

Consultation Response

Call for Evidence – National Transport Strategy Review

Transport Scotland Consultation

Date: 14 July 2017

Introduction

The Royal Geographical Society (with the Institute of British Geographers) is the UK's learned society and professional body for geography, founded in 1830. We are dedicated to the development and promotion of geographical knowledge, together with its application to the challenges facing society and the environment.

The Association for Geographic Information (AGI) is the membership organisation for the UK geospatial industry. The AGI exists to promote the knowledge and use of Geographic Information for the betterment of governance, commerce and the citizen. The AGI represent the interests of the UK's Geographic Information industry; a wide-ranging group of public and private sector organisations, suppliers of geographic information/ geospatial software, hardware, data and services, consultants, academics and interested individuals.

The RGS-IBG and the AGI are responding jointly to this call for evidence to further a shared vision and mission to ensure that geography and geographic information is recognised as an important enabler to the world of big data that surrounds us in the digital economy, and is used more widely across the public, private and third sectors. Our submission has been developed in consultation with AGI Scotland and the RGS Transport, Economic Geography and Urban Geography Research Groups. We welcome this opportunity to provide our views on the review of the National Transport Strategy.

Key Message

Geography is a key determinant of transport and transport networks, therefore using robust locational intelligence can enable smarter and more efficient transport networks, infrastructure and services to be delivered. This underpins sustainable economic growth and quality of life.

Call for evidence questions

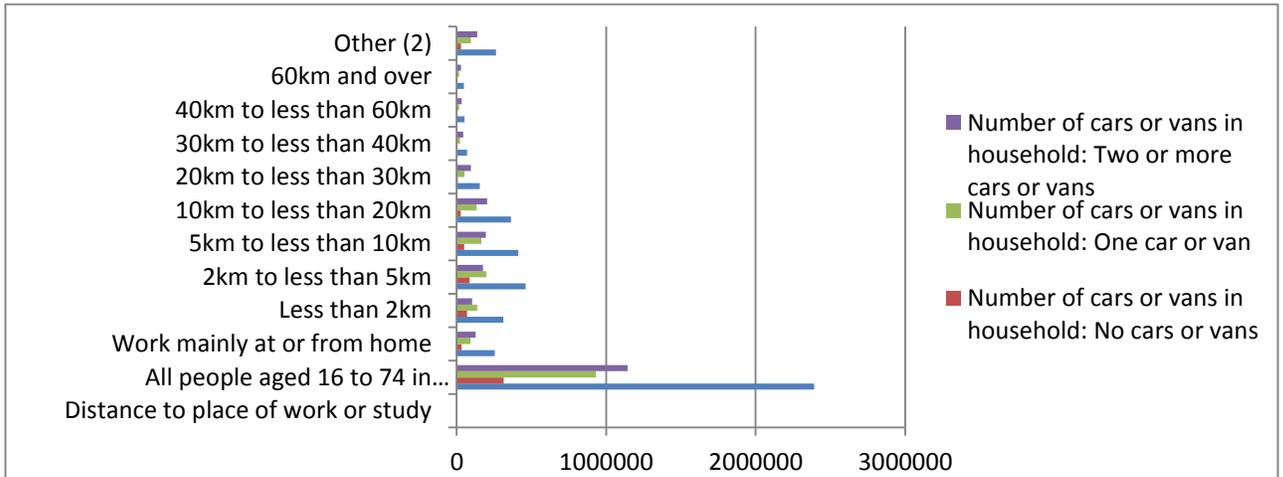
1. Economic growth and inclusive growth

What does the evidence say about the ways in which transport can best support economic growth and do so in a cost effective way? What are the implications of this in terms of inclusive economic growth (economic growth that distributes its benefits fairly across society)?

- 1.1 Transport has an important enabling role in providing access to employment, education, training, healthcare and leisure, particularly in more remote and less economically wealthy locations or areas of relative deprivation; where access to public transport is key to supporting (inclusive) economic growth.

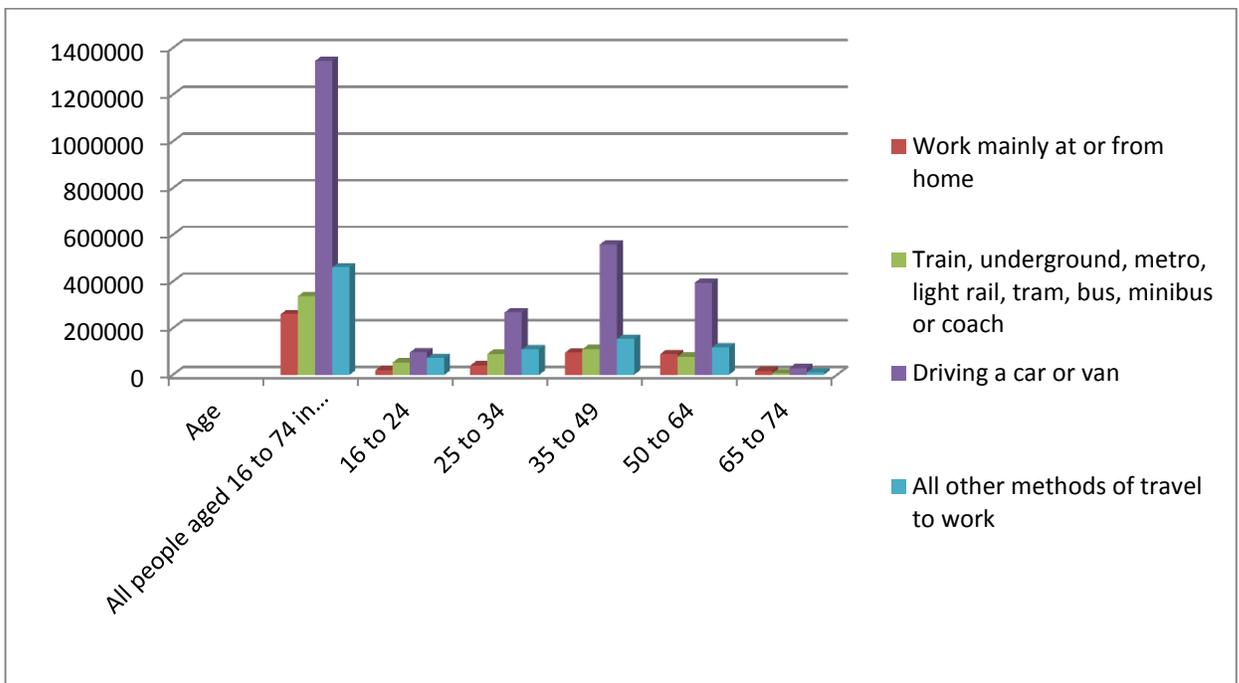
1.2 According to 2011 census data for Scotland, 13% of 16-74 year-olds in employment do not have access to a car or van in the household (see chart 1 below). This suggests a greater need for affordable and reliable public transport to support the economically active population.

Chart 1: distance travelled to work by car or van availability



1.3 The 2011 census also showed that the majority of those in employment drive to work, with the second most used form of travel being public transport. Around 10% of the workforce work mainly at or from home. See chart 2 below.

Chart 2: Method of travel to work



1.4 A comparative analysis of method of travel to work between selected Scottish and English cities (see table 1 below) shows that travel to work methods are broadly similar. The main difference is in much higher levels of commuting by bicycle achieved in Cambridge and Oxford, though levels in the Scottish cities were comparable to London where significant

investment has gone into Boris bikes to encourage workers and visitors to make more sustainable travel choices.

Table 1: comparative analysis of travel to work methods 2011

City	CO ₂ emissions per capita (tons)	Commuting by bicycle (%)	Commuting by bus, train or metro (%)	Commuting by private vehicle (%)	Commuting on foot 2011 (%)	Commuting by other methods (%)	People who work from home (%)
Aberdeen	6.99	1.84	12.94	59.16	15.43	2.61	
Dundee	5.95	1.26	15.35	60.55	13.30	0.79	
Edinburgh	6.11	4.30	27.61	40.70	16.34	0.73	
Glasgow	5.97	1.31	23.12	55.93	9.28	0.73	
Brighton	4.33	4.57	21.59	43.85	17.45	0.52	12.03
Cambridge	5.69	29.03	11.26	33.96	14.56	0.40	10.80
Liverpool	5.59	1.91	22.93	57.05	11.44	0.58	6.08
London	5.08	3.62	44.63	33.55	8.01	0.50	9.68
Newcastle	5.60	2.23	21.45	58.70	9.84	0.88	6.91
Oxford	5.89	17.07	18.56	36.62	16.81	0.50	10.44

Source: ONS Census 2011

- 1.3 Access to healthcare is also important in that it supports economic productivity i.e. a more resilient workforce and a quicker return to work following an illness. Transport therefore underpins the quality of life in a locality. The 2011 census highlighted that 34% of people in Scotland aged 16 or over had one or more long term health conditions. This will have implications for transport policy and access to healthcare and healthcare facilities. This suggests that spatial analysis of people with long term health conditions and travel times to GP surgeries and hospitals along with access to (public) transport will be needed to support the National Transport Strategy. It is worth bearing in mind the ageing population in Scotland; nearly two-thirds of one person households aged 65 and over have no access to a car or van, thereby increasing their reliance on public transport.
- 1.4 The What Works Centre for Local Economic Development has reviewed the impact transport can have on the local economy¹. The review considered more than 2,300 policy evaluations and evidence reviews from the UK and other OECD countries. While many of the findings depend on a small number of studies, they are consistent with other research on the economic impact of transport improvements.
- 1.5 The evidence showed that road projects:
- can positively impact local employment. But effects are not always positive and a majority of evaluations show no (or mixed) effects on employment
 - may increase firm entry (either through new firms starting up, or existing firms relocating). However, this does not necessarily increase the overall number of businesses (since new arrivals may displace existing firms)
 - tend to have a positive effect on property prices, although effects depend on distance to the project (and the effects can also vary over time)
 - impact on the size of the local population may vary depending on whether the project is urban, suburban or rural
 - can have positive effects on wages or incomes

¹ <http://www.whatworksgrowth.org/policy-reviews/transport/>

- can have a positive effect on productivity
- rail projects also tend to have a positive effect on property prices, although effects depend on distance to the project (and the effects can also vary over time).

1.6 Lessons from the review are that:

- the economic benefits of transport infrastructure spending, particularly as a mechanism for generating local economic growth, are not as clear-cut as they seem on face value
- arguments for spending more in areas that are less economically successful hinge on the hope that new transport is a cost-effective way to stimulate new economic activity. The centre does not have clear and definitive evidence to support this claim.

2. Transport mode choice and demand

To what degree are travel behaviours such as mode choice (including freight transport) and demand amenable to intervention? Which policy interventions change behaviours or demand and why? What does research tell us about the types of interventions that fail to change behaviours, particularly over the long term?

- 2.1 Measures to shift car trips to other modes of transport, such as public transport and bicycles, have been studied in many cities. A general problem when it comes to shifting from car to other modes is that many people believe they do not have any realistic alternatives to using the car²; and car trips are perceived as being cheap for those that already have a car. Once the car has been purchased, little consideration is taken of its cost or the number of taxi journeys that could be made for the same amount of money. The car therefore usually appears to be an economical alternative compared with public transport.
- 2.2 Studies³ have found that 20% of car journeys are unavoidable; 60% can be influenced in some way and are dependent on the standard of public transport, working hours and the location of services; and 20 % could be replaced by some other mode. Journeys to and from work are considered easiest to transfer from the car while journeys to drop off and collect children are hardest.
- 2.3 Factors that influence the choice of mode include⁴: car ownership; gender; income; availability of parking; the standard/ quality of travel on public transport; relative cost; journey time and distance; and convenience. A combination of measures is needed to attract car drivers to other modes of transport. These include: restrictions on the car, such as road tolls, car-free zones, parking fees; improved conditions for pedestrians, cyclists and public transport; communication in the form of campaigns and information; and incentives.
- 2.4 It appears that the individuals who are easiest to influence are already using public transport, such that the above measures would not have a major impact on this group. It might be more worthwhile to focus resources on influencing the group comprising middle-aged people with higher salaries, as they have the least sustainable travelling patterns.

Freight transport

- 2.5 The factors influencing the demand for freight are more complex and interdependent than the factors influencing passenger demand⁵ because:

² Factors that influence choice of travel mode in major urban areas <http://www.diva.portal.org/smash/get/diva2:7556/FULLTEXT01.pdf>

³ Stet http://tram.mcgill.ca/Research/Publications/Transit_Route_choice.pdf

⁴ http://tram.mcgill.ca/Research/Publications/Transit_Route_choice.pdf

⁵ <http://www.tongji.edu.cn/~yangdy/quick/ch2.htm>

- decisions by shippers, carriers and receivers affect whether or not a particular shipment is made and, if so, by what mode and route
 - there are many different types of commodities that make up the freight traffic, and these commodities have wide range of prices or values associated with them (also some are perishable while others are not)
 - freight movements are measured in various units such as financial value, quantity, weight, volume, container, carload, truckload etc.
 - the cost of moving freight is much harder to determine compared with cost to move passengers because more specialised services are required for freight (i.e. handling, loading, unloading, classifying, storing, packaging, warehousing, inventorying, etc.).
- 2.6 Generally, demand for freight is determined by economic buoyancy; the spatial distribution of industry; just in time inventory practices; centralised warehousing; fuel prices; user charges and other taxes, e.g. port fees; congestion; environmental and safety regulation; and advances in technology, e.g. in equipment and information systems, which are increasing productivity.

3. Environmental impact of transport

What does evidence suggest the most effective means of reducing transport's local (air quality) and global (climate change) emissions are? How have other countries reduced the environmental impact of transport and to what degree are any such measures also likely to be successful in Scotland? When are routes to reducing carbon emissions from transport also consistent with tackling air quality issues, and when are they not?

- 3.1 Road based transport is a major contributor to poor air quality. Any changes in the total number of vehicles travelling on the road network in Scotland, and in the type and age of the vehicles used, will affect the impact that the emissions from those vehicles have on air quality and emission levels within the country. For example, growth in vehicle numbers is likely to lead to an increase in emissions to air, although the scale of those emissions may be ameliorated by improvements in engine technology or the use of electric, plug in hybrid or ultra-low emission (one that emits 75g/km or less of CO₂) vehicles. It is important to understand the spatial incidence and impacts of low air quality and target improvements in these areas, such as in areas in close proximity to motorways or airports.
- 3.2 Changes in the spatial and temporal distribution of vehicles travelling within Scotland may alter the locations that are subject to air quality impacts arising from traffic. For example, evidence shows that falls in vehicle numbers and concentrations in urban areas at particular times of day are beneficial to air quality in those localities.
- 3.3 Congestion charging has been used globally to reduce traffic in city centres/ built up areas and thereby improve air quality. The London Congestion Charge (one of the largest such zones in the world) was introduced for road vehicles entering central London in 2003.
- 3.4 In Transport for London's (TfL) Fifth Annual Monitoring Report in 2007, it stated that between 2003 and 2006, NO_x emissions fell by 17%, PM¹⁰ by 24% and CO₂ by 3%, with some being improvements attributed to the effects of reduced levels of traffic flowing better, but with the majority being as a result of improved vehicle technology⁶. In total, the rate of fall in CO₂ was almost 20% as of 2007⁷.
- 3.5 However, the 2007 TfL report made it clear that only a one-off reduction of emissions could be expected from the introduction of the charge, whilst further reductions are unlikely

⁶ Sadler, Lucy. "[Detailed assessment London congestion charging](#)". UK Air Quality Archive. Archived from [the original](#) (DOC) on 28 February 2008.

⁷ <http://news.bbc.co.uk/1/hi/world/europe/7167992.stm>

to be as a result of the charge. It notes that lower vehicles emissions may not necessarily feed through into improvements in air quality, as vehicle emissions are only one contributor to total emissions of a particular pollutant: industrial sources, weather conditions and pollutant concentrations also play a significant role.

- 3.6 A 2011 independent study published by the Health Effects Institute (HEI)⁸, and led by a researcher from King's College, London found little evidence the congestion charge scheme had improved air quality. The research used modelling and also compared actual air pollutant measurements within the congestion charge zone with those of control sites located in Outer London. There is evidence that the congestion charging zone has displaced emissions and parking to areas bordering the charging zone.
- 3.7 There are also air quality impacts at the local level as a consequence of transport network construction and maintenance works. For example, construction activities may give rise to dust, and the vehicles and plant used during construction and maintenance works will give rise to emissions to air. Transport Scotland should consider targeting reducing air quality impacts in locations it knows construction works and road repairs will be carried out.
- 3.8 The climate change risks (principally greenhouse gas emissions) directly associated with the use of the transport network in Scotland would be avoidable and reversible. Avoidable in that demand for travel could be reduced (e.g. encourage more home working), and less carbon intensive modes of transport could be employed; and reversible in that the amounts of greenhouse gases arising from transport could be reduced as a consequence of changes in travel behaviour and choice. This would depend on the extent to which Transport Scotland, and the Scottish Government, can influence societal behaviour. Success is likely to be location specific, where citizens have good access to alternative means of reliable and cost effective transport.

4. Active travel (e.g. walking and cycling)

What does the evidence suggest are the best ways to achieve improved health outcomes from active travel that can be targeted by policy in the Scottish context?

- 4.1 As well as increasing physical activity levels, walking and cycling can help reduce car travel leading to reductions in congestion, air pollution and noise; reduce road danger; increase the number of people on the streets making public spaces seem more welcoming; and provide an opportunity for people to participate in the outdoor environment. These benefits may be particularly significant for people with disabilities whose participation in other activities may be more restricted.
- 4.2 Integrated decision making and referral systems between public health, planning, housing, transport and environment services, which recognise the universal promotion of healthy lifestyles can have a range of co-benefits for both health and the environment. For example promotion and facilitation of walking and cycling simultaneously reduces carbon emissions improves air quality locally and increases physical activity for the individual. For example:
- getting just one more person to walk to school could pay back £768 in terms of the health benefits to individuals, savings to the NHS, productivity gains and reduction in air pollution and congestion⁹
 - replacing car journeys with walking or cycling and making roads and neighbourhood environments safer and more pleasant could deliver considerable savings. For

⁸ <http://www.greencarcongress.com/2011/04/hei-study-finds-london-congestion-charging-scheme-shows-little-evidence-of-improving-air-quality.html#tp>

⁹ Dept of Health et al 2011- Soft Measures – Hard facts. The value for money of transport measures which change travel behaviours

instance for every £1 spent on cycling provision the NHS recoups £4 in reduced health costs¹⁰

- choice of green travel – the overall costs of transport induced poor air quality, ill health and road accidents are huge, exceeding £40 billion annually¹¹

4.3 An evaluation of the social return on investment of a volunteer-led health walks programme in Glasgow was carried out between April 2011 and March 2012. The programme delivered 59 projects for the general public and specially referred clients, such as hospital in-patients. Investment in the Glasgow Health Walks amounted to £48,705. However, the value of the associated outcomes is estimated to be £384,630, which amounts to a cost: benefit ratio of £8 generated for every £1 invested¹².

4.4 There are also useful examples of integrated/ partnership working at a local level around green infrastructure. For example, the Green Infrastructure Strategy for Liverpool¹³ was jointly funded by Liverpool City Council and Liverpool Primary Care Trust. The latter helped pay for spatial and data analysis to feed into the strategy.

4.5 According to the National Institute for Health and Care Excellence (NICE), the ways to ensure pedestrians, cyclists, and users of other modes of transport that involve physical activity, are given the highest priority when developing or maintaining streets and roads, include one or more of the following methods¹⁴:

- re-allocate road space to support physically active modes of transport, e.g. by widening pavements and introducing cycle lanes
- restrict motor vehicle access, e.g. by closing or narrowing roads to reduce capacity
- introduce road-user charging schemes
- introduce traffic-calming schemes to restrict vehicle speeds (using signage and changes to highway design)
- create safe routes to schools, e.g. by using traffic-calming measures near schools and by creating or improving walking and cycle routes to schools
- provide a comprehensive network of routes for walking, cycling and using other modes of transport involving physical activity. These routes should offer everyone (including people whose mobility is impaired) convenient, safe and attractive access to workplaces, homes, schools and other public facilities
- separation – there needs to be adequate pavements but actually walking and cycling flourish if they can be separated into networks entirely away from vehicles (and by more than a white line or cones).
- (and/or) Integration – doing away with surface differentiation as in test cases in Europe can increase through speeds while reducing accidents.
- priority – in urban environments which mode has priority has a pretty dramatic impact on choice especially if cars are slowed, diesels are banned, freight is moved to non-core hours, buses are electric, sensors for crossing are smart, “rolling red” rules for bikes are adopted.
- surface – many highways departments/ road inspectors do not appreciate the impact that poorly finished/maintained road surfaces have on 2 wheel/small wheel transport. Potholes, cracks, subsiding manholes etc. are dangerous in their own right and hazardous as places where glass, nails etc. land. Good roadway construction

¹⁰ Get Britain Cycling Parliamentary Inquiry 2013

¹¹ Cabinet Office – Wider Costs of Transport 2009

¹² Carrick, K. (2013) Glasgow Health Walks Social Return on Investment Analysis. Alloa: Paths for All

¹³ <http://www.greeninfrastructurenw.co.uk/liverpool/>

¹⁴ <https://www.nice.org.uk/guidance/ph8/chapter/1-Recommendations>

(consider the Belgian cycle network, separate from most roads, mainly consisting of roads that were surfaced over 40 years ago) and roadway maintenance are essential.

5. Safe and resilient¹⁵ transport

What are the current and emerging risks to the safe operation and resilience of Scotland's transport network and what does evidence say about the ways in which these risks can be best managed? What does the evidence tell us about what adaptation measures (in response to environmental, or other, changes) may be effective to respond to changing pressures on the network?

- 5.1 The Department for Transport published a review of the resilience of England's transport network to extreme weather events in July 2014¹⁶. The recommendations are worth consideration by Transport Scotland.
- 5.2 The review found current risks include extreme weather events, e.g. heat, flooding and high winds, which are expected to increase in frequency and duration in the future that cause significant disruption to the transport network (road, rail and air). The resilience of IT systems is also a risk as modern transport systems are increasingly dependent upon information technology, internet access and other computer systems. These are critical in the operation of the system, for example, computer based signalling systems on the railways and the software to support air traffic control. Related to this is the resilience of electricity sub stations to flooding.
- 5.3 Transport Scotland and infrastructure owners need to collaborate to define a critical network of railways, highways, ports and airports which should be prioritised in strengthening resilience. The economic rationale for investing in transport needs to be strengthened. Infrastructure operators in particular need to develop methodologies for estimating the economic and social costs of disruption, and for capturing the costs of rectifying damage caused by extreme weather, so these can be factored into spending decisions on resilience measures. Transport Scotland should work with operators to help develop these methodologies, so that the level of investment in resilience is optimised. At present, spending on resilience is largely event led and reactive. It is important that in future funding decisions adequate provision is made for maintenance expenditure to ensure resilience.
- 5.4 Extreme weather not only causes transport disruption but also has a considerable impact on the condition of transport infrastructure. Deterioration and ageing of road and rail infrastructure is principally the result of two forces - the volume and weight of usage, and the impact of weather. Extreme weather has a substantial impact in accelerating the rate of deterioration, particularly of local roads, with water erosion and ingress, frost, and summer heat all having a damaging impact. Public sector spending decisions need also to take account of this impact.
- 5.5 Contingency plans for how to manage disruption and clear crisis management procedures are vital preparations for effective management of disruption when it happens and ensuring rapid recovery; all transport operators should have a contingency plan. These should be periodically rehearsed, via desktop or live exercises with relevant principal partners in the industry.

¹⁵ The capacity to plan for, respond to and recover from negative impacts

¹⁶ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/335115/transport-resilience-review-web.pdf

6. Transport governance

What does evidence say the most effective forms of governance and institutional arrangements around transport might be, in order to meet the Scottish Government's strategic objectives?

- 6.1 Since 2010 Conservative-led governments in Westminster have radically reformed local transport governance and finance in England¹⁷. It devolved powers to local bodies to plan and fund their own transport developments, using both grants from central government as well as money raised elsewhere, such as from the private sector and local taxpayers.
- 6.2 The Government now expects major local transport schemes to be delivered by Local Enterprise Partnerships (LEPs) and local authorities either alone or as part of new governance arrangements, such as Combined Authorities and, in the future, alongside strategic Sub-national Transport Bodies (STBs). The bulk of the capital funding for transport projects is now managed by LEPs via growth funding. Local authorities continue to receive revenue funding from the Department for Communities and Local Government and can apply for Access Funding for sustainable transport projects. The effectiveness of LEPs in delivering transport schemes is not yet clear, and is likely to vary between LEPs.
- 6.3 Arrangements differ In London, where the Greater London Authority (GLA) exercises a range of functions in transport, policing, planning, fire and rescue, housing and economic development. It is not a local authority for most purposes. In other parts of England, central government manages some of the functions that the GLA undertakes for London. The Mayor of London produces a Transport Strategy. This is the statutory document that sets out the policies and proposals of the Mayor of London to (re)shape transport in London over the coming 25 years.
- 6.4 In the US, deregulation of intercity travel modes improved their operations. Benefits extended broadly to the economy. Innovations were an important source of those benefits¹⁸. Evidence from the US suggests that public policy can contribute to an effective transport system in three clear ways:
- encourage the modes to operate efficiently in their pricing, service, and innovation—regulate or deregulate
 - ensure that the infrastructure operates efficiently in pricing, investment, and technology—public ownership or privatisation
 - technology policy – using and promoting private sector innovations to realise gains.
- 6.5 For the strategic transport network, responsibility should rightly remain with Transport Scotland. Whereas for delivery of local schemes, governance and funding could be improved by devolving both to the appropriate body. Some locally important schemes may not match national criteria around the rate/ ratio of return on investment, but nevertheless would improve that location's quality of life.

7. Potential changes in society and technology

In the next 20 years, what will be the most significant changes and new technologies influencing the way people live, work and consume that will impact on travel behaviour and demand? Are there examples of places that have already experienced some of this change and therefore provide evidence on how travel behaviour might change in Scotland? How can uncertainties about the future be robustly considered in transport strategy development?

¹⁷ Local transport in England 2010 - <http://researchbriefings.files.parliament.uk/documents/SN05735/SN05735.pdf>, 23 August 2016

¹⁸ <https://www.brookings.edu/wp-content/uploads/2015/05/Transportation-and-the-Economy-China.pdf>

- 7.1 Faced with the combined challenges of an ageing global population, rapidly increasing urbanisation and the corresponding strain on the environment, current approaches to transport are unlikely to be sufficient for our future needs. The work of the Transport Systems Catapult¹⁹, set up by Innovate UK, is helping to create intelligent, integrated transport systems that work across multiple forms of transport. We recommend Transport Scotland engage with the Transport Systems Catapult and its sister Future Cities Catapult, who are supporting projects on urban mobility.
- 7.2 In the coming years, technological advances will continue to shape the way we live in many ways, be it improved public and commercial service delivery, use of drones for commercial deliveries or personalised offers based on location information (underpinned by big data analytics). The Internet of Things, remote sensing, earth observation, 5G, and autonomous vehicles, as part of a wider approach to geographic/ location based intelligence, will revolutionise society. This includes transport, e.g. driverless cars require accurate and real time geographic information if they are to be effective and a spatial network of charging points is needed to support a growth in the use of electric vehicles. Transport networks connect communities, open up opportunities, support quality of life and create the conditions for Scotland's economy to flourish. This points to a need for continued investment in intelligent mobility.
- 7.3 As part of Dubai's bid to be a city of the future, it plans to have 25% of its public transport autonomously controlled by 2030. An exciting aspect of this is the autonomous aerial taxi (AAT) service announced in February 2017. Testing will begin toward the end of this year. It will continue for approximately five years until legislation is in place to facilitate a larger expansion.
- 7.4 The goal of the AAT is to eliminate the growing problem of traffic within the city. The service was due to launch at the end of July, however, implementation has been delayed to ensure the technology is as safe as it possibly can be.
- 7.5 Dubai will be the first city to use air taxis, and its experiment will have a profound effect on the future of transport, as other cities and companies will be judging the applicability of the idea based on Dubai's successes or failures. A particularly interested party will be Uber, which is planning to develop an autonomous airborne taxi service of its own.
- 7.6 A way to reduce uncertainties in transport strategy development is to conduct scenario/ stress testing when the strategy is first developed and again at regular review intervals. Any refreshes can then benefit from the most up-to-date information available at the time. Strategies, by their nature, need to be a living document to avoid becoming a snapshot at a point in time.

For further information please contact:

Damian Testa

Senior Public Affairs Manager

Royal Geographical Society with IBG and the Association for Geographic Information

Tel: 020 7591 3057

Email: d.testa@rgs.org

¹⁹ <https://ts.catapult.org.uk/>