Travel in Britain in 2035

Future scenarios and their implications for technology

Background

The UK's roads, railways and airports are some of the most congested in the world. In the past, countries have addressed such problems with additional infrastructure investment. But this strategy has its limits: land is finite, government resources are constrained, and study after study has shown that it is not possible to build one's way out of congestion.

In this project we look at how emerging technologies might help to make the transport system more efficient and effective. We use a futures methodology that takes a systematic view of travel activity, looking at scenarios that incorporate insights from key activities that generate travel: work/business, health, retail, long-distance travel for work and leisure, and freight movement. Our focus is on the year 2035, and we have therefore concentrated on technologies that are in development today.

Six key technologies

Based on expert interviews, we identified six technologies that are likely to have an impact on the efficiency and effectiveness of the transport network, either by influencing travel demand, increasing the capacity of the transport network, or improving the productivity of travellers:

Autonomous vehicles (AVs): A field of technologies that, in their fullest expression, will allow vehicles to sense their environment and navigate without human input (e.g. driverless cars).

Next generation of information and communications technology (ICT) connectivity: A range of telecommunications technologies that improve bandwidth, network availability and download and upload speeds for wireless communication, facilitating telecommuting, telehealth and retail activities.

User apps / Big Data / intelligent processing: Collectively this refers to the gathering and analysis of vast amounts of data that can be used to provide personalised information. Together these technologies offer substantial potential for expansion of new mobility services, whether as part of autonomous or non-autonomous vehicle

sharing schemes, or through more efficient transporting of freight, or by allowing travellers to seamlessly travel across modes.

Advanced manufacturing: A range of novel technologies, including 3D printing, that improve manufacturing processes and could have the ability to influence freight travel.

Internet of Things: A network of physical objects capable of detecting and communicating information between each other, which could influence health, retail, logistics and freight.

Novel materials and embedded sensors in infrastructure: A range of advances in materials science and production techniques across the transport network, which could reduce damage and wear-and-tear of road surfaces or automatically repair ruptures or abrasions, thus reducing travel delays.

Three future scenarios

We used a scenario approach to explore plausible visions of travel in 2035. The aim was not to predict the future, but to explore a broad spectrum of future possibilities. We developed three future travel scenarios, incorporating the six technologies described above, as well as social and economic factors that may influence future travel. These scenarios vary by gross domestic product (GDP) growth assumptions, technology development, cost of travel and total travel.

Driving Ahead

A scenario where GDP and per capita travel have grown at rates higher than anticipated. Stimulating growth in both is the rise of AVs, which are changing the face of not only transport, but also healthcare and retail. Many of these are shared vehicles, reducing costs for those who no longer have to own cars. The ease of use has led to growth in vehicle travel and congestion, as being stuck in traffic no longer means being unproductive. As the population has grown, the large proportion of older people who live on their own have greater flexibility to travel, especially for medical visits, and the freight and retail sectors make heavy use of AVs for both long-haul freight as well as delivery to customers.

Live Local

This scenario is distinguished by more use of digital substitution for travel and lower per capita travel. The most advanced technologies developed by 2035 are more powerful ICT, user apps and the Internet of Things. They have led to some profound changes in travel demand, because their ease of use has led to far greater use of telepresence. At the same time there has been an evolution in environmental attitudes, with a robust 'Live Local' movement that frowns on excess travel, as well as greater decentralisation of both population and employment away from London. Two other factors have contributed to the decline in per capita travel: first, AVs have not been widely adopted by the public, and second, road pricing has become sophisticated and effective.

Digital Divide

In this scenario, the economy and the overall population are growing at slower-than-anticipated rates. Income inequality is increasing and, while advanced technologies have been commercialised, many remain financially out of reach for much of the population. Lower GDP growth combined with increased travel costs has led to lower levels of travel per capita. Advanced ICT has contributed to businesses moving away from London, which has remained very expensive. AVs and 3D printing are used fairly extensively in the freight sector, with warehouses around the country serving as devolved 3D printing locations. An extensive peer-to-peer and sharing-based economy has developed, because many people cannot afford to buy everything new.
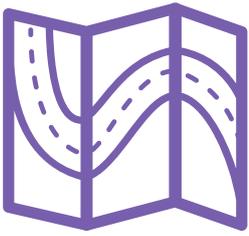
A strategic roadmap of policy and investment

The scenarios were used to identify innovation investment and policies to encourage efficient and effective transport. The following recommendations reflect high-level observations on policy and innovation investments, based on consideration of the potential future landscape for transport, across the range of technologies discussed.

1. **Government agencies should, as a priority, invest in and monitor technological interventions that are robust across a range of future scenarios by:**

   - Being aware of what quality of ICT services are needed to support future technologies and services and ensuring that these services are available, across all geographies.

   - Supporting the development of frameworks and systems necessary for addressing issues of data governance, transparency, value, ownership, privacy and security, ensuring balance in regulation between the beneficial uses of data and the need for consumer protection.

   - Supporting pilot testing of new technologies and services, particularly those that will bring substantial societal benefits.

2. **Government agencies should develop policies to ensure that new technologies lead to the best outcomes for society by:**

   - Monitoring road congestion and, if required, introducing road-pricing policies to manage travel demand.

   - Supporting training and up-skilling of workers to ensure they have the skills needed for future jobs.

   - Ensuring equity of access to technologies that have the possibility of bringing substantial societal benefits, across geographies and society.

3. **Governments should address key barriers to innovation for AVs, next-generation ICT and Big Data / user apps / intelligent processing by:**

   - Monitoring and, if necessary, addressing future liability and safety regulatory issues for AVs.

   - Monitoring and, if necessary, supporting development of standards promoting interoperability of systems, ensuring that such standards are developed in consultation with all relevant stakeholders.

   - Providing education to ensure that all those with access to new services are able to benefit from them, particularly monitoring the use and take up of new technology by the elderly.

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