of DfT's tracker survey demonstrated that people have a strong attachment to their car. Car owners were very likely to agree with the statements "*I enjoy the freedom and independence I get from my car or van*" (94%) and "*My current lifestyle means I need to own a car or van*" (87%).
17. These findings are reinforced by DfT-commissioned Future Roads Public Dialogue⁶, explored views on sharing in the context of autonomous vehicles. People instinctively compared sharing options unfavourably against familiar forms of transport. In particular, car owners saw them as inconvenient when compared to personal ownership, especially so for those with complex trips or trip chains (e.g. combining commute, school drop offs, shopping).
18. The DfT Future Roads public dialogue also found resistance to ride-sharing in smaller vehicles, where close proximity to other passengers was seen as a risk to personal comfort and safety. Accommodating other passengers' needs was seen to compromise convenience, and there was a willingness to pay a

⁶ Future roads: public dialogue, exploring the public's reactions to future road technologies, DfT (2018)
<https://www.gov.uk/government/publications/future-roads-public-dialogue>

premium for private self-driving services to avoid the inconvenience and discomfort of having to share routes and personal space.

19. More recently people's views on sharing have also been covered in the latest wave of DfT's tracker survey and a public dialogue (jointly funded by DfT and Sciencewise) on connected and autonomous vehicles, with emerging findings broadly supportive of the evidence above. This emerging evidence will be shared with the Commission over the next quarter.

Q3: Who is sharing and for what purposes?

20. Wave 3 of DfT's public attitudes tracker will be an important source of evidence in answering this question. Currently available evidence from CoMoUK suggests that car club membership is predominantly amongst the 25-44 age group, with men more likely to join car clubs than women (70% of car club members are men). Research undertaken by MERGE Greenwich⁷ found that the most likely users of an autonomous vehicle ride-sharing service would be men with an average age of 45, whereas women over 50 were identified as the least likely to use such a service (women tended to be concerned with personal safety).
21. Shared modes are typically complementing public transport and used when public transport is not a suitable option. In early 2019 the Government Office for Science published a report exploring the human factors in shared use of transport in the UK⁸. It states that less affluent people use sharing as a cost-saving measure, and that for some parts of a community with limited access to public transport, sharing can be used to access health or employment opportunities. The report also referenced a second group of frequent transport sharers that are likely to be wealthy, employed, living in an urban environment, and use shared travel to reduce or eliminate the need for car ownership. There is a suggestion that sharing is likely to be adopted by those who already travel flexibly, live where public transport is easily available and accessible, and seek to optimise their journeys on a case-by-case basis. This group are also more likely to be more environmentally aware than those that do not share.
22. MERGE Greenwich⁹ found that, compared to other survey respondents, private car users were more likely to adopt an autonomous vehicle ride-sharing service – 28% who used a private car for leisure and 18% who use one for commuting indicated a high likelihood – as people were increasingly frustrated with the reality of owning and operating a personal vehicle. This was due to a mixture of reasons, including: traffic; parking; congestion fees; and fines or parking tickets.
23. CoMoUK evidence suggests that car club vehicles are less likely to be used for commuting (2%), and more likely to be used for personal business (30%); visiting friend/family (21%); leisure (20%); shopping (19%); business (14%).
24. As part of the Future of Mobility Research and Analysis Programme, DfT will be commissioning qualitative research into current sharers' experiences of sharing, key motivators for adopting shared transport modes.

⁷ Customer attitudes to Autonomous Vehicles and Ride-sharing, MERGE Greenwich (2018)

<https://mergegreenwich.com/2018/04/10/customer-attitudes-av-ride-sharing/>

⁸ Human Factors in Exclusive and Shared Use in the UK Transport System, Government Office for Science (2019)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/773669/humanfactors.pdf

⁹ Customer attitudes to Autonomous Vehicles and Ride-sharing, MERGE Greenwich (2018)

<https://mergegreenwich.com/2018/04/10/customer-attitudes-av-ride-sharing/>

Q4: What is different about sharing a car or taxi to sharing on public transport and why?

25. DfT's Future Roads public dialogue found that, in the context of autonomous vehicles, the idea of sharing in a small vehicle with a small number of other passengers created strong negative reactions of discomfort, lacking the relative anonymity and established etiquette around sharing on public transport. This included fears for personal safety related to sharing space with an unknown stranger, accentuated by the lack of any driver to act as a concierge.
26. Emerging findings from DfT's recent public dialogue on connected and autonomous vehicles bear out those described above, with personal safety coming out strongly as a deterrent to sharing where no driver is present and there is only a small number of passengers.
27. Similarly, research undertaken by MERGE Greenwich also looked at views towards ride-sharing in autonomous vehicles. It found that sharing a journey in a small space (such as a saloon car) implied different social rules compared to, for example, sharing a busy tube carriage or bus. This indicates that vehicle design would be key to overcoming barriers to ride-sharing. Also, the ability to make contact with the service provider or the presence of an on-board steward may be required for some passengers.

Q5: What interventions have been effective at sharing?

28. DfT are aware of only limited evaluation evidence on interventions to support shared transport. DfT do not have any specific plans to undertake evaluations in this area, but where Local Authorities invest in supporting shared transport under either of the relevant upcoming programmes (Transforming Cities Fund & Future Mobility Zones) we would expect them to generate meaningful evaluation evidence.
29. DfT ran two trials¹⁰ in 2015 to explore ways of increasing participation of a well-established car-sharing scheme (Liftshare) for Heathrow airport employees. The research found that, in the Heathrow context, (where employees do not have to pay for their parking) simple light touch letter or email intervention is not enough to shift single occupancy vehicle (SOV) drivers into car sharing. It suggested that harder measures may be necessary alongside promotion of the car sharing scheme e.g. additional car parking spaces for car sharers.
30. The Local Sustainable Transport Fund did support some initiatives on car-sharing, but the programme evaluation did not focus on car-sharing specifically nor did it assess those activities that are effective in promoting sharing. However, the case study evaluations included some relevant evidence, including the West of England case study¹¹ and the Telford case study¹².

¹⁰ An Evaluation of Low Cost Workplace-Based Interventions to Encourage Use of Sustainable Transport, Behavioural Insights Team (2017) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/586376/sustainable-travel-evaluation-of-low-cost-workplace-interventions.pdf

¹¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738302/ses-west-of-england-final-report.pdf

¹² [Telford and Wrekin LSTF Outcome monitoring report, March 2016](#)

31. DfT is also aware of an effective car-sharing scheme in Devon, where Devon County Council set up CarshareDevon¹³. Since its launch in 2004, Carshare Devon has reportedly grown with over 10,000 individuals joining of whom 7,500 are currently active on the site. This has resulted in approximately 150,000 trips shared/year contributing towards Devon County Council's annual carbon and congestion savings.
32. DfT is also aware of other research which puts forward ideas that might encourage people to take up car sharing more in the future. For example, DfT's Future Roads public dialogue suggested that incentives to share and discounts, promotions or loyalty schemes for using sharing schemes could be effective in stimulating car-sharing. Other research mentioned above (MERGE Greenwich) pointed to the importance of vehicle design in overcoming people's reluctance to ride-share.

Q6: What is the potential to accelerate decarbonisation through sharing?

33. To address the uncertainty surrounding the impact of future vehicle technology on road traffic demand, DfT has completed sensitivity tests using the National Transport Model (NTM) designed to help understand which assumptions related to the consequences of future technology (such as the development of CAV technology) could have the largest impact on demand.
34. Two tests have been conducted regarding ride sharing: 'Ride-Sharing' and 'Private Travel'. In the 'Ride-sharing' test, sharing is assumed to be well-embedded, with new business models being extensively used. Average vehicle occupancy rates would dramatically increase (from 1.5 to 1.7) and most journeys would be shared. In the 'Private Travel' test, ride-sharing does not become well embedded and vehicles are primarily used by individuals to travel alone. Fewer escort trips are required and empty running becomes an increasing factor. Overall car occupancy rates reduce (from 1.5 to 1.3). This is not a forecast of how we expect car occupancy rates to change and is instead a test of the NTM response to changes to car occupancy rates.
35. It is important to highlight the limitations to how well we can test these uncertainties. For example, we acknowledge that the NTM is calibrated to the 'current state of the world'. As a result, any modelling has used 'current state of the world' elasticities (such as those for GDP, fuel cost etc), which would be subject to change in a world where CAVs make up a significant proportion of the fleet.
36. Once calculated, we see traffic growth of approximately 5% and 55% over the 2015 to 2050 period (Table 2). This is relative to approximately 35% growth in Scenario 1 (Reference) in RTF18, which takes central estimates for GDP, population and fuel prices as inputs.

Table 2: Traffic Growth from 2015 to 2050

Tests	Traffic Growth from 2015 to 2050
Private Travel	55%
Ride-Sharing	5%

37. Regarding CO2 emissions resulting from this level of demand, in the 'Ride-Sharing' test we see an approximate decrease of 35% in emissions by 2050 (relative to 2015 levels), whilst in the 'Private Travel' test we see a decrease of approximately 14% (Table 3).

¹³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/3890/making-sustainable-local-transport-happen-whitepaper.pdf

Table 3: CO2 Emissions Reduction from 2015 to 2050

Tests	CO2 Emissions Reduction from 2015 to 2050
Private Travel	14%
Ride-Sharing	35%

38. It may be helpful to view these results in the context of a forecast decrease in emissions of approximately 22% in RFT18 Scenario 1 (Reference) - where we assume 25% of the car and van fleet is electric by 2050 - and a forecast decrease of approximately 80% in RFT18 Scenario 7 (Shift to ZEVs), where we assume 97% of the car and van fleet is electric by 2050. For more details please consult the RFT18 report.

Q7: What are the implications of sharing for the future of parking? (e.g. increasing pick-up and drop-offs; charging shared electric vehicles; reducing parking for cars)

39. New mobility models could reduce dependency on car ownership, increasing vehicle utilisation rates and allowing urban space to be used more efficiently as parking spaces are removed. This could allow for more green space, with associated benefits including improved physical and mental health and mitigating the higher temperatures and air pollution of urban areas.¹⁴

40. Around 16% of land in London is currently designated to parking spaces¹⁵. New mobility models could reduce the need for parking¹⁶, freeing up land for building new homes or green and open spaces.

Conclusion

41. DfT welcomes the work of the Commission on Travel Demand on shared transport and we are pleased to provide this written response. DfT is committed to continuing work in this area and we look forward to continuing to engage with experts and stakeholders as we do this, including with the Commission.

¹⁴ Green Space and Health, Parliamentary Office of Science and Technology (2016)

<https://researchbriefings.parliament.uk/ResearchBriefing/Summary/POST-PN-0538>

¹⁵ WSP and Farrells (2016), Making Better Places: Autonomous vehicles and future opportunities, <https://www.wsp.com/en-GB/insights/autonomous-vehicles>

¹⁶ Shared Mobility Simulations for Helsinki – ITF (2017)

<https://www.itf-oecd.org/shared-mobility-simulations-helsinki>