

## **Written evidence submitted by KPMG LLP (MAS0055)**

KPMG LLP welcomes the opportunity to contribute evidence to The House of Commons Transport Committee inquiry into Mobility as a Service (MaaS).

KPMG is a global network of independent member firms offering audit, tax and advisory services. Our global transport practice advises public agencies (at central, regional and local government level) and privately owned transport groups around the world. Our submission is based both on our in-house research and expertise and our recent experience of working with clients around the world on MaaS and connected future mobility challenges.

This submission is provided in five sections;

- The first section summarises the key findings of KPMG’s recently published Autonomous Vehicles Readiness Index (published in January 2018), focussing on the UK’s position relative to other countries.
- The second section explores how to define MaaS, how it has developed over recent years, and how connected and autonomous vehicles (CAVs) and Electric Vehicles (EV) may impact on MaaS schemes in the future.
- The third section considers the issues local transport authorities ought to consider when assessing the potential benefits of MaaS schemes in their areas.
- The fourth section considers the impact of MaaS schemes from a broader public policy perspective covering economic, social and environmental considerations.
- The final section considers the actions Government could take in enabling MaaS schemes.

KPMG has a dedicated team – “Mobility 2030” that is leading our thinking on how transport will change over the next 10-20 years. There are three significant and connected innovations emerging which we believe will fundamentally change how people travel in the UK – Electric Vehicles (EV), Connected and Autonomous Vehicles (CAV), and Mobility as a Service (MaaS).

Electric vehicles use electric motors to drive their wheels. They derive some or all of their power from large, rechargeable batteries.

Autonomous vehicles are those in which operation of the vehicle occurs without direct driver input to control the steering, acceleration, and braking, and are designed so that the driver is not expected to monitor constantly the roadway while operating in self-driving mode.

Connected vehicles are vehicles that use any of a number of different communication technologies to communicate with the driver, other vehicles on the road (vehicle-to-vehicle [V2V]), roadside infrastructure (vehicle-to-infrastructure [V2I]), and the 'cloud'. Some vehicles can be both connected and autonomous (CAV), some can be just autonomous (AV) and some can be just connected (CV).<sup>1</sup>

MaaS is a term which has attracted a wide range of definitions. At KPMG, we think Mobility as a Service ('MaaS') is the integration of multi-modal public and private sector mobility services, delivered through one or more digital platforms incorporating travel information, payments, reservation of on-demand/demand responsive modes and/or authentication, designed to enable customers to seamlessly access and consume mobility services to undertake end-to-end journeys in accordance with quality, cost and time preferences.

### **Section 1 – Autonomous Vehicle Readiness Index (AVRI)**

The Autonomous Vehicle Readiness Index is a report released in January 2018 by KPMG. We have attached the full report as an Appendix to this submission. The report assesses various countries' preparedness and openness to AV technology, and is designed to assist public authorities in learning about best practice globally and to provide meaningful challenge by highlighting areas where each country has more to do.

The relevance of this report to the Committee's work is that we view the growth in MaaS and demand-responsive transport as one aspect of the indicators of readiness for AV.

The Index consists of four pillars: policy and legislation, infrastructure, consumer acceptance and technology and innovation. 20 countries were selected for assessment based on the size of their economies and known progress towards adopting AVs.

#### **UK ranks 5<sup>th</sup> on the overall index**

The UK rates in the top five for three pillars, but only tenth on infrastructure.

On policy and legislation, the UK scores strongly in AV regulation, with the Department for Transport having determined that it is legal for driverless cars to be tested on any public roads without permits or extra insurance and the establishment by the Government of the Centre for Connected and Autonomous Vehicles (CCAV) to act as a focal point for the Government's commitment to the development CAVs. The UK has carved out a niche as an attractive testing and proving ground for CAV technology in Europe. This is shown by the range of CAV focussed consortia that are benefiting from private and government funding (largely awarded as grants via competitions run by CCAV and Innovate UK) to develop, test and refine CAV technology.

On consumer acceptance, the UK has one of the highest ratings from KPMG's Change Readiness Index and the World Economic Forum's GCI technology readiness score (which includes a number of

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<sup>1</sup> House of Lords Science and Technology Committee report into CAV  
<https://publications.parliament.uk/pa/ld201617/ldselect/ldsctech/115/115.pdf>

variables that capture the use of technology by consumers), although lower ratings for the proportion of people living in test areas.

On technology and innovation, the UK scores well on industry partnerships and research and development hubs, as well as receiving strong ratings on technology availability and capacity for innovation by the World Economic Forum, although it has fewer AV patents than other leading nations.

The UK's mid-table performance on infrastructure is due to one of the lowest scores for 4G coverage among the 20 countries assessed and the quality of some of its roads (especially non-Strategic Road Network), meaning that it came 13<sup>th</sup> out of the 20 countries assessed for roads quality. While the UK is third in EV charging station density with more than three EV charging stations per 100 kilometres of road, it is considerably behind the Netherlands which has 19 EV stations per 100km of road, more than six times that of the UK.

The UK came 5<sup>th</sup> in relation to Uber's relative market presence – a proxy indicator for the public's desire, and the Government's commitment, to facilitating demand responsive transport solutions.

### **Global best practices in AV adoption**

The Index finds the most prepared countries for AVs share five characteristics;

- Private-sector investment and innovation
- Large-scale testing powered by a strong automotive industry presence
- Governments willing to regulate and support AV development
- Excellent road and mobile network infrastructure
- A proactive government that attracts partnerships with manufacturers.

It is clear that the overall landscape is still relatively immature in every country and few countries are scoring strongly across the board. The Netherlands is the exception and leads this index because it performs strongly across all four pillars, showing how both its private and public sectors are highly engaged. It is already a global leader in the use of Electric Vehicles but it also has excellent infrastructure and a government determined to take advantage of AV.

## **Section 2 – How has MaaS developed in recent years and how will CAV and EV impact on MaaS in the future**

### **What do we mean by MaaS**

To date, MaaS has predominantly focused on the customer proposition, providing travellers with technology-enabled solutions to seamlessly access and consume a wide range of public mass transport and private mobility services to undertake end-to-end journeys in accordance with their cost and journey time preferences.

Integration of services within MaaS schemes promises significant benefits to customers, enabling seamless interchange between public and private transport modes and personalisation of travel planning and information. MaaS platforms will enable travellers to optimise their consumption of mobility services according to their time, cost and quality preferences and, in doing so, unlock access

to mobility and reduce dependencies on private cars through addressing challenges associated with availability of information, interchange penalties associated with different payment mechanisms adopted by operators, and low consumer confidence in completing unobstructed end-to-end multi-modal journeys. MaaS will also benefit operators through providing richer customer insights and access to a much wider customer base. These benefits extend to Transport Authorities who will be able to better understand multi-modal demand throughout the transport ecosystem and, potentially, to work with MaaS schemes to influence the development of products that can influence behaviours to achieve local transport policy.

There are two types of products – Pay As You Go – where payment is made per journey per operator, and subscriptions – where customers pay a monthly fee and can consume a set amount of services per mode, following which journeys are treated on a Pay As You Go basis (albeit unlimited travel subscriptions are also emerging). The commercial success (or otherwise) of subscription models has yet to be established, however it is anticipated that these will work in a similar manner to mobile phone contracts or the commonly referred to “Netflix” platform.

To deliver seamless, customer-oriented, and modally-integrated mobility services, the following functions are typically required, underpinned through digital integration using aggregation platforms;

- A shift towards Account Based Travel where customer needs can be matched to corresponding services
- Complete, accurate and timely reference data and information, provided to customers in an easily consumable/interpretable manner to enable effective decisions to be made
- Relevant services (i.e. mobility services operations / modes)
- Relevant products (e.g. fares / tickets) which may include “best price” capping and dynamic pricing
- Seamless, integrated customer identification and authentication
- Seamless, integrated payments
- Seamless, integrated interchange between modes of transport and/or services
- Proactive and relevant delay, disruption and dispute management processes to mitigate/reduce the impact to travellers
- Knowledgeable and efficient customer services and support capabilities for when things go wrong

It could be argued that a MaaS scheme could only be referred to as such if all of these components / functions are present; however these functions – or derivatives thereof – are already being delivered in isolation or through integrated smart travel schemes both in the UK (and around the world).<sup>2</sup> The extent to which all of these services are delivered together in an integrated package depends on both the nature of the mobility services being offered through the platform and demand from customers;

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<sup>2</sup> Examples include integrated and smart ticketing and payment schemes such as TfWM and TfN’s respective initiatives to emulate the success of Oyster and Contactless Payments in London, the recent announcement by the NTA in Dublin that the Leap card can now be used to access Car Club vehicles (in addition to already being able to be used to access Cycle Hire services), and the use of Google Transit Feed Specification (GTFS) interfaces to enable customers using Google Maps (and similar platforms) to undertake point to point journey planning and be provided with real time information).

however we are already seeing moves towards a more integrated package with examples including MaaS Global's Whim platform.

As the concept of MaaS matures and pilots start to be delivered, industry stakeholders are starting to consider how current MaaS schemes can be leveraged to deliver other capabilities and, therefore, how they might evolve. This includes if and how Transport Authorities can participate, direct or even regulate MaaS platforms and capabilities to deliver strategic objectives, opportunities for cross-regional schemes, and incorporation of ancillary services and products.

### **Why have MaaS schemes not become commonplace already?**

If many of the building blocks for MaaS already exist, why has it not developed more fully? We see this as being due to three principal reasons:

#### *Demand*

Regional Smart and Integrated Ticketing schemes typically cite agglomeration as a wider benefit however the majority of journeys (between 70% and 90%) are undertaken using the same route and modes on a daily basis by travellers<sup>3</sup>. Furthermore, whilst the National Travel Survey indicates that 69% of GB journeys are multimodal<sup>4</sup>, the majority of this comprises a combination of walking and private car for first and last mile (e.g. Park and Ride, parking at the train station), and a more conservative estimate is that 21% of journeys are genuinely multimodal (derived from the same study). Travel on a repeat basis using one mode reduces the need for complex integrated platforms.

Most trips are also completed within the same region (between 92% and 98%<sup>5</sup>). On the assumption that most customers need only one payment mechanism to complete their journey and are highly familiar with the schedule and services that they are using, this indicates that demand for integrated multi-modal, multi-operator schemes is currently underdeveloped.

This may change significantly with the advent of Autonomous Vehicles and a shift away from personal car ownership to subscription-based "on demand" models as discussed elsewhere in this evidence, given the requirement that this introduces for reservation and payment for the personal vehicle component of the journey. To this extent we believe that the use / adoption of MaaS, and associated availability of MaaS schemes, may see significant growth when Autonomous Vehicles are deployed.

#### *Commercial imperatives*

A number of commercial barriers exist in respect of multi-operator schemes, and especially so for multi-operator products. These include;

- Operators with existing, captive, customer bases being averse to entering into schemes which give their customers options to use competitor services. This especially applies to operators whose commercial models thrive on annual season ticket holders who require little engagement and support from the operator, however who may be increasingly relevant in

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<sup>3</sup> <https://www.sciencedirect.com/science/article/pii/S0965856415001433>

<sup>4</sup> <https://www.sciencedirect.com/science/article/pii/S0965856415001433>

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/457752/nts2014-01.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/457752/nts2014-01.pdf)

respect of subscriptions for automotive manufacturers<sup>6</sup> and ride hailing/sourcing services<sup>7</sup>. The extent to which these operators participate in MaaS schemes may be influenced by their potential loss of control (and revenue) from customers and / or their ability to lead on MaaS platform development themselves.

- Operators being disintermediated from their customers by MaaS scheme providers, who will assume primary customer engagement activities, thereby reducing the ability of the operators to generate ancillary revenue (e.g. through advertising and cross-selling).
- Concerns by operators, in respect of competitors being able to identify “in demand” routes and competing for these, as well as around commercial transparency.
- Funding of the MaaS scheme: Unless the MaaS scheme is the sole provider of ticket purchasing and fulfilment capability, it adds an additional processing layer – and associated costs – to payment for mobility services. In a subscription / package-based product set, the MaaS scheme may be able to self-fund from pricing packages so as to make an overall profit based on the consumption of services within the package (subject to there being sufficient variance in demand and a healthy proportion of under-utilisation of subscription packages). For Pay As You Go the MaaS provider will have to charge a commission for sale. Our informal conversations suggest that this may be as high as 10%; however it is highly unlikely that operators already operating with very low margins would be prepared to pay this high a commission rate for a product that they could retail themselves (our understanding is that a Licensed Travel Agent retailing tickets with 3% commission plus booking fees<sup>8</sup>).
- Allocation of liabilities in respect of both inability to collect payment from customers and over consumption of services (versus forecast) in unlimited travel models.

To attain maximum participation in MaaS schemes by operators so as to deliver a compelling customer proposition through coverage of services and products, “rules of the road” that support commercial equity and fair competition ought to be considered. Where vested interests exist (see below for more information) clear Codes of Practice or, going further, regulatory interventions may be required to address potential market and scheme failures.

#### *Governance imperatives*

Getting the right balance between the interests of customers and mobility services providers is paramount in MaaS schemes, as is delivering the MaaS scheme in such a way as not to disrupt or negate the achievement of local strategic public transport objectives (key for Transport Authorities). However, aligning the strategic objectives of the various stakeholders and participants (ranging from Authorities and Operators to Customers, Platform Providers and third party services providers) in MaaS schemes is difficult for the following reasons;

- Private sector MaaS platform providers ultimately need to be profitable. This means that they either need sufficient commissions on journeys sold and/or to make a profit on subscriptions.

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<sup>6</sup> <http://www.autonews.com/article/20171127/RETAIL/171129821/vehicle-subscription-services-expand>;  
<http://www.jdpower.com/cars/articles/automotion-blog/vehicle-subscription-services-emerge-new-car-ownership-model>

<sup>7</sup> <http://uk.businessinsider.com/lyft-is-testing-a-new-subscription-offering-2018-3>

<sup>8</sup> <https://www.atoctravelagents.org/licensing>

Platform providers will therefore favour / preference scheme participants and customers who can help them be profitable, this most likely being reflected in the journey options (mode / route / etc.) presented to customers in a less than optimal way<sup>9</sup>.

- Privately operated MaaS schemes that have emerged to date often have complex ownership and capital structures, potentially creating conflict of interest issues. This includes automotive manufacturers who have stakes in MaaS scheme providers. In the future where autonomous ULEV vehicles are anticipated to be a significant component of MaaS ecosystems, there is the potential for an automotive manufacturer to have a significant degree of influence on MaaS ecosystems and ability to preference the manufacturer's fleets above both other providers and other modes (including Public and Active Transport), to secure the largest share of customer wallets.
- Revenue streams (albeit limited) may be generated from customer use of cycle hire; however the same is not true of walking. Active Transport will likely be a key component – and encouraged within – public-sector operated MaaS schemes but we have less confidence of this being the case in private-sector schemes unless there is sufficient regulation or a contractual precedent to do so.
- Customer preference will generally trend towards the most personalised, most comfortable and least cost solution. As the cost of mobility in connected single occupancy road vehicles (autonomous or not) falls these are likely to increasingly become the preferred option for customers, thereby creating significant challenges for road-management authorities and operators in balancing demand and available capacity whilst keeping cities moving with a number of governmental and international bodies forecasting increased congestion as result in Vehicle Miles Travelled to fulfil demand<sup>101112</sup>.
- At present, in our experience, it can take between one and six months to model, agree, and publish a new multi-operator rail product through the rail industry processes due to the commercial negotiations required. In a MaaS scheme this needs to happen in a far more agile fashion to attract and retain customers.
- Authorities in the regions into which MaaS schemes are being delivered are looking at how to use said schemes to facilitate achievement of strategic policy objectives for transport (e.g. the London Mayor's Transport Strategy<sup>13</sup> for 15 minutes' active transport a day and 80% of all journeys to be completed using public and active transport modes). In some regions, authorities will already have regulatory powers to govern MaaS schemes but in others this is nascent or non-existent. Additionally, existing regulations (e.g., for private hire vehicles) may not be suitable for a MaaS environment.
- We see the significant opportunity (and therefore demand) for MaaS schemes arising from Transport Authorities assessing how they can better integrate public and private sector transport services in a holistic mobility ecosystem to facilitate achievement of their strategic policy objectives. Through delivery of each of the functional components listed above, and the

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<sup>9</sup> <http://orr.gov.uk/news-and-media/press-releases/2017/rail-regulator-calls-for-ticket-machine-price-guarantee>

<sup>10</sup> <http://www.eltis.org/discover/news/autonomous-vehicles-risk-increasing-congestion-cities>

<sup>11</sup> <http://uk.businessinsider.com/self-driving-cars-traffic-congestion-2017-6>

<sup>12</sup> <https://www.ptua.org.au/myths/robotcar/>

<sup>13</sup> <https://tfl.gov.uk/corporate/about-tfl/how-we-work/planning-for-the-future/the-mayors-transport-strategy>

establishment of appropriate commercial and regulatory frameworks, we see MaaS as an enabler of optimised management of mobility ecosystems to achieve policy objectives. The predominant challenge, however, is the capacity and capability of the various (and numerous) transport authorities across the UK to govern and direct the establishment of successful MaaS schemes in the region. Whilst a handful of authorities have some resources to dedicate to this agenda, the majority don't. There is therefore an explicit and urgent need for the Department for Transport to identify where most benefit can be derived from integrated mobility platforms such as MaaS, to determine where market failures may prevent this from happening, to identify what (if any) regulatory framework may be required to enable effective direction and governance by local authorities of the development / implementation of such schemes, and to provide tools and guidance required to assure a consistent and educated approach across the country.

### *Data and Technology Standards*

- To date no formal standards have been determined at a national level for technology interoperability, data integration and data sharing to facilitate MaaS adoption. Initiatives are underway within the industry (e.g. to develop the ITxPT standard for fare system technology integration and interoperability) and default standards emerging (e.g. the Google Transit Feed Specification (GTFS)) but these are not mandated and, like the ITSO standard of ticketing, are interpreted differently across operators and schemes. Whilst initiatives such as the open data requirements in the recent Bus Bill and the Department's intention to develop a central data platform are welcomed<sup>14</sup>, more work is required to agree a national (preferably, international) standard. This should also take account of the applicability of the General Data Protection Regulation (GDPR) to the MaaS schemes.

### **How will possible MaaS schemes evolve?**

We see four likely evolution models for MaaS schemes as follows:

- i) Market entry by disruptive innovators such as MaaS Global with their own platforms (e.g. Whim) likely focused on securing maximum sales revenues of products sold through the platform – especially subscriptions.
- ii) Market entry by existing operators of mobility services (e.g. Go Ahead, Uber, etc.) – potentially working with Original Equipment Manufacturers (OEMs) already operating in the market – both Automotive (e.g. Ford) and Transport Infrastructure (e.g. Siemens, Alstom, Thales) – likely focused on securing maximum patronage of their services and sell on of additional services to generate ancillary revenues. A very recent example of this is Uber's announcements in respect of both their partnership with Masabi to advertise and

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/585244/the-bus-services-bill-open-data-and-registration.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/585244/the-bus-services-bill-open-data-and-registration.pdf)



- retail Public Transport tickets through the Uber app<sup>15</sup>, and their wider ambitions to operate and/or provide access to a full range of mobility services<sup>16</sup>.
- iii) Growth and extension of existing smart and integrated travel schemes (e.g. Oyster and Contactless Payments in London) - which may be authority- or operator-provided – focused on leveraging the existing customer base and trusted payment mechanisms.
  - iv) Local Transport Authorities and bodies developing their own platforms (which might only be at the data layer similar to Wiener Linien’s public and private operator integration platform<sup>17</sup>, or to also provide a customer portal) - focused on delivering / effecting policy to achieve transport objectives through controlling and/or regulating demand and supply.

We have already seen initiatives and pilots emerging under each model and we believe that we will have a mixed delivery model well into the future, given that the different types of regional ecosystem present different challenges, thereby creating opportunities and needs for the different models (discussed further in KPMG’s MaaS Requirements Index<sup>18</sup>).

From a transport policy perspective, we believe that growth of MaaS could happen via any route, but that proactivity by local, regional and national government is to be encouraged to ensure that market failures do not prevent the anticipated social and economic benefits from being delivered. A few suggestions are as follows:

- Ensuring that Smart & Integrated Ticketing schemes have a clear roadmap as to how they will evolve and mature to provide the basis for MaaS or to be able to participate in MaaS initiatives / schemes, and evidencing how they will not create “lock in” to legacy technologies and mobility products which cannot be integrated.
- Developing guidance for local, regional and sub-national transport bodies on how to evaluate which MaaS operating model (e.g. Authority Delivered vs. Private Sector Delivered) is most appropriate based on their local mobility ecosystem and challenges in achieving local policy objectives, and typical roadmaps for designing and implementing MaaS schemes (e.g. when and how to participate in third-party developed/operated schemes vs. how to engage the market in Authority developed/operated schemes).
- Developing guidance to enable operation of MaaS schemes nationally – a potential challenge here is the wide variety of regulations locally in respect of some modes within MaaS schemes (e.g., private hire) alongside a significant lack of regulation of other modes (bikes)
- Developing/supporting the development of a national (or preferably, international) standard for data sharing and technology integration for the individual components of MaaS and the aggregation platform itself.

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<sup>15</sup> [https://blog-masabi-com.cdn.ampproject.org/c/blog.masabi.com/blog/masabi-and-uber-announce-first-of-its-kind-ride-sharing-and-public-transit-ticketing-partnership?hs\\_amp=true](https://blog-masabi-com.cdn.ampproject.org/c/blog.masabi.com/blog/masabi-and-uber-announce-first-of-its-kind-ride-sharing-and-public-transit-ticketing-partnership?hs_amp=true)

<sup>16</sup> <https://www.theverge-com.cdn.ampproject.org/c/s/www.theverge.com/platform/amp/2018/4/11/17220408/uber-jump-getaround-masabi-cities-data>

<sup>17</sup> <http://www.uitp.org/The-Mobility-as-a-Service-MaaS-success-story-WienMobil>

<sup>18</sup> <https://home.kpmg.com/uk/en/home/insights/2017/08/reimagine-places-mobility-as-a-service.html>

- Consideration of structuring and funding of MaaS models to ensure that an appropriate balance is reflected between private sector interests and wider competitiveness / access to customers as well as return on investment in public transport assets

### **How will CAV impact on the potential for the development of MaaS services?**

The Secretary of State has set a target of 2021 for driverless cars to be on UK roads. This timeframe is certainly challenging. Yet there are a wide range of car manufacturers and technology businesses, primarily in the United States, that have forecast they will have driverless vehicles on public roads by 2021. The majority of these businesses intend to use these vehicles initially to provide mobility on demand (MOD) services (“robo-taxis”) to the public, with a view to having autonomous vehicles available for sale to the public a few years later. The businesses developing MOD services and likely to launch AVs for these services include Waymo (currently trialling fully driverless vehicles with passengers in Phoenix, Arizona), General Motors (Cruise), Ford, and a UK based business, FiveAI, which is working with TfL and is aiming to begin pilots in London during 2019.

From 2021 onwards, we expect robo-taxis to begin operating in some UK cities, confined to small areas at first, but gradually expanding the area within which they are allowed to operate. We believe that these robo-taxi services that could be the catalyst for MaaS services to expand significantly in the UK.

This is because robo-taxi services are forecast to be significantly cheaper than existing taxi services – we estimate a potential 40% reduction in cost per mile travelled using a robo-taxi compared to a conventional taxi – due to a combination of the removal of a driver, longer vehicle lives, and the potential scale of these businesses.

We believe this reduction in cost is likely to lead people (particularly in urban areas) to increasingly use robo-taxis instead of owning a car, thereby replacing at least the second household vehicle and possibly all household vehicles. We also anticipate that these services could replace traditional bus services in some areas, and may also enable individuals who are currently poorly served by transport (e.g., those living in remote areas) to make additional journeys. Finally, there is some evidence to suggest that individuals are likely to prefer a point-to-point single mode journey if one is readily available at an acceptable price.

However, without some intervention by local transport authorities, this could lead to an increase in congestion and reduction in the use of public transport and walking / cycling for parts of journeys. We anticipate various forms of nudging and incentivisation will be necessary (early) to ensure that this market develops in a way which meets overall public policy objectives. In particular, given the likely continuing importance of the car as a mode of transport, the manner in which robo-taxis are included in the mobility ecosystem (and more formally in MaaS) will be critical. At a minimum, this could include data sharing provisions, a requirement on robo-taxi services to show all journey options, influencing the pricing of robo-taxis, or more interventionist approaches. It will also require a new type of collaboration between public and private sector entities.

In this respect, ensuring that robo-taxi options are part of a MaaS scheme will be critical to the uptake of MaaS and the introduction of AVs into UK cities could drive a significant increase in the use of MaaS platforms by members of the public.

Although it is commonly believed that most robo-taxis will be electric vehicles (which are particularly suited to relatively short journeys in urban environments subject to sufficient charging infrastructure being available), we do not see EV as having a significant impact in the development of MaaS services in the same way we think autonomy will.

### **Section 3 – What are the risks of MaaS services from a transport policy perspective?**

The public and private sectors will have specific aims in relation to MaaS provision which are important to understand when designing MaaS services. The public sector's MaaS goals will tend to be centred on achieving transport policy objectives in areas such as an increased use of public transport, improving air quality, and reducing congestion. Commercial operators are likely to seek to maximise their long-term financial returns, and MaaS can help them do that if it generates additional (profitable) demand for their services.

In August 2017, KPMG released the MaaS Requirements Index Report (attached as an appendix) to help public authorities gain a deeper understanding of their platforms and where risks and opportunities lie with MaaS. It sets out three MaaS models – an Open MaaS Market Model, a Lightly Regulated MaaS Market Model and an Interventionist (from a public sector perspective) MaaS Market Model.

Very broadly, the more complex the mode and choice mix an area's transport services are, and the more congested the area's roads and crowded its public transport services are, the more likely it is that an area would benefit most from an Interventionist MaaS Market Model. In the UK, London is the most obvious example of a city that would most likely need an Interventionist MaaS Market Model, with TfL acting as the regulator.

Without an Interventionist MaaS Market Model in a city like London, there is a considerable risk that the emergence of MaaS would hinder a city's ability to meet its wider transport goals. As described in Section 2, the emergence of robo-taxis could provide a significant launch-pad for MaaS services. If our analysis that robo-taxis will be 40% cheaper than conventional taxis is correct, then without regulation, that will lead to a spike in demand for such services that is likely to both increase congestion and reduce the use of public transport.

According to DfT data, the number of private hire vehicles in London increased from 50,000 in 2013 to almost 90,000 in 2017 – this increase is widely attributed to the introduction of Uber services in London in the summer of 2012. Alongside this increase in private hire vehicles TfL figures suggest that bus journeys in London have decreased from 2.4bn in 2014 to 2.25bn in 2017. Although there are other factors that are affecting bus patronage in London, most observers believe that the rise in the use of private hire vehicles (led by Uber) has directly impacted on the use of buses for two reasons: first, because they provide an affordable alternative for some people to bus travel around the city; and second, because its proliferation increases congestion, thereby slowing bus speeds and making them less attractive as a mode of transport.

A private hire service 40% cheaper than existing services is only likely to exacerbate that problem. Therefore for major cities like London, it will be vital that local transport authorities have the ability to regulate robo-taxi providers to ensure that core public transport objectives can be met. One means

of achieving this could be to limit the number of robo-taxi licences granted. Another means of achieving this may be for the public transport authority to require robo-taxi operators to operate via a MaaS platform.

In more rural areas with relatively limited public transport provision, MaaS services could give a significant boost to public transport – robo-taxis, or shared forms of autonomous transport could become a cost effective means of helping people who are isolated get from their homes to local transport hubs in a way that is not possible currently. For local authorities in these sorts of areas, it is less likely that they will need to heavily regulate MaaS services, although support will be needed to engage the private sector effectively and ensure best practice is readily available to all authorities.

There is also a significant risk that smaller operators are treated in a fair manner commercially as detailed in Section 2.3. Under a MaaS scheme, if consumers are able to buy fixed price mobility packages, the demand risks of such packages need to be shared fairly, and held at least in part by the MaaS scheme provider (which in an Interventionist Model is likely to be the local transport authority). There is a risk that smaller operators (ie a provider of 1<sup>st</sup> mile / last mile services to a particular suburb) are forced to accept too much demand risk, to the benefit of larger players in the MaaSecosystem.

#### **Section 4 - What are the broader public policy implications of MaaS**

From a broader public policy perspective, there are social policy implications associated with MaaS which local transport authorities will need to consider.

- There are social considerations around how to ensure the future mobility world does not entrench inequalities. As set out in Section 3, there is a danger that MaaS services will lead to declining bus use, which could eventually lead to a reduction in bus services. This is likely to impact on the poorest members of society the hardest. Similarly, many modern transport services are booked via apps on smartphones – yet approximately 1/4<sup>19</sup> of UK residents do not own a smartphone – it is vital that access to MaaS services is not limited to those who can afford smartphones. Public authorities will need to continue consider how to provide concessionary transport for society's least well off under a MaaS system, or consider means of digitally enabling every user of local transport services.
- Many public authorities are seeking to encourage “active travel” – people walking and cycling. There is a risk that MaaS services / AV reduce the price of certain modes of travel to the point where people stop walking and cycling.
- There are entire sectors which are susceptible to the disruption caused by MaaS. For example, many professional drivers in freight, taxi and public transport are at risk of being replaced by autonomous technology. KPMG is supporting a study by a student at Harvard's Kennedy School on potential job losses in the trucking and taxi markets and opportunities for new employment in the automotive and supply chain industries. This raises further questions on re-training and how to encourage mobility businesses to invest in the areas where they are operating and create new jobs. Attention to this could form part of Local Industrial Strategies under development.

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<sup>19</sup> [https://www.ofcom.org.uk/\\_\\_data/assets/pdf\\_file/0023/105926/Fast-facts.PDF](https://www.ofcom.org.uk/__data/assets/pdf_file/0023/105926/Fast-facts.PDF)

- MaaS has implications for government revenues as well. Fuel Duty, levied on vehicles with internal combustion engines is expected to raise £28bn in 2018/19 by the OBR. The Government does not place this levy on Electric Vehicles. It is expected that as MaaS platforms develop over the next few years, they will be at the forefront of the switch to electric vehicles. If MaaS does cause significant numbers of people to switch from car ownership to a Mobility Service Package, the amounts levied by the Government via Fuel Duty will fall quickly over the next decade.

#### **Section 4 – What are the key things that Government should do to promote the growth of MaaS?**

There are several areas we think Government should consider in this Parliament;

- Review the regulatory framework of local transport authorities. At the moment, local transport authorities have limited ability to regulate the number of private hire vehicles which operate in their areas. Additionally, different authorities interpret the regulatory framework in different ways, leading to significant additional complexity for operators. Guidance on key points of interpretation would be useful.
- The data generated by MaaS systems will present another unique set of policy challenges. Government should quickly mandate the use of an open data protocol – e.g. use of GTFS (Google Transit Feed Specification)-style data architectures / working with UITP to extend ITxPT (device to device data standards for transport technology architectures) data standards for all MaaS schemes.
- Consider what would be required to establish a MaaS procurement framework – i.e. a document which would set out how MaaS services would be regulated and would establish the obligations of MaaS providers in areas such as data sharing or commercial provisions. This would save local transport authorities considerable resource and give some consistency to private sector operators seeking to provide MaaS services. This could include guidelines, toolkits and commercial support.
- Review a live MaaS scheme to understand the basis of the commercial model and assess whether guidelines are needed to ensure equity, a competitive landscape and better understand regulatory needs.
- Identify the commercial and technical skills that will be required within local government and transport authorities to plan for and manage future mobility schemes and establish a grant scheme to support local authorities in investing in these skills.
- Consider the key barriers to how a MaaS scheme might operate nationwide, or how different MaaS schemes may connect to each other and develop principles to enable seamless collaboration.
- Consider a workable MaaS business model for smaller urban / rural areas and develop a proposal which would engage MaaS providers in exploring the potential in these areas.
- Work with local authorities to investigate the changes that would need to be made to local infrastructure to facilitate robo-taxis on their streets. This should include reviewing the quality and consistency of road sign and lane markings and ensuring that robo-taxi providers are aware of protocols for events which change standard road layouts (such as roadworks). Local authorities should be encouraged to work with Highways England, who are currently

reviewing the changes they may need to make to the Strategic Road Network to facilitate the use of autonomous vehicles.

- DCMS should work with local transport authorities to investigate how the required connectivity infrastructure can be installed in cities to facilitate AV connectivity and MaaS systems where every transport option available is fully connected to a Network Control Centre meaning customers have live information on every possible transport option available.

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