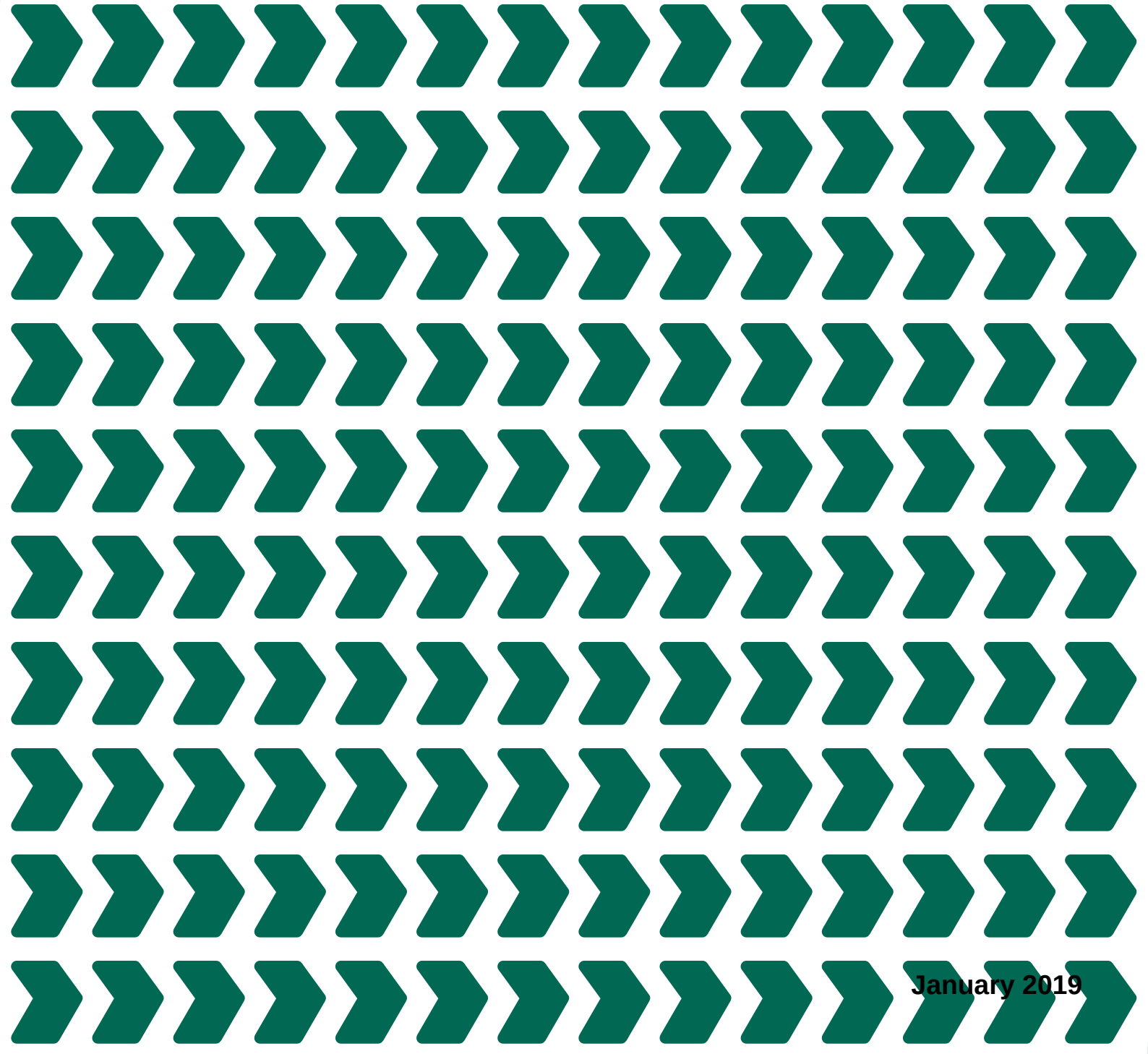
Department for Transport

INDUSTRIAL STRATEGY

Summary of Responses to Call for Evidence

Future of Mobility

Moving Britain Ahead



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Executive Summary

This document summarises the responses to the Department for Transport's Call for Evidence on the Future of Mobility, which ran between 20 July 2018 and 10 September 2018.

Context

The Future of Mobility Grand Challenge is one of four Grand Challenges, established in the Industrial Strategy to put the UK at the forefront of the industries of the future and improve the transport system to become safer, cleaner and more reliable. Through the Future of Mobility Grand Challenge Grand Challenge, we aim to **stimulate innovation**, **create new markets** and secure a **21st Century transport system**. We will proactively shape developing trends and technologies in transport such as zero emission vehicles, automation, new business models and new modes so they develop in line with our vision.

In July 2018, we published this Call for Evidence to seek views on our assessment of the emerging trends that will shape urban mobility and how industry, government and cities could work together to help harness the opportunities.

Opportunities

The Call for Evidence identified a number of opportunities which could improve the transport system and the experiences of consumers.

One of the strongest messages was the opportunity for technology-enabled inclusion. New innovations such as dynamic demand responsive transport could cater to the needs of areas where currently a viable commercial model for a transport network may not exist. The use of personalised wayfinding services could also meet the needs of people with disabilities, allowing increased access to public transport.

While a range of benefits were identified, some of the most revolutionary included the potential impact of connected and self-driving vehicles, which could make cities more liveable through radical changes in the use of road space and parking. Similarly, zero emission vehicles were also considered to present a new opportunity for environmentally-friendly and accessible transportation.

Risks

However, the evidence also highlighted the possibility that these opportunities may not materialise. In fact, a number of potential unintended consequences were identified.

The most frequently raised risk was that without simultaneously increasing car and ride-sharing there could be a reduction of forms of active travel such as walking and cycling due to the convenience of on-demand, self-driving vehicle services.

In addition, risks of reduced accessibility and under-provision in rural areas were highlighted should new service providers only select routes based on profitability.

Other issues identified included competition risks and potential barriers to entry for innovators, and that digital platforms could lead to some companies having excessive market power, resulting in higher prices for consumers.

The need for a proactive response and a strategic vision from the Government

The responses submitted to the Call for Evidence demonstrated the uncertainty we are facing on the impacts and timescales for change in urban mobility. Factors such as the actions taken by central and local government and public attitudes have the potential to impact on the extent to which we realise the opportunities of this change. As a result, there were several calls for proactive government intervention through the range of levers available including regulation, funding and setting out a clear strategic vision to guide the market.

We have taken these recommendations into account in the Government's Future of Mobility: Urban Strategy which is published alongside this document.

Introduction

Background

A core part of the UK's Industrial Strategy, the Grand Challenges aim to make the UK world-leading in the industries of the future, and competitive in the face of the most significant global economic trends. Zero emission technologies, automation, new business models and new modes are transforming passenger and freight transport alike, and creating new opportunities to make travel safer, cleaner and more reliable

The Future of Mobility: Urban Strategy published alongside this document, sets out the Government's approach to emerging mobility technologies and services in cities. It aims to help cities harness the opportunities and address any challenges presented by emerging mobility technologies and services.

The Strategy will form part of the wider Grand Challenge on the Future of Mobility. The remit of this challenge is broader than urban areas, and future work will explore the specific challenges and opportunities for rural transport with a Future of Mobility: Rural Strategy.

Call for evidence

The Department for Transport (DfT) ran a Call for Evidence on the Future of Mobility between 30 July and 10 September 2018. The Call for Evidence invited respondents to submit their views on 15 questions.

This document summarises the points raised by respondents to the Call for Evidence. The responses have informed the development of the Future of Mobility: Urban Strategy, published alongside this document.

The identification of particular suggestions within this document does not mean that DfT will necessarily take them forward. Similarly, the absence of a suggestion from this report does not mean it will not be considered. We will continue to use the evidence gathered to inform the Future of Mobility Grand Challenge, with further announcements in due course.

Structure of this document

Section 1 summarises the responses to questions relating to the Future of Mobility: Urban Strategy. Section 2 summarises the responses to questions relating to the wider Future of Mobility Grand Challenge.

Terms highlighted in **bold** are defined in the glossary at the end of the document.

Overview of respondents

Responses to the consultation were received via letter, email, online survey and easy read answer booklet. In total, 225 responses were received.

Responses to the consultation were submitted by a mixture of individuals and organisations, including local authorities, trade associations, transport operators, other businesses, Non-Governmental Organisations and universities.

Overall, there were more responses from organisations than individuals (63% of the responses were from organisations).

1. Future of Mobility: Urban Strategy

1.1 The first section of the Call for Evidence asked questions to inform the development of the Future of Mobility: Urban Strategy. The strategy, published alongside this document, sets out the Government's approach to emerging mobility technologies and services in cities and towns.

Question 1

We have identified in our Call for Evidence the main technologies and trends that we believe will affect urban mobility in the coming decades. Are there any missing?

Summary of responses

1.2 Respondents frequently felt that the major trends identified were the correct ones, either responding as such or providing no answer to this question. However, many respondents offered additional perspectives or insights to add depth to our overview of the trends.

Active travel

1.3 The most common response was that a potential increase in walking and cycling, and the design of cities to encourage active modes, were not sufficiently emphasised. Some respondents described how technology could help increase **active travel**, for instance through shared bike schemes or using big data to identify priority areas for improving cycling infrastructure.

1.4 A need for close cooperation between transport and wider land use planning and city design was also raised. It was said that this could help determine the level and type of travel demand, encourage active modes through car-free areas, and ensure appropriate resources are given to local councils for the required infrastructure.

Micromobility

1.5 Frequent references were made to the role of **micromobility**, also referred to as personal electric mobility, in urban transport. Micromobility options that were referenced included dockless and docked shared bicycle schemes, e-cargo bikes and e-bikes.

1.6 Additionally, many respondents referred to electric hoverboards, electric scooters and electric skateboards. They said that regulation was preventing the use of these modes in the UK and highlighted that where they were permitted in other countries, they were playing an increasingly important role.

1.7 Some disabled people's organisations felt that these modes presented additional hazards, for example to the visually impaired.

Multimodal system

1.8 Many respondents felt that there was too great an emphasis on roads, to the detriment of other existing modes, such as rail, light rail, trams and boats.

1.9 Many respondents felt that the potential role of urban airspace was not sufficiently considered, particularly the role of vertical take-off and landing (VTOL) vehicles. To take advantage of such technology, respondents said work was needed now to understand the required infrastructure, regulation and air traffic management.

Scope

1.10 The scope of the strategy was questioned, particularly the definition of ‘urban’ and the interface with inter-urban transport, commuting and wider city regions.

1.11 Some respondents suggested a more holistic approach is required, considering transport as a system of systems and taking account of the necessary interconnectivity between urban and rural areas.

1.12 Many respondents suggested that the focus should be not merely on mobility but on how the design of city infrastructure and an emphasis on place can be used to create 'liveable places'.

Changing nature of work

1.13 Many comments were received on the nature of work and the impacts on travel patterns. These included the effects of increased urbanisation, ageing populations, and working from home on commuting demand and the impact of the gig economy on demand patterns.

1.14 Some respondents felt that telecommunications now do the job of transport in connecting people with goods and services, including health and education. It was suggested that a better understanding of the implications of this for future travel demand was needed.

Changing consumer preferences

1.15 It was noted that changing lifestyles, an abundance of data and new technologies, including on demand services, were increasing the expectations of travellers for convenience and immediate access to travel.

1.16 An increased preference for ordering goods online was mentioned as a driving factor behind an increase in delivery traffic and a decrease in shopping trips.

Global context

1.17 Many respondents discussed the importance of considering the Future of Mobility: Urban Strategy in the context of global trends. For instance, it was said that climate change would create a need for future mobility to be resilient to increasingly frequent extreme weather events.

Question 2

We want our urban infrastructure to support these trends and deliver benefits to society. What changes are required to urban infrastructure?

Summary of responses

Need for flexibility

1.18 Several respondents highlighted the inherent uncertainty in evaluating future technologies and their significance for infrastructure. A need for flexibility was raised, for example through the introduction of car parks that can be repurposed.

Supporting sustainability

1.19 Many respondents highlighted that, despite the proliferation of new modes and technologies, mass transit and sustainable travel choices must be at the heart of future mobility if issues such as congestion are to be addressed. Infrastructure development was seen as an effective way to support sustainable travel, for example through the deployment of bus lanes and traffic systems which prioritise buses, trams, or cyclists, as appropriate.

1.20 The need for further cycling and pedestrian infrastructure was emphasised. Respondents advocated proper segregation from traffic and the better provision and integration of more direct, rapid cycling routes to places of work.

1.21 The need for electric vehicle charging infrastructure at destinations, places of work and home was also seen as a significant issue. Respondents raised the challenges associated with charging a large number of vehicles parked on residential streets, as well as the need for power generation, distribution requirements and storage possibilities to be fully considered.

Digital and data

1.22 Many respondents saw investment in digital infrastructure as vital to connect transport systems with one another and with wider city-wide digital networks. They frequently underlined the role of investment in fibre optic cable for rapid, reliable transmission of data between networks, as well as the need for access to buildings and street furniture (equipment such as road signs and traffic lights) for radio antennae. There was a general message that digital infrastructure should be perceived as at least equal in importance to physical infrastructure.

1.23 Similarly, some respondents said that data should be regarded as a form of infrastructure. They mentioned the need to invest further in sensors and to exploit the possibilities in areas such 'digital twin' technology (data-enabled virtual models of physical assets), for improved transport modelling, management, operation, and maintenance.

Impacts of new modes and mobility models

1.24 New modes were a common theme, including drones, vertical take-off and landing (VTOL) applications, micromobility and self-driving vehicles. Here, the need for future urban mobility to integrate a greater number of modes was emphasised. For example, VTOL and drones would require locations for landing, take-off and

refuelling and integration into the wider transport system. Logistics hubs would need to be deployed and integrated, and micromobility would need to be integrated with existing and future cycling infrastructure and wider road space.

1.25 New mobility models were also a recurrent theme in responses, which highlighted that **Mobility as a Service (MaaS)** may reduce the need for car parks but will put increased pressure on kerb space for pick-up and drop-off and may lead to more circulating traffic.

1.26 Views were divided regarding the potential impact of connected and self-driving vehicles on the design of urban space. Some suggested automation will lead to radical changes for signs, lines, surfaces, road widths, car parking and maintenance. They highlighted that connected and self-driving vehicles could bring opportunities to provide more green or blue infrastructure (natural elements such as parks and ponds) and make cities more liveable. Others argued that new modes will need to be able to function effectively on relatively unchanged road networks given the costs of retrofitting and ongoing maintenance.

Inclusive design

1.27 Our ageing population and growing numbers of disabled people were also highlighted, with many emphasising the need for more inclusive and thoughtful design.

Question 3

What evidence do you have to enhance our overview of the impacts of these trends on cities and their use of urban space? Are any impacts missing?

Summary of responses

Potential challenges

1.28 Some respondents felt the potential negative impacts were not fully considered. For example, the possibility that the availability of self-driving vehicles could induce demand, slow traffic and increase competition for kerbside and road space was highlighted as worthy of further analysis. It was also said that **shared mobility** including bike hire could increase pressure on pavement space.

1.29 The risk that greater electricity demand (due to higher uptake of electric vehicles) could place significant pressure on electricity generation and distribution was highlighted as a missing impact. Flexible charging and smart storage were suggested as cost-effective means of countering this.

1.30 The responses to Questions 4 and 5 provide further information on the potential risks arising from emerging mobility services and technologies.

Potential benefits

1.31 The benefits of car clubs were raised by some respondents, citing surveys and studies such as the CarPlus Annual Survey of Car Clubs. They suggested car clubs are associated with a decline in vehicle ownership and usage, encourage use of public transport and can help increase familiarity with electric vehicles.

1.32 Several respondents considered emphasis on the benefits of cycling to be missing from our overview. They highlighted evidence of the health and congestion benefits from increased cycling in continental Europe (such as in Copenhagen), as well as evidence of the effectiveness of local investment in walking and cycling.

1.33 The wider economic benefits from the future of mobility (such as for housing and trade) were also seen as missing, as were some broader societal impacts, such as new modes and services allowing independent living for the elderly and increased employment.

Evidence gaps

1.34 Evidence gaps were also highlighted. For example, it was said that there is a need to increase understanding of the impacts of new mobility on transport poverty and the accessibility of key services. Other proposed areas for further research included the impact of new mobility on existing transport providers, how new services could support statutory transport services, such as Home to School transport, and public attitudes to new mobility.

1.35 Detailed consideration of the consequences for the environment and impacts on disabled people were also felt to be lacking from our overview.

1.36 Several respondents recognised that the impacts of many of the future mobility trends was uncertain, and dependent on a range of factors including regulatory frameworks and models of adoption.

Question 4

What possible market failures might emerging technologies and trends give rise to that could require intervention by Government?

Summary of responses

Road network efficiency and congestion

1.37 Respondents noted that the impact of driving on other road users such as cyclists, various costs of congestion, are externalities (impacts of an activity or behaviour on third parties that are not reflected in market prices). Several respondents highlighted that while electric vehicles alleviate emissions, they still contribute to congestion, and the subsidy they receive is inconsistent with objectives for congestion reduction. Many respondents suggested that e-bikes should be subsidised through grants, to reduce the upfront purchase costs of cycling and stimulate an early market.

1.38 Some respondents said that self-driving vehicles could reduce the cost of some mobility services and increase travel demand. It was noted that larger, shared vehicles (such as vans and buses) are more suitable for self-driving vehicle services if the efficient use of road space is a priority.

1.39 It was said that privately owned self-driving vehicles and **demand responsive transport** services could lead to an increase in road traffic due to empty running, where vehicles travel without passengers.

1.40 Solutions proposed included moving from fuel duty to a vehicle mileage-based taxation system, the ending of support for electric vehicles, incentives to increase

vehicle occupancy and legislation to prevent self-driving vehicles from being privately owned.

Climate change and local air quality

1.41 Respondents noted that the market does not price the environmental impacts of mobility, even though these effects can have significant cost implications. For example, some respondents highlighted the costs associated with increasing building infrastructure resilience to extreme weather events attributable to climate change.

1.42 Some respondents also noted that air quality has equality impacts as lower income groups tend to be more exposed to pollution.

Competition risks and barriers to entry

1.43 A common theme was competition risks, including potential barriers to entry. It was said that digital platforms might lead to the monopolisation of the transport system, resulting in higher prices for consumers and outcomes being driven by commercial rather than societal interests. Some respondents said that the market dominance of a single player that is not compelled to provide services on an ongoing basis could lead to lack of provision in the event of that player abruptly exiting the market.

1.44 It was also said that data monopolies could emerge from mobility platforms gaining market advantage, and a lack of open data could be a barrier to others looking to enter the market.

1.45 The costs of passenger and e-cargo bikes were also cited as a barrier to entry. It was said that the Government should consider fiscal incentives to address this.

Coordination failures

1.46 Respondents noted that there are roles for the Government in promoting open data and standards, coordinating the improved integration of different transport modes, and promoting standards for charging electric vehicles and other electric modes.

1.47 Obstructions and waste caused by competing dockless bike companies in China were cited as examples of the issues that arise from a lack of coordination.

1.48 Several respondents raised the need to integrate Mobility as a Service (MaaS) with local public transport networks to prevent competition from new services decreasing public transport revenues. Potential solutions included regulating MaaS to compel certain transport services to participate.

Other

1.49 The prioritisation of commercial returns by the private sector, at the expense of social or other objectives, was highlighted as a risk by several respondents. It was noted that such effects are a product of early stage innovation, and that some market failures may need to be tolerated in emerging innovations until they have developed sufficiently to be self-sustaining.

1.50 The risk of under-provision in rural areas was also mentioned. This is expanded on in the summaries of the responses to Questions 5 and 10.

1.51 It was suggested (and reiterated in the responses to Question 6) that greater use of on-demand services might reduce walking and cycling and undermine public health.

1.52 Several respondents highlighted the difficulties in attracting funding for innovation in the rail industry, and for drones and vertical take-off and landing (VTOL) aircraft.

Question 5

We are committed to a transport network that works for everyone. What role should Government play in helping ensure that future transport technologies and services are developed in an inclusive manner?

Summary of responses

The opportunities

1.53 The opportunities for technology-enabled inclusion were frequently recognised, with examples including:

- **Dynamic demand responsive transport** allowing for the expansion of the transport network in areas where ridership may be too low to sustain commercial services on a fixed route basis;
- The use of personalised wayfinding services to meet the needs of vision impaired persons, persons with reduced mobility, or deaf or hard of hearing persons;
- Electric, on-demand self-driving vehicle services presenting a new opportunity for environmentally-friendly, convenient, low-cost, accessible and comfortable transportation for those who would not be able to drive or afford a car.

Broadening the focus

1.54 While the focus on inclusion in the Call for Evidence was welcomed, it was stressed that this needed to go wider than accessibility to ensure that the different needs of a diverse range of people are met.

Availability and affordability

1.55 Many respondents mentioned the risk of new services cherry-picking profitable routes and leaving behind 'transport deserts'. For example, it was said that mapping of MaaS provision in Los Angeles had found that areas where users are less wealthy are not served by transportation services. Where securing and selling data about users is the primary driver for transport provision, there was a risk that wherever the data of potential users is deemed less valuable, provision would be less comprehensive. Some respondents raised concerns that certain areas, especially rural ones, would be left behind, and a fragmented approach would limit the national growth of MaaS.

1.56 A related risk highlighted was that new privately-operated services could compete with mass transit routes, reducing the revenues of public transport operators. For example, dynamic demand responsive transport might undermine the profitability of the more marginal conventional bus services currently operated, for example in outer suburban areas.

1.57 Several solutions were proposed for addressing these risks, including: requiring operators to offer their service over a defined area; cities levying additional charges on private operators (e.g. on a per mile or per trip basis) to subsidise less profitable public transport routes; and widening the validity of concessionary fares to other modes in addition to bus services.

Importance of user engagement in the design process

1.58 Many respondents said that to ensure an inclusive transport system, the Government should support the close involvement of a breadth of users, including but not limited to disabled people, in service and policy design.

1.59 In line with this recommendation, specific solutions proposed included: commissioning a large, representative user cohort as a common asset for Research and Development projects and service designers to access; auditing the datasets used to train algorithms for self-driving vehicle systems to ensure they accommodate a wide range of user groups; and requiring potential providers applying through any tendering process to set out their plans for inclusion in their bid.

Accessibility

1.60 Several areas were raised for consideration by developers of new transport services to ensure they are accessible to people with disabilities. For example, it was noted that human operators currently provide assistance to disabled passengers in many forms, and as the driving task becomes increasingly automated, this support function would need to be undertaken by new 'customer assistance' roles delivered by humans or machines. In addition, the trend towards **ride-sharing** would need to cater for wheelchair accessible vehicles as well as those who, due to certain mental health or developmental conditions, might not feel comfortable sharing with strangers.

1.61 Regarding the need for regulation or standards, many respondents mentioned a need for standards or guidance on inclusive design at a national level. Of the respondents that mentioned regulation, most argued that accessibility regulations would need to keep pace with the emergence of new services (such as private hire vehicles and self-driving vehicles). However, a few suggested that regulating too early could limit innovators' ability to scale and grow.

Digital and financial exclusion

1.62 Many respondents highlighted that not everyone has smartphones, a data package or adequate online skills, limiting the ability of some people to access transport services through smartphone applications. A smaller number of respondents pointed out that new mobility services often require the user to have a bank account.

1.63 Respondents called for a discussion on which basic mobility services should be guaranteed to all, and whether large-scale operators should be required to offer alternative booking options (such as call centres).

Active travel

1.64 A common theme was that e-bikes and similar technologies can support people with limited mobility who might not otherwise be able to enjoy the health benefits of active travel. Prioritising these technologies and safe infrastructure would allow all users to experience the benefits of active travel modes and create a more equitable transport network.

1.65 It was argued that while there were understandable reasons for attempting to reduce the use of cars, it should be acknowledged that there are some groups of vulnerable people for whom there is currently no alternative.

Question 6

How can Government ensure that future urban transport systems support people's wellbeing and flourishing, healthy communities?

Summary of responses

Public transport and active travel

1.66 The importance of protecting walking and cycling was the most frequently raised theme in response to this question. The risk of more convenient on-demand, self-driving vehicle services causing a decrease in active travel was a common concern. It was also said that MaaS providers may have little incentive to promote walking and cycling due to the lack of revenue potential.

1.67 Suggestions for countering these risks included: protecting and enhancing active travel infrastructure; banning vehicles from dropping off children outside schools to encourage active travel and reduce childhood obesity; and actively managing the development of MaaS providers so that incentives support modal shift.

1.68 Several respondents highlighted the need to protect public transport from increased competition from emerging taxi services. Ideas included putting public transport priority measures in place to maximise reliability and minimise journey times. One respondent said that the question, 'To what extent does this particular innovation complement existing public transport services as well as walking and cycling infrastructure?' should be at the forefront when making decisions and investments.

Environment and air quality

1.69 Many respondents talked about the importance of tackling the environmental and air quality impacts of transport, through promoting efficiency, investing in public transport and active travel, and accelerating the uptake of electric vehicles. Some advocated emissions or congestion charging zones or other forms of pricing which internalise the costs of road transport.

Demand reduction and integration with planning

1.70 It was stressed that the integration of housing, employment and transport planning at local level was very important. Respondents said that new development should occur in locations which minimise the need to travel, parking provision should be regulated and links to public transport and active travel networks should be ensured. Proposed measures included requiring an up to date Local Transport Plan as pre-requisite for public examination of a Local (Development) Plan, and devolving more infrastructure decision-making and funding powers to facilitate integrated strategic planning at the local level.

A people-focused approach

1.71 Several respondents stressed the need to put people first when outlining a vision for future mobility. There were calls to broaden the debate about what we want our communities to become in the future through wider, localised engagement, looking beyond traditional consultation methods.

Self-driving vehicles

1.72 There were mixed views on the impacts of self-driving vehicles on safety, health and wellbeing. It was said that they could improve road safety but if this relies on

expanding the segregation of road space this could erode social interaction and discourage active travel.

1.73 To counter some of the risks associated with self-driving vehicles (such as increased congestion and reduced active travel), it was said that cities should steer smart mobility in the right direction to deliver public benefits, and the Government should support cities to do so. Policy measures proposed included disincentivising single-occupancy vehicles and requiring companies working on self-driving vehicle research and development to use their services to fill gaps in existing mass transport networks in cities.

Greater integration with health services

1.74 Some respondents said that emerging mobility presented new opportunities to improve how people access health care, particularly in the context of an ageing population. One respondent suggested that a partnership between the NHS and self-driving vehicle companies could explore how these vehicles could reduce the number of appointments missed due to insufficient transport provision.

1.75 To realise the potential benefits for improved health and wellbeing from improved transport infrastructure, respondents noted that more integrated planning between transport and public health decision-makers would be needed.

Question 7

What role should Government play in understanding, shaping and responding to public attitudes to emerging technologies and services?

Summary of responses

1.76 While a small number of respondents expressed the view that the market should be left to provide solutions, most respondents envisaged a role for the Government in at least one aspect of this question.

Education

1.77 Many respondents expressed the view that the Government should take a leading role as an "educator," informing the public about the potential options for new transport modes, technologies and business models, and their benefits and risks. It was felt that the Government would be best placed to provide neutral and trusted information about new products and services.

1.78 Several respondents raised the need to provide the public with transparent assurance about the safety of new modes, including self-driving vehicles.

1.79 To reach a diverse range of audiences, several respondents advocated the use of different means of communication, including information campaigns and the use of social media. A small number of respondents emphasised the need to target groups such as older people or those with disabilities, who it was suggested may experience difficulties in adapting to new modes or systems.

1.80 Several respondents highlighted the opportunity for the Government to promote the public health benefits of walking and cycling as well as newer technologies such as zero emission vehicles.

Research

1.81 Together with information provision, many respondents suggested commissioning research. One purpose of this would be to understand public perceptions, particularly towards cultural or behavioural changes that may enable or result from new modes or systems. For example, several respondents suggested that public attitudes are likely to be important to the success of increased ride-sharing or **car-sharing** services.

1.82 Others noted the importance of research to assess the risks and benefits of emerging technologies, and to convey these to the public. One respondent suggested that evidence from such research could support 'myth-busting' statements and produce analysis to overcome barriers to change.

1.83 In producing an evidence base, several respondents stressed the need for better use of data, including open data, to identify trends and understand attitudes towards transport. Several respondents identified a role for the Government in creating and maintaining robust data standards to provide assurance to the public that their personal data would be shared responsibly by service providers, for example.

Dialogue

1.84 Several respondents expressed the view that the Government should lead in facilitating dialogue with stakeholders and the wider public to understand and shape perceptions. This should include sustained and impartial consultation to inform decision-making.

1.85 It was felt that the Government should pursue a coordinated approach to stakeholder engagement, involving all major Government departments who have responsibility for policies and regulation relevant to the Future of Urban Mobility (such as those relating to the Industrial Strategy, civil society, health and social care). Several respondents emphasised the importance of widening the range of external stakeholders consulted as far as possible to mitigate the risk of dialogue being dominated by a particular sector or interest group.

The role of local areas

1.86 Several respondents proposed a role for local authorities in collecting data on public attitudes or facilitating dialogue. It was also suggested that local trials or demonstrator projects would help to encourage public support for change and understand how citizens' attitudes and needs may vary across regions.

Question 8

What changes do you expect to the mobility-related labour market? How can Government best support people and businesses affected by these changes?

Summary of responses

Changes in the types of job available

1.87 Several respondents highlighted the potential negative impact of automation on driving jobs. However, the majority of these also noted the possibility of new higher-skilled jobs being created, for instance in digital technologies, software development and data analysis.

1.88 A recurring theme was that while future mobility developments have the potential to create higher value jobs, lower-skilled workers who are displaced (such as drivers) may need support if they are unable to transition to such jobs.

1.89 Many respondents mentioned the importance of customer care roles as automation increases, including for assisting people with disabilities and for responding to unexpected circumstances. Some respondents highlighted the potential for new jobs in the cleaning and maintenance of shared fleets of connected and self-driving vehicles.

1.90 Some respondents said that e-bikes and the use of more, smaller and lighter freight vehicles are likely to lead to a rise in delivery-related employment.

Skills

1.91 A number of respondents highlighted that several groups besides drivers, such as those working in the manufacture, maintenance, sale or fuelling of internal combustion engine vehicles, would likely need transferring or re-skilling due to changes in mobility.

1.92 A recurring theme was the increasing need to develop skills in digital and data, across both industry and local authorities. Other skills requirements mentioned ranged from the general (such as engineering) to the specific (such as transport cyber security).

1.93 It was said that local authority employees would need a knowledge of emerging transport technologies and services and how to commission them, as well as up-to-date transport modelling expertise.

1.94 Among the actions suggested for the Government were: measures to boost the provision of science, technology, engineering and mathematics (STEM) skills; extending apprenticeships to new services; developing new undergraduate and postgraduate professional qualifications; and engagement with unions to encourage positive and supportive action on re-skilling.

Gig economy

1.95 Concerns were raised that over-reliance on the gig economy employment model might not deliver a resilient round-the-clock transport system. Some said that more needed to be done to protect workers' rights in the context of zero-hours contracts and rating systems employed by some new business models.

Question 9

What other actions should Government prioritise to help people, businesses and cities prepare for the future?

Summary of responses

Infrastructure

1.96 Returning to many of the themes mentioned in response to Question 2, many respondents flagged the importance of ensuring that infrastructure is prepared for the arrival of emerging technologies.

Public transport provision and sustainability

1.97 Some respondents stated a need for improved public and high capacity transport. It was suggested that efforts to integrate these services would result in a better user experience.

1.98 It was suggested that the Government should support the development of delivery 'hubs' from which to operate e-cargo bike deliveries and consider other means of encouraging sustainable last mile deliveries.

1.99 To promote sustainable modes, several respondents suggested changes to taxation, including a possible increase in Vehicle Excise Duty.

Regulations

1.100 Several respondents felt that the regulatory framework was preventing companies from experimenting and limiting investor confidence. Several specific changes to legislation were suggested. These are covered in the response to Question 12.

Skills

1.101 Several respondents, returning to themes mentioned in response to Question 8, said the Government needed to take a role in developing the skills needed in the UK to prepare for the future of mobility. As well as the need for new skills in industry and local government, some respondents mentioned the need to upskill the public, particularly with respect to digital skills and awareness of cyber security and data protection.

Funding

1.102 Several respondents felt that the Government needed to increase funding for local authorities, to allow them to deliver infrastructure changes and trial new technologies and modes. A couple of respondents welcomed the National Infrastructure Commission's recommendation of agreeing longer term budgets between areas and central Government.

1.103 It was also suggested that the Government should provide further collaborative funding for the research and development of emerging technologies relevant to the future of mobility. Some respondents recommended investment in a large-scale trial to demonstrate effectiveness and educate the public. It was said that existing funding programmes could be improved by ensuring complementary schemes are better coordinated.

Developing a strategic vision

1.104 Given uncertainties around emerging technologies and their impact, several respondents called on the Government to publish a strategy setting out its vision for the future of transport. Several respondents suggested that this vision should be focused on the desired outcomes, with recommended priorities including sustainability, accessibility and safety.

1.105 There were several suggestions for the focus of the strategy. These included ensuring everyone can benefit from changes to the transport ecosystem, including individuals without access to digital services. It was also suggested that the strategy should focus on encouraging individuals to give up their private vehicles in favour of shared transport modes, with road user charging frequently proposed as a method for achieving this.

1.106 Respondents felt local authorities would be crucial in helping to deliver a national strategy. It was suggested by some that continued devolution to city leaders would allow for more integrated decision-making at local level and enable further innovation.

Collaboration

1.107 A need for collaboration between sectors was cited by several respondents. It was felt that more could be done to convene parties working in the transport sector to share lessons and provide further input to the Future of Mobility Grand Challenge.

Standards

1.108 Some respondents felt the Government should be supporting industry in the development and rollout of standards, particularly for Urban Air Mobility and connected and self-driving vehicles. It was said that such standards could be used both domestically and internationally to ensure technology is developing safely and securely.

1.109 It was also suggested that standards were needed for data across sectors and local authorities, to support an integrated rollout of technologies across the country.

2. Future of Mobility Grand Challenge

2.1 The Future of Mobility Grand Challenge is not just about urban areas. The second section of the Call for Evidence asked questions to help direct the Government work on the wider Grand Challenge.

2.2 Responses have been used to develop the Government's next steps for 2019, set out in the strategy published alongside this document. In some areas, further work will be announced in due course.

Question 10

Which 'missions' in the areas we have identified could be most effective in driving innovation and investment? Please refer to the criteria suggested in paragraph 2.6.

2.3 The potential areas we listed in the Call for Evidence as potentially benefiting from a missions-based approach were:

- Safer streets
- Improved access to transport
- Cleaner freight
- Liveable cities

2.4 The criteria referred to were that effective missions should:

- Address strategic public policy aims, as well as opportunities for growth
- Have clear and stretching goals, to drive long-term innovation and investment
- Be open to multiple solutions, to maximise space for innovation and competition
- Have cross-sectoral relevance, to maximise coordination benefits
- Build on available strengths in science, technology and industry

Summary of responses

2.5 Most respondents welcomed a mission-oriented approach. The main mission areas respondents focused on were Mobility as a Service (MaaS) to improve access to transport, active travel, cleaner freight and safer roads.

Mobility as a Service (MaaS)

2.6 The mission area most commonly identified for driving innovation and investment was the implementation of MaaS to improve access to transport.

2.7 Of the respondents that mentioned access to transport as the most effective mission area, most highlighted the need for an integrated multimodal transport network

linking self-driving vehicles, trains, walking, cycling, and other modes where available.

2.8 Several respondents said that the MaaS market is vast enough to drive innovation and investment in several areas including sensor technologies, data analytics, data platform development, artificial intelligence, connected and self-driving vehicles, digital connectivity and cyber security.

2.9 Several respondents said that any mission focused on MaaS would need to go beyond implementation of infrastructure and encourage new business models, whilst being underpinned by an understanding of user behaviour.

Geographical focus

2.10 Some respondents highlighted that supply side solutions for short journeys in cities would not solve the demand side problems in rural areas. A suggested solution was to fund a large pilot, with a realistic chance of becoming a permanent scheme, aiming to increase rural transport options.

2.11 Other respondents felt that while there might be societal benefits to selecting a rural mission, an urban focus would likely have most impact in driving innovation and investment because of the scale of demand and market opportunities.

Active travel

2.12 A mission focused on increasing active travel was suggested, with benefits for improving air quality and mental health as well as increasing levels of physical activity and reducing obesity.

2.13 Technologies such as e-bikes were mentioned as possible solutions for reducing the numbers of motor vehicles in the city centre and promoting cycling.

2.14 Some respondents stressed that missions should promote liveable areas rather than moulding our cities around the requirements of new innovations such as connected and self-driving vehicles.

Cleaner freight

2.15 Cleaner freight was identified by several organisations as a good candidate for a mission-based approach due to the size of the freight sector and the operating costs it faces. It was said that this approach could drive innovation in several sectors with an interest, such as manufacturers, suppliers, freight carriers, infrastructure owners and operators, and transport service providers across a range of modes.

2.16 Suggested solutions included greater use of e-cargo bikes, the implementation of freight consolidation centres and new rail freight corridors.

2.17 It was suggested that a freight-focused mission might need to go beyond emissions reduction to ensure that productivity and safety opportunities were not lost. For example, a mission could focus on safer, cleaner, and more efficient freight and logistics.

Safer roads

2.18 Many respondents emphasised the importance of any mission incorporating safety standards that are fit for purpose to meet the demands that new vehicles and technologies will bring.

2.19 Some respondents proposed that the Government should consider safer streets as a mission itself, citing the example of Sweden’s Vision Zero for road casualties.

Delivering a successful mission

2.20 Several respondents highlighted that it would be vital for any mission to have cross sectoral relevance to maximise innovation and investment and encourage competition among service providers.

2.21 The development of a challenge sponsored by the Government and industry was recommended as a tool for promoting innovation, alongside regional transport authorities setting out long term plans for mobility services.

Question 11

How should Government funding be targeted to help UK innovators build and scale transport solutions?

Summary of responses

Commonly proposed target areas

2.22 Mobility as a Service, 5G and data analytics featured in many of the responses. Respondents said that Government funding could be used to reduce the perceived level of risk associated with emerging technologies, leverage additional private sector investment and coordinate and scale up small, fragmented projects.

2.23 Many of the individual respondents raised the issue of funding for walking and cycling, and associated innovation, to improve public health. Among their suggestions were: improving cycling infrastructure; providing e-bikes in bike share schemes; and additional funding for local authorities to support cycling initiatives.

Broadening involvement

2.24 Many of the respondents suggested that collaboration between established businesses, entrepreneurial new entrants, academia, local government and charities should be encouraged when undertaking Government funded innovation projects. This would increase the chances of projects leading to genuine innovations that solve real transport problems. Involving the transport user was also mentioned as a critical factor in ensuring novel transport solutions would be adopted.

2.25 Broader engagement was also recommended in the process of designing funding competitions and evaluating bids. Local authorities proposed closer collaboration with and between city authorities when setting the scope of Government funding competitions or challenges. Some respondents suggested that views on Government funding should be sought from a wider community; it was noted that members of funding panels, often drawn from incumbent businesses, may not be best placed to identify the next wave of innovators.

2.26 Several respondents suggested greater international collaboration. Developed nations face the common problem of urbanisation producing increased urban congestion, which in turn leads to poor air quality and road safety problems. Some Government funding could therefore be targeted towards bi- or multi-lateral initiatives that allow the UK to learn from and work with other countries.

Outcome-focused funding

2.27 Several respondents said that funding should be outcome- rather than output- or solution-focused. For example, part of the funding could be released once agreed outcomes are achieved.

2.28 The challenge prize approach was highlighted as a potential model for focusing innovation on issues that matter most, attracting new stakeholders, fostering public engagement and providing publicity for innovators.

Speeding up time to market

2.29 Several respondents said that the innovation funding process should be made simpler and quicker, as the rate of innovation is rapid and time to market is critical for many businesses.

2.30 While the introduction of more trials and demonstrators can help those procuring innovation to make informed investment decisions, several respondents highlighted the need to help projects scale up beyond the trialling stage.

2.31 This might require a different kind of support, such as access to marketing and branding expertise, or Innovate UK's loans and investment accelerator competitions, which provide simultaneous grant funding and private investment.

2.32 Some respondents suggested that local and national Government could facilitate scaling by becoming early adopters of transport solutions. For example, it was suggested that all Government vehicles should be Ultra Low Emission Vehicles, or Government departments should use e-cargo bikes. It was also suggested that the Government could fund someone to liaise with innovators in each local authority, allowing local authorities to communicate transport challenges in their cities and helping innovators tailor their products to these.

2.33 Another proposal for ensuring a viable route to market for funded projects was giving a larger amount of funding, or direct investment, to a smaller number of UK companies with genuine potential to scale and attract venture capital funding.

Question 12

Which laws or regulations not currently being addressed need to be amended or created to help harness the benefits and mitigate any risks associated with new transport technologies or services?

Summary of responses

2.34 A broad range of laws and regulations were raised, with some focusing on specific modes of transport and others addressing cross-cutting themes.

Mode specific themes

Self-driving vehicles

2.35 Many respondents raised the need to address regulations for self-driving vehicles. While many welcomed the Law Commission’s current review to enable the widespread use of self-driving vehicles, and the recent Automated and Electric Vehicle Act, it was recognised that more still needs to be done.

2.36 Ensuring the safety of self-driving vehicles was the primary concern, with respondents stressing the need to develop appropriate vehicle standards and classifications for self-driving vehicle technologies, including at the international level. The need to ensure drivers of self-driving vehicles and technicians working on them are fully qualified was also raised.

2.37 Several respondents also highlighted the importance of regulating new services involving self-driving vehicles to enable the safe operation of fleets of self-driving vehicles, particularly private hire and public service vehicles, and to encourage data sharing.

Buses, taxis, and private hire vehicles

2.38 Many respondents stressed the need to amend legislative frameworks for buses, taxis, and private hire vehicles, to increase flexibility in the types of service possible and to enable dynamic demand responsive transport services.

2.39 Suggestions included permitting compliance at a service level, rather than at the individual vehicle level, and devolving powers to cities to grant temporary licences to allow small-scale rollouts.

2.40 On bus legislation, concerns were raised around competition, the Bus Services Operators Grant, and the recent focus on governance options, rather than on issues around the reliability of bus services and staff retention.

Use of the road and micromobility

2.41 Several respondents called for a review of how new types of micromobility, such as electric scooters and shared bikes, could safely be integrated into the urban transport system.

2.42 A similar number of respondents emphasised the need to continue to protect the safety of vulnerable road users, including pedestrians, and prioritise their use of the footway and cycle lanes.

2.43 Suggestions included reviewing Section 72 of the Highway Act 1935, which forbids the use of vehicles on the footway, and giving new powers to local authorities to manage the introduction of new business models and modes of transport (see below).

Cross-cutting themes

Mobility as a Service (MaaS)

2.44 Many respondents raised the emergence of the MaaS sector, with the primary concern being the impact of MaaS on competition and the potential for monopolies to emerge. Suggestions included introducing legislation to request or incentivise open data sharing for both scheduled and real-time data.

2.45 Several respondents discussed the issue of how mobility platforms should be defined, and the impact of that definition on their certification, accreditation, and the status of workers.

Data

2.46 Concerns were raised about the laws surrounding data in a changing transport environment. Local authorities and regulators stressed the need to improve access to mobility-related data for the public benefit. This could be done through introducing greater requirements or incentives for private service providers to publish open data, or through facilitating data trading in an open market.

2.47 The complexity of data privacy laws was highlighted as a barrier to innovation. A possible solution suggested was the provision of guidance and best practice examples. Further non-regulatory recommendations relating to data are contained in the response to Question 14.

Local authority powers and devolution

2.48 Several respondents called for local authorities to have greater devolved powers to regulate new modes of transport, and greater flexibilities around byelaws and highways powers.

2.49 A need for local transport authorities to have greater research and development powers was also raised, to help build the evidence base required to justify temporary regulatory changes or licences.

A more flexible approach to regulation

2.50 Several respondents highlight the need for regulations to reflect trends towards multimodal transport solutions. Some suggested increasing collaboration across regulators to create common, mode-agnostic or technology-neutral standards and regulations.

2.51 The creation of regulatory sandboxes was also suggested as a means of testing the impacts of more flexible regulations, in a combination of virtual and real-world environments.

Question 13

How could the experience of working with local and/or national regulators be improved for transport innovators?

Summary of responses

The relationship between national and local regulation

2.52 Many respondents, particularly those from organisations, called for a more joined up approach from national regulators and local authorities. They warned of the risks of disparate approaches if local activities are not standardised.

2.53 Respondents suggested transport governance should be streamlined, with some calling for a fundamental consolidation of the number of highways authorities, to create a more strategic role for Sub-National Transport Bodies.

2.54 Some respondents, however, called for regional and national strategies for transport innovation to embrace local best practice and decision-making. There were suggestions that support could be provided to local authorities to develop their own innovation strategies.

Improving cooperation between regulators and industry

2.55 Several structural issues were raised around the approach of regulators and local authorities towards innovation, and their awareness of the changing transport environment. Respondents called for a greater willingness from local authorities to embrace an ‘open for business’ approach, develop relationships with innovators and support new public-private partnerships.

2.56 Recommendations included ensuring relevant staff at all levels of a regulatory body are well briefed on future technologies and their implications, and encouraging regulators to attend more research and development project steering boards. This would help to ensure regulators keep pace with technological change, adopt a more open approach, and have the confidence to take risks where appropriate.

Increasing the accessibility and usability of regulations

2.57 A frequently raised issue was the complexity of the UK's regulatory framework for transport and innovation. Making this framework easier to access and understand would save innovators time and resource. Suggestions included creating a single, user-friendly repository of existing and future regulatory information, and issuing more guidance documents.

2.58 Similarly, a need to clarify the responsibilities and powers of the various levels of governance was also identified, as innovators are not always clear who they should be approaching for support or approval while developing their product or service.

2.59 It was also suggested that local authorities themselves would benefit from greater guidance around their existing powers to manage new mobility services.

Improving procurement processes

2.60 Several respondents raised concerns about existing procurement practices, which were said to be highly time consuming, slowing innovation and disadvantaging smaller companies that need to move faster than the process allows.

Question 14

What further actions should Government prioritise for resolving barriers to data sharing and use in the mobility sector while protecting privacy and security?

Summary of responses

2.61 The importance of data was generally agreed, with several respondents referencing the National Infrastructure Commission's 'Data for the public good' report, which asserted that 'Data is part of infrastructure and needs maintenance in the same way that physical infrastructure needs maintenance'.

Ensuring data privacy and security

2.62 The importance of protecting individuals' privacy was a major theme of the responses. Several respondents emphasised that an innovative environment was dependent upon the public having trust in how their data was used. A couple of respondents suggested that the recently introduced General Data Protection Regulations were sufficient to ensure data privacy in the transport sector.

2.63 Mention was also made of the importance of data security and protecting systems from criminal and malicious attack.

Standardisation of data

2.64 The need for a more standardised approach to the release of data was a major theme, with issues cited including data quality, the lack of good metadata and the

release of data in different formats. It was said that these issues are hampering innovation, analysis and data interoperability across modes.

2.65 One respondent highlighted that uniform standards would become increasingly important as the volume of data continues to grow, and as computational systems become even more complex. For example, self-driving vehicles were highlighted as an area where uniform data standards would be required.

2.66 Many respondents argued that there was a role for the Government in facilitating greater standardisation of data formats, ensuring data quality and promoting open standards as appropriate.

Requiring large organisations to share their data

2.67 Several respondents suggested that the Government should require large technology companies and transport operators to open up their raw data in an anonymised form. This was considered necessary to help level the playing field, protect competition and facilitate innovation. The importance of transport data to the 'public good' and delivering societal value was also used to justify this approach.

Convening voluntary agreements to share data

2.68 As opposed to mandating organisations to share data, a corresponding number of respondents suggested a more voluntary approach, with the Government playing an active role in convening voluntary agreements. One respondent highlighted the recently published Joint Rail Data Action Plan as the approach that could be taken in other transport modes.[1] Similarly, one respondent suggested that DfT should facilitate forums to improve understanding between data providers and data aggregators/receivers.

Other suggestions

2.69 There were some mode specific suggestions, including the adoption of the Dutch model for sharing cycling data, for example, and the need for a review of data protection and confidentiality of shipment data.

2.70 A wide range of other ways for the Government to help support progress were suggested, including: publishing a data vision for transport; establishing a publicly owned data platform; digitising Traffic Regulation Orders; creating standard templates for data sharing agreements; and promoting data skills.

[1] https://www.gov.uk/government/publications/joint-rail-data-action-plan/joint-rail-data-action-plan-addressing-barriers-to-make-better-use-of-rail-data

Question 15

Do you have any further suggestions or comments on the subject of this call for evidence?

Summary of responses

2.71 The majority of respondents echoed the themes highlighted in response to Question 9. Building on the points raised, some respondents advised some caution around emerging technologies, suggesting they may have unexpected negative side effects or take longer to develop than anticipated.

2.72 Many respondents reiterated that the impacts of the changes will be far reaching, and the Government should engage widely across sectors to discuss and support its work on the future of mobility.

3. Glossary

Active travel: The terms ‘active travel’ and ‘walking and cycling’ are used in this document to encompass a range of methods of active mobility, including trips made by wheelchair, mobility scooters, adapted cycles and e-bikes.

Car clubs (sometimes known as car-sharing): Car clubs use electronic systems to provide customers unattended access to cars for short-term rental, often by the hour. Business models can be categorised into round-trips, where the vehicle must be returned to its home station, and flexible, which allows one-way trips. Vehicles may be owned by individuals and lent out on a peer-to-peer basis via an intermediary platform, or form part of a fleet owned by a single organisation.

Demand responsive transport: A flexible service that provides shared transport in response to requests from users specifying desired locations and times of pickup and delivery. Dial-a-ride services scheduled through next day or advance bookings are a traditional example.

Dynamic demand responsive transport: More recent applications of demand responsive transport seek to work dynamically, adjusting routes in real time to accommodate new pickup requests often made minutes in advance.

Fractional ownership: An ownership model that involves a group of people purchasing or leasing a good (such as a vehicle) and splitting the costs.

Micromobility: The use of small mobility devices, designed to carry one or two people, or ‘last mile’ deliveries. E-scooters and e-bikes are examples.

Mobility as a Service: The integration of various modes of transport along with information and payment functions into a single mobility service. Recent services that allow customers to purchase monthly subscription packages giving them access to public transport and private taxi and bike hire schemes are an example.

Ride-hailing: Ride-hailing services use smartphone apps to connect paying passengers with licensed taxi drivers or private hire vehicle operators who provide rides for profit.

Ride-sharing (sometimes known as car-pooling): Formal or informal sharing of rides between unlicensed drivers and passengers with a common or similar journey route. Ride-sharing platforms charge a fee for bringing together drivers and passengers. Drivers share trip costs with passengers rather than making a profit.

Shared mobility: Transport services and resources that are shared among users, either concurrently or one after another. Public transport, or mass transit, as well as newer models such as car-sharing, bike-sharing and ride-sharing, are all types of shared mobility.